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A video game to learn ancient Greek: an exploratory case study on learners' perceptions of an inclusive Digital Game-Based Learning environment for the ancient Greek language

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Abstracts

Eng.

This dissertation focuses on the investigation of *Digital Game-Based Learning* (DGBL) – a digital ludic pedagogy – for ancient Greek language instruction. The approach is complemented by an educationally inclusive implementation for learners with Special Learning Difficulties (SpLD) through the guidelines of the *Universal Design for Learning* (UDL) didactical framework. Thus, this study qualitatively explores whether a didactical video game can be perceived as motivating in learning the ancient Greek language and useful in learning its vocabulary. To address the research questions, the researcher developed an online, inclusive DGBL environment, *The Mystery of Pella*, for beginners of the ancient Greek language. The DGBL environment was implemented on the OpenILIAS platform of the University of Göttingen. With this didactical video game, she investigated the research questions through: 1) a general online survey with a large international sample; and 2) a pre-quasi-experiment and a quasi-experiment with a small sample consisting of two classes of first-year ancient Greek learners aged 12-17 in England.

Findings highlight the positive potential of DGBL for maintaining and increasing intrinsic motivation, vocabulary retention, and meaning inference of unknown words, as well as guaranteeing general educational inclusion in ancient Greek instruction. While limitations and difficulties in terms of didactical implementation and investigation were observed, the project nonetheless highlighted the didactical potential of DGBL, as well as the necessity for further research in this still vastly underexplored field for ancient Greek instruction.

Deu.

Im Mittelpunkt der vorliegenden Dissertation steht der digitale spielerische Ansatz *Digital Game-Based Learning* (DGBL) für den Sprachunterricht des Altgriechischen. Dieser Ansatz wurde mit den Leitlinien des didaktischen Rahmens *Universal Design for Learning* (UDL) gekoppelt, um die didaktische Inklusion von Schüler:innen mit Lernschwierigkeiten zu garantieren. Die Dissertation setzt sich qualitativ mit den Forschungsfragen auseinander, ob ein didaktisches Videospiel als motivierend zum Erlernen der griechischen Sprache und hilfreich für den Wortschatzerwerb dieser wahrgenommen werden kann. Um die Forschungsfragen zu beantworten, wurde eine inklusive DGBL Onlineumgebung, namens *The Mystery of Pella*, auf der OpenILIAS Plattform der Universität Göttingen entwickelt: Die Umgebung wurde für Lernanfänger:innen konzipiert. Anhand dieses didaktischen Videospiele wurden die Forschungsfragen durch 1) einen online Survey mit einer größeren internationalen Stichprobe, und 2) ein Prä-Quasi-Experiment und ein Quasi-Experiment mit einer kleiner Stichprobe von zwei Schulklassen mit Lernanfänger:innen zwischen 12 und 17 Jahren in England, untersucht. Trotz einiger Limitationen und Schwierigkeiten auf Ebenen der didaktischen Implementierung und der Untersuchung führt diese Dissertation eine erste qualitative Analyse des DGBL für den Sprachunterricht des Altgriechischen durch und hebt sowohl das didaktische Potenzial dieses Ansatzes als auch den Bedarf an weiterer Forschung in diesem noch unzureichend untersuchten Gebiet für diesen Fachbereich hervor.

Ita.

La tesi si concentra sull'indagine del *Digital Game-Based Learning* (DGBL) – un approccio didattico ludico e digitale – per l'apprendimento della lingua greca antica. L'approccio è stato abbinato a un'implementazione focalizzata sull'inclusione didattica di soggetti con disturbi specifici dell'apprendimento (DSA). L'inclusione è stata quindi messa in atto tramite le linee guida del *framework* didattico *Universal Design for Learning* (UDL). La presente ricerca indaga qualitativamente se un videogioco didattico possa essere percepito come motivante nello studio della lingua greca e utile per l'apprendimento del suo lessico. Ai fini dell'indagine è stato creato sulla piattaforma digitale *OpenILLIAS* dell'Università di Gottinga un ambiente didattico inclusivo basato sul DGBL, chiamato *The Mystery of Pella*. Questo video gioco didattico è rivolto a giovani principianti britannici che desiderano apprendere la lingua greca. Tramite questo strumento le domande di ricerca sono state indagate attraverso: 1) una *survey* online con un campione internazionale di partecipanti; 2) un pre-quasi-esperimento e un quasi-esperimento con un piccolo campione di due classi di principianti tra i 12 e i 17 anni in Inghilterra.

I risultati dell'indagine mostrano un chiaro potenziale didattico del DGBL non solo per la motivazione intrinseca e la memorizzazione del lessico ma anche per l'inferenza semantica di parole sconosciute, ed infine per l'inclusione didattica nell'insegnamento della lingua greca. Nonostante i limiti e le difficoltà riscontrati nell'implementazione didattica e nell'indagine di alcuni aspetti, la presente tesi conduce una prima analisi qualitativa del DGBL, un campo didattico potenzialmente interessante, ma ancora ampiamente inesplorato per quanto concerne l'insegnamento della lingua greca.

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ΔΗΙΑΝΕΙΡΑ

ὦ Ζεῦ, τὸν Οἴτης ἄτομον ὃς λειμῶν' ἔχεις,
ἔδωκας ἡμῖν ἀλλὰ σὺν χρόνῳ χαράν.

O Zeus, owner of the unmown meadow of Oeta,
you have given us joy although after some time.

(Soph. *Trachiniae*, 200-201)

Chapter 1

The theoretical foundations of the project

μη τοίνυν βία [...] τοὺς παῖδας
ἐν τοῖς μαθήμασιν ἀλλὰ παίζοντας τρέφε,
ἵνα καὶ μᾶλλον οἷός τ' ἦς καθορᾶν ἐφ' ὃ ἕκαστος πέφυκεν.
(Plat. *Republic*, 7.536e-537a)

1. Introduction

During their interviews, two research experiment participants commented: “I think it [i.e. the game] would help people recall a lot more of the information they learned because they were so engaged, even if they don’t *notice* it’s happening currently,” and “[I would play the game because of] [...] the fact that it’s probably also helping me with the um - - helping me with learning and it’s something I’m doing that’s fun. So, I think it’s the fun that’s the incentive?”

Interestingly, the idea of keeping learners engaged in a subject and of aiding their learning process through playing can already be found in Plato. In the *Republic* (7.536e-537a), the philosopher affirms that “nothing that is learned under compulsion stays with the mind”¹ and that therefore one should not “keep children to their studies by compulsion but by play. That will also better enable you to discern the natural capacities of each.”²

Plato’s words concisely capture many aspects that shaped this dissertation, namely the importance of learning motivation, the potential value of playing as a didactical tool, and the idea that a playing setting can be an environment for personal discovery. With these ideas in mind, the following study focuses on the investigation of a digital ludic pedagogy (Digital Game-Based Learning) to learn the ancient Greek language and on the inclusion of learners with Special Learning Difficulties (SpLD). This second focus has been chosen due to the

¹ 7.536e: ψυχῇ δὲ βίαιον οὐδὲν ἔμμονον μάθημα. Plato, *Republic*, trans. Paul Shorey, Plato in twelve volumes vols. 5-6 (Harvard University Press and William Heinemann, 1935), 216–17.

² 7.536e-537a: Μὴ τοίνυν βία, εἶπον, ὃ ἄριστε, τοὺς παῖδας ἐν τοῖς μαθήμασιν ἀλλὰ παίζοντας τρέφε, ἵνα καὶ μᾶλλον οἷός τ' ἦς καθορᾶν ἐφ' ὃ ἕκαστος πέφυκεν. Plato, *Republic*, 216–17.

increasing number of learners with Special Educational Needs (SEN) in the UK³ and the absence of numbers regarding ancient Greek learners with SEN. However, in order to understand why these foci are important for and relevant to the current issues in ancient Greek didactics, a preamble is due.

Commercial video games have an unprecedented global reach, generating an estimated \$184.4 billion in revenue in 2022.⁴ Due to this global phenomenon, researchers have been investigating the potentiality of this media as a venue for fostering education for the last few decades.⁵ Among other names, this research field is called *Digital Game-Based Learning* (DGBL) – a name popularized by *inter alios* Mark Prensky.⁶ Over the last few decades, studies have focused on different themes connected to video games and education (e.g., engagement, motivation, learning effectiveness, etc.) and also on different subjects (e.g., mathematics, history, modern languages, computer science, etc.).⁷ At the same time, the number of publications on this topic continues to grow steadily.⁸

However, in spite of this increasing generalized interest and the fact that many popular video games are about Classics (or inspired by Classics),⁹ ancient Greek pedagogical research has paid little attention to the field of ludic pedagogy and no attention at all to *digital* ludic pedagogy to teach the ancient Greek language, leaving this research field still vastly unexplored. Nevertheless, playing is a fundamental part of children’s and adolescents’ development and learning processes: through playing, children learn “to experiment and explore, and playful activities provide a secure setting for testing the consequences of many alternative scenarios, in order to develop a rich and flexible behavioural, social and emotional repertoire. As such, play is a natural tool for children to develop resilience, by learning to cooperate, overcome

³ Department for Education, *Special Educational Needs in England: Academic Year 2024/25*, published June 12, 2025, updated October 2, 2025, <https://explore-education-statistics.service.gov.uk/find-statistics/special-educational-needs-in-england/2024-25>.

⁴ Krishan Arora, “The Gaming Industry: A Behemoth with Unprecedented Global Reach,” *Forbes*, November 17, 2023, <https://www.forbes.com/councils/forbesagencycouncil/2023/11/17/the-gaming-industry-a-behemoth-with-unprecedented-global-reach/>.

⁵ Wiwit Ratnasari et al., “Exploring the Research Trajectory of Digital Game-Based Learning: A Citation Network Analysis,” *Journal of Educational Technology & Society* 26, no. 01 (2023): 45.

⁶ Marc Prensky, *Digital Game-Based Learning* (McGraw-Hill, 2001).

⁷ Ratnasari et al., “Exploring the Research Trajectory of Digital Game-Based Learning: A Citation Network Analysis,” 45.

⁸ Ratnasari et al., “Exploring the Research Trajectory of Digital Game-Based Learning: A Citation Network Analysis,” 49.

⁹ Christian Rollinger, *Classical Antiquity in Video Games. Playing with the Ancient World*, *Imagines: Classical Receptions in the Visual and Performing Arts* (Bloomsbury Academic, 2020); Ross Clare, *Ancient Greece and Rome in Videogames: Representation, Play, Transmedia*, *Imagines: Classical Receptions in the Visual and Performing Arts* (Bloomsbury Academic, 2021); Jane Draycott and Kate Cook, eds., *Women in Classical Video Games*, *Imagines: Classical Receptions in the Visual and Performing Arts* (Bloomsbury Academic, 2022).

challenges and negotiate with others.”¹⁰ If play already offers children opportunities for emotional, social, and personal learning, why not then investigate whether it can also be used to teach ancient Greek and to motivate learners? Due to a lack of research in the field, as well as a recognition of the importance of playing in the learning process, this study conducts a preliminary qualitative investigation of this field as “it is crucial that Classics continues to assert its place within this emerging use of interactive technology for pedagogic purposes.”¹¹

One may ask: if ancient Greek has been taught for millennia via traditional methods, why investigate video games to teach this subject? How can video games, typically considered entertainment sources, be relevant when their formats are so different than the literary sources through which ancient Greek is usually taught? The answer is actually quite straightforward and for this study is comprised of three interconnected words: *motivation*, *inclusion*, and *alternative*.

Let’s start with the first word: *motivation*. Going back to Plato’s quote, the Greek philosopher already noticed that learners cannot be *forced* to learn, as what is learnt under compulsion will easily be forgotten.¹² The most efficient “ingredient” that opens the doors to the possibility of metabolizing learnt material is motivation: one could almost say that without motivation learning cannot happen, as the former represents the necessary fuel to ignite the learning-motor.¹³ The debate over justifying the continued study of ancient Greek is age-old:¹⁴ why should one ever waste time learning this “awful language” (it. *linguaccia*),¹⁵ which is perceived as difficult, anxiety-inducing and useless?¹⁶ As Pasquali provocatively wrote, the only ones that embark on this Herculean task and *really* learn this language are those who will become future Greek teachers, while the others will forget even the alphabet (or at least the capital letters) as soon as the school ends.¹⁷

¹⁰ Sanne L. Nijhof et al., “Healthy Play, Better Coping: The Importance of Play for the Development of Children in Health and Disease,” *Neuroscience & Biobehavioral Reviews* 95 (2018): 422, <https://doi.org/10.1016/j.neubiorev.2018.09.024>.

¹¹ James Robson and Emma-Jayne Graham, “Classics Online at the Open University: Teaching and Learning with Interactive Resources,” in *Forward with Classics: Classical Languages in Schools and Communities*, ed. Arlene Holmes-Henderson, Steven Hunt, and Mai Musié (Bloomsbury Academic, 2018), 228.

¹² 7.536e: ψυχῆ δὲ βίαιον οὐδὲν ἔμμονον μάθημα. Plato, *Republic*, 216–17.

¹³ Andrea Villarini, *Didattica delle lingue straniere* (il Mulino, 2021), 142.

¹⁴ Camillo Neri, “Riflessioni inattuali su quella «linguaccia»,” in *A scuola di greco: temi e prospettive*, ed. Adele Teresa Cozzoli et al. (Urbino University Press, 2024).

¹⁵ Giorgio Pasquali, *Pagine Stravaganti*, vol.1, Biblioteca Sansoni (Sansoni, 1968), 159.

¹⁶ Guido Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne. Convergenze e illusioni,” in *Lingue antiche e moderne dai licei alle università*, ed. Renato Oniga and Ugo Cardinale (il Mulino, 2012), 68; Neri, “Riflessioni inattuali su quella «linguaccia»,” 57–58.

¹⁷ “Quei pochi che hanno buona voglia e l’imparano per davvero, studiano poi per lo più lettere e divengono alla loro volta professori di greco, tanto più valorosi quanti più sforzi hanno dovuto fare per impadronirsi di questa

Pasquali's quote begs the question: what does "really learning ancient Greek" actually mean? From this research's perspective – and the decreasing numbers of learners worldwide seems to corroborate it – really learning ancient Greek cannot mean (only) learning the grammar and vocabulary by heart and being able to read ancient Greek texts. Some people (fortunately) will still learn grammar and vocabulary by heart, and they will probably become Greek teachers, as Pasquali wrote, but what about the others, who forget the alphabet as soon as they can? How can one prevent them from abandoning and forgetting this language at the first available opportunity? The answer is, once again, *motivation*.

One could offer as many reasons as possible to why one should learn ancient Greek – as also the researcher will partially try to do in the following section. However, at least from this research's perspective, the answer to "why learn ancient Greek" truly and mostly depends on a single major factor: the individual looking at and interacting with ancient Greek. Individual intrinsic motivation can be aided and facilitated, and the role of teachers, themes, methods, available resources and other numerous variables play a pivotal role in achieving this goal. Therefore, it is clear that a one-size-fits-all solution does not exist: offering possible theoretical explanations on why one should learn ancient Greek may resonate with and help some people find motivation, but not everyone, leaving the dilemma unsolved. Here is where the other two aforementioned words come into play, namely inclusion and pedagogical alternative.

The word *inclusion* is here intended not only as meaning the educational inclusion of learners with SpLD, which still represents a main focus of this research, but also as *latu sensu* inclusion of (various) learners' potential motivations, curiosity, interests, and characteristics. This means that, although it is clear that playing does not appeal to everyone and that it would be naïve to think so, playing can still engage and attract some learners. This nevertheless represents an important pedagogical goal, especially for a subject like ancient Greek that is losing learners worldwide almost every day, as shown in the following section. Thus, through playing some learners can find *a* motivation to start or keep learning this "awful language." That is why DGBL in this study is presented as a *pedagogical alternative* or a *complementary pedagogical resource* rather than a substitute for traditional in-presence methods. DGBL here does not represent a harbinger for some hypothetical future dystopian vision of education as a completely online reality: the pandemic already showed the world the tragic consequences of purely online

linguaccia; e così il circolo è chiuso. Gli altri, superata la maturità, si affrettano a dimenticare persino l'alfabeto (o almeno le maiuscole)." Pasquali, *Pagine Stravaganti*, 159.

education, due to the interruption of human contact and relationships.¹⁸ Hence, investigating DGBL works towards the goal of “building on tried and tested forms of teaching as well as existing pedagogical methods and theory to enhance what we already offer and to reach a wider range of students, and potential students, with varying learning needs and styles.”¹⁹

As a “magic wand” solution to solve the motivational problems in ancient Greek instruction does not exist, what one can do is offer pedagogical alternatives, *other ways* to let learners discover the ancient Greek world and discover themselves and their learning motivations through the ancient Greek language. To conclude this preamble, it seems therefore that “really learning the language,” to quote Pasquali, is surely comprised of understanding the language mechanisms and having a solid language knowledge. However, this is not *all* that learning ancient Greek actually means: mastering vocabulary or grammar does not assure for all learners the most pivotal aspect. For many, what is more important is the discovery of a passion for the subject, which cultivates the desire to “stay with ancient Greek,” even after the school ends. Thus, from this research’s perspective, “really learning the language” means finding one’s personal motivation to cultivate an engagement with ancient Greek that is lifelong, and therefore not abandoning it just because one does not remember all the letters.

That is why, especially recently, with so few learners and the necessity of defending Greek courses from being cut from schools’ or universities’ budgets, it seems pivotal to teach ancient Greek by *fueling* different interests and curiosities, pushing one to keep trying and to stay, sometimes even in a *γλυκύπρικός* relationship with this subject, but *to still somehow engage with* this language. Thus, playing could represent this “*somehow*” for some: and if someone, ten years after the end of their Greek course, does not remember all meanings of the word *λόγος*, but still once in while *feels the desire* or the *curiosity* to open a Greek text, to read a bit of Greek (maybe consulting how the capital letters look like) and to *play* with this language, it can be considered a great win.

In light of this preamble, this research sets out to develop a qualitative understanding of DGBL as a means to teach the ancient Greek language (specifically vocabulary), to (potentially) influence the aforementioned intrinsic motivation, and to include learners with SpLD. Thus, the study will investigate: 1) whether and how DGBL, built upon a framework for inclusivity (UDL, see *infra*), influences intrinsic motivation; and 2) whether its components are perceived

¹⁸ Mark West, *An Ed-Tech Tragedy? Educational Technologies and School Closures in the Time of COVID-19*, ed. Kate Davidson and Rebecca Yaghmour (UNESCO, 2023).

¹⁹ Robson and Graham, “Classics Online at the Open University: Teaching and Learning with Interactive Resources,” 228.

as useful and/or motivating in general ancient Greek learning and more specifically in vocabulary learning, a fundamental and often “neglected” part of learning ancient Greek (see ¶ 2.1). In order to do so, the researcher developed an experimental DGBL tool to teach the ancient Greek language through which she conducted a pre-experiment and a main experiment in two British classes of ancient Greek beginners.

Thus, in the first chapter, the focus lies on the theoretical foundations of this research, therefore on ludic pedagogy and on inclusion, and on the description of the qualitative research questions. First, the discussion will focus on a general analysis of ancient Greek instruction and on some related aspects (i.e., didactical goals and motivation). At the same time, DGBL will be analyzed from a general theoretical perspective and also in relation to ancient Greek. Lastly, learning difficulties and pedagogical inclusion in ancient Greek instruction will be discussed from the perspective of Universal Design for Learning (UDL), a pedagogical framework for inclusion.

In the second chapter, an online survey (Survey A) will be discussed and the game design elements of a DGBL environment to learn ancient Greek will be investigated both in theory and in practice. This means that the single design components of DGBL (i.e., content and skills, narrative design, game and learning mechanics, visual aesthetic and sound designs, and incentive system and feedback) will be described according to the relevant literature and then according to this research’s tool.

In the first part of the last chapter, the researcher will focus on the research methodology and methods and specifically on the instruments she used to qualitatively investigate her research questions. Thus, she will describe them addressing ethics principles, reflexivity, validity and reliability. To conclude, in the last part of the final chapter, she will analyze the experiment and the collected results. Within this chapter, the limitations of this study will also be addressed, e.g., the sample size, available resources, etc. Throughout all three chapters, the researcher will reflect on didactical guidelines to develop a digital ludic environment for the ancient Greek language: in the first chapter, she will reflect on theoretical guidelines offered by previous literature on modern languages; the second chapter will analyze these theoretical guidelines and adapt them for the ancient Greek language; and lastly, in the third chapter, she will offer “practical” guidelines that stem from the previous sections, combined with her personal experience in developing the experiment tool.

2. Ancient Greek learning: why?

A recent analysis of the situation of Classics around the world showed that, in contrast to Latin, the study of ancient Greek is mostly disappearing at a school level, and in the future, may only be taught at the university level.²⁰ Shared problems worldwide seem to be the pressure of “justifying” the study of ancient Greek in the face of more “useful” fields such as STEM subjects, especially in relation to potential future job market prospects. Some countries highlighted the question of elitism or class differences, namely that learning ancient Greek (and Latin) is still associated with specific social groups or European oppression.²¹

Scientific literature shows that one of ancient Greek’s biggest problems as perceived in some European education systems (e.g., Italy, Greece, UK) seems to be the “lack of attractiveness and/or motivation” of ancient Greek.²² As mentioned, this subject is suffering from a low number of enrolled students and the number of available courses around the world is similarly unpromising. For example, in the American schools, the ancient Greek language is usually taught only in some units within Latin courses or as extra-curricular activity,²³ while in Argentina Greek remains available only in some institutions in the form of Greek literature (but not as a language that can be learnt).²⁴ In the UK, ancient Greek is mostly only taught in private

²⁰ Steven Hunt and John Bulwer, introduction to *Teaching Classics Worldwide: Successes, Challenges and Developments*, ed. Steven Hunt and John Bulwer (Bloomsbury Academic, 2025), 1.

²¹ Hunt and Bulwer, introduction, 2.

²² Franca Zanetti, “Aporie nella didattica delle lingue classiche nella scuola italiana,” in *Disegnare il futuro con intelligenza antica. L’insegnamento del latino e del greco antico in Italia e nel mondo*, ed. Ugo Cardinale (il Mulino, 2012), 406; Maria Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience (Part II),” *Journal of Classics Teaching* 21, no. 42 (2020): 19–30, <https://doi.org/10.1017/S2058631020000409>; Rowan Newland, “Closing the Gap: Understanding Two Year 10 Boys’ Difficulties with Comprehension of Latin Stories in a Mixed Comprehensive School,” *Journal of Classics Teaching* 17, no. 34 (2016): 22–30, <https://doi.org/10.1017/S2058631016000210>; Evelien Bracke, “Bringing Ancient Languages Into a Modern Classroom: Some Reflections,” *Journal of Classics Teaching* 16, no. 32 (2015): 35–39, <https://doi.org/10.1017/S2058631015000185>. For a problematization of these findings, see chapter 2 (§ 2-2.4).

²³ Teresa Ramsby, “United States of America,” in *Teaching Classics Worldwide: Successes, Challenges and Developments*, ed. Steven Hunt and John Bulwer (Bloomsbury Academic, 2025), 287.

²⁴ Álvaro Matías Moreno Leoni, Diego Alexander Olivera, and Natalia María Ruiz de los Llanos, “Argentina,” in *Teaching Classics Worldwide: Successes, Challenges and Developments*, ed. Steven Hunt and John Bulwer (Bloomsbury Academic, 2025): 307.

schools,²⁵ and in Germany in 2023/24 the number of learners was around ten thousand in comparison to 543.000 Latin learners.²⁶

Against this bleak backdrop, the Italian and Cypriot school systems remain two of the few that offer compulsory ancient Greek learning. Ancient Greek is still part of the curriculum at one type of high school in Italy, the *liceo classico*, and students typically study it for five years, with a total of 132 yearly teaching hours for the first two years and 99 hours for the last three.²⁷ In Cyprus, all secondary school students “have to attend 50 teaching hours of ancient Greek language for each of the three years of *gymnasium* and the first year of *lyceum*,”²⁸ while “for humanities majors, the ancient Greek language workload rises to 75 teaching hours during the second and third years of *lyceum*.”²⁹

Despite the decline in enrollment in ancient Greek courses in various educational systems, as noted in the previous section, the researcher will offer some compelling reasons justifying the continued focus on the study of this language.

First, it is important to remember that every kind of (formal) education is always partially or totally linguistic: this means that everything we learn usually has some kind of language as medium (e.g., one uses a language to teach and explain any subject, such as math, science etc.) or studies a language as the subject itself (e.g., English, French, ancient Greek, etc.).³⁰ In light of this strong interconnection between language and instruction, it is an overall educational goal to promote language education, i.e., the care and improvement of the language faculty, in each student.³¹ Language education means learning languages, learning *through* languages, learning

²⁵ Alex Imrie et al., “Ancient Languages in UK Schools: Current Realities and Future Possibilities,” *LSP*, December 3, 2024, <https://www.lspjournal.com/post/ancient-languages-in-uk-schools-current-realities-and-future-possibilities>; Aisha Khan-Evans, “UK: England,” in *Teaching Classics Worldwide: Successes, Challenges and Developments*, ed. Steven Hunt and John Bulwer (Bloomsbury Academic, 2025), 233; Ian Collen and Jayne Duff, “Language Trends England 2025,” *British Council*, June 2025, 21, <https://www.britishcouncil.org/path-to-report>. However, the introduction of a national linguistic qualification recognized by universities (the Intermediate Certificate in Classical Greek – ICCG) showed positive acceptance and interest at a general level, suggesting learners’ interest towards an official acknowledgment of acquired knowledge. It can be hypothesized that a similar interest is motivated by the desire of expendability of ancient Greek in academical and working environments. Claire Le Hur, “A New Classical Greek Qualification,” *Journal of Classics Teaching* 23, no. 45 (2022): 79–80.

²⁶ “Schüler Mit Fremdsprachen-Unterricht 2023/2024: Bundesländer, Schuljahr, Fremdsprachen, Schulart, Jahrgangsstufen,” *Statistisches Bundesamt (Destatis)*, updated October 26, 2025, <https://www-genesis.destatis.de/datenbank/online/statistic/21111/table/21111-0006>.

²⁷ Ministero dell’Istruzione, dell’Università e della Ricerca (MIUR), *Indicazioni nazionali riguardanti gli obiettivi specifici di apprendimento concernenti le attività e gli insegnamenti compresi nei piani degli studi previsti per i percorsi licei*, Decreto Ministeriale n. 211, October 7, 2010.

²⁸ Maria Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience,” *Journal of Classics Teaching* 21, no. 41 (2020): 42, <https://doi.org/10.1017/S2058631020000124>.

²⁹ Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience,” 42.

³⁰ Michele Daloso and Gruppo di Ricerca ELICom, eds., *Le difficoltà di apprendimento delle lingue a scuola. Strumenti per un’educazione linguistica efficace e inclusiva* (Erickson, 2023), 29.

³¹ Daloso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 29.

about languages and learning *how to learn* languages. From this research's point of view, ancient Greek study can be an excellent experience to navigate all four aspects of language education: thus, ancient Greek can be at the same time a way to learn a language, to learn through a language (e.g., philosophy, mathematics, poetry, science, etc.), to learn about languages (e.g., as it is a common etymological pool for European languages and some of its language mechanisms can be found in other modern languages) and to learn how to learn other languages. Therefore, it can be a rich practice field for developing language mastery.³²

Secondly, ancient Greek is a language that can provide a valuable lens through which one can understand diversity and appreciate different cultures: through its entire linguistic development, ancient Greek was always in contact with different cultures and these encounters are recorded through written texts (e.g., Herodotus, etc.). Thus, these testimonies could represent a reference point for an intercultural discussion.

In today's multicultural world, the ability to appreciate diversity is becoming increasingly important, and ancient Greek can thus play a role in fostering this skill. As Dionigi suggests, ancient Greek promotes the language of diversity, teaching us the culture of *et et* (i.e., of inclusion) rather than that of *aut aut* (i.e., of exclusion).³³ Therefore, by *critically* studying ancient Greek, students can gain insights into the value of diversity and the importance of cultural respect and understanding. Thus, ancient Greek can be perceived as more than "just a language:" it becomes a real practice field for training intercultural competence, which promotes a culture of inclusion and emphasizes the importance of understanding and appreciating different perspectives.

Intercultural competence is considered the ability that allows one to: 1) observe, decentralize and estrange oneself in order to get to know a new culture and its aspects without preconceptions or emotional filters; 2) learn to suspend judgement and ask for explicative feedback on not understood aspects of other cultures; 3) learn to relativize and to actively listen; and 4) learn to emotionally understand others both through empathy (i.e., participating on an emotional level) and through the ability to recognize one own's differences and others' as natural and obvious.³⁴

³² However, more recent studies note that systematic investigation into the effectiveness of ancient Greek learning for the general linguistic education seem to be lacking, highlighting a *desideratum* in future work.

³³ Ivano Dionigi, "Classici perché, Classici per chi," in *Nuove chiavi per insegnare il classico*, ed. Ugo Cardinale (UTET Università, 2008), 129.

³⁴ Paolo Emilio Balboni, "Didattica delle lingue in prospettiva interculturale," in *Orientarsi in rete. Didattica delle lingue e tecnologie digitali*, ed. Matteo La Grassa and Donatella Troncarelli (Becarelli, 2016), 34.

As Caon points out,³⁵ in today's language teaching agenda, intercultural education plays a very important role: it does not teach tolerance – an implicitly discriminatory attitude in which the one who tolerates is somehow superior to the person tolerated – but rather it promotes *interest* between the two entities (from Latin *inter-est*, “being between”). Thus, an intercultural education aims to contribute to a more equitable and inclusive world, and to more serene interpersonal relationships which are fundamental for our multicultural and interconnected πόλις.³⁶

A last insightful point of reflection is the following: generally, as Bettini observes,³⁷ in our modern society the idea that, to have the “right” to continue being taught, a subject needs to be useful for something else persists. For example, one could say: technological skills or informatics are useful because society has become more technological, therefore a similar subject *needs* to be taught.

Following this train of thought, in order to have the “right” to still be offered in schools, ancient Greek should (or must) be “useful” for something. Bettini, writing in Italian and describing the usefulness of school subjects, uses the verb *servire*, which can be translated in English both as “to be needed” and “to serve.” However, from an etymological point of view, the verb “to serve” stems from the conceptual core of the Latin word *servus* i.e., someone doing something not freely, but rather coercively. Therefore, if a subject can be taught only if it is useful for – therefore, if it “serves” – something else, the entire learning process becomes an asymmetrical relationship: someone or something “retains the power” and the other entity exists only according to the usefulness it can bring to the entity in command. However, Bettini observes that culture – and one can also say learning – is a “matter of patience” and not a search towards usefulness. While asking one's self “why is this subject useful” is a legitimate question,³⁸ it is important to note that the explicit goal of any subject matter is unlikely to be all that one takes away from their study. Rather, if one is sufficiently patient and can “trust the process,”³⁹ one is likely to learn far more than is stated on the syllabus, including about oneself and the world around them.

³⁵ Fabio Caon, *Edulinguistica ludica. Facilitare l'apprendimento linguistico con il gioco e la ludicità*, SAIL 24 (Edizioni Ca' Foscari - Venice University Press, 2022), 74.

³⁶ Caon, *Edulinguistica ludica*, 75.

³⁷ Maurizio Bettini, *A che servono i Greci e i Romani?* (Einaudi, 2017), 7.

³⁸ Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne,” 69.

³⁹ As Bettini says, “la civiltà [...] è prima di tutto una questione di pazienza. E anche la nostra si è sviluppata proprio in relazione al fatto che alla creazione culturale *non* si è mai chiesto immediatamente ‘a che cosa serviva’. I suoi progressi si sono realizzati perché si è avuta la pazienza di aspettare,” Bettini, *A che servono i Greci e i Romani?* 19.

2.1. Goals of ancient Greek learning

Considering the previous section, the didactical goals of ancient Greek learning should be defined. Being a corpus language, ancient Greek language learning cannot aim for communicative mastery as other modern languages do. What seems therefore most important in ancient Greek language learning is obtaining a reading ability that allows one to read as much of an original text as possible.⁴⁰ As Slocum Bailey highlights, there are three areas of desired development in reading competence: 1) general reading proficiency, namely the ability to “sight-read;” 2) the ability to read specific target texts; and 3) the ability to work with written texts that are above one’s reading level, namely, to translate, comment and critically appreciate the text.⁴¹ In ancient Greek learning, especially in schools, all of these foci seem to be relevant, even though the third often plays a more prominent role.⁴²

In order to develop the competence of progressively reading more text without the need for external aids, grammar and vocabulary competences should be trained. According to Kuhlmann, competences in Classical languages have three levels: *Wissen* (knowledge), *Verstehen* (understanding) and *Können* (being able to). The first level refers to declarative knowledge, the second to analytic knowledge and the third to the capability of using acquired knowledge.⁴³ According to this schema, vocabulary competence in ancient Greek represents being able to: 1) explain and recall the meaning(s) of a Greek word; 2) correctly understand and translate the word in context; 3) deduce meanings through stems or modern words; 4) deduce new and unknown words through their context; 5) reconnect declined or conjugated forms to the basic form and find them in the dictionary; and 6) name characteristics (e.g., gender or basic form) of declined or conjugated forms.⁴⁴

⁴⁰ Steven Hunt and Mair E. Lloyd, introduction to *Communicative Approaches for Ancient Languages*, ed. Mair E. Lloyd and Steven Hunt (Bloomsbury, 2021), 1.

⁴¹ Justin Slocum Bailey, “Communication in All Modes as Efficient Preparation for Reading a Text,” in *Communicative Approaches for Ancient Languages*, ed. Steven Hunt and Mair E. Lloyd (Bloomsbury, 2021), 33.

⁴² Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne,” 78.

⁴³ Peter Kuhlmann, *Fachdidaktik Latein kompakt* (Vandenhoeck & Ruprecht, 2012), 19.

⁴⁴ Peter Kuhlmann and Henning Horstmann, *Wortschatz und Grammatik üben. Didaktische Kriterien und Praxisbeispiele für den Lateinunterricht* (Vandenhoeck & Ruprecht, 2018), 30. For an insight into the grammar competence, see Chapter 2 ¶ 3.1.1 or Kuhlmann and Horstmann, *Wortschatz und Grammatik üben*, 55–118.

Consequently, in order to train reading competence, a progressive and increasing acquisition of vocabulary⁴⁵ and the training of the aforementioned vocabulary competence are required,⁴⁶ given that reading comprehension strongly depends on how many known and unknown words a reader encounters while reading.⁴⁷ If vocabulary is not progressively acquired, as usually happens in modern language learning, a reading fluency is almost impossible to achieve.⁴⁸ Therefore, vocabulary acquisition should follow three methodological principles:⁴⁹ 1) each lesson should be calibrated, as only a certain amount of vocabulary can be effectively acquired in each learning session; 2) the vocabulary should be introduced through similarities, opposition, semantic fields or connections with previous vocabulary; and 3) vocabulary exercises should be as differentiated as possible.

Translation, which will not represent the goal of this research, also plays an important role in ancient Greek learning. Translation and reading are in fact two distinct and different aspects of language learning that therefore imply different competences: translation implies well-structured competences both in the language to which we are translating (e.g., English, German, Italian, etc.) and in the language one is learning (e.g., ancient Greek). Conversely, reading comprehension mostly implies lexical and morphosyntactic competences in the language one is learning. Thus, the use of translation usually has three main didactical goals: 1) showing the correct language and content comprehension through a control function of the text, or highlighting comprehension difficulties; 2) promoting reflection on how one can express/translate in different ways or why sometimes a certain translation is the only possible one; and 3) exercising the language competences in the language we are translating to (e.g., English, German, Italian, etc.).⁵⁰ Translating is also a complex process as it is at the same time comprised of: 1) the (inductive) comprehension of the text (*Verstehen*); 2) the formal and content access to the text (*Dekodierung*); and 3) the wording in the translating language (*Rekodierung*).⁵¹ This means that by using translation – one of the most complex competences

⁴⁵ “Der Prozess des Wortschatzlernens verläuft meist in mehreren Stufen: Zunächst begegnen die Lernenden neuen Vokabeln (Aufnahme), hierauf folgt im Idealfall ein Einprägen im Gedächtnis. Um auch noch im Langzeitspeicher erhalten zu bleiben, müssen Vokabeln in der Regel eingeübt werden. Für eine produktive, d.h. aktive und freie Verwendung ist deutlich mehr Übung notwendig als für eine rein rezeptive Abrufbarkeit (passive Vokabelkenntnis),” Kuhlmann, *Fachdidaktik Latein kompakt*, 57.

⁴⁶ Kuhlmann, *Fachdidaktik Latein kompakt*, 70.

⁴⁷ Kuhlmann, *Fachdidaktik Latein kompakt*, 54.

⁴⁸ Zanetti, “Aporie nella didattica delle lingue classiche nella scuola italiana,” 406.

⁴⁹ Kuhlmann, *Fachdidaktik Latein kompakt*, 58. María Luisa Aguilar García, “Vocabulary Acquisition in the Language Classroom: What It Is, How It Works, Which Strategies and Approaches Are Suitable for Latin Instruction,” *Journal of Classics Teaching* 25, no. 50 (2024): 119-20, <https://doi.org/10.1017/S2058631024000059>.

⁵⁰ Kuhlmann, *Fachdidaktik Latein kompakt*, 95–96.

⁵¹ Kuhlmann, *Fachdidaktik Latein kompakt*, 96–9.

to master – as the only evaluation tool of learners’ ancient Greek competence (as usually happens in the Italian school system), one cannot fully capture the breadth of students’ overall comprehension of the language they are learning.⁵² Hence, in this research, the focus lies on the steps required to strengthen reading comprehension, namely a gradual, rich, and frequent exposure to *comprehensible* input,⁵³ and, as mentioned before, a gradual vocabulary acquisition.

As noted at the beginning of the previous section, one of ancient Greek’s biggest problems seems to be the “lack of interest” towards the language and consequent dearth of available courses.⁵⁴ Ancient Greek learning is perceived as difficult, complicated, and confusing; but while other negative emotions such as boredom and disinterest have been found to be quite common in the ancient Greek classroom, according to different studies,⁵⁵ Survey A offers another insight into the topic. Ancient Greek seems to be perceived as difficult, but not as boring or useless (see Chapter 2 ¶ 2.1) which represents a compelling starting point for this research’s questions (see ¶ 5).

2.2. Motivation

A motivated student is someone who activates themselves for a necessity, a desire, an interest or an external cause, and who takes action in order to reach a certain goal.⁵⁶ Modern language education often differentiates between two types of motivation: intrinsic and extrinsic. Intrinsic motivation occurs when an individual engages in an activity for its inherent enjoyment, learning potential, or personal fulfillment, without external incentives.⁵⁷ For example, someone might read a book purely for the pleasure of reading, rather than for a grade or a reward. Conversely, extrinsic motivation arises from external pressures or rewards, such as passing an exam or gaining a certification, rather than internal desires.⁵⁸

⁵² Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne,” 78.

⁵³ Kuhlmann, *Fachdidaktik Latein kompakt*, 99.

⁵⁴ Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne;” Zanetti, “Aporie nella didattica delle lingue classiche nella scuola italiana;” Bracke, “Bringing Ancient Languages Into a Modern Classroom;” Newland, “Closing the Gap;” Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience.”

⁵⁵ Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne;” Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience.”

⁵⁶ Caon, *Edulinguistica ludica*, 15.

⁵⁷ Karl M. Kapp, *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education* (Pfeiffer Wiley, 2012), 52.

⁵⁸ Kapp, *The Gamification of Learning and Instruction*, 52.

Intrinsic motivation can also stem from cultural reasons: for example, interest in engaging with the target language's community, desire to speak the language fluently, or fascination with the language's cultural aspects like art, cinema, or literature. On the other hand, extrinsic motivation typically revolves around meeting specific, predefined goals, often related to academic or professional outcomes, indicating a more immediate desire to achieve results.⁵⁹ Thus, intrinsic motivation tends to be a less intense but more enduring drive, while extrinsic motivation provides a strong push towards specific, often short-term, goals.⁶⁰

Motivation, either intrinsic or extrinsic, is therefore comprised of two variables: intensity and persistence.⁶¹ Intensity refers to how strong the motivation is, while persistence refers to durability. For language learning, intensity can be influenced by different external factors e.g., the status that a certain language has in the school system (for example, the importance attributed to English as a second language compared to ancient Greek). On the other hand, persistency can be influenced by the methodology chosen by the teacher so that the motivational pull is not limited to the lesson hours, but rather continues even afterwards, in students' leisure time. Generally, intrinsic motivation is the most desirable type of motivation for language learning and it can be stimulated through: 1) content choice (e.g., something that resonates with students' interests); 2) methodology or approach (e.g., grammatic-translation method, inductive method, etc.); 3) instruments (e.g., books, games, comics etc.); and 4) the relationships with the teacher and the other students, which should be based on transparency, trust, clarity and effective communication.⁶² However, one should always take into consideration the fact that every student is unique for many different reasons, (e.g., experience, family background, resources), among which there are also the personality traits (e.g., introvert/extrovert, optimist/pessimist, independent/dependent, etc.). For example, in relation to a ludic didactical approach – focus of this study – these personality traits seem to generate three binomials of opposite attitudes towards play and playfulness: 1) rejection, distrust, indifference vs. pleasure or passion; 2) perception of play as collaborative, cooperative, participative vs. perception of play as competitive; and 3) preference for group games vs. preference for individual games.⁶³ Thus, one should keep in mind that, according to individual personal traits, learners can perceive playing and playing to learn in very different ways.

⁵⁹ Villarini, *Didattica delle lingue straniere*, 142.

⁶⁰ Villarini, *Didattica delle lingue straniere*, 142.

⁶¹ Caon, *Edulinguistica ludica*, 15.

⁶² Caon, *Edulinguistica ludica*, 17.

⁶³ Caon, *Edulinguistica ludica*, 17.

A unique approach to motivation, applicable to language didactics, is provided by the Self-Determination Theory (SDT) by Deci and Ryan.⁶⁴ SDT is a comprehensive theory encompassing human motivation and personality. It can be divided into six distinct “mini-theories.” As illustrated in Figure 1.1, SDT categorizes motivation into three primary branches. In contrast to the traditional intrinsic vs. extrinsic motivation, SDT introduces a third branch: amotivation.

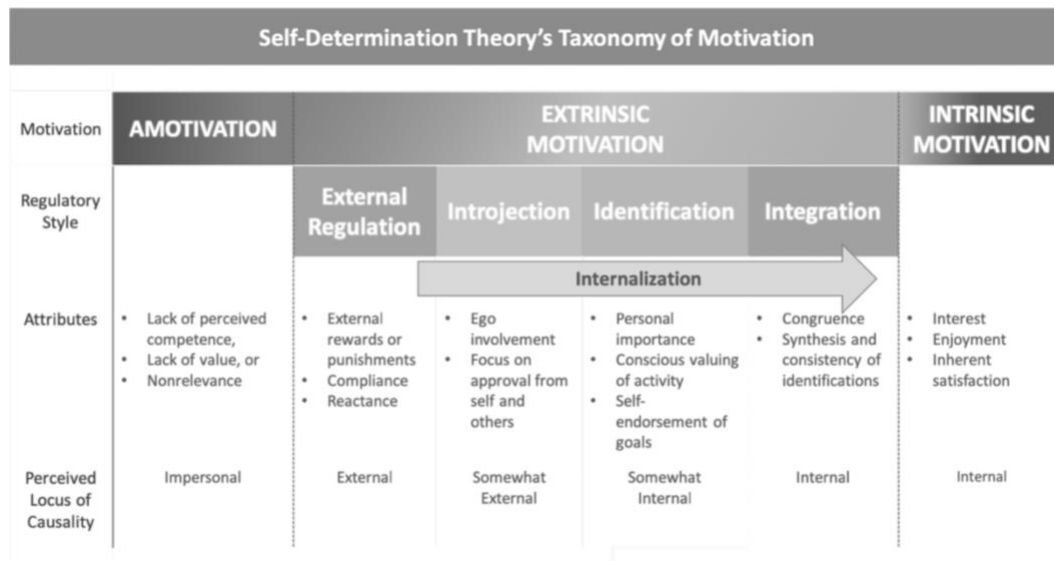


Figure 1.1 Taxonomy of SDT.⁶⁵

According to SDT, intrinsic and extrinsic motivation are not opposite notions, but rather two points on a continuum on which a person’s motivation fluctuates. In other words, extrinsic motivation can evolve into intrinsic motivation and *vice versa*, depending on the degree of internalization – which refers to the process of internalizing and accepting external realities as one’s own. Additionally, SDT defines extrinsic motivation as a multi-level construct that ranges from external regulation to integration, based on the perceived loci of causality. Amotivation, namely the absence of motivation, is often linked to a lack of perceived competence, value, or relevance, and also represents a focus of SDT.

⁶⁴ Edward L. Deci and Richard M. Ryan, “The ‘What’ and ‘Why’ of Goal Pursuits: Human Needs and the Self-Determination of Behavior,” *Psychological Inquiry* 11, no. 04 (2000): 227–68, https://doi.org/10.1207/S15327965PLI1104_01; Richard M. Ryan and Edward L. Deci, “Intrinsic and Extrinsic Motivation from a Self-Determination Theory Perspective: Definitions, Theory, Practices, and Future Directions,” *Contemporary Educational Psychology* 61 (2020): 101860, <https://doi.org/10.1016/j.cedpsych.2020.101860>.

⁶⁵ Ryan and Deci, “Intrinsic and Extrinsic Motivation,” 31.

One of SDT's mini-theories, the Cognitive Evaluation Theory (CET), emphasizes three essential factors for fostering and maintaining intrinsic motivation and consequently a high level of engagement, performance, persistence, and creativity in activities. These three factors are autonomy, competence, and relatedness.

Autonomy refers to "a sense of initiative and ownership in one's actions."⁶⁶ It is also definable as a sense of volition or ownership in one's actions.⁶⁷ It can be encouraged by interesting experiences or encounters perceived as valuable, and can be undermined by a sense of being externally controlled (e.g., through rewards or punishments). Conversely, competence indicates "the feeling of mastery, a sense that one can succeed and grow"⁶⁸ and can be facilitated by challenging experiences, positive feedback and growth-possibilities. Lastly, relatedness involves "a sense of belonging and connection,"⁶⁹ achievable through shared experiences. According to SDT's theory, intrinsic motivation and psychological well-being thrive when these three aspects coexist but are at risk when even one of them is missing. As will be later discussed, video games can provide an environment that satisfies these psychological needs.⁷⁰

SDT's hypotheses towards education and learning suggest that "(a) more autonomous forms of motivation will lead to an enhancement of students' engagement, learning, and wellness; and (b) that basic psychological need support from both teachers and parents facilitates such motivation, whereas need thwarting undermines it."⁷¹ However, in generalizing the importance of these three factors, SDT also recognizes the salience of cultural differences in the perception of motivation and the importance of basic psychological needs that may vary from individual to individual.⁷²

Two other psychological theories are relevant when talking about motivation: the Self-efficacy theory⁷³ and the Attribution theory.⁷⁴ According to the Self-efficacy theory, one can influence their motivation through their beliefs and actions: if one *believes* they can achieve a certain outcome through their actions, their motivation is going to be stronger and more long-lasting.⁷⁵ Self-efficacy is strictly connected to self-esteem, therefore the increase of one usually

⁶⁶ Ryan and Deci, "Intrinsic and Extrinsic Motivation," 2.

⁶⁷ Richard M. Ryan et al., "The Motivational Pull of Video Games: A Self-Determination Theory Approach," *Motivation and Emotion* 30 (2006): 155, <https://doi.org/10.1007/s11031-006-9051-8>.

⁶⁸ Ryan and Deci, "Intrinsic and Extrinsic Motivation," 2.

⁶⁹ Ryan and Deci, "Intrinsic and Extrinsic Motivation," 2.

⁷⁰ Ryan et al., "The Motivational Pull of Video Games," 155.

⁷¹ Ryan and Deci, "Intrinsic and Extrinsic Motivation," 4.

⁷² Ryan and Deci, "Intrinsic and Extrinsic Motivation," 9.

⁷³ Albert Bandura, *Self-Efficacy: the Exercise of Control* (Freeman and Company, 1997).

⁷⁴ Bernard Weiner, *An Attributional Theory of Motivation and Emotion* (Springer, 1986).

⁷⁵ Dalloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 62.

causes the increase of the other and *vice versa*. According to this theory, one's future actions are influenced by one's self-perceptions and beliefs, which are shaped by one's causal attributions, and not by past results.

According to the Attribution theory, causal attributions refer to the cause to which one attributes a failure or a success. These attributions can be internal or external to the person, stable or unstable through time, controllable or uncontrollable. For example, effort is an internal and controllable attribution, while good or bad luck are external, unstable and uncontrollable.⁷⁶ Causal attributions are subjective and often do not represent the factual reality. However, the perception of self-efficacy and of causal attribution can strongly influence motivation.

In the past, extrinsic motivation, particularly driven by the need to get access to higher professions, was the most common type of motivation among students learning Latin, while learning ancient Greek was an “aristocratic seal,”⁷⁷ and therefore a sort of external reward. However, more recently, the perception of a lack of career-related advantages or benefits usually associated in the past with learning Latin and ancient Greek has led to a decrease in motivation for studying them.⁷⁸ Thus, ancient Greek is deprived not only of an extrinsic motivation (e.g., passing an exam), but also of what could be termed “long-distance” extrinsic motivation (e.g., future career or social benefits).⁷⁹ This decline in motivation – especially towards ancient Greek – has been observed in many countries such as Cyprus and Greece,⁸⁰ the United Kingdom,⁸¹ and Malta.⁸²

Survey A's findings offer some interesting insight into the topic.⁸³ Even though, as later discussed, data need to be analyzed with caution due to the type of sample, the results of this survey seem to indicate that learners of ancient Greek, at any age, display high interest in learning the language, but lower motivation.

In the development of her master's thesis,⁸⁴ the researcher suggested the idea of a gamified online language course to re-engage learners that may have lost interest as well as attracting

⁷⁶ Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 62.

⁷⁷ Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne,” 72.

⁷⁸ Milanese, “Insegnare le lingue antiche, insegnare le lingue moderne,” 73.

⁷⁹ Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 70.

⁸⁰ Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience;” Dimitrios Stamatis, “Greece,” in *Teaching Classics Worldwide: Successes, Challenges and Developments*, ed. Steven Hunt and John Bulwer (Bloomsbury Academic, 2025).

⁸¹ Newland, “Closing the Gap;” Khan-Evans, “UK: England.”

⁸² Bracke, “Bringing Ancient Languages Into a Modern Classroom.”

⁸³ The analysis of Survey A – an online survey conducted between May and June 2023 – can be found in Chapter 2 (¶ 2-2.4).

⁸⁴ Irene Di Gioia, *Didattica delle lingue online e greco antico: possibilità o illusione?* (master's thesis, Università per Stranieri di Siena, 2022).

interested new students. Such a learning experience could cultivate a sense of playfulness and discovery, and offer a safe room in which one can learn and practice ancient Greek. Survey A's results suggest that learners and non-learners alike potentially have interest in the study of ancient Greek. This is a promising foundation upon which one can build a gamified online language experience given that, as Hoblitz points out, learning through playing is a great learning motivator, if learners *want* to be motivated and an interest is already more or less present:⁸⁵ the aim of implementing a game component in ancient Greek learning is therefore to infuse the learning experience with elements of fun, discovery, and playfulness, fostering an enjoyable and engaging process, as well as practicing the language “without consequences,” namely without a school grade. Thus, learning through playing can become an alternative way of experiencing ancient Greek for some learners. As Koster points out, “fun from games arises out of mastery. It arises out of comprehension. It is the act of solving puzzles that makes games fun. In other words, with games, learning is the drug [that releases endorphins into our system].”⁸⁶ Therefore, fun can be for some learners “just another word for learning.”⁸⁷

⁸⁵ Anna Hoblitz, *Spielend lernen im Flow: Die motivationale Wirkung von Serious Games im Schulunterricht, Medienbildung und Gesellschaft* 22 (Springer VS, 2015), 262.

⁸⁶ Raph Koster, *A Theory of Fun for Game Design*, 2nd ed. (O'Reilly Media, 2013), 40.

⁸⁷ Koster, *A Theory of Fun for Game Design*, 46.

3. Digital Game-Based Learning (DGBL)

In light of the observations of the previous sections, Digital Game-Based Learning (DGBL) has been chosen as the main theoretical approach of the following project.

Understanding the concepts of “game” and “play” is crucial for comprehending the notion of Game-Based Learning (GBL) and, by extension, of Digital Game-Based Learning (DGBL).

Play is intrinsic to human nature and is considered a precursor to culture.⁸⁸ As Huizinga remarks, “play is more than a mere physiological phenomenon or a psychological reflex. It goes beyond the confines of purely physical or purely biological activity. It is a significant function - that is to say, there is some sense to it.”⁸⁹ Thus, play is a multifaceted concept that has proven difficult to define comprehensively, given its subjective nature. The definition changes from language to language and from culture to culture,⁹⁰ and many researchers have offered their own interpretations. For example, Caon defines play *latu sensu* as: 1) demanding (i.e., it requires some sort of effort); 2) continuous (i.e., it is part of human’s experience from childhood to adulthood); 3) progressive and non-static (i.e., it evolves and contributes to cognitive, affective, interpersonal development); 4) and autotelic (i.e., it is not functional but not unproductive in the sense that it does not have an explicit second goal, but it ends in itself).⁹¹ Another popular definition of play comes again from Huizinga, who defines it as “a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy and the consciousness that it is ‘different’ from ‘ordinary life.’”⁹²

However, Reinhardt raises valid critiques against this popular definition, emphasizing that “the idea that the aim of play is ‘in itself’, in other words it is unproductive, is also problematic if we recognize that ludic or goal-oriented play is intentional and rule bound.”⁹³ Therefore, Reinhardt argues that “the definition of play, that it tends towards the voluntary, delimited, rule-based, intrinsically motivating, and extraordinary, can be problematic if we use it to exclude some activities which the player themselves considers to be play, because the term is highly

⁸⁸ Johan Huizinga, *Homo Ludens* ILS 86, 1st ed., Sociology of Culture vol. 3 (Routledge, 1949), 10.

⁸⁹ Huizinga, *Homo Ludens*, 10.

⁹⁰ Huizinga, *Homo Ludens*, 36.

⁹¹ Caon, *EduLinguistica ludica*, 56.

⁹² Huizinga, *Homo Ludens*, 36.

⁹³ Jonathon Reinhardt, *Gameful Second and Foreign Language Teaching and Learning: Theory, Research, and Practice* (Palgrave Macmillan, 2019), 47.

subjective.”⁹⁴ For example, it is noteworthy to notice that adults often differentiate between play (equals fun) and work (equals not fun) while talking to children, which is a differentiation that may not be inherent to children themselves.⁹⁵ In fact, while growing into adulthood, one can often encounter the idea that being an adult means dealing with only “serious” things and that fun is just another word for “frivolous.”⁹⁶ However, children do not typically perceive play as something extraordinary or separate from their normal lives;⁹⁷ on the contrary, play is an inherent part of their routine. Therefore, as Reinhardt affirms, “defining play as something that takes place outside of the everyday and unremarkable overlooks its involvement in transforming the ordinary to the extraordinary. If we do not challenge our unexamined beliefs that play is the opposite of work, we may not be able to recognize that play can be involuntary, serious, and necessary, and that as such, it may not only be requisite for learning, but also part of how we generate culture and participate in it as adult.”⁹⁸ Play is therefore a fundamental aspect of human behavior that is intertwined with learning, culture, and creativity, because, just as learning itself, it is a complex, unpredictable and multifaceted concept.⁹⁹

Another concept, closely intertwined with play, is the notion of game. According to Reinhardt, game is a rule-structured, “narrativizable” form of play.¹⁰⁰ Once again, Reinhardt stresses that a univocal definition is problematic to find, due to games’ subjective nature. An interesting perspective on the notion of game has been given by ludologist Jesper Juul, who defines game as “a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable.”¹⁰¹ Juul’s definition highlights the idea of the game as a formal system and as the relationship between player and game, stressing therefore the importance of player’s emotions in the gaming experience.

However, once again, there is no consensus among researchers on the precise definition of a game (or, as has been shown, of play), as it is influenced by various factors, such as cultural norms and individual experiences and perceptions. Hence, it seems that play and game are

⁹⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 73.

⁹⁵ Marc Prensky, “Don’t Bother Me Mom - I’m Learning!” *How Computer and Video Games Are Preparing Your Kids For Twenty-First Century Success - and How You Can Help!* (Paragon House, 2006), 30.

⁹⁶ Koster, *A Theory of Fun for Game Design*, 50.

⁹⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 48.

⁹⁸ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 48.

⁹⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 49–54.

¹⁰⁰ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 98.

¹⁰¹ Jesper Juul, *Half-Real: Video Games Between Real Rules and Fictional Worlds* (The MIT Press, 2005), 36.

inextricably linked and can be also seen as complementary aspects of the same phenomenon. Defining their differences is challenging because various attributes of play are interconnected or interchangeable with those of games, such as the motivating factors involved. However, for the purposes of this discussion, play will be considered as a broader category that encompasses game, which possesses some distinctive features.

Most researchers agree on the following characteristics of game. A game is a reality which: 1) is rule-based; 2) is responsive; 3) provides feedback and responses; 4) is challenging; 5) has a cumulative progress; and 6) is inviting and motivating to engage with.¹⁰² Both analog games and video games can be considered part of the same artistic experience as they share “the ways players participate and interact with the game, the ways they explore possibilities, solve problems, and seek outcomes, the way their experience is framed by their own decisions and actions,”¹⁰³ even if through different media. A last – holistic and somehow poetic – perspective on the ubiquitous nature of game is given by Koster: “the world is full of systems that we can choose to approach as games, and by approaching them that way, we make them into games. Games are puzzles to solve, just like everything else we encounter in life.”¹⁰⁴

Thus, according to the discussed definitions, GBL can be defined as a pedagogical approach that modifies tasks to enhance their appeal, significance, and efficiency by leveraging the complete spectrum of games elements,¹⁰⁵ while DGBL uses the complete spectrum of *digital* games elements.¹⁰⁶

The better-known ludic approach called gamification usually involves the “addition of specific game features, mainly involving the reward system and narrative structure, to an existing (nongame) learning environment in order to make it more motivating;”¹⁰⁷ playful learning, another ludic approach, implies that “a full game is not always needed when a learning task is redesigned to make it more effective in terms of relevance, meaning, and interest;”¹⁰⁸ conversely, GBL and DGBL consider game as a whole reality: a game is no longer something

¹⁰² Jan L. Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 3.

¹⁰³ Frank Lantz, *The Beauty of Games*, (The MIT Press, 2023), 14.

¹⁰⁴ Koster, *A Theory of Fun for Game Design*, 34.

¹⁰⁵ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 4.

¹⁰⁶ Another notion is that of Serious Game, which once again opens the door to an enormous quantity of definitions. For a detailed analysis of the different perspectives on this definition, see Hoblitz, *Spielend lernen im Flow*, 19–28. In this research, Serious or Educational Games can be considered as the products or tools through which Digital Game-Based Learning happens. Therefore, Serious or Educational Games are here the instruments, while DGBL is the pedagogical approach.

¹⁰⁷ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 3.

¹⁰⁸ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 5.

“unusual” and “out of the ordinary,” but the starting point of the didactical intervention.¹⁰⁹ Thus, the key distinction between (D)GBL and playful learning and gamification is that the latter two utilize game features in a limited capacity, rather than holistically. Furthermore, playful learning differs from gamification as the former alters the learning methodology to incorporate game elements, while the latter merely introduces game elements without altering the learning methodology. Considering these definitions, it is evident that GBL and DGBL highlight a more holistic perception of the game-notion and of its possible didactical implementation.

	Learning activities	Used game components
Gamification	Mostly unchanged	Mainly incentive system (extrinsic rewards)
Playful learning	Redesigned to increase relevance, meaningfulness and interest	Mainly incentive system (intrinsic rewards)
Game-based learning	Redesigned to increase relevance, meaningfulness and interest	All (narrative design, sound design, visual design, game mechanics, incentive system)

Table 1.1 Differences between gamification, playful learning, and game-based learning. Adapted from Plass et al.¹¹⁰

Caon points out that in opposition to the notion of play (which according to him is demanding, continuous, progressive and non-static, and autotelic), game-based learning is demanding, continuous, progressive and non-static, but *it is not autotelic*: in game-based learning activities, the main goal is not the game itself but a learning goal (in this research’s case, language learning).¹¹¹ That is why, (digital) game-based learning implies two main theoretical shifts: 1) playing is the founding pedagogical principle to promote students’ global development: therefore the learning environment is characterized by the absence of negative stress (to the greatest extent possible) and the presence of an omnipresent playful attitude both in the teacher and in the students; and 2) play is the conduit for learning: reality, knowledge and competences are re-elaborated *through* and *with* playing.¹¹²

One of linguist James Paul Gee’s most famous books, “What Video Games Have to Teach Us About Learning and Literacy,”¹¹³ is widely regarded as one of the most significant contributions to pedagogical approaches that use video games to improve language learning. In

¹⁰⁹ Stefan Kipf, “Et vitae et scholae ... ludimus. Das Lernspiel im altsprachlichen Unterricht,” *Der altsprachliche Unterricht* 44, no. 01 (2001): 5.

¹¹⁰ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 4.

¹¹¹ Caon, *Edulinguistica ludica*, 56.

¹¹² Caon, *Edulinguistica ludica*, 59.

¹¹³ James Paul Gee, *What Video Games Have to Teach Us about Learning and Literacy: Revised and Updated Edition*, rev. ed. (Palgrave Macmillan, 2007).

his book, Gee emphasizes the impact of video games on learning and literacy, identifying thirty-six learning principles. According to the researcher, these principles are valid both for traditional learning (i.e., in a classroom) and for learning within video games.¹¹⁴ Among these, a few principles stand out as particularly relevant to this dissertation:

*Number 1. Active, critical learning principle:*¹¹⁵ every aspect of the learning environment (including the ways in which the semiotic domain is designed and presented) is arranged to encourage active and critical, rather than passive, learning. This aligns with the idea that language learning, including ancient Greek learning, should be active rather than passive. Modern language education suggests that active language use is essential for language acquisition.¹¹⁶ Caon also agrees on the benefits of games as a tool to promote active and interactive learning;¹¹⁷

Number 10. Amplification of input principle: in comparison to a small amount of input, learners receive an even bigger amount of output.¹¹⁸ This concept aligns with modern language education, which suggests that the more exposure to and active use of a target language learners have, the more likely they are to improve their language skills;¹¹⁹

Number 12. Practice principle: learners have many occasions for practice in a compelling and stimulating context, which encourages them to spend more time on a task.¹²⁰ Motivation is crucial here, as learners are more likely to continue learning when the learning environment is interesting and stimulating.¹²¹ Therefore, if the learning environment is appealing, one tends to keep engaging with it. Additionally, the more opportunities learners have to practice, the more likely they are to improve their language skills (cf. *supra*);

Number 15. Probing principle: learning can be intended as a cycle of 1) probing the world by doing an action, reflecting in and on this action and consequently forming a hypothesis; 2)

¹¹⁴ Gee's affirmations have been criticized for their lack of empiric evidence. Some researchers have defined them as "theoretical speculation." For these critiques, see Aroutis Foster, "Games and Motivation to Learn Science: Personal Identity, Applicability, Relevance and Meaningfulness," *Journal of Interactive Learning Research* 19, no. 67 (2008): 602; Fengfeng Ke, "A Qualitative Meta-Analysis of Computer Games as Learning Tools," in *Handbook of Research on Effective Electronic Gaming in Education*, ed. Richard E. Ferdig (IGI Global Scientific Publishing, 2009), 1. In spite of the lack of empiric evidence, Gee's affirmations are presented here as a point of view or a perspective through which one can perceive and interpret the video game environment.

¹¹⁵ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 221.

¹¹⁶ Villarini, *Didattica delle lingue straniere*, 159.

¹¹⁷ Caon, *Edulinguistica ludica*, 64.

¹¹⁸ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 222.

¹¹⁹ Villarini, *Didattica delle lingue straniere*, 148-150.

¹²⁰ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 223.

¹²¹ "Durch Hören und Sprechen lernt man Sprachen nachweislich besser. [...] Die active und spielerisch-kreative Verwendung von Sprache macht den Unterricht lebendiger und spricht auch die affective Seite der Lernenden an," Kuhlmann, *Fachdidaktik Latein kompakt*, 51.

re-probing the world to investigate the hypothesis; and 3) accepting or reformulating the hypothesis.¹²² This cycle of learning by probing is essential for language acquisition, as learners constantly form and test hypotheses about language phenomena. This behavior has been observed in young children who, while learning their native language, constantly form hypotheses, probe them, and accept them or rethink them. In ancient Greek learning, in which communicative fluency is not the primary goal, this principle is particularly relevant for the process of translating and reading. By translating (or simply reading), learners form hypotheses about specific language phenomena and test whether their hypothesis is suitable for the context (e.g., encountering a structure such as δῶρον, one must form a hypothesis and decide by probing the hypothesis in the context whether this structure is, for example, an accusative masculine, an accusative neuter singular, or a nominative neuter singular). Caon agrees with this idea as he affirms that learning is deeply connected to playing in the processes of exploration and discovery, hypothesis formulation, confrontation and negotiation with peers, and verification of the solution.¹²³

Number 17. Situated meaning principle: the meanings of entities (e.g., words, actions, objects, texts, etc.) are included in embodied experience. Thus, meanings are not general or decontextualized: the general meanings of entities are discovered “bottom up via embodied experiences.”¹²⁴ This principle is closely aligned with the idea of inductive learning in modern language education, according to which learners start working with the general context and work their way up towards specific language phenomena. Unlike deductive methods such as grammar-translation, where learners start working with given, predefined rules and then apply them to the general context, inductive learning allows learners to derive meanings from the general context and gradually build their understanding of the language. This principle can be also defined a “semiotic principle” which refers to the interconnection of the single meaning-carrying parts in the macro-context;¹²⁵

Number 18. Text principle: texts are not exclusively verbally experienced, meaning only through the definitions of the words within the text or through words’ mutual text-internal relationships; on the contrary, texts are experienced as embodied experiences, given that “more purely verbal understanding (reading texts apart from embodied action) comes only when learners have had enough embodied experience in the domain and ample experiences with

¹²² Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 223.

¹²³ Caon, *Edulinguistica ludica*, 65.

¹²⁴ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 224.

¹²⁵ Caon, *Edulinguistica ludica*, 60.

similar texts.”¹²⁶ This principle aligns with the previous and emphasizes the importance of ergodic learning (alias learning-by-doing) to understand a specific phenomenon;¹²⁷ Caon points out that in ergodic learning, or learning-by-doing, the idea of “doing” can refer to different aspects: 1) “doing with the language” i.e., learning while using the language and through the language; and 2) “doing with the game” i.e., learning while creating objects for a game (e.g., cards, dominoes, etc.) or learning while creating one’s own game;¹²⁸

Number 20. Multimodal principle: words are not the only way in which one can build up meaning and knowledge. These are also achieved through other ways such as images, symbols, interactions, sounds, etc.¹²⁹ In a subject such as ancient Greek, in which meaning is usually built up only through texts and words, this principle is particularly relevant. Especially from a perspective of inclusion (cf. ¶ 4), allowing learners to understand and build their knowledge in many different ways can facilitate and encourage them in learning the language.

Number 29. Transfer principle: learners have at their disposal numerous opportunities for practice and support for “transferring what they have learned earlier to later problems, including problems that require adapting and transforming that earlier learning.”¹³⁰ This principle is aligned with the idea of a growth mindset (see ¶ 3.4) which sees learning (in this specific case, learning ancient Greek) as an opportunity for personal development, in contrast to a fixed mindset which views learning as a means to prove one’s intelligence.¹³¹ Moreover, Caon points out that playing can (and should) promote awareness of acquired learning strategies and knowledge. That is why he suggests always including in game-based learning a moment in which students can reflect on the fact that by playing, they have learned some elements of the language, they have used the language *to communicate* with peers (or *to take action*) and *not to complete* a formal, grammar exercise. Therefore, they have discovered how language is both a social game and an immense puzzle to gradually solve, activity after activity.¹³²

¹²⁶ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 224.

¹²⁷ For a more detailed description of ergodic learning, see ¶ 3.5.1.

¹²⁸ Caon, *Edulinguistica ludica*, 64.

¹²⁹ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 110.

¹³⁰ Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 226.

¹³¹ Carol Dweck, *Mindset: How You Can Fulfill Your Potential* (Robinson, 2017); Emily Evans, “Gamification in a Year 10 Latin Classroom: Ineffective ‘Edutainment’ or a Valid Pedagogical Tool?,” *Journal of Classics Teaching* 17, no. 34 (2016): 3, <https://doi.org/10.1017/S2058631016000192>.

¹³² Caon, *Edulinguistica ludica*, 66–7.

3.1. Learning functions, types of research, and design elements

Four main types of learning functions have been pointed out in DGBL:¹³³ 1) preparing for future learning; 2) learning new knowledge and skills; 3) practicing and reinforcing existing knowledge and skills; and 4) developing learning and innovation skills. The following research project is mainly conceived as a combination of functions two and three, but functions one and four are not precluded as they may occur as well.

At the same time, three different types of research on DGBL are most common:¹³⁴ 1) value-added research, which aims to understand whether a single feature added to the normal version of a game increases learning; 2) cognitive consequences research, which asks itself whether an off-the-shelf game can improve player-students' cognitive skills; and 3) media comparison research, that aims to understand whether students learn better from playing a game than from other media. The following project cannot be considered *strictu sensu* as an example of any of these types of research: this dissertation mainly aims at investigating alternative ways of learning, and not at making explicit comparisons with other learning methods. Thus, the underlying idea of this research is to qualitatively investigate the methodological potentiality of DGBL for ancient Greek learning, as grounds for future research.

Regarding game design elements, games are comprised of different components that can help achieve interactions between player-learners and learning content. Therefore, these elements can be divided into six different groups:¹³⁵ game mechanics, visual aesthetic design, sound design, narrative design, incentive system, and content and skills.¹³⁶

Game mechanics (1) refer to gameplay. They represent an activity or a group of activities that are repeated by player-learners during playing and their functioning represents the “major building blocks of play activities.”¹³⁷ These mechanics can be further divided into *learning mechanics*, i.e., an activity that has a learning goal and is designed on a learning theory approach aiming at facilitating learning, and *assessment mechanics* which aim to collect diagnostic data

¹³³ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 5–7.

¹³⁴ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 9–11.

¹³⁵ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 11–2.

¹³⁶ In this section, these elements are just briefly introduced to give the reader a general understanding. For their detailed description in relation to ancient Greek, see Chapter 2.

¹³⁷ Shanshank Pawar et al., “Emerging Design Factors in Game-Based Learning: Emotional Design, Musical Score, and Game Mechanics Design,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 355.

and are based on testing theory approaches.¹³⁸ Compared to game mechanics, learning mechanics are not as playable, thus they need to be realized as game mechanics and their design should be based on learning science.¹³⁹

Visual aesthetic design (2) includes the visual design of game environment, characters and avatars. While creating a game-based learning environment, it is important to create a product that is not so visually rich that its complexity could interfere with learner's capacity to understand the information that the environment contains, as interacting with a game-based environment contributes to the so-called cognitive load.¹⁴⁰ Cognitive load can be categorized into three types: intrinsic, extraneous, and germane.

The first type, intrinsic, represents the inherent demand that a certain task requires e.g., the mental effort and level of comprehension required to interact with the task.¹⁴¹ This type of cognitive load varies with the difficulty level of the task.

The second type, extraneous, appears when irrelevant information requiring extraneous mental effort appears alongside the relevant information. Researchers therefore have been trying to understand how to reduce this type of cognitive load during learning, finding three main design principles (signaling, redundancy, and immersion),¹⁴² discussed in Chapter 2 (see ¶ 3.4).

The last type of cognitive load, germane, represents “processing information, building mental models to understand information, and developing automation skills.”¹⁴³ It helps to facilitate the achievement of a learning goal thanks to the enhancement of information processing and the aid in construction of mental models. Hence, instructional game-design principles aim to minimize player-learners' extrinsic cognitive load in order to maximize germane cognitive load.¹⁴⁴ This goal has been proven to support learning in non-game learning environments.¹⁴⁵

¹³⁸ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 11.

¹³⁹ Pawar et al., “Emerging Design Factors in Game-Based Learning: Emotional Design, Musical Score, and Game Mechanics Design,” 356.

¹⁴⁰ Brian Nelson and Younsu Kim, “Multimedia Design Principles in Game-Based Learning,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 308.

¹⁴¹ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 308.

¹⁴² Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 315.

¹⁴³ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 308.

¹⁴⁴ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 308.

¹⁴⁵ Zeynel Kablan and Münire Erden, “Instructional Efficiency of Integrated and Separated Text with Animated Presentations in Computer-Based Science Instruction,” *Computers & Education* 51, no. 02 (2008): 660–8, <https://doi.org/10.1016/j.compedu.2007.07.002>; Richard E. Mayer and Roxana Moreno, “Nine Ways to Reduce Cognitive Load in Multimedia Learning,” *Educational Psychologist* 38, no. 01 (2003): 43–52, https://doi.org/10.1207/S15326985EP3801_6.

Sound design (3) refers to soundtrack, ambient sounds, and sound within players' or characters' actions. Sounds are a motivational factor and can therefore increase or decrease players' engagement.¹⁴⁶

Narrative design (4) concerns the storytelling or plot in the game. The narrative component can be defined as “the ubiquitous structure that permeates our lives,”¹⁴⁷ but also as “one of humanity’s chief teaching tools.”¹⁴⁸ It can be comprised of in-game dialogues between players and other players or game characters, game agents, or voice-overs. Narrative design plays a motivational role within the game but at the same time provides context for the learning contents and goals, and connects different game factors.¹⁴⁹ According to Malone, fantasy – also described as “theme” and comparable to the modern notion of narrative¹⁵⁰ – can be both extrinsic and intrinsic. Extrinsic means that narrative is external to the gameplay and has no direct consequences on the gameplay, while intrinsic narrative is an active part of playing, strictly connected with gameplay.¹⁵¹ Intrinsic narrative can be more interesting and even more instructional given that this type of narrative could help understanding how a specific skill might be applied to the real-world.¹⁵² An interesting example of intrinsic narrative in a game-based learning environment is “Murder on Grimm Isle,” a 3D adventure game that aims to enhance argumentation-writing competencies for language art students in grades 9-14.¹⁵³ In this specific game, narrative plays a central role as learners must investigate a crime scene to uncover evidence and identify a culprit: while proceeding in the narrative, learners are asked to develop their arguments. The intentional absence of a single main narrative, but rather the multiple possible scenarios that players are to encounter are designed to maximize focus on the didactical goal of developing one’s arguments,¹⁵⁴ showing how narrative can be adapted to the pedagogical aim.

Incentive systems (5) indicate a specific reward structure that aims to provide feedback and direct the player-learner’s behavior.¹⁵⁵ These rewards can be both intrinsic and extrinsic. The

¹⁴⁶ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 11.

¹⁴⁷ Michele D. Dickey, “Narrative in Game-Based Learning,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 284.

¹⁴⁸ Koster, *A Theory of Fun for Game Design*, 88.

¹⁴⁹ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 11.

¹⁵⁰ Thomas W. Malone, “Toward a Theory of Intrinsically Motivating Instruction,” *Cognitive Science* 5, no. 04 (1981): 336, https://doi.org/10.1207/s15516709cog0504_2; Dickey, “Narrative in Game-Based Learning,” 284.

¹⁵¹ Malone, “Toward a Theory of Intrinsically Motivating Instruction,” 360–1.

¹⁵² Malone, “Toward a Theory of Intrinsically Motivating Instruction,” 361; Dickey, “Narrative in Game-Based Learning,” 284.

¹⁵³ Dickey, “Narrative in Game-Based Learning,” 287.

¹⁵⁴ Dickey, “Narrative in Game-Based Learning,” 289.

¹⁵⁵ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 12.

former refers to rewards that are connected to gameplay and learning goals and can represent, e.g., the access to a new level or a new tool. This specific kind gives a player “special abilities that can be used in gameplay.”¹⁵⁶ The latter, the extrinsic type, indicates elements such as stars, points, badges, etc. which are not directly related to gameplay. This kind of rewards are normally used in gamification as they tend to offer the perception of achievement in players.¹⁵⁷

Content and skills (6) represent the goal to which each project should aim. Therefore, they should determine “all aspects of the game design, including the learning mechanics to be used, the visual design to be adopted, the narrative design, the incentive system design, and the sound design elements in the game.”¹⁵⁸

These six components of game design, briefly introduced here, are analyzed in depth in the second half of Chapter 2.

3.2. Theoretical foundations and theories of second language learning

In this section, some relevant theories and aspects to consider while creating or analyzing a DGBL environment are discussed: DGBL theoretical foundations, types of player-learners, and theories of second language acquisition.

According to Plass *et al.*,¹⁵⁹ DGBL is based on four equally supportive theoretical foundations that are deeply interconnected: motivational, cognitive, affective, and sociocultural.

Motivational foundations rely on theories that describe learning motivation such the aforementioned Self-Determination Theory (see ¶ 2.2). Games can be motivating in that they consider an incorrect answer or response not as failure, but rather as: 1) a normal and necessary part of the learning process that shows that knowledge is progressively forming in learners’ minds; 2) a welcomed and encouraged aspect of gameplay; and 3) an opportunity to learn how to self-regulate as they allow learners to monitor the efficacy of their strategies and approaches in achieving their goal.¹⁶⁰

¹⁵⁶ Frankie Tam and Shanshank Pawar, “Emerging Design Factors in Game-Based Learning: Incentives, Social Presence, and Identity Design,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 367.

¹⁵⁷ Tam and Pawar, “Emerging Design Factors in Game-Based Learning: Incentives, Social Presence, and Identity Design,” 369.

¹⁵⁸ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 12.

¹⁵⁹ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 14–18.

¹⁶⁰ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 15.

Cognitive foundations rely on the idea that games can create meaning and relevance for learning tasks and can respond to learner's needs and situations accordingly. That means that "games can facilitate emotional, sociocultural, and behavioral engagement that can be used to promote learners' cognitive engagement."¹⁶¹ Therefore, cognitive engagement can be seen when learners use generative cognitive processing while learning, e.g., when selecting relevant information and processing it into a coherent schema, or connecting new information with prior knowledge.¹⁶²

Affective foundations assume that games can influence learners' emotions, e.g., by using an engaging narrative or interesting visual design. Using features to increase emotional engagement is called emotional design.¹⁶³ Plass *et al.* highlight that this design is considered particularly important¹⁶⁴ as positive emotions have been proven to broaden cognitive resources,¹⁶⁵ improve attention,¹⁶⁶ function as effective retrieval stimuli,¹⁶⁷ and strengthen decision making and creative problem solving and their related higher-level cognitive activities.¹⁶⁸

Finally, sociocultural foundations rely on the capacity of games to offer rich social interactions, a pivotal aspect of both game-based learning and online language learning.¹⁶⁹ According to these foundations, learning is seen as the result of social interaction thanks to which a shared knowledge can be created (peer-learning and peer-teaching).

Moving on now to consider the groups of people interacting with the games, according to Reinhardt, players (and therefore player-learners) can be divided into different categories in relation to their personal attitudes. Bartle, analyzing players in MUDs (i.e., multi-user

¹⁶¹ Plass et al., "Theoretical Foundations of Game-Based and Playful Learning," 15.

¹⁶² Plass et al., "Theoretical Foundations of Game-Based and Playful Learning," 15.

¹⁶³ Jan L. Plass and Ulas Kaplan, "Emotional Design in Digital Media for Learning," in *Emotions, Technology, Design, and Learning*, ed. Sharon Tettegah and Martin Gartmeier (Elsevier, 2016), 138.

¹⁶⁴ Plass et al., "Theoretical Foundations of Game-Based and Playful Learning," 16.

¹⁶⁵ Barbara L. Fredrickson and Christine Branigan, "Positive Emotions Broaden the Scope of Attention and Thought-Action Repertoires," *Cognition & Emotion* 19, no. 03 (2005): 313–32, <https://doi.org/10.1080/02699930441000238>.

¹⁶⁶ Carroll E. Izard, "Four System for Emotion Activation: Cognitive and Noncognitive Processes," *Psychological Review* 100, no. 01 (1993): 68–90, <https://doi.org/10.1037/0033-295x.100.1.68>.

¹⁶⁷ Alice M. Isen et al., "Affect, Accessibility of Material in Memory, and Behavior: A Cognitive Loop?," *Journal of Personality and Social Psychology* 36, no. 01 (1978): 1–12, <https://doi.org/10.1037//0022-3514.36.1.1>; Alice M. Isen et al., "Positive Effect Facilitates Creative Problem Solving," *Journal of Personality and Social Psychology* 52, no. 06 (1987): 1122–31, <https://doi.org/10.1037//0022-3514.52.6.1122>.

¹⁶⁸ Amir Erez and Alice M. Isen, "The Influence of Positive Affect on the Components of Expectancy Motivation," *Journal of Applied Psychology* 87, no. 06 (2002): 1055–67, <https://doi.org/10.1037/0021-9010.87.6.1055>; Udo Konradt et al., "Flow Experience and Positive Affect during Hypermedia Learning," *British Journal of Educational Technology* 34, no. 03 (2003): 309–27, <https://doi.org/10.1111/1467-8535.00329>.

¹⁶⁹ Plass et al., "Theoretical Foundations of Game-Based and Playful Learning," 16; Villarini, *Didattica delle lingue straniere*, 159–60.

dungeons, a precursor of modern MMORPGs, namely Massive Multiplayer Online Role-Playing Game), proposes four different playing attitudes:¹⁷⁰ achievers, explorers, socializers, and killers. These playing styles can be complementary even if they may also occasionally be at odds.

Achievers, as the name suggests, want to set and achieve goals and at the same time accumulate experience and resources.¹⁷¹ The second type, Explorers, want to discover, primarily by mapping and experimenting with the mechanics of the game. The third group, Socializers, want to get in touch with the other people playing, as inter-player relationships are for them as important as the game experience itself. The last category, Killers, want to impose their actions on others as they look to wreak havoc.

These four foundations and the different categories of players also rely on and interact with different theories of learning which, for this project's specific case focusing on language learning, are mainly four. Didactics of modern languages do not agree on a single and unique theory for second language acquisition (SLA), as no single theory can perfectly fit every single learning-teaching situation. Therefore, in didactics of modern languages for DGBL, the four main SLA perspectives are: 1) the structural-behaviorist perspective; 2) the psycho-cognitive or constructivist perspective; 3) the social-informed perspective; and 4) the ecological or polytheoretical perspective.

1) The structural-behaviorist theory sees language from a structural point of view. The language is therefore comprised of structures that combine and recombine in different forms to form different meanings.¹⁷² An example of a structural teaching can be seen in the grammar-translation method (GT), which is often used in Italian high schools to teach ancient Greek.¹⁷³ The GT method for ancient Greek helps increase grammatical awareness and memorization of grammar rules, but its results are not sufficiently motivational for most students.¹⁷⁴ Another teaching method connected with this perspective is the audiolingual method (ALM), which is

¹⁷⁰ Richard Bartle, "Hearts, Clubs, Diamonds, and Spades: Players Who Suit MUDs," *Journal of MUD Research* 1, no. 01 (1996).

¹⁷¹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 63; Bartle, "Hearts, Clubs, Diamonds, and Spades."

¹⁷² Michael Filsecker and Judith Bündgens-Kosten, "Behaviorism, Constructivism, and Communities of Practice: How Pedagogic Theories Help Us Understand Game-Based Language Learning," in *Digital Games in Language Learning and Teaching*, ed. Hayo Reinders (Palgrave Macmillan, 2012), 51–3; Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 104–5; Bruce D. Homer et al., "Games as Playful Learning: Implications of Developmental Theory for Game-Based Learning," in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 35–6.

¹⁷³ Franca Zanetti, "Modelli didattici nella prassi scolastica attuale," in *Nuove chiavi per insegnare il classico*, ed. Ugo Cardinale (UTET Università, 2008), 453–57.

¹⁷⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 104.

based on the repetition of elements and habit formation, and which sees learning as being reinforced by positive or negative feedback.¹⁷⁵ A final, digital, example of second language teaching and learning online from a behaviorist point of view is the app *Duolingo*, which bases its functioning on GT method mechanisms. According to this perspective, a player-learner learns the language by repeating elements and losing or achieving points according to the level of correctness of their answer. As Reinhardt points out, “learners are expected to draw parallels between their L1 and the L2, and learn through comparison, contrast, and analysis, not by using the language or contextualized learning.”¹⁷⁶ Therefore, a structural-behaviorist perspective identifies DGBL for SLA as the result of “comprehension and production of game language through translation; repeated exposure to the structures of language, especially sounds, words, and grammar; or positive and negative reinforcement through rewards and penalties.”¹⁷⁷

2) A second theory is the so-called psycho-cognitive or constructivist view, which assumes that language is already in the mind of a person within the form of representation or relationships of form, meaning and usage.¹⁷⁸ In a DGBL environment for SLA that would mean that “players learn game rules through experimentation and deduction, i.e., devising, employing, and testing out various strategies, and by actively exploring and engaging with the game narratives.”¹⁷⁹ Furthermore, it would mean that learners are socially dynamic, cooperative or competitive, all aspects of great importance for DGBL and for language e-learning as well.¹⁸⁰ In SLA environments, this theory is applied to each method that makes learners active participants of their knowledge e.g., the inductive method. Therefore, from this point of view, SLA in DGBL happens due to:

Immersion in game content rich in partially comprehensible language use, made possible through interaction with in-game narratives and/or game-related practices rich in various discourses; noticing of lexico-grammar in the game or produced by other players that differs from the player’s understanding; negotiation for meaning with in-game content and characters, and potentially with other players; or opportunities for production of language or other comprehension signals to which the game can respond accordingly.¹⁸¹

(3) The third perspective, the social-informed view, assumes that sociality is not merely a contextual factor, but rather one of most important aspects of language learning. Some of its

¹⁷⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 105.

¹⁷⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 104.

¹⁷⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 105.

¹⁷⁸ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 106.

¹⁷⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 107.

¹⁸⁰ Homer et al., “Games as Playful Learning,” 37–8.

¹⁸¹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 107.

adherents think that learning happens when something is first socially mediated by an expert or a peer, and then assimilated by the individual herself. However, others hold that learning happens within socialization, dialogic interaction, or participation rather than merely transmission. Therefore, to create a DGBL pedagogy for language learning within this perspective, one should provide the right conditions for meaningful ludic interactions, role play, and collaboration.¹⁸² Thus, this perspective believes that L2 learning happens when there are components of:

Interaction with game discourses, which are embedded in the game, emergent through gameplay, and attendant to the game; enacting roles and developing and practicing identities, as a game player or as a game avatar or character in a game; negotiation with other players for not only ideational meaning (the propositional content of language) but also interpersonal, pragmatic, and cultural meaning; or participation in gameful social practices, which entails learning how to play and be recognized as a player.¹⁸³

(4) The last view, called by Reinhardt the ecological perspective, can be identified with a polytheoretical approach, that includes both social-informed approaches and cognitive approaches. From this point of view, language and learning are seen as complex and systemic processes as well as non-linear and emergent. Thus, no single approach can be completely satisfying for a L2 learning situation as “theories are always tentative representations of complex phenomena, and do not need to encompass all aspects of those phenomena.”¹⁸⁴ As research on DGBL shows, it is important that DGBL environments for second language teaching and learning, as well as DGBL environments in general, do not choose and follow a single pedagogical theory; on the contrary, they should instead embrace a polytheoretical approach to maximize the chance of learning and playfulness by adapting different methodologies suited to the environment itself.¹⁸⁵ This polytheoretical approach is fundamental for second language teaching and learning in general, as a single perfect method that can be fully customized to all learners, both in in-person teaching and online, does simply not exist.¹⁸⁶

In light of this discussion, several theoretical and practical implications emerge. On the one hand, to achieve the best benefits from play, a comprehensive view of DGBL must be considered, as a broad range of features of games need a broad theoretical foundation. On the

¹⁸² Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 109.

¹⁸³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 109.

¹⁸⁴ Filsecker and Bündgens-Kosten, “Behaviorism, Constructivism, and Communities of Practice,” 64.

¹⁸⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 112; Filsecker and Bündgens-Kosten, “Behaviorism, Constructivism, and Communities of Practice,” 64; Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 17.

¹⁸⁶ Villarini, *Didattica delle lingue straniere*, 192.

other hand, the game must have a clear function as, without it, learning objectives and mechanics are not easily clarified or specified for player-learners.¹⁸⁷

3.3. Key concepts

Before looking at DGBL for ancient Greek, four key concepts usually related to DGBL and extremely relevant for this research's discourse are briefly introduced:¹⁸⁸ 1) engagement; 2) motivation; 3) individual differences and adaptivity; and 4) affect and emotional design.

1) Engagement represents “an active and focused investment of effort in a game environment.”¹⁸⁹ Engagement levels are normally high in videogaming; therefore, researchers have started to analyze how to optimize videogaming in order to increase learning engagement. Engagement can be divided into four different types: a) behavioral engagement (e.g., players' actions and gestures in interactions within the game); b) cognitive engagement; c) emotional engagement; and d) sociocultural engagement i.e., players' social interactions with others.¹⁹⁰ A relevant notion connected to engagement is the concept of flow, namely a deep emotional condition of engagement experienced by players. Flow means that other activities not involved with playing are ignored by players as their level of engagement is too high. A flow state or condition is “typically induced when someone is faced with challenges that stretch, but do not overwhelm, their abilities, and there are clear goals, with immediate feedback indicating progress.”¹⁹¹ The notion of flow can therefore be understood as a positive psychological condition of complete engagement that occurs when challenges are well-calibrated (neither too easy nor too difficult) to one's abilities.¹⁹²

2) Motivation, as previously mentioned, represents one core component of DGBL. In DGBL, both extrinsic and intrinsic motivation should be equally present, but this combination is not easy to reach as learning goals can differ from game goals. Therefore, Plass, Homer, and Kinzer¹⁹³ have suggested that game mechanics and learning mechanics (i.e., activities that

¹⁸⁷ Plass et al., “Theoretical Foundations of Game-Based and Playful Learning,” 17–8.

¹⁸⁸ Homer et al., “Games as Playful Learning,” 38–43.

¹⁸⁹ Jan L. Plass and Ryth N. Schwartz, “Types of Engagement in Learning with Games,” in *Handbook of Game-Based Learning*, ed. Jan L. Plass et al. (The MIT Press, 2020), 55.

¹⁹⁰ Homer et al., “Games as Playful Learning,” 39.

¹⁹¹ Homer et al., “Games as Playful Learning,” 39.

¹⁹² C. Scott Rigby and Richard M. Ryan, “The Player Experience of Need Satisfaction (PENS). An Applied Model and Methodology for Understanding Key Components of the Player Experience,” white paper, Immersyve Inc., May 28, 2015, 7. For a more detailed description of flow, see Hoblitz, *Spielend lernen im Flow*, 111–42.

¹⁹³ Jan L. Plass et al., “Foundations of Game-Based Learning,” *Educational Psychology* 50, no. 04 (2015): 268, <https://doi.org/10.1080/00461520.2015.1122533>.

support learning in the game) should closely align.¹⁹⁴ The Player Experience of Need Satisfaction model (PENS) has been proposed by Rigby and Ryan in order to understand the nuance of player experience.¹⁹⁵ According to this model, instead of focusing on the broad (and variable) notion of “fun,” great attention is instead paid to the basic psychological needs that games satisfy i.e., autonomy, competence, and relatedness (as in the SDT). These three main needs express themselves in different ways according to different components of a game (e.g., game mechanics, gameplay, play narrative, etc.), but all should be guaranteed to reach a greater gaming experience. Another main point of PENS is the concept of mastery in action i.e., “when the player can more easily conquer game challenges and obstacles, delivering a superlative performance without having to work too hard.”¹⁹⁶ This notion can be linked with the previously discussed notion of flow: in-game activity must therefore be well-calibrated to a certain level in which the player-learner is challenged, but not discouraged or overwhelmed. Moreover, in-game activities should be balanced so that they do not completely distract learners from learning.

3) Individual differences and adaptivity mean that videogames offer the chance to increase inclusivity as one can personalize one’s learning experience.¹⁹⁷ This specific key concept aligns with what Universal Design for Learning (UDL) proposes for inclusion, which will be discussed in ¶ 4. Similarly, Kickmeier-Rust and Albert identify three categories of adaptivity: a) adaptive presentation of material (i.e., how material can “look and feel”); b) adaptive curriculum sequencing (i.e., matching individual preferences, goals, etc.); and c) adaptive problem-solving support (i.e., providing feedback, hints, and solutions while problem-solving).¹⁹⁸ These three aspects are also highlighted by UDL. For example, a group of researchers have quantitatively tested the combination of UDL and video games for learners with learning disabilities in science classes:¹⁹⁹ according to their findings, video games can be considered a useful support for

¹⁹⁴ Homer et al., “Games as Playful Learning,” 40.

¹⁹⁵ Rigby and Ryan, “The Player Experience of Need Satisfaction (PENS);” C. Scott Rigby and Richard M. Ryan, *Glued to Games. How Video Games Draw Us and Hold Us Spellbound* (Praeger, 2011).

¹⁹⁶ Rigby and Ryan, “The Player Experience of Need Satisfaction (PENS),” 9.

¹⁹⁷ Homer et al., “Games as Playful Learning,” 41.

¹⁹⁸ Michael D. Kickmeier-Rust and Dietrich Albert, “Micro-Adaptivity: Protecting Immersion in Didactically Adaptive Digital Educational Games,” *Journal of Computer Assisted Learning* 26, no. 02 (2010): 97, <https://doi.org/10.1111/j.1365-2729.2009.00332.x>.

¹⁹⁹ Matthew T. Marino et al., “UDL in the Middle School Science Classroom: Can Video Games and Alternative Text Heighten Engagement and Learning for Students With Learning Disabilities?” *Learning Disabilities Quarterly* 37, no. 02 (2014): 87–99, <https://doi.org/10.1177/0731948713503963>.

students with learning disabilities as they provide multiple means of representation, expression, and even assessment.²⁰⁰

Finally, 4) affect and emotional design shows that video games are thought to allow one to experiment, fail, and then learn how to deal with such failures without real-life costs. This stands in direct contrast to traditional educational environments, where “students may be given only one opportunity to perform, with failure resulting in harsh penalization (e.g., lower grades, denied admission into schools).”²⁰¹ Video games offer an opportunity for the so-called “graceful failure” which is of great importance in second language learning, where learners often show a so-called language anxiety, i.e., the fear of making linguistic mistakes.²⁰² Due to the playful environment, negative emotions associated with the fear of failure are reduced while persistence is encouraged. As noted by Homer *et al.*, “the chance for multiple attempts at success also provides players with an opportunity to regulate their own learning, as they are able to set goals, monitor their achievement of these goals, and assess the effectiveness of strategies used in their attempt to achieve their goals.”²⁰³

3.4. Why DGBL in the study of ancient Greek?

In light of previous sections, there are several reasons why DGBL can be used in the study of ancient Greek.

In ancient Greece the term used to define “education” is παιδεία, the etymological root of which is to relate to παῖς, “child.” To this word are connected the verb “to play” as well, παίζω, and the noun παιδία, “childish play.” Even though these terms are etymologically interconnected, it is important to point out that in the Greek mentality the notions of these terms were not univocally related: a child (παῖς) was meant to receive an education (παιδεία) in order to become a man – and not to develop as a child. However, the verb παίζω is used not only in reference to children’s play, as the etymology may suggest; παίζω refers to playing sports and music as well, two crucial activities for Greek cultural and moreover political life:²⁰⁴ therefore, playing in ancient Greece has a broader meaning than one might think. In one of his works

²⁰⁰ Homer et al., “Games as Playful Learning,” 42; Marino et al., “UDL in the Middle School Science Classroom,” 98.

²⁰¹ Homer et al., “Games as Playful Learning,” 43.

²⁰² Villarini, *Didattica delle lingue straniere*, 146-8; Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 176.

²⁰³ Homer et al., “Games as Playful Learning,” 43.

²⁰⁴ Arman D’Angour, “Plato and Play: Taking Education Seriously in Ancient Greece,” *American Journal of Play* 5, no. 03 (2013): 297.

(*Laws*, 1, 643b-643d), Plato points out for example that play should be used as means *to teach* children how to become adults and specialize in eventual future profession, as well as to direct them towards their fulfillment in adulthood i.e., becoming good citizens:²⁰⁵ hence, playing is considered as a way to grow into adulthood.

However, Plato himself suggests another intriguing perspective on play and knowledge in his *Theaethetus*, a dialogue that explores the nature of knowledge: Socrates presents the central and initial question of how to define the true nature of knowledge.²⁰⁶ To explore this concept, he suggests a game: if a player makes a mistake, they must sit down and be called a “donkey,” while if they are successful, they will be declared “king” and can ask others any question they desire.²⁰⁷ Pavlou observes that “playfulness is evident throughout the dialogue and goes hand in hand with seriousness, a noticeable combination that runs counter to modern discussions of philosophy which are typically conspicuous for their gravity.”²⁰⁸ Throughout the entire dialogue, Socrates insists that Theaetetus express his thoughts by engaging in play and contemplating possibilities. He emphasizes to Theaetetus that “the effectiveness of their discussion depends on their genuine and mutual willingness to keep ‘playing,’ that is, to keep asking questions and trying to provide answers.”²⁰⁹ Socrates then outlines to Theaetetus the qualities of a good player (or player-learner),²¹⁰ which include having what today is called critical thinking (i.e., questioning everything rather than accepting it as fact simply because someone said so (179c)); being willing to explore situations, even when the outcome is uncertain (200e-201a); and not giving up easily but rather putting in effort and viewing mistakes as opportunities for growth (152d, 190e-191a).

²⁰⁵ D’Angour, “Plato and Play,” 300.

²⁰⁶ 145e:

τοῦτ’ αὐτὸ τοίνυν ἐστὶν ὃ ἀπορῶ καὶ οὐ δύναμαι λαβεῖν ἰκανῶς παρ’ ἐμαυτῶ, ἐπιστήμη ὅτι ποτὲ τυγχάνει ὄν
 (“Well now, the point that I have difficulty with, and can’t find an adequate grasp of in myself, is just this: what, exactly, knowledge really is”). Plato, *Theaetetus*, trans. and ed. John McDowell, Claredon Plato Series (Claredon Press, 1973), 6.

²⁰⁷ 146a: ἄρ’ οὖν δὴ ἔχομεν λέγειν αὐτό; τί φατέ; τίς ἂν ἡμῶν πρῶτος εἴποι; ὁ δὲ ἀμαρτῶν, καὶ ὃς ἂν ἀεὶ ἀμαρτάνῃ, καθεδεῖται, ὥσπερ φασὶν οἱ παῖδες οἱ σφαιρίζοντες, ὄνος: ὃς δ’ ἂν περιγένηται ἀναμάρτητος, βασιλεύσει ἡμῶν καὶ ἐπιτάξει ὅτι ἂν βούληται ἀποκρίνεσθαι. τί σιγάτε; οὐ τί που, ὦ Θεόδωρε, ἐγὼ ὑπὸ φιλολογίας ἀγροικίζομαι, προθυμούμενος ἡμᾶς ποιῆσαι διαλέγεσθαι καὶ φίλους τε καὶ προσηγόρους ἀλλήλοις γίνεσθαι; (“So can we put it into words? What do you all say? Which of us is going to be first to speak? If he goes wrong, and if anyone goes wrong when it’s his turn, he’ll sit down and be donkey, as the children say in their ball game; but if anyone survives without going wrong, he’ll be our king, and set us to answer any question he likes. Why don’t any of you say anything? Theodorus, I hope my love of argument isn’t making me behave rudely? I’m only doing my best to make us start a discussion, and get to be on friendly and sociable terms with one another”). Plato, *Theaetetus*, 6–7.

²⁰⁸ Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience,” 43.

²⁰⁹ Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience,” 44.

²¹⁰ The entire list of the characteristics of the good player-learner are summarized by Pavlou, “Game-Informed Assessment for Playful Learning and Student Experience,” 44.

Therefore, it appears that even thousands of years ago, the potentiality of combining what is traditionally considered “serious” (e.g., philosophy or ancient Greek) with what is perceived as playful, fun or enjoyable (e.g., playing a game) had been already recognized.

Moreover, playing to learn offers a didactical environment where intercultural education and competence can thrive. Through playing, the approach to differences can take place in a “safe-place,” in a context where the main valid rules are those of the game and therefore the hypothetical negative emotional impact, connected for example to language or cultural differences, are mitigated.²¹¹ This can happen because of the game’s characteristics, which are cross-cultural and culturally determined: the game is cross-cultural because players share rules from the “universal play-grammar”²¹² which are, *inter alia*, the respect of the arbitrary rules that, when not respected, imply the exclusion from the playing community and the logic of “someone is going to win, therefore someone is going to lose.” Due to its inherently cross-cultural nature, the game reunites culturally different grammars in a universal play-grammar which guarantees an equal relationship between knowledges and competences.²¹³ However, games are also the implicit mirror of a society and more or less knowingly, players take part in the game carrying their own culture. With this awareness, however, playing can potentially help player-learners in terms of: 1) questioning ethnocentric approaches to culture and the misleading simplifications of stereotypes; 2) recognizing the value of cultural pluralism; 3) being aware of the existence of “universalia” (e.g., playing) which are indeed universal (i.e., present in every culture through space and time) but also culturally determined; and 4) promoting interest towards diversity through fun and enjoyable interactions.²¹⁴

Moreover, other perspectives on the potentialities of DGBLL (Digital Game-Based Language Learning) have been proposed. First, according to Baltra, using a game to learn a language, for example ancient Greek, shifts the focus away from only language’s grammatical structures (i.e., focus on forms), by focusing also on its meaning (i.e., focus on form). Trying to understand what the language is communicating becomes thereby an active part of the game dynamics.²¹⁵ In this perspective, language may not be perceived by players as a simple sum of linguistic structures to learn, but rather as a *tool* to solve problems, discover, interact with the

²¹¹ Caon, *Edulinguistica ludica*, 75.

²¹² Caon, *Edulinguistica ludica*, 75.

²¹³ Caon, *Edulinguistica ludica*, 76.

²¹⁴ Brigitte Wilke, “Spiele im Anfangsunterricht Griechisch,” *Der altsprachliche Unterricht* 44, no. 01 (2001): 23; Caon, *Edulinguistica ludica*, 77.

²¹⁵ Armando Baltra, “Language Learning through Computer Adventure Games,” *Simulation & Gaming* 21, no. 04 (1990): 447, <https://doi.org/10.1177/104687819002100408>.

game environment and advance in the game's storyline. Therefore, desiring to play and to interact with the playful environment, learners may perceive a stronger urge to learn the language.

Secondly, video games can be intended as a way to promote meaningful discovery in language learning: in video games, learners are not typically presented directly with explicit content or skills; on the contrary, they discover them while discovering the narrative.²¹⁶ As meaningful learning must be based on experience, the discovery process connected with playing can be seen as a part of this necessary experience.²¹⁷

Additionally, “a gamified learning environment promotes ownership of one's learning process, by offering an organized space in which intrinsically motivated goals can be achieved.”²¹⁸ Playing to learn a language can encourage a *growth mindset* i.e., a mental attitude that allows one to see learning as an opportunity for self-improvement. On the contrary, a *fixed mindset* can perceive learning as a means of demonstrating intelligence or capability.²¹⁹ Thus, learning ancient Greek through playing may suggest a new perception of ancient Greek itself: Greek could be not merely a means to demonstrate intelligence or capabilities, but rather a way to learn how to learn, and to develop language mastery instead of showing knowledge.²²⁰ The playful environment could expose learners to peer and teacher scaffolding while also being a safe playground to experience mistakes as steppingstones to language proficiency, rather than as indications of bad grades or serious consequences. Moreover, such perspective could encourage a more active style of learning, typically lacking in ancient Greek learning. Hence, learning becomes a “global experience” for the learner who is not only cognitively involved in the process of learning but also affectively and emotionally.²²¹

Thirdly, discovery or active learning can promote cooperative learning, which is essential for language learning and particularly so for language e-learning.²²² Game-based learning can therefore also promote positive interactions between peers.²²³

²¹⁶ Caon, *Edulinguistica ludica*, 52.

²¹⁷ Kipf, “Et vitae et scholae ... ludimus,” 3; Caon, *Edulinguistica ludica*, 28.

²¹⁸ Evans, “Gamification in a Year 10 Latin Classroom,” 2.

²¹⁹ Evans, “Gamification in a Year 10 Latin Classroom,” 3; Dweck, *Mindset*.

²²⁰ Evans, “Gamification in a Year 10 Latin Classroom,” 3.

²²¹ Caon, *Edulinguistica ludica*, 28.

²²² Michael Thomas, “Contextualizing Digital Game-Based Language Learning: Transformational Paradigm Shift or Business as Usual?” in *Digital Games in Language Learning and Teaching*, ed. Hayo Reinders (Palgrave Macmillan, 2012): 20; Adolf Richardo Bagus Setiadi, “Benefits of Digital Game-Based Learning (DGBL) for English Learning,” *International Journal of Advanced Research* 6, no. 07 (2018): 190, <https://dx.doi.org/10.21474/IJAR01/7351>.

²²³ Caon, *Edulinguistica ludica*, 29.

Fourthly, DGBLL offers the possibility of integrating all four language skills (i.e., listening, speaking, reading, and writing) and may also encourage the development of communicative fluency through lively discussions, reading, vocabulary building, note-taking, and even essay writing.²²⁴

This productive and/or active component (speaking, listening and writing) of language learning is especially valuable for ancient Greek learners, as they are usually precluded from it. It can be argued that ancient Greek is a corpus language and therefore the active mastery of this language is utopic and meaningless: however, if one perceives the active exposure to ancient Greek as an *alternative way* of discovering the language that does not exclude other more traditional ways of approaching the language, but rather complements them – especially in a perspective of inclusion as argued later on – this strategy could allow some learners to internalize and better understand the language mechanisms. Thus, it could foster a deeper sense of meaning in Greek learning, especially in those learners who have difficulties with handling solely written media, as is typically the case in Greek class. Moreover, DGBLL “is perhaps unique in providing learners with tools that can work across this traditional divide [i.e., the idea that formal instructed language learning contexts are divided from informal extra-curricular contexts], developing learners’ actual communication and negotiation of meaning skills rather than typical school-based view of language learning as a system of rules to be learned in a vacuum.”²²⁵

Contextualized learning is preferred in language learning as learners are more likely to make and remember linguistic associations and mechanisms, as the narrative (or context) helps them anchor the learning material.²²⁶ For example, learning vocabulary is facilitated and more efficient when words are semantically related and narrativized.²²⁷

Furthermore, DGBLL involves learners in two dimensions: synchronically, as they are emotionally and cognitively involved in the moment of gaming, and diachronically, as by gaming throughout time their competences and motivations evolve.²²⁸

²²⁴ Baltra, “Language Learning through Computer Adventure Games,” 446-7.

²²⁵ Thomas, “Contextualizing Digital Game-Based Language Learning,” 26.

²²⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 199.

²²⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 199; Bagus Setiadi, “Benefits of Digital Game-Based Learning (DGBL) for English Learning,” 191.

²²⁸ Caon, *Edulinguistica ludica*, 54.

Finally, some DGBLL and GBL environments have the potential to increase motivation,²²⁹ by promoting fantasy, curiosity and challenge.²³⁰ Challenge can be divided into six components:²³¹ (1) clear goals, as clarity enhances motivation; (2) constant feedback, to maintain engagement; (3) uncertainty about goal attainment, to sustain involvement and engagement, meaning that the game should be neither too difficult nor too easy (however, achieving the right balance of challenge in DGBLL can be extremely arduous, as games should be neither too difficult nor too easy to maintain high engagement. For example, most commercial video games are usually too difficult from a linguistic perspective for a non-native language learner); (4) hidden information, which encourages effort in uncovering new information, which in DGBLL means that students are encouraged to discover new language mechanisms to be able to advance with the game and the storyline; (5) unpredictability, achievable by displaying various outcomes at various points; and (6) randomness, strictly connected to unpredictability, to increase motivation and engagement.²³²

3.5. Literature review

Having seen why DGBL can be used in ancient Greek instruction, it is sensible to analyze the literature review regarding video games and ancient Greek. Hence, the following literature review considers two different categories: (some) video games that take place in ancient Greece, and examples of gamified learning environments for ancient Greek and Latin. This choice is justified by the observation that there does not seem to be any combination of these two categories, i.e., there is no didactical video game set in ancient Greece with the goal of teaching

²²⁹ Malone, "Toward a Theory of Intrinsically Motivating Instruction," 355-65; Kipf, "Et vitae et scholae ... ludimus," 5; Wilke, "Spiele im Anfangsunterricht Griechisch," 22; Thomas, "Contextualizing Digital Game-Based Language Learning," 19; Bagus Setiadi, "Benefits of Digital Game-Based Learning (DGBL) for English Learning," 191; Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 118-19.

²³⁰ Malone, "Toward a Theory of Intrinsically Motivating Instruction," 356-64.

²³¹ Malone, "Toward a Theory of Intrinsically Motivating Instruction," 356-9; Baltra, "Language Learning through Computer Adventure Games," 448-50.

²³² However, it is important to note that recent research suggests interpreting these findings on motivation with caution, due to the numerous different conceptualizations of intrinsic motivation applied by different studies, which thus hinder comparability and generalization. Moreover, research studies highlight the need for more research on DGBL, systematically investigating its motivational outcomes with rigorous experimental design, control groups, validated instruments and clear reporting. See Lena Fanya Aeschbach et al., "Systematic Review on the Methodological Rigor and Effectiveness of Digital Game-Based Learning in Education," preprint, PsyArXiv, May 3, 2024, 4-5, <https://doi.org/10.31234/osf.io/6qgvp>.

the ancient Greek language.²³³ Thus, this research gap represents the research focus of this dissertation.

Many interesting contributions regarding the use of ancient Greece as a setting in video games have already been written,²³⁴ and different tools to look at the plethora of video games set in antiquity are available online (an example is the database by Vandewalle).²³⁵ Therefore, the following literature review analyzes only the most recent commercial video games set in ancient Greece or with an ancient Greek-esque setting, published between 2020 and 2025. As criterion for the selection, the researcher chose the commercial video games according to their potential for didactical use in a class to teach ancient Greek language or literature. However, some video games that were published before the aforementioned timeframe have also been considered due to their relevance for the discussion.

3.5.1. Commercial video games with an ancient Greek scenario

As the first section of the literature review is chronologically organized, before analyzing the video games that have been released from 2020 on, the researcher will analyze some particularly relevant examples of video games that were released before 2020.

Apotheon, released in 2015 by developer Alientrap, is one such game based in ancient Greece. Here, the protagonist is a villager named Nikandros. *Apotheon*'s visual ambience is notable for the obvious inspiration taken from Greek cultural visual codes.²³⁶ As Clare points out, "Apotheon's world of Greek vase-painting aesthetics gives the player a seemingly authentic representation of pottery that is then seen to 'come to life.'"²³⁷ As the player helps Nikandros kill his opponents, different cues from ancient literature come through, e.g., in the representation of gods and goddesses or in the presence of lines from the *Homeric Hymn to*

²³³ As for language courses found online, the research has been done by searching various different combinations of the words "ancient/classical Greek (language)," "online course," "language course online," "game," "play," and "gamification." What has emerged from this research is that many online language courses are offered to learn ancient Greek by a number of different organizations. See "Beginning Ancient Greek," Harvard University, accessed October 18, 2025, <https://pll.harvard.edu/course/beginning-ancient-greek?delta=0>; "Greek Online – First Year Ancient Greek," University of Texas at Austin: College of Liberal Arts, accessed October 18, 2025, <https://lrc.la.utexas.edu/eicol/grkol>; "Ancient Greek Language Courses," Oxford Lifelong Learning at the Department for Continuing Education, accessed October 18, 2025, <https://www.conted.ox.ac.uk/about/ancient-greek-language-courses>). However, it seems that no university or language center offers a language course that includes some sort of ludic pedagogy (e.g., game-based learning, playful learning, etc.).

²³⁴ Rollinger, *Classical Antiquity in Video Games*, 2020; Draycott and Cook, *Women in Classical Video Games*, 2022; Clare, *Ancient Greece and Rome in Videogames*, 2021.

²³⁵ Alexander Vandewalle, *Paizomen*, updated March 28, 2021, <https://paizomen.com/>.

²³⁶ Clare, *Ancient Greece and Rome in Videogames*, 59.

²³⁷ Clare, *Ancient Greece and Rome in Videogames*, 58.

Poseidon that are visible at the entrance to Poseidon's lair.²³⁸ What is most interesting about *Apotheon* is the presence of "actual" ancient Greek literature material that the player can encounter throughout the gameplay in English translation, as well as the presence of characters from the mythological Greek world, e.g., satyrs, monsters, etc. Even if the goal of the video game is not to teach the language, the incidental learning of small parts of Greek mythology is "a by-product of play centered primarily around the reproduction of spectacle and the facilitation of epic conventions."²³⁹

Another interesting example of the use of ancient Greek setting in video games is offered by the visual novel *Melos* (released in 2015 by Skarn). It represents a first-person game type in which the player is asked to make decisions and personally interact with the surrounding reality. Compared to *Apotheon*, this first-person game exhibits "highly alternative ways of applying and presenting antiquity within a unique video game framework, as [it] mould[s] specific phenomena from, and surrounding, antiquity into varying spaces, aesthetic styles and themes."²⁴⁰ In *Melos*, the player takes the role of an ancient Greek woman, a Sappho-esque female poet. This protagonist contrasts with the typically misogynistic environments featured in most video games, which tend to stereotype or wholly exclude female characters. Texts and dialogues in English are the main part of this visual novel (VN), as "action is [...] less important in VNs where narrative progression and character development are the principal concerns of developers and players."²⁴¹ This VN could represent an opportunity to introduce Greek literature, as for example *Melos* offers some poems by Sappho in translation (e.g., Hymn to Aphrodite).

Oedipus Dating Sim is a dating simulation game released in 2018 by Wholetone Games. The game, available in English, relates the adventure of the mythological hero Oedipus who by travelling in time lands in Las Vegas in the 21st century. The player is asked to find a date for Oedipus in the American city and to avoid pairing him with his mother, Jocasta. Apart from the names of the characters, the game has very few references to ancient Greece. However, at some point during the game, a police officer appears in the plot: he does not believe Oedipus' story (namely, that he has travelled in time and that he is actually an ancient Greek). In order to convince the police officer that he actually comes from ancient Greece, and thus also avoid imprisonment, Oedipus must pass an ancient Greek vocabulary test given by the officer by

²³⁸ Clare, *Ancient Greece and Rome in Videogames*, 61.

²³⁹ Clare, *Ancient Greece and Rome in Videogames*, 64.

²⁴⁰ Clare, *Ancient Greece and Rome in Videogames*, 117.

²⁴¹ Clare, *Ancient Greece and Rome in Videogames*, 143.

connecting the Greek word to the English translation (e.g., they must connect the word μέλας (mélas) to black). After a while, the officer will appear again and test the player's progress in vocabulary learning. This "mini-game" does not seem to be intended to teach the language specifically, but rather merely represents a side quest that the player has to take on. The words are randomly selected and do not follow a semantic order or have any actual role for the development of the game. However, it is noteworthy to observe how this introduction of a "vocabulary-quest" could induce incidental learning, a phenomenon that will be later discussed.

A last interesting example is provided by *Assassin's Creed: Odyssey* (released by Ubisoft in 2018), an action-adventure game in third-person perspective. As the name of the series (*Assassin's Creed*) suggests, players play assassins and can interact with the gameplay through three main activities, typical of violent settings: fighting, stealth and "parkour."²⁴² *Assassin's Creed's* narrative revolves around the use of a hyper-technological machine, called *Animus*, that enables the player to go back in time and to experience the past firsthand. With 2017's *Assassin's Creed: Origins* and *Assassin's Creed: Odyssey* (AC:O), the player can get in touch for the first time in the series with classical antiquity (Egypt's Hellenistic period and the Peloponnesian War in ancient Greece, respectively), both by playing and interacting with the virtual world and by entering an in-game feature called *Discovery Tour* (see *infra*), which serves as a virtual museum with guided tours of historical aspects to be discovered.²⁴³ *Assassin's Creed: Odyssey* follows the adventure of protagonist (which can be chosen by the player and therefore be female, *Kassandra*, or male, *Alexios*) during the initial period (431-422 BCE) of the Peloponnesian War (431–404 BCE).²⁴⁴ The protagonist, whoever the player chooses it to be (henceforth, *Kassandra*), is a mercenary – the game calls them *mysthios* from Greek μίσθιος, "salaried, hired"²⁴⁵ – that embarks on three different main quests. Therefore, the entire gameplay is comprised of three main sections that represents *Kassandra's* *Odyssey*: 1) "Odyssey," focusing on *Kassandra's* adventure to find out who her parents are in order to reconcile her estranged family; 2) "Hunt the Cult of Kosmos" focusing on the fighting against the cult that is fomenting dissent amongst both war parties (Athenians and Spartans) in order to

²⁴² Aris Politopoulos et al., "'History Is Our Playground': Action and Authenticity in *Assassin's Creed: Odyssey*," *Advances in Archaeological Practice* 7, no. 03 (2019): 317, <https://doi.org/10.1017/aap.2019.30>.

²⁴³ Politopoulos et al., "'History Is Our Playground,'" 319.

²⁴⁴ In 2023, Ubisoft released *Assassin's Creed Nexus VR*, another example of the AC series which also offered a virtual reality experience. In *Nexus*, players encountered three main storylines, following three of the main AC characters: *Ezio Auditore da Firenze* (first encountered in AC:II), *Kassandra* (first encountered in AC:O) and *Connor Kenway* (first encountered in AC:III). *Kassandra's* storyline does not present anything particularly relevant for the present literature review, thus AC:Nexus is only mentioned here and not thoroughly analyzed.

²⁴⁵ *LSJ*, "μίσθιος," accessed November 8, 2025, <https://stephanus.tlg.uci.edu/ljs/#eid=70207>.

keep the conflict alive; and finally 3) “Between Two Worlds,” showing Cassandra’s journey to slay different mythical monsters and beasts (e.g., the Minotaur, the Sphinx, the Cyclops Brontes, and Medusa) within a storyline focused on the mythological city of Atlantis.²⁴⁶

What is most fascinating about this video game is the semi-accurate rendition of ancient Greece’s geography as well as the opportunity given to the player to visit and interact with important Greek city-states e.g., Delphi Sanctuary or Athens.²⁴⁷ Another relevant aspect is the opportunity to meet famous figures of ancient Greek history of V BCE e.g., Socrates, Aristophanes, Pericles, etc., whom the protagonist encounters during their journey. Even if many inaccuracies occur during gameplay, players can interact with a reliable and visually appealing rendition of ancient Greece and experience the Greek “reality” as if they were there. As Sedgwick notes, in comparison with other video games e.g., *Apotheon* or the here not analyzed *Hades*, “rather than interacting with the gods themselves [...] AC:O refers to the Olympians as ancient Greeks did – as gods, rather than beings to interact with or gain power from.”²⁴⁸ This aspect makes AC:O a “window into the reality of ancient Greece, instead of a mystical adaptation of it.”²⁴⁹ Therefore, Cassandra or Alexios tell a more “realistic” story as they interact with reality through a cultural ancient Greek lens which e.g., considers gods and goddesses as deities to be worshipped and adored, instead of fought. This point of view reflects a more accurate approach to ancient Greece’s perception of mythology as “what modern society calls Greek mythology now was simply the known religion practiced in ancient Greece and Rome.”²⁵⁰

This approach to verisimilitude yields particularly interesting results as much attention is given to details, including linguistic details. Politopoulos *et al.* observe that AC offers its players a well-reconstructed past: “building materials and styles are period accurate, city layouts and landscapes conform to what is known about their original geography, other material culture mostly adheres to the style and technology of the day, people tend to be dressed and act

²⁴⁶ Alexander Vandewalle, “‘Named After the Great Odysseus’: Putting the Odyssey in Assassin’s Creed Odyssey,” *Sapiens ubique civis* 3 (2022): 465.

²⁴⁷ The geography shown in AC:O has as furthest cardinal points Cephalonia (West), Lesbos (East), Makedonia (North) and Crete (South), see Vandewalle, “‘Named After the Great Odysseus,’” 465. Nevertheless, scholars have pointed out the condensed and compressed rendition of ancient Greece’s topography. For “compression” in AC:O, see Politopoulos *et al.*, “‘History Is Our Playground,’” 319–23. For “shrinking” in AC:O, see Jonathan Westin and Ragnar Hedlund, “Polychronia – Negotiating the Popular Representation of a Common Past in Assassin’s Creed,” in *Journal of Gaming & Virtual Worlds* 8, no. 01 (2016): 10, https://doi.org/10.1386/jgvw.8.1.3_1.

²⁴⁸ Eleanor Rose Sedgwick, “Cheat Codes of the Gods: Narrative and Greek Mythology in Video Games” (master’s thesis, Texas State University, 2021), 32.

²⁴⁹ Sedgwick, “Cheat Codes of the Gods,” 32.

²⁵⁰ Sedgwick, “Cheat Codes of the Gods,” 37.

appropriately, and scenes of daily life fit within scholarly expectations.”²⁵¹ Even if the video game does not aim to teach the language, players can encounter Greek names of objects (e.g., the dagger being called *makhaira* from Greek μάχαιρα, dagger or knife),²⁵² overt Greek literary references,²⁵³ and even text written in ancient Greek as in the Sanctuary of Asclepius in Epidaurus, where the player can read a small fragment of a real, 126 line inscription (IG IV², 1.121 = LiDonnici stele A) in ancient Greek:²⁵⁴

Λύσων Ἑρμιονεὺς παῖς ἀϊδῆς. οὗ[τος] ὕπαρ
 ὑπὸ κυνὸς τῶν κατὰ τὸ ἱερόν θε[ραπ]ευόμενος
 τοὺς ὀπτίλλους ὑγ[ι]ῆς ἀπῆλθε

Lyson of Hermione, a blind boy. The boy, while awake,
 has his eyes treated by one of the dogs
 about the sanctuary, and went away well.²⁵⁵

However, as Vandewalle observes, this same inscription returns many times throughout the gameplay and one can encounter it not only on many different stones in Epidaurus, but also in

²⁵¹ Politopoulos et al., “‘History Is Our Playground,’” 317.

²⁵² *LSJ*, “μάχαιρα,” accessed November 8, 2025, <https://stephanus.tlg.uci.edu/ljsj/#eid=67427>.

²⁵³ There are many Greek literary references in AC:O. However, the goal of this literature review is not mainly to show examples of the use of literary text. For Alcaeus, Anacreon, Archilochus and Homer, see Rollinger, *Classical Antiquity in Video Games*; for Herodotus, Pausanias and Thucydides, see Xavier Guilbert et al., “Revivre l’histoire en écrivant la sienne. La construction des mondes d’*Assassin’s Creed*,” *Revue de La BnF* 59, no. 02 (2019): 108, <https://doi.org/10.3917/rbnf.059.0104>; for Aristophanes, Pausanias, Pindar and Thucydides, see Alexander Vandewalle, “Assassin’s Creed Odyssey: een speelbare versie van klassiek Griekenland,” *Hermeneus* 91, no. 04 (2019): 146–52; for Plato (and Socrates), see Alexander Vandewalle, “Playing with Plato: The Presentation of Socrates in Assassin’s Creed Odyssey,” YouTube, March 4, 2021, 2 hours, 36 min., 40 sec., https://www.youtube.com/watch?v=vhYxUY_8vrA.

²⁵⁴ Another small fragment of the same inscription, regarding a miraculous healing of a man’s toe by a Sanctuary snake, has also been used by AC:O; however in this context the fragment’s section is only presented as a non-sensical successions of words and not as the entire section, Alexander Vandewalle, “Scripta Manent: The Inscriptions of Assassin’s Creed Odyssey,” *Working Classicists*, January 21, 2022, <https://www.workingclassicists.com/zine/scripta-manent-the-inscriptions-of-assassins-creed-odyssey>. The same random selection of words can be encountered once again for other inscriptions such as the Gortyn Code (5th century BCE), a real law document found on the wall of the city of Gortyn on Crete, that details different topics e.g., divorce. Within the gameplay, the player is supposed to encounter the Gortyn code itself, but the words shown on the monument come again from the Epidaurian inscription and they are once again randomly selected. Vandewalle cleverly defines this use of the fragment’s words within the video game as “a Greek *lorem ipsum* and a stand-in for the generic concept of text,” Vandewalle, “Scripta Manent.” Moreover, he observes that, even if the choice is unfortunate from an accurate historical perspective, such “recycling” is understandable from a game design point of view as including and designing hundreds or thousands of accurate inscriptions is extremely demanding in terms of time and cost, while the priority of a commercial game is mainly to create a fun and engaging environment.

²⁵⁵ Translation and text by Lynn R. LiDonnici, *The Epidaurian Miracle Inscriptions: Text, Translation and Commentary*, Society of Biblical Literature: Text and Translations 36 (Scholars Press, 1995), 98–9.

different city states such as Delphi or Athens, sometimes with different styles or on different materials.²⁵⁶ A similar choice by the developers makes the inscription lose “its original contextualization, as it starts to be copied and becomes removed from its historical setting. This again opens the game up to criticism and discussions of historical accuracy.”²⁵⁷

Nevertheless, the encounter with a similar literary text (particularly an accurate text, as discussed in the first example) is an effective example of incidental learning, i.e., an informal type of learning that allows one to discover something unexpectedly. This phenomenon can be compared to a common event in academic research, i.e., looking for something and discovering something equally or even more important than the original goal.²⁵⁸ As Vandewalle points out, in this way “the user is thus motivated to engage with the Latin and Greek languages outside of an institutionalized context of education”²⁵⁹ and, one might add, the player-learner sees the language contextualized and understands that the language can be in fact a tool to communicate and do actions or moreover to play. At the same time, this is an example of what Aarseth calls ergodic literature, i.e., texts where “nontrivial effort is required to allow the reader to traverse the text.”²⁶⁰ The term derives from the Greek word ἔργον, “action,” and it indicates the need for doing actual actions to get in touch with and understand a text. As Vandewalle points out,²⁶¹ video games are an exceptional example of ergodic literature as the player must play (take action) in order to navigate the game (the transmedial text). AC:O therefore allows the player e.g., to “walk through the port of Piraeus and board her/his own ship to sail across the Aegean. The port, the crew, the ship, the sea, etc., are represented, but all are part of a simulation in which the user not only views these representations but also acts with(in) them.”²⁶² An example of how AC:O can be ergodically used to teach e.g., Greek religion is given by Oulitskaia.²⁶³

A year later, in 2019, Ubisoft released a stand-alone educational game, thematically connected with AC:O, called *Discovery Tour: Ancient Greece*. The game is set once again in Classical Greece, but the gameplay focuses on a macro-tour, as the title suggests, comprised of 30 micro-tours, through historical places and monuments of ancient Greece in order to learn

²⁵⁶ Vandewalle, “Scripta Manent.”

²⁵⁷ Vandewalle, “Scripta Manent.”

²⁵⁸ Maria Ranieri and Stefania Manca, eds., *I social network nell'educazione. Basi teoriche, modelli applicativi e linee guida* (Erickson, 2013), 75.

²⁵⁹ Alexander Vandewalle, “Ludendo discimus. The Learning Possibilities of Video Games Set in Antiquity,” *Frons* 40 (2019), 42–3.

²⁶⁰ Espen J. J. Aarseth, *Cybertext. Perspectives on Ergodic Literature* (Johns Hopkins University Press, 1997), 1.

²⁶¹ Vandewalle, “Ludendo discimus,” 40.

²⁶² Vandewalle, “Ludendo discimus,” 41.

²⁶³ Vlada Oulitskaia, “Using *Assassin's Creed: Odyssey* to Teach Olympia as Part of the Classical Civilisation A Level,” *Journal of Classics Teaching* 25, no. 50 (2024): 166–72, <https://doi.org/10.1017/S2058631024000400>.

cultural and historical contents.²⁶⁴ Players can navigate through and interact with an open-world ancient Greece while discovering different themes (e.g., Daily Life; Politics and Philosophy; Art, Religion, and Myths; Battles and Wars; Famous Cities), which are connected to different points of interest called “stations” i.e., places or monuments;²⁶⁵ players also have the opportunity to interact with historical (Aspasia, Leonidas and Herodotus) or fictional (Markos and Barnabas) characters. A narrating voice explains the information related to the place or monument, while real images of the reconstructed selected points of interest are shown. At the end of every micro-tour, players can test their acquired knowledge through a multiple-choice quiz. The progression within the macro-tour is by default linear, but players are able to autonomously choose how to progress (whether through the map, or the selection of specific themes in the menu, or through a chronological approach). As the focus of the game is predominantly educational, the usual violent content which characterizes the AC series (e.g., killing, fighting, etc.) is here absent. Ubisoft developed the game in cooperation with education professionals, and provided some curriculum guides that aim to help teachers implement the game in their lessons. The available resources are divided into four main categories: 1) curriculum maps; 2) gameplay maps; 3) adoption tips, which contain FAQs and tips for teachers regarding game implementation; and 4) examples of lesson plans. Moreover, the website offers additional resources containing video recordings of all guided tours, the user guide for the game, more historical resources relevant to teaching and learning, as well as all in-game texts, descriptions, and image files. The first three categories are sortable online through filters or parameters (e.g., subject, learners’ level, topics); all four categories offer printable teaching materials.

The researcher explored the categories focusing on the teaching material for the subject “language and literacy.” The offered curricula in the “curriculum maps” for this subject are 20 in total and they focus on learning goals such as “make logical inferences from text and cite specific textual evidence to support conclusions drawn from text.” Each curriculum represents a short resource containing the learning objective, the instructional recommendations, the

²⁶⁴ For the video recordings of each tour, see “Discovery Tour Assassin’s Creed Odyssey,” *Assassin’s Creed: UK* YouTube playlist, 31 videos, updated September 10, 2019, https://www.youtube.com/playlist?list=PL8za59GW8txS4t33fvf116t_8NKXTrVM2. For the entire gameplay (11 hours), see Michael Gustafson, “Assassin’s Creed Odyssey: Discovery Tour - Ancient Greece | All Tours | All Discovery Sites | 100%,” YouTube, March 12, 2024, 11h, 06 min., 05 sec., <https://www.youtube.com/watch?v=WedmHimZ63A>.

²⁶⁵ Michele Sardo and Mattia Thibault, “‘I like Everything about It’ - Perceived Educational Value of a Digital Gaming Experience with Assassin’s Creed Odyssey: Discovery Tour,” *Italian Journal of Educational Technology* 32, no. 03 (2024): 69, <https://doi.org/10.17471/2499-4324/1399>.

assessment/prompts, the learners' level, and the topics.²⁶⁶ However, instruction of the ancient Greek language is not explicitly targeted.

The pedagogical relevance of a similar tool, especially for historical instruction, seems to be confirmed by Sardo and Thibault's experiment.²⁶⁷ Participants, who were teachers or scholars in the fields of education, history, or history education, expressed their approval towards the pedagogical relevance of the tool, mentioning, for example, benefits such as more engagement, motivation, interest, or even learning.²⁶⁸ A participant also noted that this tool "increases accessibility for learners who might be disadvantaged when learning through conventional methods,"²⁶⁹ which resonates with the UDL approach that will be later discussed. However, some of the disadvantages noted by the participants were: 1) the lack of interactivity, as learners can only "passively discover" the stations without actually "doing something" e.g., a quest or something similar; 2) the lack of explicit learning goals or aims, which caused a cognitive overload;²⁷⁰ and 3) the transmissive-instructional method of the entire experience, which reconnects with the first aforementioned disadvantage.²⁷¹ Therefore, *Discovery Tour* presents both advantages and disadvantages from a didactical point of view.

In 2020 two interesting video games with ancient Greek settings were released: *A Total War Saga: Troy* (TWT) and *Immortal Fenix Rising*. The former was produced by Creative Assembly and represents an installment of the acclaimed *Total War* series. TWT allows players to experience a strategic simulation of the Trojan War either as a Danaan or as a Trojan.²⁷² Even though the video game mainly focuses on war aspects, the main inspiration for the setting is Homer's *Iliad* and Homer himself, depicted as a blind bard, is the narrator of the story.²⁷³

²⁶⁶ For example for the learning objective "Analyze how Ancient Greek society used theater, and how Ancient Greek theater influenced individuals and the society," the instructional recommendations suggest that "Students take the Guided Tour and explore related Discovery Sites, reflect and discuss the questions either in groups or with the whole class" while answering these questions: "What would it be like to watch a Greek play in the theatron? How is this experience different/similar to modern forms of watching drama? "How would ancient Athenian citizens be influenced by watching the Greek plays?" and "How are the effects from Ancient Greek theater different/similar to the impact of modern drama?"The assessments/prompt suggest that "teachers could invite students to write short reflective essays to discuss these questions as an assignment. Encouraging students to explore the game world using the first-person view could help them to imagine the experience and construct answers," see "Discovery Tour: Ancient Greece Curriculum Guide," *Ubisoft*, accessed October 18, 2025, <https://www.ubisoft.com/en-us/game/assassins-creed/discovery-tour/curriculum-guide/ancient-greece>.

²⁶⁷ Sardo and Thibault, "I like Everything about It."

²⁶⁸ Sardo and Thibault, "I like Everything about It," 78.

²⁶⁹ Sardo and Thibault, "I like Everything about It," 78.

²⁷⁰ Sardo and Thibault, "I like Everything about It," 79.

²⁷¹ Sardo and Thibault, "I like Everything about It," 80.

²⁷² Alexander Vandewalle, "Paizomen: A Database of Classical Antiquity Games," *Paizomen*, August 30, 2020, 1, <https://paizomen.com/wp-content/uploads/2020/08/paizomen-vandewalle-aug-30-2020-2.pdf>.

²⁷³ Jane Draycott and Kate Cook, introduction to *Women in Classical Video Games*, ed. Jane Draycott and Kate Cook, *Imagines: Classical Receptions in the Visual and Performing Arts* (Bloomsbury Academic, 2022).

Therefore, many references to Homer’s literature and Homeric dialect are present and visible while playing. Vandewalle observes:

loading screens oftentimes feature Iliadic quotes, the game’s main characters are addressed with heroic epithets (e.g. ‘Agamemnon, wide-ruling lord’ after εὐρὺ κρείων Ἀγαμέμνων),²⁷⁴ and the map’s fog of war is designed in a specific style informed by Greek pottery containing multiple words in (Homeric) Greek, such as names of the gods (Ποσειδάων, Ἀφροδίτη, etc.) or the traditional Greek names of the Iliadic books (λοιμός, μήνις, ὄνειρος, διάπειρα, κατάλογος νεῶν, Διομήδους ἀριστεία, etc.). The spelling of these words follows the early (epigraphical) Greek script: for instance, μήνις is written as

Μ Ε Ν Ι Σ

and Ποσειδάων is written as

Π Ο Σ Ε Ι Δ Α Ο Ν ²⁷⁵

Even though the game has no didactical aims, by playing and encountering these examples (relevant representation of the ancient Greek language within a commercial video game), players could once again experience incidental learning (see *supra*). Moreover, the references to Homer’s *Iliad* could be used to introduce aspects of the Homeric dialect and the poem itself.

On the other hand, *Immortal Fenyx Rising*, released by Ubisoft, is an action-adventure game that tells the story of a Greek (mortal) farmer, Fenyx, playable both as a female or male character. Fenyx is shipwrecked on a mythical island, called Golden Isle, inhabited by several gods. Once Fenyx arrives, she finds that the island has been destroyed and left in ruins by the attack of the evil Giant Typhon, whom she will be asked to defeat. Due to this attack, some gods have fled (as described in Ovid *Metamorphoses* 5.321-324), but others have stayed to (unsuccessfully) try stopping Typhon. As a consequence of their failure, the gods that stayed have been transformed by Typhon into threatless entities, e.g., a chicken (Ares), a tree (Aphrodite), a child (Athena), and an automaton (Hephaestus). The narrators of the entire story are Zeus and Prometheus, as the King of gods asked for Prometheus’ help to foresee the future and defeat Typhon.²⁷⁶

²⁷⁴ “At the time of release, players could experience the game’s campaign from the perspective of eight distinct heroes (four Danaans and four Trojans): Achilles, Agamemnon, Odysseus, Menelaus; Hector, Paris, Aeneas and Sarpedon. The epithet εὐρὺ κρείων for Agamemnon is found at *Il.* 1.102, 1.411, 3.178, 7.107, 7.322, 11.107, 11.238, 13.112, 23.887 and *Od.* 3.248. With the *Amazons* DLC pack, released on September 24th 2020, the game added Hippolyta and Penthesilea as playable characters,” Vandewalle, “*Paizomen: A Database of Classical Antiquity Games*,” 1.

²⁷⁵ Vandewalle, “*Paizomen: A Database of Classical Antiquity Games*,” 1.

²⁷⁶ Alexander Vandewalle and Maciej Paprocki, “Mythological Comedy through Incongruity in *Immortals Fenyx Rising*: Humor and Playfulness in Antiquity Games,” *Game Studies* 24, no. 4 (2024): 5–6.

Immortal Fenyx Rising is relevant to this literature review as it represents a very interesting example of Classical reception of comedy and therefore a potential tool to introduce comical texts to learners. Vandewalle and Paprocki showed many parallels between the entire (fictive) structure of the video game's narrative and comical examples of Greek literature.²⁷⁷ The authors have identified some analogies to the *Dialogues of the Gods* by Lucian of Samosata (ca. 125 – after 180 CE) in particular, as well as to mythological parody, a characteristic of the Greek Middle Comedy (ca. 400-340 BCE).²⁷⁸ Within the gameplay of *Immortal Fenyx Rising*, one can recognize similarities with Lucian's *Dialogues*, e.g., the comical request for help by Zeus to Prometheus (*Dialogue 5*) or the ongoing quarrel and fighting between the gods (*Dialogue 8 and 15*). A similar video game could therefore be employed in a classroom to introduce Greek comical literature (especially Lucian's *Dialogues*) or the Middle Comedy.

Between 2021 and 2022, even though many video games with an ancient Greek settings were developed, none are particularly relevant to this literature review. On the other hand, a notable virtual reality experience was released in 2023: the *Virtual Reality Oracle* (VRO). VRO cannot be considered as a commercial video game, as it represents instead an academic Virtual Reality (VR) experience, professionally developed by a cluster of different British universities. VRO offers a seven minute-long historically accurate virtual encounter with the Ancient Greek Oracle of Zeus at Dodona (c. 465 BCE). Users experience it in first-person by impersonating a slave asking for an oracular divination after having escaped. The seven minute-experience is divided into different scenes, focusing on the story of different ancient Greek men and women consulting the oracle, e.g., two Spartan brothers. The project hired Greek actors to voice the characters to increase the authenticity of the experience, even though the chosen language for VRO was English. To guarantee historical accuracy, a team of ancient historians worked on the narrative as well as the physical designs, including characters and dialogues. The research team decided not to implement any elements of agency or interaction. Even though VRO was not developed to teach the ancient Greek language, a similar resource could be integrated within language classes together with original Greek oracular tablets such as those of Dodona,²⁷⁹ along with an excursus on the cultural relevance of the oracular arts in the Greek world.²⁸⁰

²⁷⁷ Vandewalle and Paprocki, "Mythological Comedy through Incongruity in Immortals Fenyx Rising."

²⁷⁸ Heinz-Günther Nesselrath, *Die attische mittlere Komödie: Ihre Stellung in der antiken Literaturkritik und Literaturgeschichte* (de Gruyter, 1990), 188–241.

²⁷⁹ *Dodona online*, accessed October 29, 2025, <https://dodonaonline.com/>.

²⁸⁰ The official website of the project offers some didactical suggestions on how to use the VOR in the British school system through its links with the OCR A-level curricula. See "Resources for Teachers," accessed October 18, 2025, <https://www.vroracle.co.uk/db#aLevelLinks>.

In 2024, *Kottabos VR* was released.²⁸¹ *Kottabos VR* was developed by lead programmers Aiden Gohlke and Donovan Lott at Kennesaw State University and is available for free on the Steam platform. It represents a VR experience of the *kottabos*, a popular ancient Greek game in which players were asked to throw the dregs from the bottom of their cup at targets (such as a disk on the top of a pole or cups floating in a bowl of water). The items presented in the game are 3D reconstructions of real ancient furniture, pottery, and Kottabos targets from museums,²⁸² which therefore easily show a possible usage of *Kottabos VR* for additional activities offered by museums hosting these artifacts. This tool could however also be used in language class. For example, the webpage “Samothracian Networks,” which is involved in the Kottabos project, has created learning resources in order to implement *Kottabos VR* in the classroom. One of these resources revolves, for example, around the description of the κότταβος made by Athenaeus of Naucrati (2nd-3rd centuries AD) in his *Deipnosophistae* (15.665d sqq.),²⁸³ which could therefore be offered to students in its original language combined with a cultural insight on the role of games in the Greek world.²⁸⁴

²⁸¹ In 2024 *Oedipus/Antigone* was also released. While the tool presents Greek texts in the original language, the game component is completely absent in this example, and thus the researcher decided to describe it in a footnote. *Oedipus/Antigone* is a “visual novel” (or rather an “illustrated book”) developed by Febrvum. Sophocle’s Theban cycle, i.e., the three tragedies Oedipus Rex, Oedipus at Colonus, and Antigone, are simply presented on screen in an English translation by R. Jebb and in Greek, accompanied by AI-generated illustrations and an original soundtrack. No actual gameplay or interactivity are present. On a Reddit thread, the developer (@Februum) explained that a “visual novel is a good alternative to a book or an audiobook. So it might be more engaging for students. And for those who already know the material, it is an option to re-read the plays and to see the presentation, the art direction [sic!].” See “I’ve made a visual novel adaptation of the Theban cycle of Sophocles. The game is called Oedipus/Antigone and I’m planning to release it on Steam next week. Here’s the trailer.,” Reddit Post, May 28, 2024, https://www.reddit.com/r/ancientgreece/comments/1d2nh1f/ive_made_a_visual_novel_adaptation_of_the_theban/.

From a didactical point of view, the visual component of the tool, i.e., its AI-generated illustrations, might (partially) help learners with inferring the context and perhaps engage them, however the lack of a voiceover of both the English translation and the Greek text - which could have been beneficial for Special Educational Needs students - and its lack of interactivity seem to diminish the potential pedagogical value.

²⁸² “Kottabos VR,” *Samothracian Networks*, accessed October 18, 2025, <https://scholarblogs.emory.edu/samothraciannetworks/educational-gaming/casual-educational-gaming/kottabos-vr/>.

²⁸³ “Kottabos VR – Lesson 1 (Reading Assignment),” *Samothracian Networks*, accessed October 18, 2025, <https://scholarblogs.emory.edu/samothraciannetworks/educational-gaming/casual-educational-gaming/kottabos-vr/kottabos-vr-lesson-1-reading-assignment/>.

²⁸⁴ Two other video games that are still in development that could be interesting for the means of this research are *Lisistrata* and *Homer’s Odyssey*. However, as they have not yet been released, no further information is available.

3.5.2. Educational games for Latin and Greek

In the second category of analysis, i.e., examples of gamified learning environments for Latin and Greek, one project for Greek mythology and three for Latin have been considered: *The Trojan War*, *Operation LAPIS*, *Lingua Vitae*, and *Rome: The Game*. Moreover, another example not focusing on Latin or Greek, but relevant to this dissertation has been taken into consideration. It is important to note that at present time, no actual examples of DGBL to teach the ancient Greek language seems to exist in academia.

Salapata, Tracy, and Loke designed a scenario-based video game called *The Trojan War* to teach Greek mythology to students at Massey University in New Zealand.²⁸⁵ Even though the researchers did not aim to teach the language and as far as one can understand from the article, the Greek language was not present in the video game, it is still a remarkable example of DGBL applied to ancient Greek. As the researchers point out, the students could impersonate a main character from the Trojan War mythology and “make pivotal decisions at critical junctures in his or her story. Depending on the choices made, players can either arrive at the ‘canonical’ (and usually rather grim) outcome prescribed by the Greek mythological tradition or else shape an entirely different outcome, both for their chosen character and for the Greeks and Trojans as a whole.”²⁸⁶ The main pedagogical aim was to promote in students critical engagement with the past and to make them ponder their choices so that, “rather than winning, the game aims to give students the opportunity to engage with key ancient Greek ideas and values that are also of relevance to modern social issues, by exploring multiple perspectives on the topic,”²⁸⁷ which can be connected with this research’s idea of Greek as field to practice one’s intercultural competence. Additionally, this project is an example of Interactive Fiction (IF) which is also the genre used for the experimental tool and is discussed in Chapter 2.

Another interesting example of gamified learning is the project *Rome: The Game* by the University of Santa Barbara (CA, USA). The project was developed by the History of Art & Architecture Department in conjunction with the Writing Program, and is a choose-your-own-adventure-style interactive narrative, where “undergraduate students play the role of a graduate student who is sent to Rome by a Getty Museum curator in order to solve a mystery involving

²⁸⁵ Gina Salapata et al., “Teaching Greek Mythology through a Scenario-Based Game,” *Journal of Classics Teaching* 25, no. 49 (2024): 22–32, <https://doi.org/10.1017/S2058631023000752>.

²⁸⁶ Salapata et al., “Teaching Greek Mythology through a Scenario-Based Game,” 22.

²⁸⁷ Salapata et al., “Teaching Greek Mythology through a Scenario-Based Game,” 29.

an ancient statue found in the museum's storeroom."²⁸⁸ The adventure, an online course of nine chapters covering a ten-week quarter, offers all its course materials in different formats (e.g., videos, podcasts, readings, mini-games, images, interactive websites, etc.), as well as assessments in both archeology and writing.²⁸⁹ The project, unlike the following examples, does not aim to teach the Latin language, but rather focuses on both Roman archeology and writing. The goal of the project is therefore "to immerse students inside a rich interactive world that encourages students to engage with and retain information more effectively, to feel more invested in the course and its assessments, and to reflect meaningfully on course material."²⁹⁰ Even though the learning goal is not linguistic, its structure and foci offer notable observational points for this research. One of the project's main characteristics is the "choose-your-own-adventure" format, which "offers a narrative crafted in the second-person point of view, allowing the reader to step into the role of protagonist and assume a measure of control over the shape of the narrative."²⁹¹ The ability to choose is offered through the branching technique, which therefore allows different possible storylines and connected consequences. Choice is however supported by close scaffolding, as, for example, "if the student's choice is based on a misunderstanding of the material, the game responds with relevant information, as well as new chances to make different choices, offering the student the opportunity to learn from past 'mistakes.'"²⁹² The learning material is strictly connected to the narrative and students are motivated to engage with the former in order to be able to proceed with the latter, given that "successful choices can only be made with knowledge gleaned from the readings and other course materials."²⁹³ Therefore, both narrative and possibility of choice represent the main foci of this project. Moser and Thomas also focused on punctuating the most relevant learning goals through the elicitation of emotions within the narrative. Hence, they offered the narrative as a mystery within which looking at statues or their context (i.e., a learning goal) represented a step towards the resolution of the mystery itself.²⁹⁴

²⁸⁸ Claudia Moser and Christian Thomas, "Rome: The Game. Creating an Online Course as an Interactive Adventure Game," *Journal of Classics Teaching* 25, no. 50 (2024): 155, <https://doi.org/10.1017/S2058631024000394>.

²⁸⁹ Moser and Thomas, "Rome," 155.

²⁹⁰ Moser and Thomas, "Rome," 160.

²⁹¹ Moser and Thomas, "Rome," 156.

²⁹² Moser and Thomas, "Rome," 156.

²⁹³ Moser and Thomas, "Rome," 156.

²⁹⁴ It is worth noting that, thanks to the experience of the creators of *The Wolf Among Us*, a popular narrative-driven game produced in 2014 by the company Telltale Game, Moser and Thomas decided that within the mystery genre, particular importance must be paid to the interrelationships among characters in order to elicit intense emotions and social connectedness in players.

Even though the project was not followed by an experiment to investigate evidence-based effectiveness, researchers collected some of the anonymous comments students left during and after the experience which resonate with this research's findings: regarding the narrative, 90% of students positively rated the effectiveness of the narrative component in information retention, as they expressed a feeling of investment in the learning material by saying e.g., that it helped them feel personally more engaged as they had the feeling they were participating in the story. Further, a majority (76%) of students positively commented on both the effectiveness of the game format in information retention and on the helpful nature of interactivity (e.g., choices and interactive videos) to learn. Researchers finally commented: "it should be noted that student assessments too reflected this level of retention and investment, with high marks on the weekly writing assignments, midterm exam, and final papers and strong evidence of student commitment, creativity, and retention of knowledge."²⁹⁵ Even though further investigation is clearly needed and causality cannot be assessed, the success of *Rome: The Game* seems to offer noteworthy insights into the potentiality of narrative-focused, game-based learning for classical subjects.

The web-based project *Operation LAPIS* is a (digital) game-based learning interactive adventure to learn Latin, created by The Pericles Group. The starting question which moved the developers in creating *Operation LAPIS* was: "can storytelling afford opportunities to investigate a culture while simultaneously belonging to the culture being investigated?"²⁹⁶ According to the game developers, *Operation LAPIS* can be called a "collaborative narrative grounded in experiential, project-based, and anchored learning – that is, a shared tale in which students learn the language by role-playing as Romans."²⁹⁷ The project is divided into 174 immersive units that cover both language and cultural content,²⁹⁸ and are available to students through the educational interfaces Edmodo and Google Drive, in a form somewhere between

²⁹⁵ Moser and Thomas, "Rome," 163.

²⁹⁶ Stephen T. Slota and Kevin Ballestrini, "Una Vita: Exploring the Relationship between Play, Learning Science and Cultural Competency," in *Teaching Classics with Technology*, ed. Bartolo Natoli and Steven Hunt (Bloomsbury Academic, 2019), 83.

²⁹⁷ Stephen T Slota et al., "Learning Through Operation LAPIS - a Game-Based Approach to the Language Classroom," *The Language Educator* (2013): 36.

²⁹⁸ The following is an example of the language and cultural content, taken from the "Grammatical and Cultural Objectives" section available on the web-page of the project: "Mission 1, grammatical objectives, • Nominative singular • Accusative singular • 3rd person singular present tense • Introduction to Latin word order; Mission 1, cultural objective, • Analyze Roman naming conventions and construct Roman greetings, • Analyze and evaluate Lucius Caecilius Iucundus, • Examine the lay-out of the Roman house, • Design a route around the major neighborhoods of Pompeii, • Identify, describe, and use customs of Roman dining," see Kevin Ballestrini and Stephen T. Slota, "Practomime," *The Pericles Group*, accessed October 18, 2025, <https://www.practomime.com/lapis/lapis.php>.

an Internet forum and a social networking platform.²⁹⁹ In these units the students-characters, organized in teams, roam around the Roman world to decipher an inscription of the so-called “Lapis Saeculorum” in order to ultimately save the values of the ancient World in the Western culture. These immersive units represent a two-year introductory Latin curriculum which covers the same contents as most common English-based Latin textbooks (e.g., Cambridge Latin Course, Oxford Latin, etc.).³⁰⁰ In this project, learning Latin is deeply interconnected with learning about Roman culture and how to critically analyze it. Through the idea of ergodic learning (see *supra*), the students must interact with the story to reach the tablet inscription, and to interact with it they must progressively learn the language. In this process, the pedagogical aim is to promote problem-solving, critical thinking, and reflection.³⁰¹ Different *CODICES* i.e., a series of web-pages including the language content, are offered as tools for the students, who are therefore motivated to independently discover the language mechanisms that they need to proceed in the story: each *CODEX* presents a *grammatica* section, a *verba* section for unknown glosses, *key texts* for additional reading materials, and *attunement exercises* to practice Latin skills. Although the project has been developed for the Latin language and at the present time is inaccessible, the structure and the educational goals in which it is grounded resonate with this research’s experimental tool.

The last Latin project is *Lingua Vitae*. The project has been developed starting September 2018 by Lissa Crofton-Sleigh and Brian Beams at Santa Clara University (CA, USA) supported by a team of faculty members, student programmers, and a nontechnical student research assistant. *Lingua Vitae* represents the combination of XR technology (eXtended Reality) and Latin language active education at a university level. It was conceived as a supplement to *Wheelock’s Latin*, the textbook used at Santa Clara University Latin courses. The XR component of the project was implemented through a 3D reconstruction of the Roman Forum. However, this reconstruction, which took inspiration from Frischer’s *Rome Reborn*³⁰² (an ensemble of different apps that uses Virtual Reality – VR – to reconstruct some parts of ancient Rome), exhibits a structural difference: “rather than placing emphasis on the site of Rome

²⁹⁹ Slota et al., “Learning Through Operation LAPIS,” 37.

³⁰⁰ Slota et al., “Learning Through Operation LAPIS,” 36.

³⁰¹ Slota et al., “Learning Through Operation LAPIS,” 38.

³⁰² “L’esperienza Rome Reborn consiste in una serie di applicazioni che prevedono l’impiego di realtà virtuale e si basano su tour, guidati o da svolgere autonomamente, attraverso fedeli ricostruzioni delle architetture romane. Attualmente le due applicazioni della serie disponibili sono The Roman Forum e Flight Over Ancient Rome. La prima consiste in un video esplicativo guidato che fa da introduzione all’esperienza in realtà virtuale, la quale fa sì che l’utente sia libero di muoversi ed esplorare la ricostruzione del Foro romano; il secondo pone l’utente a bordo di una mongolfiera immaginaria che sorvola la città di Roma come appariva nel 320 d.C.,” see “Rome Reborn,” IVIPRO, accessed October 2018, 2025, <https://ivipro.it/it/portfolio-item/rome-reborn/>.

(architecture, topography, and so on), *Lingua Vitae* focuses on the people and communication of ancient Rome, highlighted by the interaction with virtual characters in Latin, telling a story as the player advances.”³⁰³ Further, the reconstruction also depicted an earlier historical period (late 1st century BCE) compared to *Rome Reborn*. Player-learners could navigate the 3D space by pointing and clicking through Oculus Touch controllers (a VR headset by the Meta Company), converse in Latin with characters, voiced by different actors, and progress in the narrative through the branching structure of the story.³⁰⁴ The dialogues were therefore written and fully voiced. Researchers encountered many difficulties in the selection of the vocabulary, as they needed to craft it so that the vocabulary proposed in the dialogue was compatible and aligned with the textbook’s contents. The researchers also needed to understand how to develop the dialogue in the chapters of the story while considering the selected vocabulary.³⁰⁵

The narrative focuses on the story of Titus, a young fictional poet, who seeks inspiration to write a poem. Titus would also like to find a patron during a military triumph in Rome and in order to do so he interacts with other characters in Latin. The active and inductive educational component is a fundamental part of the entire project as NPCs (Non-Player Characters) assign players various tasks in Latin which players therefore must be able to understand and translate in order to complete them. Crofton-Sleigh and Beams affirm that their goal is for players to learn the single word through a contextual understanding of the story, therefore a “learning by doing,” or even better, “learning by playing” approach. The 3D and narrative components further offer the opportunity for contact with historical contextual information regarding everyday Roman life as the story also focuses on everyday scenarios: as most digital content focuses instead on topics such as war and politics, *Lingua Vitae* offers an important opportunity to discover Latin as a *lingua vitae*, i.e., a language of (everyday) life, as the title of the game suggests. The project was preliminarily tested in the fall and winter of 2019-2020 with Latin students at Santa Clara University. The research questions concerned whether and how VR can aid the acquisition of a foreign language and the understanding of cultures that lived thousands years ago, and whether VR can enrich the humanities and “their striving to understand the

³⁰³ Lissa Crofton-Sleigh and Brian Beams, “*Lingua Vitae*: Teaching the Latin Language in Virtual Reality,” in *Past and Future Presence: Approaches for Implementing XR Technology in Humanities and Art Education*, ed. Lissa Crofton-Sleigh and Brian Beams (Amherst College Press, 2024), 97, <https://doi.org/10.3998/mpub.14371789>.

³⁰⁴ For an insight into the branching technique, see chapter 2 (cf. 3.2.2).

³⁰⁵ Crofton-Sleigh and Beams, “*Lingua Vitae*,” 98. To tackle this challenge, Crofton-Sleigh decided not to include any vocabulary that was not part of the Wheelock vocabulary for the chapters covered. Moreover, words that were not clear derivatives of English were placed into the dialogue in English (for example, “Decernunt si (if) patria bellum geret et de aliis consilia capiunt”).

nature and development of being human.”³⁰⁶ The experimental and control groups were comprised of 19 and 12 participants, respectively, and both groups had already learnt the first ten chapters of the textbook before participating in the experiment. Pre- and post-questionnaires were administered to both groups who interacted with *Lingua Vitae* but with a small difference: the experimental group experienced the VR and interacted with the NPCs, while the control group had to read and translate the written dialogues. Even though the sample was quite small and therefore the results need to be approached with caution, the responses to the VR experience were positive, and post-questionnaires also showed a positive trend in vocabulary recognition. The trend seems to be exemplified by the results regarding the term *panis*, “bread,” that both groups did not know before the experiment, but that they encountered in the adventure when one NPC (the centurion) asked players to purchase a loaf of bread for him. Researchers commented that in defining the word *panis*, the control group’s correct responses increased from 42.8% to 71.4% between pre- and post-questionnaire, while the experimental group’s correct responses went from 38.8% to 100%.³⁰⁷ Despite the necessity of further and broader investigation, *Lingua Vitae*’s experiment suggests a positive potentiality of VR for learning Classical language.

Some structural differences between *Lingua Vitae* and this research’s project should be noted: firstly, the researchers of *Lingua Vitae* did not opt for a mystery narrative which could have increased students’ perception of active participation (as *Rome: The Game* showed) and secondly, they decided to follow the content progression of a book, instead of creating their own content progression, which represented a challenge in terms of developing the narrative and its dialogues. As will be analyzed in Chapter 2 of this dissertation, the researcher hypothesizes that, even if clearly more expensive in terms of time and resources, a personally-crafted content progression could facilitate in the long run the creation of story, as one could introduce themes and content according to the narrative’s necessities and not the opposite: therefore, instead of creating the story and then adjusting its development according to a pre-fixed content progression, one could create a flexible scaffolded structure of content progression and tailor such progression to the story as it develops. Especially for the introduction of vocabulary, a “home-made” content progression might simplify the introduction of new words. However, a similar *in fieri* content progression represents at the same time both a great resource for narrative freedom and development as well as a great challenge for

³⁰⁶ Crofton-Sleigh and Beams, “*Lingua Vitae*,” 103.

³⁰⁷ Crofton-Sleigh and Beams, “*Lingua Vitae*,” 106.

didactical planning, as one must be able to meaningfully anticipate or delay specific contents in order to enable learners to interact with the story (and maybe later on, also with the original texts).

A final and inspirational example of a language-based video game is the successful *Chants of Sennaar*, released by Rundisc and Focus Entertainment in 2023. While it does not center around Latin or Greek (in fact it focuses exclusively on fictional languages), *Chants of Sennaar* is a language-themed puzzle game where players need to decipher unknown glyphs through observation, contextual clues, and trial and error, in order to discover different fictional languages and cultures while climbing a tower (inspired by the Biblical story of the Tower of Babel). As Donat and Lilie point out, “during the game, you will explore different places, meet people of various cultures and classes and initially never understand the language they communicate in.”³⁰⁸ The main gameplay requires players to use contextual clues to guess, infer, and translate the right meaning of the presented glyph in order to be able to further climb the tower. The glyphs are presented either as dialogue bubbles from NPCs or as notebooks that one encounters in discovering the world. Yet interestingly, the mechanics of the translation process is left completely up to the player, as they can enter any word they think is the right translation for the glyph; consequently this mechanism “creates an engaging and fun playing experience as it can make the player feel like a linguist deciphering a lost language, or a puzzle solver needing to understand their environment to reach their goal.”³⁰⁹ A notable aspect of this video game is the interconnection between language and culture: within the game, players will learn that the languages they are learning, unique for each of the five groups of people they will meet, reflect some pivotal cultural aspects of each group, e.g., the “Bards” have many words in their vocabulary to describe arts and music, which are their main interests, while another group, the “Warriors,” give strong importance to words in the field of duty, as their goal in life is to protect the tower. Players will therefore learn that “the vocabulary [of each group] also reflects on their statuses, their beliefs, uniquenesses and the way they perceive the other cultures.”³¹⁰

As the processes of deciphering and inferring, as well as the importance given to the relationship between culture and language, are pivotal for foreign language learning or translating – both important components of ancient Greek learning – the researcher decided to

³⁰⁸ Luise Donat and Julius Lilie, “How Chants of Sennaar Creates Intriguing Gameplay around Learning Culturally Infused Languages,” *SSNR* (October 25, 2024): 1, <http://dx.doi.org/10.2139/ssrn.5001086>.

³⁰⁹ Donat and Lilie, “How Chants of Sennaar Creates Intriguing Gameplay around Learning Culturally Infused Languages,” 2.

³¹⁰ Donat and Lilie, “How Chants of Sennaar Creates Intriguing Gameplay around Learning Culturally Infused Languages,” 5.

include *Chants of Sennaar* in the literature review as well, as it serves as an inspiring example of how language learning and translating mechanisms can be successfully included in a video game:³¹¹ in fact, *Chants of Sennaar* received extremely positive reviews from both players (Metacritic Score 8.6/10 on the PC version) and video game critics (86/100).³¹²

In conclusion, the literature review has highlighted some relevant aspects for the present research. Firstly, some commercial video games set in ancient Greece include references in translation of famous Greek literary works, such as the Lucian's *Dialogues* or Sappho's *Hymn to Aphrodite*. Others present some examples of ancient Greek language in the form of dialogues (as in *Oedipus Dating Sim*), to indicate some objects (e.g., μάχαιρα for dagger in AC:O) or to characterize places (e.g., the inscription at the Sanctuary of Epidaurus in AC:O). Although these games were not developed specifically to teach the Greek language or literature, they could be used to introduce particular aspects of ancient Greek literature and language, for example by showing the reconstruction of specific places through AC:O and comparing it with Pausanias' testimony, as Oulitaskia has shown in her study.

Secondly, the literature review has pointed out the lack of examples of DGBL to teach the ancient Greek language, which represents the research gap investigated in this study. Hence, the analyzed examples of DGBL to teach the Classical languages referred to Latin, while another example focused on Greek mythology. All examples showed a strong focus on narrative and on the possibility of making choices, yielding positive effects for learners. This combination, shared by all examples, was also one focus of the present research and will be analyzed in detail in chapters 2 and 3.

3.6. DGBLL: game-based, game-enhanced and game-informed

Within the DGBLL (Digital Game-Based Language Learning) world, Sykes and Reinhardt have proposed three different terms to help distinguish between commercial/vernacular games used in game-enhanced instruction and game-based environments:³¹³ 'game-enhanced,' 'game-

³¹¹ Other interesting examples of similar language-deciphering video games – that also served as inspirations for the developers of *Chants of Sennaars* – are *Lingotopia* (released by Lingo Ludo in 2018), *Heaven's Vault* (released by inkle Ltd in 2019), *Observation* (released by No Code in 2020), *Sethian* (released by Duang!Games LLC in 2016), and *Missing Translation* (released by ALPixel Games in 2015).

³¹² "Chants of Sennaar Reviews," *Metacritic*, accessed October 18, 2025, <https://www.metacritic.com/game/chants-of-sennaar/>.

³¹³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*; Jonathon Reinhardt and Julie M. Sykes, "Conceptualizing Digital Game-Mediated L2 Learning and Pedagogy: Game-Enhanced and Game-Based Research and Practice," in *Digital Games in Language Learning and Teaching*, ed. Hayo Reinders (Palgrave Macmillan, 2012).

informed,’ and ‘game-based.’ They suggest the overarching term *gameful*, which refers to a common characteristic of the aforementioned terms, i.e., the fact that “they all presume a learner or a player of the designed activity is a player-learner with a certain disposition, mindset, or approach that may be focused on the ‘serious’ activity of learning, but is still open to being in a game and playing by its rules, that is, by being gameful.”³¹⁴ The notion of *gameful* is complementary to *learnful* which refers to the disposition of finding learning opportunities in environments not expressly designed for learning.³¹⁵

‘Game-enhanced’ refers to the use of vernacular games which are not originally built for second language teaching and learning, but are instead adapted afterwards to promote language learning.³¹⁶ The broader commercial video game industry today is very prolific in terms of output, and even though it does not focus on the production of games for learning, many games on the market can be used as DGBLL (e.g., *World of Warcraft* or *The Sims* for modern languages, or the commercial examples mentioned in the literature review for ancient Greek).

‘Game-informed’ refers to those games that use the instruction of play or games’ theoretical principles in the first instance and add certain theories of SLA after the fact.³¹⁷ This means that game developers try to understand how to incorporate what Reinhardt calls *gamefulness* into instructional practices. The concept of game-informed encompasses the notion of gamification, but the main difference between the two, according to Reinhardt, is that in game-informed environments, playful elements are not immediately identifiable, while in gamification they are recognizable and unconventional for the system into which they are placed. As Reinhardt points out, often the macroscopic difference between the two is “a matter of degree and formal design.”³¹⁸ However, game-informed for second language learning offers interesting environments, which normally understand the importance of contextualization and insert language learning into a meaningful and goal-directed narrative, promoting goal-directed behavior.³¹⁹ This means that learners are always using the language to do something meaningful, which is a fundamental part of the task-based approach, discussed in Chapter 2. However, one risk that may occur while planning a game-informed environment needs to be

³¹⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 11.

³¹⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 12.

³¹⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 194–5.

³¹⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 173.

³¹⁸ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 186.

³¹⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 182.

mentioned, namely that of transferring old pedagogical designs to new contexts.³²⁰ As Reinhardt observes, “new designs should be built anew on the reality that the boundaries between informal and formal learning have been permanently blurred by digital technology, and actively counter the message that school is where all or most of the learning happens.”³²¹ Game-informed environments for second language teaching and learning aim to support autonomy and independence in language learning, and to make learners understand that they should not always rely exclusively on teachers or formal resources, given that gaming, and thus game-informed environments, can be learning experiences as well.

Lastly, the notion of ‘game-based’ represents the use of educational games which are from their conception designed for second language teaching and learning. This kind of DGBLL is uncommon, as it is particularly expensive and difficult to create. As opposed to vernacular games, in this type of environment the formal pedagogical structures are mostly explicit, as they are intended from the beginning as means to learn. As Reinhardt points out, often the distinction between what is *lesson* and what is *game* depends on the perspective and perception of the learner-player, as “a lesson acting like a game is gamification, while a game acting like a lesson is an educational game.”³²²

Game-based environments can be divided in two types: 1) story-focused games, which use narrative, progression, and role play as means to contextualize how a target language is used thematically and coherently, and 2) structure-focused games, in which language structures are explicitly the focus of learning (e.g., the game could focus on learning the English present perfect forms).³²³ In the former type, if the narrative is too evocative, learning could be negatively influenced, while in the latter type, if structures are not connected to the understanding of the use or context of that particular form, learners will gain declarative knowledge, but not procedural competence.³²⁴

Moreover, one major drawback of this last type of DGBLL that has been pointed out by many researchers is that many game-based environments are designed for a particular context or audience and therefore may suffer from the so-called “chocolate-covered broccoli effect.” This metaphor refers to the idea that when learners “bite through the ‘chocolate coating’ or

³²⁰ Donatella Troncarelli, “Nuovi e vecchi paradigmi nell’insegnamento delle lingue e culture straniere in rete,” in *Orientarsi in rete. Didattica delle lingue e tecnologie digitali*, ed. Donatella Troncarelli and Matteo La Grassa (Becarelli, 2016), 44.

³²¹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 180.

³²² Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 195.

³²³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 199-200.

³²⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 200.

gameful trappings of an educational game, they are repulsed by the ‘broccoli’, or the boring, ineffective educational content.”³²⁵ Therefore, the focus of a game-based implementation must be finding the *aurea mediocritas* between chocolate and broccoli.

3.6.1. Guidelines to create a DGBLL environment for ancient Greek: theory

This section is conceived as the first step of a three-part macro-section of this research, focusing on the implementation of DGBLL for ancient Greek. Each chapter of this study focuses on a different part of the macro-section: in this first chapter, the focus lies on listing some theoretical guidelines regarding how to create a DGBLL environment for languages in general with some references to ancient Greek; in the second chapter, the single design elements (e.g., narrative, incentives, etc.) are analyzed in detail and in explicit relation to ancient Greek learning; lastly, in the third chapter, in light of the experimental findings and of the aforementioned sections, some guidelines – this time more “practical” – on how to develop a DGBLL adventure explicitly for ancient Greek are discussed.

In order to create a DGBLL environment, one must consider different aspects. Firstly, one has to decide if one wants: 1) to target only a specific L2 level and differentiate levels according to game proficiency; 2) to create different game versions according to different L2 proficiency levels; or 3) to create different difficulty levels for each task according to L2 proficiency where learners can progress through levels, “according to the development of the game and language skills separately.”³²⁶

Secondly, language learning through video gaming must be goal-oriented, which means that players must have specific in-game tasks to accomplish. In-game tasks represent “a goal-oriented activity the player does in the game for a particular reward or possibly penalty.”³²⁷ Therefore, learners should be able to explicitly understand what they are going to learn and have some level of agency and possibility of choice. Tasks can be divided in so-called “knowledge tasks” or “use tasks:” in the former, a task’s completion involves demonstrating correct knowledge on a language aspect; in the latter, a task’s completion can involve “successful comprehension or communication about game narratives or related discourses, or successful interaction with an NPC [Non-Player Character].”³²⁸ The reward for every

³²⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 10.

³²⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202.

³²⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202.

³²⁸ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202.

completed task should involve the possibility of progression in the game, or the acquisition of a tool useful for future tasks or for increasing win chances.

Thirdly, feedback plays a very important role and must be always provided, but it must be well balanced. This means that the focus should neither be mainly on the story nor on the form or structure (i.e., language) but should rather strike the right balance between the two.

Fourthly, it has been observed that effective educational games simultaneously combine extrinsic and intrinsic learning games.³²⁹ Extrinsic learning games, according to Malone, focus on learning solely the content, rather than focusing on both playing and learning the content as in intrinsic learning games.³³⁰ An extrinsic approach can fundamentally be seen as the GT pedagogical perspective, while the intrinsic approach mirrors contextualized pedagogical approaches such as Communicative Language Teaching.³³¹

Further, an ideal DGBL environment should promote meaningful interaction between learners (cooperation). That could be realized by e.g., “one-way or two-way information gap tasks, and brainstorming or problem solving tasks that demand a single shared outcome (i.e., a shared goal).”³³² Adapting this aspect to a language learning environment could involve e.g., “differentiating access to resources like glossaries for certain registers or domains of language like a magic spell book or a food recipe book, or specific grammar guides like a book of past tense forms or a scroll of gerunds and infinitive.”³³³

Furthermore, a well-designed DGBLL environment should offer “spaces for identity work and play, in other words, investing in and experimenting with who you are and might become.”³³⁴ This means that a player can experiment with mimicry by using new roles or points of view.

Lastly, it should take advantage of the possibility of m-learning (Mobile Learning) by e.g., using mobile devices’ features such as cameras or video recording capabilities to promote collaborative games or by emphasizing the anytime, anywhere characteristic of m-learning in order to increase learners’ sense of autonomy and motivation.

³²⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 204.

³³⁰ Malone, “Toward a Theory of Intrinsically Motivating Instruction,” 360-1.

³³¹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 204.

³³² Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 204.

³³³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 205.

³³⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 205.

Purushotma, Thorne and Wheatly listed ten principles to follow to create a DGBLL environment, many of which resonate with Reinhardt.³³⁵

The three researchers begin their contribution by highlighting that, as modern language didactics prescribe, students should be active with the language in order to learn it better. For modern languages, the learning goal is normally communication, while in corpus languages such as ancient Greek, the goal is usually text-comprehension or translation. However, neither communication nor comprehension can be achieved without using and experiencing the language itself: hence, if a grammatical content is taught within a task, learning is far more effective and remarkable, as the students embodied the content, or at least they can practice the structure without knowing that they are practicing it.³³⁶

The researchers discourage from following one tendency in L2 videogames i.e., to replicate in-presence practices into videogames, as it most certainly will result in a negative outcome. Thus, they argue that this tendency leads to bad video games with bad didactical practices. They instead recommend taking elements of language learning processes that are already present within modern video game genres and using them as the basis for further development.³³⁷ This means that language becomes a resource for players to carry out social actions within the video game and a means to play, and not the explicit goal of playing.

The ten principles can be thus summarized. Firstly, (1) one should consider more carefully the failure states than the success states: success is (almost) boring while playing games because it simply brings the player to the next level; on the contrary, failure can (and should) be interesting and varied as one has to understand why the failure occurred. Especially in language learning, good games must involve making mistakes as an important way to learn and to develop language mastery. By creating and offering many possible reactions to wrong answers, one can convey the message that making mistakes is normal and indeed necessary to language competence development.³³⁸ From a practical point of view, the game developer must find a way to give dynamic assessment and to correct mistakes in a playful and humorous way, as subtle correction is inefficient, but explicit correction is too harsh. This same principle regarding feedback was highlighted by Reinhardt as well.³³⁹

³³⁵ Ravi Purushotma et al., “10 Key Principles for Designing Video Games for Foreign Language Learning,” *Lingual Games*, April 15, 2009, <https://lingualgames.wordpress.com/article/10-key-principles-for-designing-video-27mkxqba7b13d-2/>

³³⁶ Purushotma et al., “10 Key Principles.”

³³⁷ Purushotma et al., “10 Key Principles.”

³³⁸ Purushotma et al., “10 Key Principles.”

³³⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 203.

Secondly, (2) instructions are necessary for learners mostly to focus on form (i.e., meaning), but at the same time to focus on forms (i.e., language structures) as well. If by creating a game, one starts from and focuses only on the language learning objective (language structures), the game will be boring, resulting in a tool unsuited for pedagogical purposes.

Thirdly, (3) all elements of the game, particularly communication and input mechanisms, must be playful, as players should have the perception of playing an actual game rather than learning a certain topic.

(4) Metalinguistic description: metalinguistic description and terminology should be presented as support material, not as a part of the core game. When designing levels and goals for a DGBLL environment, one should carefully sequence and build game content in order to ensure that “players are exposed to a wide range of linguistic and pragmatic resources they will need to communicate effectively.”³⁴⁰ As they point out, it is preferable not to “place [...] metalinguistic information as a central feature of the game; nor should the game require players to name the grammatical categories and other metalinguistic concepts in order to make progress in the game, so long as they are able to use them successfully.”³⁴¹ Indeed, most successful language learning apps (e.g., *Rosetta Stone*) do not use metalinguistic descriptions. However, as the question of how much metalinguistic content should be explicitly detailed in the classroom is still a controversial subject, the researchers suggest ignoring the dilemma of how much time to give to explicit metalinguistic explanations and how much to practice. Their solution is instead to offer a differentiated range of options that can adapt to a singular student. This means following the *three-tiered approach* to present new language.

The three-tiered approach is comprised of three steps: 1) the first interaction with the game requires the player only to accomplish a task without focusing on metalinguistic terminology; 2) if players cannot complete the task by just focusing on it, they can be asked to consider the language in different ways thanks to the different possibilities offered by video gaming features, but not yet to consider grammar; and 3) students should be able to “interact with the system in order to receive whatever explicit grammatical instruction they still need to understand the forms being highlighted.”³⁴² The three-tiered approach thus suggests that aids and grammar should not be directly incorporated into the core videogame. They should certainly be present, but as an external resource to the video game itself. As for modern languages, pragmatics can and should be incorporated as well. However, in this research case, given that ancient Greek is

³⁴⁰ Purushotma et al., “10 Key Principles.”

³⁴¹ Purushotma et al., “10 Key Principles.”

³⁴² Purushotma et al., “10 Key Principles.”

a corpus language, historical, cultural, and literary facts can and should be included rather than pragmatics.

Furthermore, (5) learning content should be presented through tasks and not taxonomically, as Reinhardt has also noted.³⁴³ By developing the tool, one should keep track of the grammar and language contents, but instead of focusing on how to explain that specific language topic, one should start creating the curriculum by asking oneself: “what are examples of some foreign-language dependent tasks we want the learner to be able to accomplish by the end of this game?”³⁴⁴

Moreover, as modern languages didactics and acquisitional linguistics has also shown,³⁴⁵ (6) new language contents should be introduced gradually and connected with other content before requiring difficult responses from players.³⁴⁶

(7) “Assessment should intelligently track free production tasks throughout the game, not simply measure controlled production during test events.”³⁴⁷ As modern languages didactics and acquisitional linguistics have shown, mistakes are a sign of developing language competence and should be considered as such.³⁴⁸ However, in video game-learning, observation becomes harder, as mistakes can hardly be distinguished from errors.³⁴⁹ Thus, Purushotma, Thorne and Wheatly point out the necessity of new forms of assessment in DGBLL that could discern whether the player is aware of the nature of the mistake.³⁵⁰

Furthermore, the three researchers suggest to: (8) consider the full range of gaming platforms available while programming the DGBLL environment; and (9) allow students “to spend extra time in activities they enjoy and to minimize time in ones they don’t. Ultimately, instructional activities should be designed to teach students how they can autonomously continue playing similar games or performing similar activities taken directly from the target culture.”³⁵¹

Lastly, (10) if the DGBLL environment is a multiplayer game, interaction, collaboration, and cooperation must be guaranteed and the individual roles of all players must be defined.

³⁴³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202-04; Purushotma et al., “10 Key Principles.”

³⁴⁴ Purushotma et al., “10 Key Principles.”

³⁴⁵ Villarini, *Didattica delle lingue straniere*, 198.

³⁴⁶ Purushotma et al., “10 Key Principles.”

³⁴⁷ Purushotma et al., “10 Key Principles.”

³⁴⁸ Villarini, *Didattica delle lingue straniere*, 104-7.

³⁴⁹ In language didactics, mistakes are made out tiredness, forgetfulness or disattention, while errors are systematic or non-systematic deviations from accuracy and correctness. This can happen because the learner has wrongly acquired the rule. For a more detailed explanation, see Villarini, *Didattica delle lingue straniere*, 104-7.

³⁵⁰ Purushotma et al., “10 Key Principles.”

³⁵¹ Purushotma et al., “10 Key Principles.”

To conclude this section, it is important to point out that “if research is intended, a full-fledged game can be designed and tested, but a more sensitive and effective way is to have a general plan in mind and then build the game piece-by-piece in iterative design fashion, testing each mechanic and correlating it if possible to learning outcomes.”³⁵²

3.7. Limitations of DGBL

In the previous sections, many positive factors regarding DGBL have been mentioned. However, researchers have also expressed criticisms towards this approach.

From a research perspective, it has been observed that studies on DGBL lack rigorous methodologies to assess the effectiveness of DGBL itself. A recent systematic review noticed a variety of problems in most studies stating positive effects of DGBL on learning: for example, the use of non-validated instruments, the absence of pre-tests, and the lack of appropriate control groups or of control groups entirely.³⁵³ Studies on DGBL seem to lack methodological cohesion,³⁵⁴ which therefore makes it almost impossible to state with more certainty an effective positive influence of DGBL on learning. That is why it is suggested that future work aims to both rigorously examine the effects of DGBL, as well as investigate whether long-term effects of DGBL persist. It is further suggested to investigate whether video games motivate learners towards learning more than traditional teaching methods.³⁵⁵

From an ethical perspective, it is important to note that digital games, together with other technological resources, are not “neutral” realities, as they can hide issues such as algorithmic bias, racism, exploitation, homophobia, and sexism.³⁵⁶

From an educational perspective, researchers have observed that finding the right balance between effective learning and an engaging game still poses a challenge, resulting in many DGBL environments not being effective.³⁵⁷ Access and application also represent issues: given that DGBL can rely on specific infrastructures and technologies, less equipped or poorly-funded schools may find themselves at a disadvantage and unable to experiment with DGBL. Another problem is represented by teachers’ technological competences, which may hinder the adoption

³⁵² Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 220.

³⁵³ Aeschbach et al., “Systematic Review,” 4.

³⁵⁴ Earl Aguilera and Roberto De Roock, “Digital Game-Based Learning: Foundations, Applications, and Critical Issues,” *Oxford Research Encyclopedia of Education* (2022): 13, <https://doi.org/10.1093/acrefore/9780190264093.013.1438>.

³⁵⁵ Aeschbach et al., “Systematic Review,” 16.

³⁵⁶ Aguilera and De Roock, “Digital Game-Based Learning,” 14.

³⁵⁷ Aguilera and De Roock, “Digital Game-Based Learning,” 14.

of similar resources. Separately, some companies or researchers may develop DGBL resources as a kind of quick educational panacea, although their ultimate motivations are merely financial.³⁵⁸ DGBL can also increase cognitive load, especially for weaker readers, and may lack adequate linguistic feedback or communication between students and teachers.³⁵⁹ Aligning a game's curriculum with a teacher's curriculum can also pose challenges, potentially increasing a teacher's workload.³⁶⁰ Researchers also face the risk of exaggerating the benefits of digital education, which can lead to the belief that merely introducing digital technologies is enough to transform learning environments.³⁶¹ Another risk is to propose an old paradigm with a new aspect, such as the Duolingo app, which relies on the traditional GT method but in a digital setting.³⁶² Finally, DGBLL can involve other issues such as: management difficulties (i.e., learners play without having understood the rules); organizational difficulties (i.e., creating a balanced alternation between individual and group activities); testing/evaluation difficulties (i.e., how can one test/evaluate language learning through playing?);³⁶³ wrong focus

³⁵⁸ Aguilera and De Roock, "Digital Game-Based Learning," 14.

³⁵⁹ Bagus Setiadi, "Benefits of Digital Game-Based Learning (DGBL) for English Learning," 192.

³⁶⁰ Bagus Setiadi, "Benefits of Digital Game-Based Learning (DGBL) for English Learning," 192–3.

³⁶¹ Thomas, "Contextualizing Digital Game-Based Language Learning," 13; Pier Cesare Rivoltella and Pier Giuseppe Rossi, "Tecnologie e didattica nella società informazionale. Una cornice concettuale," in *Tecnologie per l'educazione*, ed. Pier Cesare Rivoltella and Pier Giuseppe Rossi (Pearson, 2019), 15.

³⁶² Troncarelli, "Nuovi e vecchi paradigmi nell'insegnamento delle lingue e culture straniere in rete," 50.

³⁶³ Caon, *Edulinguistica ludica*, 81–2.

An empiric study on the effectiveness of GBL for learning Latin vocabulary and grammar, conducted by Kikenberg, needs to be mentioned here. According to Kikenberg's empiric results, game-based learning for learning Latin vocabulary and grammar (and so hypothetically for ancient Greek too) seems not to be the best option. The researcher conducted an experiment with two German classes in 2013 to understand whether learners better learn Latin vocabulary and grammar through a game-based learning approach, i.e., whether their grades increase after having learnt by playing. In her case, she developed different board games to learn vocabulary and grammar and tested afterwards the participants. According to the results, learners do not show better results by learning through playing and she suggests therefore not to use games as the only method to teach Latin in class. Kikenberg's goal was to quantitatively measure whether there were improvements with a game-based learning approach, however it is important to note that her results are based on just one experiment that took place in one day. As she mentioned herself, it is very likely that, as students had the same amount of time to learn words through playing and through a classic method (e.g., memorization), by playing, they had less time to focus on the actual learning as they spent time as well learning the game's rules and getting used to a new didactical approach. See Andrea Kikenberg, "Spielen oder nicht spielen, das ist hier die Frage. Eine empirische Untersuchung über die Effektivität von Lernspielen im Lateinunterricht," *Pegasus-Onlinezeitschrift* 13, nos. 01-2 (2013): 100, <https://doi.org/10.11588/pegas.2013.0.35357>.

Nevertheless, it is important to highlight that in this dissertation DGBL does not aim to replace traditional teaching methods, but rather to implement them as another resource to learn and teach. Therefore, the idea of not using DGBL as the only method to teach vocabulary in Greek class was already implied in the reasonings of this dissertation. Moreover, it seems sensible that to quantitatively evaluate the effectiveness of a game-based learning approach to learn vocabulary, this evaluation should be carried out over an extended period of time, as learners should have the chance to get used to the new approach and to get in the "game-mentality," which is relatively uncommon, especially with corpus languages. As will be shown in Chapter 3, the results of the experiments conducted for this research are qualitatively approached and analyzed and therefore do not aim at generalizing.

(i.e., learners consciously or unconsciously focus more on the game than on the learning happening).³⁶⁴

From a health perspective, videogaming tends to be defined in the society as “addictive,” carrying with it a negative social stigma. However, such a definition is not completely rational and should be further analyzed. As Sykes and Reinhardt point out, “if people lose themselves in a book for hours, we do not say the book is addictive, but rather it is engrossing and well written.”³⁶⁵ This observation should be applied to videogaming as well: on the one hand, there can be engrossing video games that fully engage players for hours (just as a good book might), while on the other one, there are legitimately addictive behaviors towards video games exhibited by some players. Video games are not intrinsically good or bad, but it depends on how one uses them.³⁶⁶

Internet gaming disorder is recognized as a non-substance addictive disorder that has been included since the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DMS-5), published in 2013 by the American Psychiatric Association. Since 2018, the World Health Organization (WHO) has also recognized this addictive behavior with the name “gaming disorder” and has included it in the eleventh revision of the International Classification of Diseases (ICD-11).³⁶⁷ In order to consider someone affected by a gaming disorder, some parameters and criteria must be met. According to DMS-5, the nine criteria for gaming disorder are:

(1) high preoccupation with gaming, (2) withdrawal symptoms, (3) increased tolerance to gaming, (4) unsuccessful attempts to stop or reduce gaming, (5) loss of interest in other hobbies or activities, (6) excessive gaming despite negative consequences, (7) deception about gaming activities towards others, (8) use of gaming as escape or relief from a negative mood, and (9) jeopardized or lost relationships, jobs, or educational or career opportunities.³⁶⁸

Moreover, the addictive behavior has to be visible for at least one year for a diagnosis to be made, but if all the parameters are co-present and severe the diagnosis can be made after a

³⁶⁴ Hoblitz, *Spielend lernen im Flow*, 9.

³⁶⁵ Julie M. Sykes and Jonathon Reinhardt, *Language at Play. Digital Games in Second and Foreign Language Teaching and Learning* (Pearson Education, 2012), 33.

³⁶⁶ Prensky, “Don’t Bother Me Mom - I’m Learning!” XIX.

³⁶⁷ Nazia Darvesh et al., “Exploring the Prevalence of Gaming Disorder and Internet Gaming Disorder: A Rapid Scoping Review,” *Systematic Reviews* 9, no. 68 (2020): 2, <https://doi.org/10.1186/s13643-020-01329-2>.

³⁶⁸ Darvesh et al., “Exploring the Prevalence of Gaming Disorder and Internet Gaming Disorder,” 2.

shorter period of time.³⁶⁹ As one can see, simply defining videogaming as inherently “addictive” is both unreasonable and an oversimplification.

On this topic, UNESCO published in 2023 a contribution, focusing on ed-tech during the COVID-19 pandemic. This contribution highlighted that during the pandemic students drastically retreated into videogaming and meta-verses, especially because of video games’ ability to be used as an outlet for socialization.³⁷⁰ This retreat caused a series of physical, mental and social-related difficulties in young learners, such as loneliness, depression, and antisocial behavior.³⁷¹ UNESCO stated “while video games are sometimes considered or marketed as educational – and some studies have cautiously suggested specific domains where they may facilitate superior learning outcomes than the use of conventional educational media and approaches – they remain, at least given the limitations of current technology, touchless worlds with a strong tilt towards entertainment.”³⁷²

From this research’s point of view, two points of this statement need to be stressed. First, even if UNESCO’s findings are alarming and should be acknowledged while discussing DGBL, it is nonetheless crucial to point out that UNESCO’s contribution analyzed *only and purely* the dramatic period of COVID-19 which represented an extraordinary, as in out of ordinary, scenario both for human socialization and for the educational world. Therefore, the analysis is likely not relevant for the use of ed-tech used *inside the school setting* and conceived as an *additional and not univocal* tool for learning – as for example the use of video games is considered in this research. The reasoning of the UNESCO’s contribution focused instead on ed-tech used as the only resource for learning, as was seen during COVID-19.³⁷³ It is therefore important to highlight that this research’s idea of proposing video games for learning ancient Greek is based on the following belief: just as UNESCO showed in its contribution, ed-tech (and therefore video games) are not a substitute for face-to-face learning, in a dynamic of “or-or,” but they are rather an integrative pedagogy and an integrative tool in a perspective of “and-and.” Hence, DGBL is not aiming to replace traditional learning, but it aims rather at integrating and improving face-to-face pedagogy by stimulating and motivating students’ interest through “new” ways.

³⁶⁹ Darvesh et al., “Exploring the Prevalence of Gaming Disorder and Internet Gaming Disorder,” 2; “Addictive Behaviours: Gaming Disorder,” *World Health Organization*, updated October 22, 2020, <https://www.who.int/news-room/questions-and-answers/item/addictive-behaviours-gaming-disorder>.

³⁷⁰ West, *An Ed-Tech Tragedy?* 198.

³⁷¹ West, *An Ed-Tech Tragedy?* 203.

³⁷² West, *An Ed-Tech Tragedy?* 203.

³⁷³ West, *An Ed-Tech Tragedy?* 28.

Second, according to UNESCO, video games aim to “entertain.” This affirmation seems to resonate once again with what Reinhardt and many other researchers point out (see ¶ 3) i.e., the consolidated idea that “play equals fun; work/study equals non-fun.” A similar affirmation seems to suggest that it is almost impossible to learn while having fun or “being entertained.” The theoretical framework of DGBL however uses video games *not only* as a tool to entertain, *but first and foremost* as a tool to *teach*, which therefore implies an enormous difference in the development of the video game itself. Thus, if while developing a traditional video game the developers are striving to “only” engage and engross the player to keep playing, a DGBL reality aims instead to engage and engross the player-learner to *keep learning by playing*: as Prensky points out, “the ‘fun’ kids are always seeking is really a synonym for ‘unforced learning,’”³⁷⁴ where learning has a broad meaning. Hence, being entertained should not be considered as something to avoid but rather something to encourage and promote in learning settings.

³⁷⁴ Prensky, “Don’t Bother Me Mom - I’m Learning!” 5.

4. Inclusion and Specific Learning Difficulties (SpLD)

Inclusion has been selected as the second focus of the present research project. The importance of this focus is justified by the rising number of students with Special Educational Needs (SEN) in the UK,³⁷⁵ and by the exacerbation of existing challenges for students with SEN due to the impact of the COVID-19 pandemic on the educational system, as observed for example in Pakistani students with SEN.³⁷⁶ Moreover, the fact that no official numbers on SEN students learning ancient Greek are retrievable suggests an important starting question that will lead this macro-section: why do SEN students not learn ancient Greek?

The UK Department of Education and the Department of Health and Social Care produced a statutory guidance document on SEND (SEN and disabilities) called the 0-25 SEND Code of Practice.³⁷⁷ In this code, four broad areas of need in SEND children and young people are identified: (1) communication and interaction, (2) cognition and learning, (3) social, emotional and mental health difficulties, and (4) sensory and/or physical needs.³⁷⁸ In this research, the focus will be on (2).

Children or young people with cognition and learning needs tend to learn at a slower pace in comparison to their peers. These needs can be moderate learning difficulties (MLD) or severe (SLD) and they can combine with other learning difficulties such as sensory or physical needs. Thus, the Specific Learning Difficulties (SpLD) “affect one or more specific aspects of learning. This encompasses a range of conditions such as dyslexia, dyscalculia and dyspraxia.”³⁷⁹

According to different researchers, the acronym SpLD may be commonly used as an umbrella term referring to other learning difficulties as well (e.g., dysorthography, dysgraphia, etc.). Here the researcher will take into consideration those SpLD that are more likely to interfere with learning ancient Greek, i.e., dyslexia and reading comprehension deficit.³⁸⁰

³⁷⁵ Department for Education, *Special Educational Needs in England: Academic Year 2024/25*.

³⁷⁶ Nasir Shazia and Hameed Mehwish, “Impact of COVID-19 on the Learning Processes of Typically Developing and Special Needs Students in Pakistan,” *Asian Journal of University Education* 17, no. 03 (2021): 67–75.

³⁷⁷ Department for Education & Department of Health, *Special Educational Needs and Disability Code of Practice: 0 to 25*, published June 11, 2014, updated September 12, 2024, <https://www.gov.uk/government/publications/send-code-of-practice-0-to-25>.

³⁷⁸ Department for Education & Department of Health, *Special Educational Needs and Disability Code of Practice: 0 to 25*, 97–98.

³⁷⁹ Department for Education & Department of Health, *Special Educational Needs and Disability Code of Practice: 0 to 25*, 98.

³⁸⁰ Nicole Landi and Kayleigh Ryherd, “Understanding Specific Reading Comprehension Deficit: A Review,” *Language and Linguistics Compass* 11, no. 02 (2017): 1, <https://doi.org/10.1111/lnc3.12234>.

Before diving into the analysis of the different SpLD, it is interesting to reason on the acronym itself. According to Stella e Grandi, the letter D in SpLD or in LD (Learning Disabilities) can be intended in three different ways.³⁸¹

1) D as in *disorder or disability*. “Disorder” focuses on the discrepancy between parameters that are selected a priori e.g., lower outcomes compared to the average. That does not mean that students with SpLD are less intelligent than others, but rather that they simply have lower outcomes in specific fields (e.g., reading, writing, etc.), compared to the average, which means therefore that they are not “in the standard.” “Disability,” on the other hand, focuses on the notion of ability, which refers to the capacity of doing rapidly and efficiently a series of actions, often in sequence, to reach a goal with minimum effort.³⁸² Having a disability therefore means that the human subject does not have this capacity. Thus, this disability comes from *a lack of basic preconditions*, rather than from a lack of practice or inputs. Therefore, for students with SpLD, even with sufficient practice or inputs, this automatization of actions does not improve;³⁸³

2) D as in *difficulty/difficulties*. Students with SpLD face many difficulties both in their school experiences and in their normal lives. This can often lead to low self-esteem and low motivation.³⁸⁴ However, it is important to remember that each student has a different and unique way of facing such difficulties and that what can work for one person, may not work for another student with or without SpLD; hence, the term “difficulty” refers to every educational struggle that every single person can stumble upon during their learning journey due to individual characteristics (e.g., anxiety, demotivation, etc.) and more often due to contextual causes (e.g., economic disadvantages, traumatic events).

3) D as in *difference*. A SpLD is diagnosed in comparison to a standard, however these standards change from society to society. Moreover, according to the neurodiversity theory, what is called SpLD is in reality just a normal individual difference.³⁸⁵ Therefore from this point of view, differences are not something that must be “fixed” according to a standard. On the contrary, it is important to focus on the strengths of the learner to enable them to reach the same goal as others in their most preferred way of doing. Such strengths *inter alia* can be: intelligence, ability to memorize through images, “unusual” ways of approaching school

³⁸¹ Giacomo Stella and Luca Grandi, *Come leggere la dislessia e i DSA*, 2nd ed. (Giunti Edu, 2016), 9–14.

³⁸² Stella and Grandi, *Come leggere la dislessia e i DSA*, 10.

³⁸³ Stella and Grandi, *Come leggere la dislessia e i DSA*, 11.

³⁸⁴ Stella and Grandi, *Come leggere la dislessia e i DSA*, 11.

³⁸⁵ Stella and Grandi, *Come leggere la dislessia e i DSA*, 13.

subjects and creating links between topics, fantasy, and “unusual” methods of problem-solving.³⁸⁶

It is therefore important to understand that a SpLD should not be considered as a “problem of the student” i.e., a problem that comes from the nature of the student herself/himself, but rather as the result of unfavorable combination of the student’s characteristics and the surrounding environment.³⁸⁷ Thus, it is of primary importance to always consider and analyze the environment in which the student is learning: if the environment is not taken into consideration, one risks falling into the “portrait trap” (*trappola ritrattistica*),³⁸⁸ i.e., a tendency of describing the SpLD as a list of characteristics of the student and not as the result of a combination of different factors (i.e., student’s characteristics, teacher, environment, family situation etc.). The importance of the role of the environment in the learning process represents one of the reasons why the researcher has chosen the Universal Design for Learning framework, as will be later discussed.

4.1. Learning Styles, Cognitive Styles and Cognitive Theory of Multimedia Learning (CTML)

When talking about learning and education in general, learning styles are often mentioned. However, many researchers have expressed critiques against this theory.

Learning styles are defined as the typical cognitive, affectional, and physiological behaviors that more or less predict how learners perceive, interact with, and react to the learning environment.³⁸⁹ According to their different learning style, a learner should perceive, process, store, and recall the encountered information in a specific way. This information, called input, can be perceived through different sensory channels (i.e., visual-verbal, visual-nonverbal, hearing, kinesthetic) that typically affect how one prefers to learn: the visual-verbal sensory channel is typically associated with learning by reading, the visual-nonverbal with visual learning (e.g., using the visual memory), hearing with learning by listening to information, and kinesthetic with learning by actively doing some actions.³⁹⁰ According to this theory, learners with SpLD tend to avoid the visual-verbal sensory channel (which is the most common one in schools) and prefer the other three sensory channels.

³⁸⁶ Stella and Grandi, *Come leggere la dislessia e i DSA*, 13.

³⁸⁷ Daloiso and Gruppo di Ricerca ELICOM, *Le difficoltà di apprendimento delle lingue a scuola*, 23.

³⁸⁸ Daloiso and Gruppo di Ricerca ELICOM, *Le difficoltà di apprendimento delle lingue a scuola*, 23.

³⁸⁹ Stella and Grandi, *Come leggere la dislessia e i DSA*, 17–18.

³⁹⁰ Stella and Grandi, *Come leggere la dislessia e i DSA*, 18–19.

However, researchers have strongly criticized the learning styles theory as a myth that should be debunked. The main critiques concern: 1) the dearth of empirical data that corroborate learning styles theory's assumptions (namely the categorization into which learners can be divided according to their learning typology), as this dearth of experimental evidence could partially be attributed to the difficulty of measuring "learning itself;" 2) the measurement difficulties due to the numerous models explaining learning styles and the presence of confounding factors, such as a positive teacher-student relationship; and 3) the risk of "wrongly attributing" a learning style to a student and therefore implementing incorrect didactical interventions, leading to non-optimal instruction.³⁹¹

Therefore, instead of the focusing on the learning styles theory which is often mentioned in relation to learners with SpLD, two other theories seem relevant to this discussion. First, the Cognitive Theory of Multimedia Learning (CTML) represents an evidence-based theory that can help design effective multimedia material.³⁹² According to this theory, people learn better from the combination of pictures *and* words, rather than just words (multimedia principle), with *words* being spoken or written, and *pictures* either static or dynamic (e.g., a video). In order to design effective multimedia material, this material should be compatible with how people learn. This theory's vision on how people learn is comprised of three assumptions: 1) dual-channel: people have separate channels to process visual and auditory information; 2) limited capacity: the amount of information people can process in each channel at once is limited; and 3) active processing: people actively pay attention to relevant incoming information, then organize it into coherent mental representations and integrate these representations with previous knowledge.³⁹³

Second, cognitive styles indicate how one usually and most of the times processes the information and therefore can be intended as one's preference in one's own capabilities.³⁹⁴ Although scientific literature tends to separate into bionomies (see Table 1.2) and one usually shows a specific preference towards a cognitive style, it is important to specify that every learner normally uses each cognitive style, however differently and in different use-percentage. Thus, the following strict dichotomies are merely explanatory and do not aim to describe a reality, as no one uses exclusively one or the other cognitive style.

³⁹¹ Andrea Antoniuk, "Learning Styles: Moving Forward from the Myth," *Canadian Journal for New Scholars in Education* 10, no. 02 (2019): 85-6.

³⁹² Richard E. Mayer, "Cognitive Theory of Multimedia Learning," in *The Cambridge Handbook of Multimedia Learning*, 2nd ed., ed. Richard E. Mayer (Cambridge University Press, 2014), 31-48.

³⁹³ Mayer, "Cognitive Theory of Multimedia Learning," 34.

³⁹⁴ Stella and Grandi, *Come leggere la dislessia e i DSA*, 20.

Pairs of cognitive styles	Description
Global vs. analytic	A global cognitive style tends to first focus on the overview and then on the particulars, while an analytic style focuses first on the details and afterwards creates an overview.
Systematic vs. intuitive	A systematic cognitive style proceeds in a stepwise manner by analyzing the different variables, while an intuitive style creates hypotheses and tries to prove them.
Verbal vs. imagery	A verbal cognitive style prefers which relates to language, while an imagery style prefers schemes, maps, photos, or charts.
Reflective vs. impulsive	A reflective cognitive style tends to reflect and reason for a long period of time before taking action, while an impulsive style does the opposite.
Field dependent vs. field independent	A field dependent cognitive style relies heavily on the context, while an independent style is more autonomous.
Convergent vs. divergent	A convergent cognitive style proceeds by logical links relying on given information, while a divergent style proceeds autonomously and creatively.

Table 1.2. Cognitive styles.³⁹⁵

In light of these observations, researchers have shown that while every learner with SpLD is different and unique, the majority of learners with SpLD tend to use a global cognitive style – which assists in developing an overview of the topic, but involves difficulties in grasping specific pieces of information – and an imagery cognitive style, which means they therefore tend to prefer information conveyed by images rather than by written texts.³⁹⁶ Thus, in relation to the aforementioned CTML, offering multimedia material that is not limited to only the written word seems to be necessary to facilitate learning in all students and in particular in those with SpLD.

Moreover, SpLD students may show different difficulties according to the specific school subject, as difficulties in the phonological, expressive, receptive, and pragmatic areas can be isolated or interconnected and of different levels of intensity.³⁹⁷ However, as ancient Greek learning is usually based on written texts, it is possible to summarize some very common characteristics of the two SpLD subtypes that are analyzed in this research, i.e., dyslexia and

³⁹⁵ The table is adapted from Stella and Grandi, *Come leggere la dislessia e i DSA*, 20–21.

³⁹⁶ Stella and Grandi, *Come leggere la dislessia e i DSA*, 22.

³⁹⁷ Dalonso and Gruppo di Ricerca ELICOM, *Le difficoltà di apprendimento delle lingue a scuola*, 109.

specific reading comprehension deficit. It is also important to consider that both SpLD subtypes tend to present not only linguistic difficulties in different areas, but also cognitive difficulties in attention and inhibitory control, and efficacy in the elaboration of information and in the working memory.³⁹⁸

Dyslexia is usually defined as a specific and persistent inability to develop efficient reading abilities in relation to the received formal education or age, despite having adequate cognitive abilities.³⁹⁹ According to the *International Classification of Disease (ICD-11)*, dyslexia, also called developmental learning disorder with impairment in reading (code 6A03.0), is:⁴⁰⁰

characterised by significant and persistent difficulties in learning academic skills related to reading, such as word reading accuracy, reading fluency, and reading comprehension. The individual's performance in reading is markedly below what would be expected for chronological age and level of intellectual functioning and results in significant impairment in the individual's academic or occupational functioning. Developmental learning disorder with impairment in reading is not due to a disorder of intellectual development, sensory impairment (vision or hearing), neurological disorder, lack of availability of education, lack of proficiency in the language of academic instruction, or psychosocial adversity.⁴⁰¹

Among others, some of the most common mistakes made by learners with dyslexia while reading a text are: 1) mixing up differently spatially oriented signs or letters that differ in small details (p/q; d/b; u/n; m/w); 2) whole-word guesses (e.g., tired for tried); 3) failing to recognize familiar words; 4) skipping words and jumping from one line to another, especially when starting a new paragraph/line; 5) difficulty in establishing syllable division or knowing the beginnings and endings of words; 6) unusual pronunciation of words; 7) lexicalization of non-words (e.g., clip for clup).⁴⁰²

The specific reading comprehension deficit (S-RCD) refers to the difficulty of understanding what one is reading, despite having good cognitive (and often even good decoding) competences.⁴⁰³ As research in developmental psychology showed, understanding a text is a

³⁹⁸ Daloiso and Gruppo di Ricerca ELICOM, *Le difficoltà di apprendimento delle lingue a scuola*, 109.

³⁹⁹ Claudio Vio et al., *Diagnosi dei disturbi specifici dell'apprendimento* (Erickson, 2022), 61.

⁴⁰⁰ "International Statistical Classification of Diseases 11th Revision," *World Health Organization*, updated February 14, 2025, <https://icd.who.int/en/>.

⁴⁰¹ "International Statistical Classification of Diseases 11th Revision," *World Health Organization*, 6.A03.0.

⁴⁰² Adaptation from: Elizabeth Adams, "5 Common Dyslexia Related Reading Errors," *Minnesota Neuropsychology*, July 19, 2024, <https://www.mnneuropsychology.com/articles/common-reading-errors/>; "Signs of Dyslexia (Primary School Age)," *British Dyslexia Association*, accessed November 2, 2025, <https://www.bdadyslexia.org.uk/advice/children/is-my-child-dyslexic/signs-of-dyslexia-primary-age>; Elisa Veronesi, "Didattica delle lingue classiche per DSA," in *Cinque incontri sulla cultura classica*, Quaderni Di Atene e Roma 5 (Pensa MultiMedia, 2015), 412.

⁴⁰³ Landi and Ryherd, "Understanding Specific Reading Comprehension Deficit," 1.

complex ability that requires other linguistic and cognitive abilities e.g., vocabulary knowledge, the ability to make inferences, good memory etc.⁴⁰⁴ While reading a text to understand its meaning, one should more or less automatically decipher each single word and give it a specific meaning, which should then be integrated into the context of the phrase. The decoded phrase should then be meaningfully inserted into the context of the other phrases in an interconnected system that creates a “mental model” of the text, starting from the reader’s pre-knowledge,⁴⁰⁵ as already mentioned by the CTML. However, in students with a specific reading comprehension deficit, there are three main areas of difficulty in this process: 1) making inferences; 2) recognizing important elements in the text and creating a hierarchy; and 3) controlling the comprehension process i.e., recognizing incongruences or anomalies.⁴⁰⁶

In light of these considerations, the researcher valued and investigated *Universal Design for Learning* (UDL) as a framework to inclusion.

4.2. Universal Design for Learning (UDL)

Educational inclusion can have at least four different meanings which refer to four different approaches to inclusion itself. The first meaning is the so-called (1) corrective educational model.⁴⁰⁷ This model recommends the inclusion of disabled students into the so-called “normal” classrooms by using compensatory measures or tools. The target group consists of students with disabilities and the goal is the *correction* of disordered functions. This model, however, has several problematic aspects: in the first place, it gives the idea that amongst students there are some which should be considered “normal” and others that should not, which means that the “not-normal” students are unable to fulfill the traditional curricula. Consequently, this point of view implies retrofitting of traditional curricula which reinforces “the message that the classroom is made for only some, and others need to be worked in.”⁴⁰⁸ In the second place, this idea of inclusion does not take into account the fact that each person can approach the learning process in different ways. Therefore, “the diversity of learners [should be seen] as a natural phenomenon in society because no two learners exist who think in the

⁴⁰⁴ Vio et al., *Diagnosi dei disturbi specifici dell’apprendimento*, 215.

⁴⁰⁵ Vio et al., *Diagnosi dei disturbi specifici dell’apprendimento*, 215.

⁴⁰⁶ Vio et al., *Diagnosi dei disturbi specifici dell’apprendimento*, 216.

⁴⁰⁷ Alvyra Galkiene and Ona Monkeviciene, eds., *Improving Inclusive Education through Universal Design for Learning*, Inclusive Learning and Educational Equity (Springer International Publishing, 2021), 2.

⁴⁰⁸ Whitney H. Rapp, *Universal Design for Learning in Action: 100 Ways to Teach All Learners* (Brookes Publishing, 2014), 3.

same way,⁴⁰⁹ nor do any two learners approach learning in the exact same way, with the same abilities and interests.

The second meaning refers to the (2) inclusive special needs education.⁴¹⁰ This kind of inclusion focuses on SEN students whose needs are caused by functional disorders. This type of inclusion is therefore based on components of special needs education and considers specialized schools as the most appropriate environment for the education of SEN students.⁴¹¹ Consequently, SEN students tend to be educated in different classrooms by specialized teachers, meaning that “education is nevertheless designed based on disability and developmental disorders.”⁴¹²

The third meaning is called (3) individual inclusion and targets a variety of students’ needs caused by health-related, functional, or social differences.⁴¹³ Here, inclusion is meant not only for students with disabilities or functional disorders, but also for students with difficulties caused by linguistic, social, or cultural conditions. This idea of inclusion is necessarily connected to the political, experiential, or cultural context of the country⁴¹⁴ and, as shown by a recent study,⁴¹⁵ the term “inclusive education” is used by many countries to indicate merely the inclusion of SEN students in “normal” education schools. This way of considering inclusion shows that “the application of alternative curricula for students with special educational needs becomes an obstacle to their involvement and participation in the common educational experience.”⁴¹⁶

The fourth meaning, (4) inclusion for all, is closely identified with the theory of Universal Design for Learning (UDL), a pedagogical approach developed in the 1990s by Anne Meyer and David H. Rose that models “a system of education transferring the principles of flexible and open to everybody environment in architecture.”⁴¹⁷ UDL is defined as “a set of principles to follow when developing a curriculum so that the curriculum meets the needs of every student, giving all students equal opportunities to learn.”⁴¹⁸ This means that a UDL approach to teaching

⁴⁰⁹ Galkiene and Monkeviciene, *Improving Inclusive Education*, 7.

⁴¹⁰ Galkiene and Monkeviciene, *Improving Inclusive Education*, 3-4.

⁴¹¹ Galkiene and Monkeviciene, *Improving Inclusive Education*, 3-4.

⁴¹² Galkiene and Monkeviciene, *Improving Inclusive Education*, 4.

⁴¹³ Galkiene and Monkeviciene, *Improving Inclusive Education*, 4.

⁴¹⁴ Galkiene and Monkeviciene, *Improving Inclusive Education*, 4.

⁴¹⁵ Edda Óskarsdóttir et al., eds., “Inclusive School Leadership: Exploring Policies Across Europe,” European Agency for Special Needs and Inclusive Education, 2019.

⁴¹⁶ Galkiene and Monkeviciene, *Improving Inclusive Education*, 4.

⁴¹⁷ Galkiene and Monkeviciene, *Improving Inclusive Education*, 6.

⁴¹⁸ Rapp, *Universal Design for Learning in Action*, 2.

offers flexibility in the presentation of information, in the demonstration of knowledge and skills by students, and in the engagement of students with the material.

The goal of UDL is to reduce educational barriers and to offer to as many students as possible the same opportunity at learning. High achievement expectations are maintained for all students, not only for the so-called “standard” students but also for those who have disabilities or other generic difficulties.⁴¹⁹ To achieve this goal, UDL tries to satisfy every student’s needs by creating from the start an inclusive classroom, rather than simply retrofitting the traditional curriculum for those considered “not-standard” students. This purpose is justified by the acknowledgment that “students are vastly diverse—in *what* they learn (what they perceive), *how* they learn (how they process), and *why* they learn (what interests and motivates them).”⁴²⁰ This way of considering teaching and learning implies that a curriculum should not be designed following the idea of an “average” or “standard” student, because, as previously mentioned, every student is a singular and unique individual who approaches learning in a completely unique way. Thus, from this point of view “UDL is a process by which a curriculum is purposefully and intentionally designed right from the start to address diverse needs.”⁴²¹

In its third version, published in 2024, UDL follows three principles for the creation of an inclusive curriculum by designing: (A) multiple means of representation, (B) multiple means

⁴¹⁹ Rapp, *Universal Design for Learning in Action*, 2.

⁴²⁰ Rapp, *Universal Design for Learning in Action*, 2.

⁴²¹ Rapp, *Universal Design for Learning in Action*, 3.

of action and expression, and (C) multiple means of engagement.⁴²² Each principle is comprised of three guidelines and their “considerations.”⁴²³

The Universal Design for Learning Guidelines

The goal of UDL is **learner agency** that is purposeful & reflective, resourceful & authentic, strategic & action-oriented.

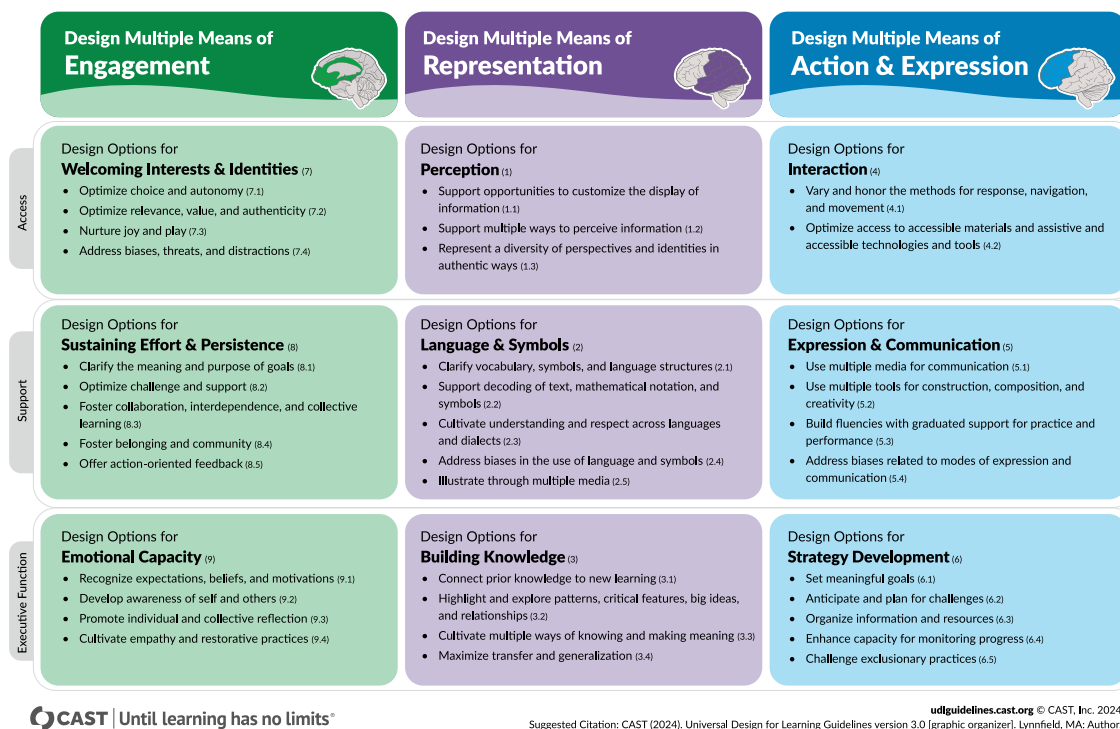


Figure 1.2. Universal Design for Learning guidelines 3.0 from the CAST website.

Principle (A) – colored in purple in Figure 1.2 – provides different ways of offering the content of learning which can be called input.⁴²⁴ If one offers different kinds of input, according to Rapp, three things happen, namely “1) more students are going to have access to the new learning, 2) the new information will be reinforced in multiple ways, and 3) students will be more likely to be expert learners because they will be familiar with multiple ways to receive information.”⁴²⁵ Thus, learning is enhanced due to the variety of input – which resonates with CTML’s idea of better learning due to the combination of pictures and words – and learners are encouraged to try out different ways of approaching information. Within this principle, the

⁴²² David H. Rose and Anna Meyer, *Teaching Every Student in the Digital Age: Universal Design for Learning* (Association for Supervision and Curriculum Development, 2002); Rapp, *Universal Design for Learning in Action*.

⁴²³ Considerations (in previous versions called “checkpoints”) are suggestions of implementation to design inclusive material connected to a specific guideline (e.g., welcoming interest and identities).

⁴²⁴ To help visualize and understand the structure of UDL, each principle has been placed after its description as an individual colored table.

⁴²⁵ Rapp, *Universal Design for Learning in Action*, 4.

CAST (Center for Applied Special Technology) website lists three guidelines: (1) perception; (2) language and symbols; and (3) building knowledge.

(1) Perception is fundamental as “learning is impossible if information is imperceptible to the learner, difficult when information is presented in formats that require extraordinary effort or assistance, and oppressive when content reinforces stereotypes or deficit thinking.”⁴²⁶ In order to guarantee that key information is equally accessible to everyone and therefore to reduce learning barriers, one can implement these considerations: (1.1) supporting opportunities to customize the display of information; (1.2) supporting multiple ways to perceive information; (1.3) representing a variety of perspectives and identities in authentic ways.

Of particular interest to this research project is CAST’s second guideline relating to the principle of representation, namely (2) language and symbols. According to the CAST website:

Learners vary in their facility with different forms of representation—both linguistic and non-linguistic. Vocabulary that may sharpen and clarify concepts for one learner may be difficult to understand for another. An equals sign (=) might help some learners understand that the two sides of the equation need to be balanced, but might cause confusion to a student who does not understand what it means. A graph that illustrates the relationship between two variables may be informative to one learner and inaccessible or puzzling to another. A picture or image that carries meaning for some learners may carry very different meanings for learners from differing cultural or familial backgrounds. As a result, **inequalities arise when information is presented to all learners through a single form of representation.** An important instructional strategy is to **ensure that multiple representations are available not only for accessibility, but for clarity, comprehensibility, and creating a shared understanding for all learners.**⁴²⁷

In order to guarantee equal access to language for everyone, one should therefore: (2.1) clarify vocabulary, symbols and language structures; (2.2) support decoding of text, mathematical notation, and symbols; (2.3) cultivate understanding and respect across languages and dialects; (2.4) address biases in the use of language and symbols; (2.5) illustrate through multiple media.⁴²⁸ Most of the aforementioned aspects are crucial in creating an inclusive project for learning ancient Greek, and were thus given special consideration in the development of the experimental tool. As a last guideline for this principle, CAST highlights the importance of (3) building knowledge, as “education helps learners transform accessible information into usable knowledge and generate new understandings.”⁴²⁹ Building knowledge

⁴²⁶ “Universal Design for Learning Guidelines version 3.0,” CAST, updated July 30, 2024, <https://udlguidelines.cast.org>.

⁴²⁷ “Universal Design for Learning Guidelines version 3.0,” CAST.

⁴²⁸ “Universal Design for Learning Guidelines version 3.0,” CAST.

⁴²⁹ “Universal Design for Learning Guidelines version 3.0,” CAST.

can be elicited by: (3.1) connecting prior knowledge to new learning; (3.2) highlighting and exploring patterns, critical features, big ideas, and relationships; (3.3) cultivating multiple ways of knowing and making meaning; and (3.4) maximizing transfer and generalization.⁴³⁰

Principle	Guidelines and considerations
(A) design multiple means of representation	1. Design options for perception (guideline) <ul style="list-style-type: none"> 1.1. Support opportunities to customize the display of information 1.2. Support multiple ways to perceive information 1.3. Represent a diversity of perspectives and identities in authentic ways
	2. Design options for language & symbols (guideline) <ul style="list-style-type: none"> 2.1. Clarify vocabulary, symbols, and language structures 2.2. Support decoding of text, mathematical notation, and symbols 2.3. Cultivate understanding and respect across languages and dialects 2.4. Address biases in the use of language and symbols 2.5. Illustrate through multiple media
	3. Design options for building knowledge (guideline) <ul style="list-style-type: none"> 3.1. Connect prior knowledge to new learning 3.2. Highlight and explore patterns, critical features, big ideas, and relationships 3.3. Cultivate multiple ways of knowing and making meaning 3.4. Maximize transfer and generalization

Table 1.3. Principle A with guidelines and considerations.

Principle (B) – colored in blue in Figure 1.2 – refers to the different ways through which students can navigate a learning environment, approach learning, and express what they have learnt, which can be called output. The most common traditional types of output in the educational system are typically writing and/or speaking; however, not everyone may be comfortable with these types of output expressions. Thus, UDL’s guidelines prescribe paying attention to: (4) interaction; (5) expression and communication; (6) strategy development.⁴³¹

⁴³⁰ “Universal Design for Learning Guidelines version 3.0,” CAST.

⁴³¹ Rapp, *Universal Design for Learning in Action*, 4.

Principle	Guidelines and considerations
(B) design multiple means of action and expression	4. Design options for interaction (guideline) 4.1. Vary and honor the methods for response, navigation, and movement 4.2. Optimize access to accessible materials and assistive and accessible technologies and tools
	5. Design options for expression & communication (guideline) 5.1. Use multiple media for communication 5.2. Use multiple tools for construction, composition, and creativity 5.3. Build fluencies with graduated support for practice and performance 5.4. Address biases related to modes of expression and communication
	6. Design options for strategy development (guideline) 6.1. Set meaningful goals 6.2. Anticipate and plan for challenges 6.3. Organize information and resources 6.4. Enhance capacity for monitoring progress 6.5. Challenge exclusionary practices

Table 1.4. Principle B with guidelines and considerations.

Principle (C) – colored in green in Figure 1.2 – considers the multiple types of engagement that students may prefer and tries to increase engagement itself by offering multiple options from which students can choose. As noted by CAST, providing multiple means of engagement involves three guidelines: (7) welcoming interest and identities; (8) sustaining effort and persistence, and (9) emotional capacity.⁴³²

Recognizing, sustaining and valuing learners’ unique personal interest is fundamental to spark engagement in their learning process.⁴³³ As considerations for eliciting interest, CAST instructs teachers to: (7.1) optimize choice and autonomy, which empowers learners to take charge of their own learning; (7.2) optimize relevance, value and authenticity, which connects learning to experiences that are meaningful and valuable to students; and (7.3) nurture joy and play, “addressing biases, threats and distractions,” which means fostering a safe space in which students can learn and take risks.⁴³⁴

⁴³² “Universal Design for Learning Guidelines version 3.0,” CAST.

⁴³³ “Universal Design for Learning Guidelines version 3.0,” CAST.

⁴³⁴ “Universal Design for Learning Guidelines version 3.0,” CAST.

(8) Sustaining effort and persistence is equally as important as sustaining interest, given that, without sustained attention and effort, many skills or strategies typical of some kinds of learning are difficult to retain. However, if learners are motivated to regulate their attention and interest to learn these skills, they are more likely to succeed. Closely linked to this notion is the third aspect of this principle, namely (9) providing options for emotional capacity. Students vary in their ability to regulate their emotions and motivations, which are important aspects of their development. When planning with UDL, one should address these skills explicitly in order to allow every student to learn how to self-regulate.

Principle	Guidelines and considerations
(C) design multiple means of engagement	7. Design options for welcoming interests & identities (guideline) 7.1. Optimize choice and autonomy 7.2. Optimize relevance, value, and authenticity 7.3. Nurture joy and play 7.4. Address biases, threats, and distractions
	8. Design options for sustaining effort & persistence (guideline) 8.1. Clarify the meaning and purpose of goals 8.2. Optimize challenge and support 8.3. Foster collaboration, interdependence, and collective learning 8.4. Foster belonging and community 8.5. Offer action-oriented feedback
	9. Design options for emotional capacity (guideline) 9.1. Recognize expectations, beliefs, and motivations 9.2. Develop awareness of self and others 9.3. Promote individual and collective reflection 9.4. Cultivate empathy and restorative practices

Table 1.5. Principle C with guidelines and considerations.

A fourth proposed principle (not part of the original UDL approach),⁴³⁵ here referred to as principle (D) in continuation of the above schematic, states that one should also provide multiple means of assessment, which is conceptually linked with principle (B): according to the

⁴³⁵ Whitney H. Rapp and Katrina L. Arndt, *Teaching Everyone: An Introduction to Inclusive Education* (Paul H. Brookes Publishing Co., 2012).

researchers, student evaluations should be modified in relation to how students are engaged in learning, and which input and output options are offered.⁴³⁶

According to UDL, offering every student the same opportunity at learning allows each student to “have ownership of their learning and progress and to advocate for themselves and for each other”⁴³⁷ and further provides the right conditions for students to become lifelong learners. In UDL’s perspective, SEN learners are taken into account for their unique way of approaching learning; however, instead of focusing on the *individual* by retrofitting a standard curriculum, which may cause feelings of exclusion and segregation,⁴³⁸ UDL focuses on the learning environment, allowing “a transition from being aware of the individual differences of some students to acknowledging the diversity of all the learners, from meeting individual needs to creating a barrier-free educational environment that answers the individual needs of all learners.”⁴³⁹ By doing so, the educational environment becomes student-centered and strives for “quality education for all and everybody (the exceptionally gifted and those with SEN) through the efficiency of suggested methods, education differentiation, cultural relevance, social-emotional learning and relevant content.”⁴⁴⁰

In the UDL approach, successful learning focuses not only on learnt knowledge, but also on teaching students to learn and become lifelong learners, as suggested also by the European Commission.⁴⁴¹ From this point of view, the application of the UDL approach aims at building “learners’ self-efficacy and their ability to represent themselves, [...] [cultivating] their interest in new information and the level of its understanding, as well as their ability to generate, model, and present information in various ways.”⁴⁴²

The table below summarizes and offers an overview of the differences between traditional inclusion and UDL.

⁴³⁶ Rapp, *Universal Design for Learning in Action*, 4.

⁴³⁷ Rapp, *Universal Design for Learning in Action*, 4.

⁴³⁸ Marta Guerra, “L’insegnamento della grammatica greca ad alunno dislessico di ginnasio,” in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015); Rapp, *Universal Design for Learning in Action*.

⁴³⁹ Galkiene and Monkeviciene, *Improving Inclusive Education*, 9.

⁴⁴⁰ Galkiene and Monkeviciene, *Improving Inclusive Education*, 9.

⁴⁴¹ European Union, *Key Competences for Lifelong Learning* (Publications Office, 2019), <https://data.europa.eu/doi/10.2766/569540>.

⁴⁴² Galkiene and Monkeviciene, *Improving Inclusive Education*, 15.

Traditional inclusion	UDL
<ol style="list-style-type: none"> 1. SEN students or students with difficulties are distinguished by compensatory tools/measures. 2. Learning difficulties are thought of as consequences of the nature of the learner or of their social and cultural experience/background. 3. The goal of learning is represented by acquisition of abilities and facts. 4. Education goals are defined by learning standards and tested by results of tests/examination. 5. Education is teacher-centered as it is the teacher who sets individual educational goals, chooses methods and suggests individual supports. 	<ol style="list-style-type: none"> 1. Different learning activities are justified by biological, cultural, or social factors and are typical of all learners. SEN students or students with difficulties are part of the same group of learners, which is composed by the uniqueness of every single student. 2. Learning difficulties are thought of as consequences of an inappropriate educational environment, which sets standards and creates barriers to the access of knowledge. 3. The goal of learning is represented by students' learning: fact-finding, critical reflection on said facts, finding solutions to assignments or problems, etc. 4. Education goal is to educate and develop a student as an expert in learning. 5. Education is student-centered as students are encouraged to be active participants in their own learning, meaning they are encouraged to contextualize their learning by sharing their own experiences and interests, ways of learning, etc.

Table 1.6. Differences between traditional inclusion and UDL.⁴⁴³

However, studies on UDL have been widely criticized by scholars over the years, namely due to “the absence of explicit alignment between UDL checkpoints [called considerations in the newer version of UDL] and the design features of intervention or instruction [...], an uneven distribution of implemented checkpoints and corresponding guidelines, confusion derived from the overlap among multiple checkpoints and guidelines, and the lack of theoretical guidance on UDL design and implementation.”⁴⁴⁴ Moreover, UDL research seems to be lacking shared and common design and measurement frameworks, which therefore hinder quantitative studies on the effectiveness of UDL as a design framework for inclusion.⁴⁴⁵

In light of this challenge, the researcher investigated UDL for ancient Greek from a qualitative point of view and focused on reporting encountered difficulties and/or positive

⁴⁴³ Galkiene and Monkeviciene, *Improving Inclusive Education*, 15-6.

⁴⁴⁴ Ling Zhang et al., “Unraveling Challenges with the Implementation of Universal Design for Learning: A Systematic Literature Review,” *Educational Psychology Review* 36, no. 35 (2024): 21, <https://doi.org/10.1007/s10648-024-09860-7>.

⁴⁴⁵ Michael P.A. Murphy, “Belief without Evidence? A Policy Research Note on Universal Design for Learning,” *Policy Futures in Education* 19, no. 01 (2021): 9–10, <https://doi.org/10.1177/1478210320940206>; Zhang et al., “Unraveling Challenges,” 2–3.

aspects during the implementation and the analysis of the different components, described in Chapter 3 (§ 4).

4.3.UDL's inclusion in DGBL for ancient Greek: the didactical approach

Given that the relevant literature review and related considerations have been addressed, the larger question concerning this macro-section can now be addressed, namely why learners with SpLD usually do not learn ancient Greek. As Patterson, herself dyslexic, showed, students with SpLD are often discouraged from learning ancient languages as they have a reputation for being difficult and for using methods that are particularly challenging for students with SpLD (e.g., the grammar-translation method).⁴⁴⁶ However, Patterson showed from her personal experience as a Latin learner and, later, a Latin teacher, that discouraging students from learning a classical language or even encouraging them to learn an “easier” one (e.g., a modern language) is not a useful strategy. As she points out, “instead of asking what the easiest language for a dyslexic [or a students with another SpLD] to learn is, we are better off asking what the easiest method for them to learn a language is.”⁴⁴⁷ Therefore, in this section, different aspects that could facilitate the learning of ancient Greek for students with a SpLD are taken into consideration.

Ancient Greek and Classics experts in general have begun to focus on inclusion in the last few decades as well;⁴⁴⁸ however, the notion of inclusion reflected in these studies was tendentially the corrective educational model or the individual inclusion model, as previously discussed. Nevertheless, some studies linked Latin learning (and not ancient Greek) to some UDL principles,⁴⁴⁹ but the experiments that followed do not show relevant data.⁴⁵⁰

⁴⁴⁶ AnnMarie Patterson, “Latin for Students with Dyslexia,” *Teaching Classical Languages* 12, no. 02 (2022): 8–9.

⁴⁴⁷ Patterson, “Latin for Students with Dyslexia,” 9.

⁴⁴⁸ Kate Chanock, “Help for a Dyslexic Learner from an Unlikely Source: The Study of Ancient Greek,” *Literacy* 40, no. 03 (2006): 164–70, <https://doi.org/10.1111/j.1467-9345.2006.00444.x>; Barbara Hill, “Overwhelmed by Words: Students with Dyslexia and Latin,” in *Bulletin of the Council of University Classical Departments* 38 (2009); Kim Shahabudin and Judy Turner, “Enabling Success for Dyslexic Students in Classics,” in *Bulletin of the Council of University Classical Departments* 38 (2009); Valentina Garulli et al., *Disturbi specifici dell'apprendimento e insegnamento linguistico: la didattica dell'italiano e delle lingue classiche nella scuola secondaria di secondo grado alla prova dell'inclusione*, Didattica dell'italiano 3 (Bononia University Press, 2021).

⁴⁴⁹ Alessandro Iannella, “Comprendere il valore di una progettazione digitale inclusiva,” in *Latino e dislessia: riflessioni, buone pratiche, esperienze*, ed. Marco Ricucci, Nuova Secondaria 17 (Edizioni Studium S.r.l., 2020); Alessandro Iannella and Sara Marani, “Open Educational Resources (OER) and Universal Design for Learning (UDL): A Winning Combination to Enhance Human Diversity and Uniqueness,” paper presented at the *Mooc2Move Conference on “MOOCs, Language Learning and Mobility: Design, Integration, Reuse,”* Naples, Italy, April 2021: 2-9.

⁴⁵⁰ It ought to be noted that, in this dissertation henceforth, the term inclusion will indicate the UDL approach.

Before diving into the different notions of inclusion connected to ancient Greek, it is crucial to briefly outline the biggest difficulties in learning ancient Greek for learners with SpLD.

One of the biggest obstacles for students with SpLD in approaching ancient Greek is the absence of a “living” linguistic model that forces one to approach ancient Greek only through its written medium.⁴⁵¹ This aspect inverts the natural order through which humans learn languages i.e., from orality to writing.⁴⁵² Thus, this reversal of stages implies two additional problems: 1) deciphering a written text requires many control functions (e.g., strategic control, ability to elaborate, cognitive flexibility), even more so in ancient Greek which has a new and different alphabet for all learners except modern Greek natives, and which usually requires translation – a complicated operation implying a great strategic ability;⁴⁵³ and 2) in order to read a text, one needs a basic vocabulary that is usually acquired through spoken communication. However, in learning ancient Greek, vocabulary learning usually happens only through the written texts which exacerbates the difficulties for students with SpLD.⁴⁵⁴

More specifically, learners with dyslexia encounter problems in Greek learning due to the aforementioned characteristics (§ 4). Thus, they encounter difficulties in: recognizing single words (also) because of the new alphabet;⁴⁵⁵ organizing and managing the translation process and understanding the meaning and the textual context; finding words in the paper dictionary;⁴⁵⁶ memorizing declensions, paradigms etc.⁴⁵⁷ Moreover, learners with any SpLD usually struggle with not wanting to be perceived as “different” by other students and therefore they often refuse the use of compensatory tools.⁴⁵⁸

Digital resources have always been used as compensatory measures or tools for inclusion, including for example computers, digital dictionaries, etc.,⁴⁵⁹ but an actual online environment, designed from its conception as an inclusive project to learn ancient Greek has not yet been available in academia. Moreover, as mentioned at the beginning of the chapter, the investigation of DGBL for ancient Greek further seems to have been ignored until now by academics.

⁴⁵¹ Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 71.

⁴⁵² Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 71.

⁴⁵³ Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 118.

⁴⁵⁴ Daloiso and Gruppo di Ricerca ELICom, *Le difficoltà di apprendimento delle lingue a scuola*, 71.

⁴⁵⁵ Rita Scocchera and Caterina Pisano, “Dal metodo traduttivo al metodo induttivo: le ragioni di una scelta,” in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015), 383; Veronesi, “Didattica delle lingue classiche per DSA,” 413.

⁴⁵⁶ Scocchera and Pisano, “Dal metodo traduttivo al metodo induttivo,” 384.

⁴⁵⁷ Daniela Venturini, “Insegnare il greco agli allievi con DSA,” in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015), 404.

⁴⁵⁸ Venturini, “Insegnare il greco agli allievi con DSA,” 405; Veronesi, “Didattica delle lingue classiche per DSA,” 414.

⁴⁵⁹ Anna Cardinaletti et al., eds., *Dislessia e apprendimento delle lingue* (Erickson, 2014); Patterson, “Latin for Students with Dyslexia,” 14–17.

However, points of contact between educational inclusion and game-based learning have been observed by some researchers. For example, Caon refers to a process called “learning facilitation” (it. *facilitazione dell’apprendimento*) which has specific characteristics. The learning facilitation process should: 1) be recursive in the content presentation and varied in methodologies and resources; 2) consider the fundamental importance of comprehensibility of the input; 3) point towards interaction between peers, socialization and the quality of relationships in terms of trust and serenity; 4) be connected to a communicative use of language (or in general, to meaningful learning); 5) promote multisensory activities in which the learning goal and its code (e.g., the language and its linguistic codes) is integrated with other codes (e.g., non-linguistic codes such as images, music, etc.); 6) be interdisciplinary; 7) integrate “traditional” ways of teaching with “modern” ones; and 8) promote the metacognitive dimension.⁴⁶⁰

As can be observed, these characteristics of the learning facilitation process suggested by Caon can be interpreted as a point of contact between UDL, DGBL and ancient Greek language learning. Due to this observation, the researcher decided to investigate whether it is feasible to develop a DGBL environment for ancient Greek by considering the UDL framework as well. To do so, she followed the iterative schema for UDL implementation, suggested by Zhang *et al.* (which is molded on Dewey’s systematic approach to inquiry in social research).⁴⁶¹

⁴⁶⁰ Caon, *Edulinguistica ludica*, 32–6.

⁴⁶¹ Zhang et al., “Unraveling Challenges,” 25; John Dewey, *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process* (Heath & Co Publishers, 1933).

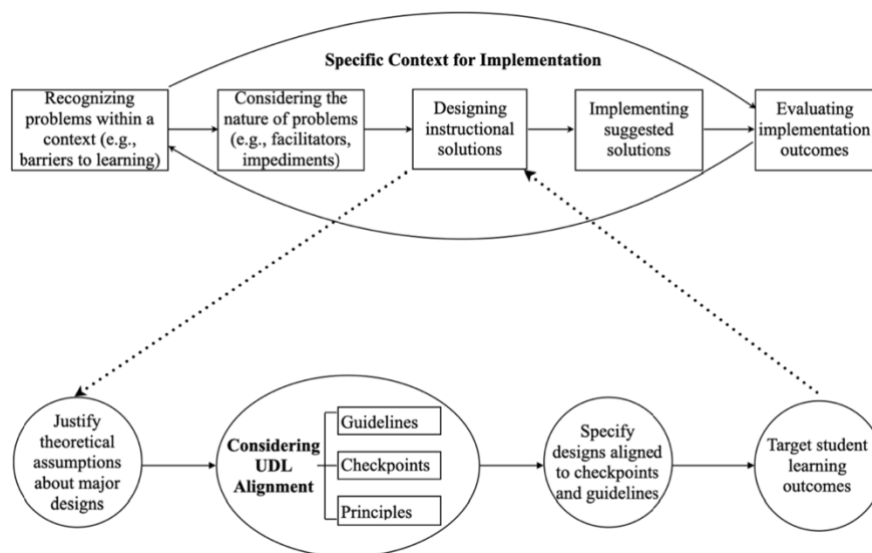


Figure 1.3. Theoretical approaches to designing intervention or instruction aligned to the Universal Design For Learning by Zhang et al.⁴⁶²

Lastly, after having described the problems of inclusion in ancient Greek instruction and having considered the nature of problems, the researcher started reasoning on the design of the instructional solutions of the project by focusing on four factors, namely the three guidelines of UDL and the choice of the didactical method. Thus, in the following sections, she will justify the theoretical assumptions about the design decisions, while in Chapter 3 she will describe in detail the alignments between UDL guidelines and considerations (in Figure 1.3 called “checkpoints”).

4.3.1. The didactical method

Studies on didactics of modern languages show that the preferred option is the so-called integrated⁴⁶³ or polytheoretical method. This choice implies not strictly following a single method, but rather changing methods along with students’ needs. The benefits of using a polytheoretical method are also highlighted by Gwiasda’s empiric research on Latin learning, which points out the importance of *variatio* in methods according to students themselves.⁴⁶⁴

⁴⁶² Zhang et al., “Unraveling Challenges,” 25.

⁴⁶³ David Urbanski, “Active Latin Promotes Open-Mindedness in Language-Learning,” in *Communicative Approaches for Ancient Languages*, ed. Steven Hunt and Mair E. Lloyd (Bloomsbury, 2021), 19; Villarini, *Didattica delle lingue straniere*, 192-3;

⁴⁶⁴ Denise Gwiasda, “Hält sie, was sie verspricht? – Induktive Grammatikeinführung in der Spracherwerbsphase des Lateinunterrichts aus empirischer Sicht” (PhD diss., Georg-August-Universität Göttingen, 2015), 239–40.

Burbank's empiric research highlights once more the importance of the method for students with SpLD as "a positive learning experience was less dependent on which language the students learnt, but rather on the teaching method and whether support was available."⁴⁶⁵

As for ancient Greek teaching methods, the most common is usually the GT method, which implies a deductive approach to grammar that anticipates the encounter with the text-input, stresses a passive role for learners and a dominant role of the teacher, and is characterized by a mainly mnemonic approach to language learning⁴⁶⁶ and to vocabulary learning.⁴⁶⁷ However, studies have shown that this method, even if capable of facilitating an explicit knowledge of grammatical rules, tends to be demotivating and unsuitable for many students,⁴⁶⁸ especially for students with SpLD.⁴⁶⁹ According to Gwiasda's empiric research, however, it has been observed that at least for grammar learning, the deductive method gives better results and better grammar understanding.⁴⁷⁰ It should be noted however that Gwiasda's sample did not include students with SpLD.

A second approach to corpus languages that has resulted in interesting outcomes for learners with SpLD is the inductive-contextual (IC) method, which was initially developed for Latin in the 1950s by Hans Henning Ørberg, a Danish language teacher, during his time teaching English at the *Naturmethodens Sproginstitut*. Ørberg's IC method takes inspiration from "natural" language learning, typical of children learning their first language. The Greek equivalent for *Lingua latina per se illustrata*⁴⁷¹ – the Latin textbooks following the IC – is *Athènaze*, a course book first developed in English by Balme and Lawall and then adapted in Italian by Borri and Miraglia.

The Italian version of *Athènaze* is comprised of two volumes, consisting of sixteen and twelve chapters each.⁴⁷² *Athènaze* can be considered as a novel in ancient Greek,⁴⁷³ given that

⁴⁶⁵ Dora Burbank, "A Survey Involving Secondary Students with Dyslexia Studying Latin or a Modern Foreign Language," *Journal of Classics Teaching* 25, no. 50 (2024): 195, <https://doi.org/10.1017/S2058631024000138>.

⁴⁶⁶ Steven Hunt, "Active Latin Learning for the Inclusive Classroom," in *Communicative Approaches for Ancient Languages*, ed. Steven Hunt and Mair E. Lloyd (Bloomsbury, 2021), 58–59; Villarini, *Didattica delle lingue straniere*, 185–6;

⁴⁶⁷ Laura Manning, "Active Latin in the Classroom: Past, Present and Future," in *Communicative Approaches for Ancient Languages*, ed. Steven Hunt and Mair E. Lloyd (Bloomsbury, 2021), 9.

⁴⁶⁸ Hunt, "Active Latin Learning for the Inclusive Classroom," 57.

⁴⁶⁹ Marco Ricucci, "Il discente dislessico del latino," in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (PensaMultiMedia, 2015), 378; Scocchera and Pisano, "Dal metodo traduttivo al metodo induttivo," 391.

⁴⁷⁰ Gwiasda, "Hält sie, was sie verspricht?" 233.

⁴⁷¹ *Lingua latina per se illustrata*, Hans Henning Ørberg, 2 vols. (Edizioni Accademia Vivarium Novum, 2010).

⁴⁷² *Athènaze: introduzione al greco antico*, Tommaso F. Borri et al., 2 vols. (Edizioni Accademia Vivarium Novum, 2013).

⁴⁷³ Marco Ricucci, "Ørberg per se e per alios illustratus: la dimensione teorico-descrittiva del metodo induttivo-contestuale," *Letras Clássicas* 17, no. 02 (2013): 31–51, <https://doi.org/10.11606/issn.2358-3150.v17i2p31-51>.

the *fil rouge* of the entire course book is the story of a farmer's family in Athens during the Peloponnesian War (V BC). The texts become gradually more difficult, as in the first volume there are easier texts, written in an artificial Greek, while the second volume features texts by actual Greek authors such as Plato, Thucydides, and Herodotus. Words are taught within the context of the story and through images and are not meant to be learnt as lists of decontextualized words, an aspect that facilitates the acknowledgement and memorization of words themselves, as already mentioned through the CTML. The benefits of using images while learning grammar are highlighted by Gwiasda's empiric research as well.⁴⁷⁴

In summary, the IC method is characterized by an inductive approach to grammar (meaning that grammar follows the encounter with the text-input),⁴⁷⁵ an active role of learners,⁴⁷⁶ a less dominant role of teachers, and a contextualized approach to learning vocabulary. Furthermore, this method implies in some cases an active use of the learnt language, e.g., by speaking or writing. Many studies have shown that this approach is more suitable to certain students with SpLD⁴⁷⁷ as it gives them a meaningful context that facilitates the approach to the language and it guarantees the use of other channels rather than only the written channel (i.e., spoken words, images or even the active reuse of learnt structures).⁴⁷⁸ Moreover, this method seems to increase motivation, engagement, and enjoyment.⁴⁷⁹ Nevertheless, some aspects of this method have been criticized: learners using this method are usually not used to the metalinguistic reflection⁴⁸⁰ typical of corpus languages; they tend to feel lost and unsure about grammar;⁴⁸¹ they do not normally know how to use dictionaries and for them it is difficult to understand ancient Greek's polysemy – as while using this method they often learn just one meaning for each word.⁴⁸² Moreover, after having used the IC method in the first two years of high school (at least in the Italian school system), the passage to authentic ancient Greek texts in the last three years of high school is often extremely problematic.⁴⁸³ According to Gwiasda's research, students are highly influenced by the method they are used to and they tend to prefer not to change it.⁴⁸⁴ Moreover, she has found that the differences between inductive or deductive

⁴⁷⁴ Gwiasda, "Hält sie, was sie verspricht?" 237.

⁴⁷⁵ Kuhlmann, *Fachdidaktik Latein kompakt*, 74.

⁴⁷⁶ Hunt, "Active Latin Learning for the Inclusive Classroom," 59.

⁴⁷⁷ Ricucci, "Il discente dislessico del latino," 377; Scocchera and Pisano, "Dal metodo traduttivo al metodo induttivo," 391; Hunt, "Active Latin Learning for the Inclusive Classroom," 59.

⁴⁷⁸ Patterson, "Latin for Students with Dyslexia," 17–18.

⁴⁷⁹ Hunt, "Active Latin Learning for the Inclusive Classroom," 58.

⁴⁸⁰ Gwiasda, "Hält sie, was sie verspricht?" 236.

⁴⁸¹ Gwiasda, "Hält sie, was sie verspricht?" 236.

⁴⁸² Zanetti, "Modelli didattici nella prassi scolastica attuale," 467.

⁴⁸³ Zanetti, "Modelli didattici nella prassi scolastica attuale," 468.

⁴⁸⁴ Gwiasda, "Hält sie, was sie verspricht?" 236.

grammar is mostly irrelevant for students, as for them the presence of an explanation by the teacher and a discussion in plenum is far more important.⁴⁸⁵

A third approach is the comparative method, which suggests learning ancient Greek (or Latin) while making comparisons with other foreign languages at the same time. The comparative method gradually introduces notions of general linguistics to show the presence of general and universal similarities (called principles) and differences (called parameters). According to Iovino's perspective, the comparative method applied to the study of ancient Greek has three main benefits: 1) the Affective Filter⁴⁸⁶ can decrease;⁴⁸⁷ 2) comprehension can facilitate a long-lasting learning because it is characterized by a meta-competency, namely an understanding of how languages work, and meta-cognition i.e., knowledge of one's own cognitive mechanisms; and 3) grammar can become a tool to develop logical and critical skills, rather than just being a descriptive tool.⁴⁸⁸ According to Iovino, the comparative method is therefore more suitable to students with SpLD as it favors the visual-nonverbal or kinesthetic cognitive channel, instead of merely the visual-verbal channel, typical of the grammar-translation method. The comparative method uses tools such as colors or images that can help students with an imagery cognitive style.⁴⁸⁹

Lastly, the valency grammar method is another approach that has been applied to students with SpLD learning ancient Greek.⁴⁹⁰ The valency grammar method, representing an approach to grammar and grammar analysis, was developed by Lucien Tesnière (1893-1954), a professor of Slavic languages and literature at the University of Strasbourg. According to this method, the phrase, namely a unit that has meaning and is in an interconnected relation with the single units that are parts of it, is the starting point of linguistic analysis.⁴⁹¹ Within the phrase, the main role is played by the verb which is compared to an atom that attracts towards itself different *actants*, i.e., units that take part in the action expressed by the verb. Therefore, these actants play a role in the phrase just as if they were actors in a small drama play (here intended as the phrase

⁴⁸⁵ Gwiasda, "Hält sie, was sie verspricht?" 236.

⁴⁸⁶ The Affective Filter hypothesis says that each speaker has an emotional "filter" comprised of motivation, self-confidence, level of anxiety, etc. When this filter is "up" learners encounter a "mental block" that impedes their acquisition of the comprehensible input. For more information, see Villarini, *Didattica delle lingue straniere*, 113-117;

⁴⁸⁷ Rossella Iovino, "Il latino nella prospettiva dell'educazione linguistica comparativa e inclusiva," in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015), 304.

⁴⁸⁸ Iovino, "Il latino nella prospettiva dell'educazione linguistica comparativa e inclusiva," 305.

⁴⁸⁹ Iovino, "Il latino nella prospettiva dell'educazione linguistica comparativa e inclusiva," 306.

⁴⁹⁰ Veronesi, "Didattica delle lingue classiche per DSA;" Donatella Vignola, "Il diritto ai Classici nei casi di DSA: strategie nuove e antiche valide per la didattica del greco," in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015).

⁴⁹¹ Kuhlmann, *Fachdidaktik Latein kompakt*, 104; Cristiana De Santis, *Che cos'è la grammatica valenziale*, *Bussole* 532 (Carocci Editore, 2016), 35.

itself).⁴⁹² To the verb and the actants one can add the *circumstants*, which indicate the circumstances in which the action takes place but are not bound to the verb. The verb's capacity for attracting different units is called valency or valence and is more specifically described as the capability of the verb to interact with a certain number and type of elements to jointly create a phrase. The term valency or valence is derived from the notion of chemical valency which refers to the ability of a chemical element to combine with a specific number of atoms of other elements to create a molecule.⁴⁹³

This method allows students from the very beginning to understand that a phrase is not composed of isolated units, but rather that the single units connect with each other to create a meaningful phrase.⁴⁹⁴ The hierarchical dynamic of the phrase is often graphically described by Tesnière through a *stemma*, i.e., a diagram that reflects the hierarchical relations of the units through lines and the positioning of the elements; these diagrams are similar to the *stemma codicum*, used by philologists to reconstruct the transmission of a text.⁴⁹⁵ During the 1970s, Happ⁴⁹⁶ and Proverbio⁴⁹⁷ respectively tried to adapt the valency grammar method to the study of Latin and slightly changed the original names of components that Tesnière proposed. Starting from Happ's and Proverbio's experiments, some Italian researchers⁴⁹⁸ proposed a list of steps to follow, aiming at helping students with SpLD while learning Latin (and ancient Greek) through the valency grammar method.⁴⁹⁹ These steps aim to facilitate the analysis of the phrase starting from the verb. Veronesi suggests the benefits of using such method for students with SpLD include:⁵⁰⁰ 1) using a graphic diagram, i.e., the *stemma*, can help students visualize the different relations of the phrase and therefore help them navigate the structure of the text without being forced to name the individual elements. Thus, the most important thing is to understand how the elements of the phrase are connected with each other and their hierarchical dynamics, not how they are called; 2) it gives them a specific set of steps to follow while working on ancient Greek texts, which facilitates organizational skills, usually lacking in students with SpLD; 3) actively creating diagrams can be in line with some students' cognitive style. However, some scholars criticize the terminological richness and very subtle

⁴⁹² De Santis, *Che cos'è la grammatica valenziale*, 19.

⁴⁹³ De Santis, *Che cos'è la grammatica valenziale*, 19.

⁴⁹⁴ De Santis, *Che cos'è la grammatica valenziale*, 21.

⁴⁹⁵ De Santis, *Che cos'è la grammatica valenziale*, 18.

⁴⁹⁶ Heinz Happ, "Möglichkeiten einer Dependenz-Grammatik des Lateinischen," *Gymnasium* 83, nos. 1-2 (1976): 35-58.

⁴⁹⁷ Gennaro Proverbio et al., *Fare latino: manuale di latino* (SEI, 1983).

⁴⁹⁸ Laura Azzoni et al., *Ratio. Un metodo per il latino* (Laterza, 2012).

⁴⁹⁹ Veronesi, "Didattica delle lingue classiche per DSA," 426.

⁵⁰⁰ Veronesi, "Didattica delle lingue classiche per DSA," 427.

differentiations between notions that could easily discourage students or even overcomplicate the process.⁵⁰¹

Given the aims and limitations of this research, the researcher chose the integrated or polytheoretical method which aims at combining different methods. However, while implementing the tool, she limited herself to the first three methods. She decided to exclude the fourth due to difficulty of implementation (for example, it would have been impossible to let learners create a *stemma* within the mechanics of the game). However, the IC method had a predominant role in the project due to the narrative nature of the game. To best implement this method and while bearing in mind its aforementioned limitations and critiques, while also adapting Gwiasda's empiric research findings, the researcher tried to guarantee the systematization of the grammar (as in the deductive method) by offering explicit explanation as available resources.⁵⁰²

4.3.2. Principle (a): multiple means of representation

As observed by different researchers, the variability in input for students with SpLD is fundamental. Following the UDL's principle of representation, great importance should be given to the input as it is the starting point of every language learning process, even more so in languages like ancient Greek where written texts are the only source of interaction with the language itself. For this reason, written texts have been considered the starting point for this project. However, the modality in which texts should be experienced is not necessarily just written.

As researchers have demonstrated,⁵⁰³ offering only a written input cannot be considered an inclusive approach because not every student can learn at their best through written input. Multisensory inputs are for this reason the key to try to satisfy most students' learning needs. The benefits of using multiple inputs are also highlighted by Burbank's empiric research and Patterson's own experience as dyslexic learner.⁵⁰⁴ An inclusive project for ancient Greek should then give students at least visual (written), acoustic, and graphic inputs – a combination that

⁵⁰¹ Kuhlmann, *Fachdidaktik Latein kompakt*, 105.

⁵⁰² Gwiasda, "Hält sie, was sie verspricht?" 237–38.

⁵⁰³ Shahabudin and Turner, "Enabling Success for Dyslexic Students in Classics;" Rapp and Arndt, *Teaching Everyone*; Guerra, "L'insegnamento della grammatica greca ad alunno dislessico di ginnasio;" Venturini, "Insegnare il greco agli allievi con DSA."

⁵⁰⁴ Burbank, "A Survey Involving Secondary Students with Dyslexia," 195; Patterson, "Latin for Students with Dyslexia," 20.

seems to have positive outcomes:⁵⁰⁵ with digital resources, such a combination can easily be achieved. This can be realized in different ways: for example, one could give students the opportunity not only to read the input-text, but also to listen someone else reading it (e.g., through a vocal synthesis), as many students with SpLD tend to have difficulties with reading alone.

Listening can also be useful to offer all students a better understanding of the text in front of them, and to strengthen their perception of the key words or the most important parts of the text.⁵⁰⁶ Furthermore, one can combine visual and acoustic inputs by offering a video that shows the text alongside images connected to the text, while simultaneously reading the text out loud.

As for the written input, favoring a simpler font such as Times New Roman, Tahoma, or Book Antiqua seems to allow every learner to decipher letters better, even at an early stage of language learning.⁵⁰⁷ Additionally, line spacing and letters should be quite large to accommodate students with visual difficulties.

4.3.3. Principle (b): multiple means of access and expression

Multiple means of access and expression (output) should be also guaranteed. This means that different means for response, selection, and composition should be available to students. The learning environment should provide alternatives for rate, timing and speed of videos as well as alternatives for physical response e.g., mouse control. Students should be able to interact with learning material by hand, voice, switch, joystick, keyboard, or adapted keyboard. Such tools should be accompanied by user support in order to guarantee full participation in activities.

Students should further be able to compose in multiple media e.g., text, speech, drawing etc. as well as social media or interactive web tools such as chats, storyboards, etc., thereby allowing students to solve problems by using various strategies.

⁵⁰⁵ Hunt, “Active Latin Learning for the Inclusive Classroom,” 60.

⁵⁰⁶ Kuhlmann, *Fachdidaktik Latein kompakt*, 51; Christophe Rico and Michael Kopf, “Teaching Ancient Greek by the Polis Method,” in *Communicative Approaches for Ancient Languages*, ed. Steven Hunt and Mair E. Lloyd (Bloomsbury, 2021), 143; Slocum Bailey, “Communication in All Modes as Efficient Preparation for Reading a Text,” 35; Urbanski, “Active Latin Promotes Open-Mindedness in Language-Learning,” 21.

⁵⁰⁷ Francesca Marseglia, “Strumenti metodologici e pratici finalizzati ad una prassi inclusiva nella didattica della lingua greca” (Master’s thesis, Università Alma Mater Studiorum di Bologna, 2018), 38; Guerra, “L’insegnamento della grammatica greca ad alunno dislessico di ginnasio,” 298; Silvia Gianferrari and Camillo Neri, “Una sintesi vocale (anche) per la dislessia,” in *Cinque incontri sulla cultura classica*, Quaderni di Atene e Roma 5 (Pensa MultiMedia, 2015), 346.

4.3.4. Principle (c): multiple means of engagement

To guarantee multiple means of engagement, one should sustain students' effort and persistence and be able to pique students' interest. According to UDL, in order to do so, one should guarantee individual choice and autonomy by offering choices between different aspects such as e.g., the type of rewards, the content and context used for practicing what has been learnt, the color and design of the resources, the timing, etc.

At the same time, the educational environment must be supportive and accepting, meaning that threats and distractions (i.e., extraneous cognitive load) must be minimized.

Individuals should also have the opportunity to engage in relevant and valuable activities, according to their own personal tendencies. This means that the value or the relevance of the activity must be clear and explained to the student, and thus it must be clear why one should complete a task. The salience of goals and objectives must be heightened through constant reminders within the learning activity, as students can lose focus and therefore lose sight of a goal's value. This aims to sustain effort and concentration.

To respect learners' diversity, it is necessary that challenges differ according to learner. Therefore, different levels and types of demands as well as different resources, tools and scaffolds must be guaranteed.

Moreover, a key aspect of engagement is fostering collaboration and community. Especially in e-learning, collaboration and cooperation are fundamental to ensure learning improvement. As communicating and collaborating are not as easy for everyone, according to UDL, support should be available according to students' needs. Collaboration should be encouraged through clear group goals, roles and responsibilities, support opportunities for peer interaction and more general support, the construction of communities of learners with common interests, and clear expectations of group work.

Lastly, to promote emotional capacity, learners should be guaranteed the opportunity to learn how to monitor and react to their emotions. This can be done explicitly for those who lack a propensity for metacognition. According to UDL, learning to understand one's own learning progress can be a highly motivating factor that pushes learners to keep learning. This aspect can be strengthened by offering devices, aids, or charts that help students keep track of their behavior, emotions, and feelings, and by offering activities that present means of feedback and scaffolding.

5. Research questions

In light of the two macro-sections of this chapter, this research will mainly focus on the implementation and qualitative investigation of an *ad hoc* DGBL environment to learn the ancient Greek language. In addition to the DGBL approach, some aspects of the UDL approach will be also taken into consideration and observed.

As the research is qualitative, the researcher decided to formulate research questions, but no explicit hypotheses, as she preferred to extrapolate hypotheses from the collected data itself. Therefore, the aim of this research and its research questions is to “describe a state”⁵⁰⁸ and investigate perceptions regarding new didactical approaches to learning the ancient Greek language.

Through this study, the researcher plan to investigate the following research questions:

1. Does a DGBL environment, built upon an inclusive pedagogical framework (UDL), influence intrinsic motivation to learn the ancient Greek language? If so, how?
2. Do player-learners perceive a sense of usefulness in an inclusive DGBL environment for learning ancient Greek?
3. Do students perceive some components of DGBL and UDL as motivating in learning the ancient Greek language?
4. Are some components of DGBL and UDL perceived as useful for remembering meanings of new Greek words?
5. Are some components of DGBL and UDL perceived as useful in deducing meanings of unknown Greek words?

⁵⁰⁸ Louis Cohen, Lawrence Manion, and Keith Morrison, *Research Methods in Education*, 8th ed. (Routledge, 2018), 291.

6. Conclusions

This chapter focused on the theoretical aspects of the project. At the beginning of the chapter, the different components of ancient Greek learning (e.g., vocabulary and grammar learning) were briefly discussed, together with the differences between reading competence and translation competence, and the role of motivation. In the first macro-section, DGBL was analyzed from different theoretical perspectives, including its limitations. Moreover, thanks to the literature review, the research gap investigated in this dissertation has been more clearly highlighted, as there is still a lack of research in the intersection between DGBL and ancient Greek instruction. The last macro-section analyzed SpLDs, the UDL framework for inclusion, and the challenges to inclusion in ancient Greek learning. Based on these theoretical foundations, Chapter 2 will discuss in depth the individual DGBL components in relation to ancient Greek from a didactical perspective.

Chapter 2

Game design for ancient Greek: didactical aspects

1. Introduction

The following chapter focuses on the design of the game elements for ancient Greek language learning, taking into account the theoretical considerations on DGBL outlined in the previous chapter.

The following chapter is divided into two main sections. The first section describes a survey conducted at the beginning of the investigation and its results. The online survey (henceforth Survey A) was aimed at investigating perceptions and desires for learning ancient Greek, including via video game, and it represented the basis on which the game design of the experimental tool was created.

The second section of the chapter deals with the theoretical and experimental description of DGBL design elements in detail. The observed elements, already briefly mentioned in Chapter 1 (cf. ¶ 3.1) are: content and skills, narrative design, game and learning mechanics, visual aesthetic and sound designs, and incentive system and feedback. Each section is once again divided into two: in the first part of the section, the researcher describes the theoretical foundation for the implementation of the specific design element for a DGBLL environment for ancient Greek; in the second part, she describes the reality of what has been implemented for the experimental tool given available resources and constraints.

Lastly, in order to discuss the different didactical aspects, some internationally commercialized textbooks for ancient Greek (and Latin) have been taken into account in the discussion itself. As these books will be referred throughout the chapter, they will first be briefly introduced here. The decision to consider books of different European countries is justified by the desire to create a video game that can be used across countries and that is not limited to a single specific location. Moreover, the books have been selected according to their input-first nature. Based on this idea, the selected books and projects include the Italian version of *Athènaze I* (already introduced in Chapter 1 ¶ 4.3.1),¹ the Italian *Méthodos esercizi 1*,² the

¹ Tommaso F. Borri et al., *Athènaze I*, vol. 1 of *Athènaze: introduzione al greco antico* (Edizioni Accademia Vivarium Novum, 2013).

² Camillo Neri, *Méthodos: corso di lingua e cultura greca. Esercizi 1*, with Giovanna Alvoni et al. (D'Anna, 2018).

German *Kántharos: Schulbuch*,³ the British *Suburani*,⁴ the British *Greek to GCSE 1*,⁵ and the international *EULALIA* project.⁶ Since these books and projects will be described in detail in the following sections, here they are merely generally introduced.

Méthodos is an Italian textbook written by Neri with the collaboration of Alvoni, Batisti, and Olivieri,⁷ and is divided into two exercise-volumes (1 and 2) introducing the language through two original ancient Greek texts (i.e., Lucian's *True story* and Lysias's *On the murder of Eratosthenes*). A grammar book is further available, in which historical grammar plays an important role.

Kántharos is a German high school course-book by Holtermann and Utzinger.⁸ The entire course is comprised of five books for students (*Grammateion*, *Vokabelheft*, *Grammatische Beiheft*, *Arbeitsheft*, and *Schulbuch*, a main course book) plus one book with resources for teachers (*Lehrerbuch mit Klassenarbeiten und CD-ROM*).

Suburani is a Latin course-book by Hands Up Education Community Interest Company.⁹ Even though the course-book is available only for Latin and Roman culture, history and mythology, it has nonetheless been considered in this research project as its structural conception could eventually be applied to ancient Greek as well.

The same exception has been made for the international academic project *EULALIA* (European Latin Linguistic Assessment) and *IN-EULALIA* (Innovative and Inclusive Instruments for European Latin Linguistic Assessment),¹⁰ which aim to create a single and shared European system for the international certification of Latin competence, taking inspiration from the CEFR model for modern languages. The project seeks to create multimedia instruments to certify two different levels of Latin competence (basic level and advanced level)

³ Martin Holtermann and Christian Utzinger, eds., *Kántharos: Schulbuch*, with Grit Diaz de Arce et al. (Ernst Klett Verlag, 2018).

⁴ *Suburani. A Latin Reading Course*, 3 vols., Hands Up Education Community Interest Company (Hands Up Education Community Interest Company, 2020).

⁵ *Greek to GCSE 1* represents an exception to the input-first selection parameter. However, given that it is the most used book in the UK and the experiment focused on British schools, the book has been included as well. See John Taylor, *Greek to GCSE*, vol. 1 of *Greek to GCSE*, rev. ed. (Bloomsbury Academic, 2016).

⁶ "EULALIA – European Latin Linguistic Assessment," *Alma Mater Studiorum Università di Bologna*, accessed November 2, 2025, <https://site.unibo.it/eulalia/en>.

⁷ *Méthodos: corso di lingua e cultura greca*, 3 vols., by Camillo Neri, with Giovanna Alvoni et al. (D'Anna, 2018).

⁸ *Kántharos: Griechisches Unterrichtswerk*, 5 vols., ed. Martin Holtermann and Christian Utzinger, with Grit Diaz de Arce et al. (Ernst Klett Verlag, 2018).

⁹ *Suburani*, Hands Up Education Community Interest Company.

¹⁰ "IN-EULALIA - Innovative and Inclusive Instruments for European Latin Linguistic Assessment," *Alma Mater Studiorum Università di Bologna*, accessed November 2, 2025, <https://site.unibo.it/in-eulalia/it>.

by offering a list of contents, vocabulary and types of exercises, decided upon through an international cooperative effort from different universities.¹¹

2. Analysis of Survey A: the sample

Survey A was administered through a Google Form between 10th May 2023 and 1st June 2023. The survey was shared via different social networks (i.e., Facebook and Instagram) and communication tools (i.e., emails, text messages, WhatsApp) and was made available in English and in Italian.¹² The goal of Survey A was to investigate feelings, preconceptions, and ideas towards learning ancient Greek and towards a hypothetical video game to learn ancient Greek.

Excluding 14 people who did not agree to the privacy policy, the final analyzed sample was comprised of 331 people: 197 female respondents, 127 male, and 7 who preferred not to answer. Being the goal of the investigation focused on general perceptions of ancient Greek, the survey was open to ancient Greek learners and non-learners. The sampling was a non-probability volunteer one, therefore the following analysis has no aims at generalization for the wider population.

The survey participants came from a wide range of countries. Specifically, there were 2 respondents from the Middle East (Egypt and Syria), 6 from Latin America (including Brazil, Mexico, Chile, Colombia, and Costa Rica), 8 from the United States, 4 from Australia, 30 from various European countries excluding Italy (such as Belgium, Croatia, the Czech Republic, Germany, Greece, Poland, Portugal, Romania, Serbia, Slovakia, Spain, and Ukraine), 37 from the United Kingdom, and 244 from Italy.¹³

In terms of ages of respondents, the survey offered 13 age groups from which one could select.¹⁴ The most represented group was the 20–30 age range, with 123 respondents, followed

¹¹*EULALIA* partners (2019-2022): Alma Mater Studiorum Università di Bologna (Italy), Köln Universität (Germany), Université de Rouen Normandie (France), Universidad de Salamanca (Spain), Università Cattolica del Sacro Cuore - Milano (Italy), Uppsala universitet (Sweden).

IN-EULALIA partners (2024-2027): Alma Mater Studiorum Università di Bologna (Italy), Georg-August-Universität Göttingen (Germany), Université de Rouen Normandie (France), Universidad de Salamanca (Spain), Università Cattolica del Sacro Cuore Milano (Italy), Universidade de Lisboa (Portugal).

¹² The revision of the English version was made by an American native English speaker, while the Italian version was reviewed by the researcher herself (Italian native speaker) and other Italian native speaker scholars and professors.

¹³ As the researcher is originally from Italy and has studied in Italy, the dissemination of the questionnaire was easier there.

¹⁴ 13, 14, 15, 16, 17, 18, 19, 20–30, 30–40, 40–50, 50–60, 60–70, and 70+.

by the 14-year-old group (33 respondents) and the 30–40 group (32 respondents). The least represented cohorts were the 13-year old group (4) and the 70+ group (3).

Regarding educational background, among learners, 22 have earned a PhD, 46 hold a master's degree, 30 a bachelor's, 78 a high school diploma, and 54 a middle school diploma. Among the non-learners, 4 have a PhD, 23 a master's, 15 a bachelor's, 49 a high school diploma, 7 a middle school diploma, and 2 completed only elementary school.

The sample was therefore comprised of 230 ancient Greek (ex-)learners and 101 non-learners. Within the 230 learners, 50 people (aged between 20 to 70 years old) had already studied it for more than five years. 82 respondents indicated having studied ancient Greek for exactly five years, presumably during the duration of the Italian high school which lasts for the same period of time. 42 respondents (mostly aged 14 years old) had been studying ancient Greek for one year: however, eight of these respondents were between 19 and 50 years old, which indicates that they previously interrupted their study of ancient Greek after just one year.

The analysis of answers has been divided into two macro-groups: (ex-)learners (230) and non-learners (101). Within the 230 (ex-)learners, another selection was made, namely the micro-group of Young Learners (aged 13-15 years old) due to the dissertation primarily targeting younger learners. This analyzed micro-group consisted of four 13-years old, thirty-two 14-years old respondents, and eleven 15-year-olds. Young Learners came from Germany (1), Serbia (1), Australia (1), Italy (15), and the UK (29). Therefore, the older learners group (henceforth, Older Learners) represented 183 people, while the Young Learners totaled 47.

2.1. Ideas and preconceptions about learning ancient Greek

The aim of this section, focusing on investigating ideas and perceptions about ancient Greek, was to see whether negative ideas (e.g., difficulty, uselessness, etc.) are connected to the study of this language, given the low number of learners worldwide (cf. Chapter 1 ¶ 2). Thus, including non-learners was crucial to gain a more detailed insight; having no direct experience with the subject itself, their answers would reflect a preconception rather than an experience and would also point out some of the possible reasons why individuals might decide not to learn this subject.

This section was comprised of different statements with which respondents had to express their agreement or disagreement on a five-points scale (Strongly Agree/Agree/Neutral/Disagree/Strongly Disagree). To the statements “I think ancient Greek is

too difficult to learn” and “I think ancient Greek is easy” the majority of all three analyzed categories disagreed. It therefore seems that ancient Greek is generally perceived as neither an overwhelmingly difficult nor particularly easy subject. Thus, for both those who have studied it as well as those who have not, ancient Greek seems to be viewed as a complicated– yet not impossible – language to learn.

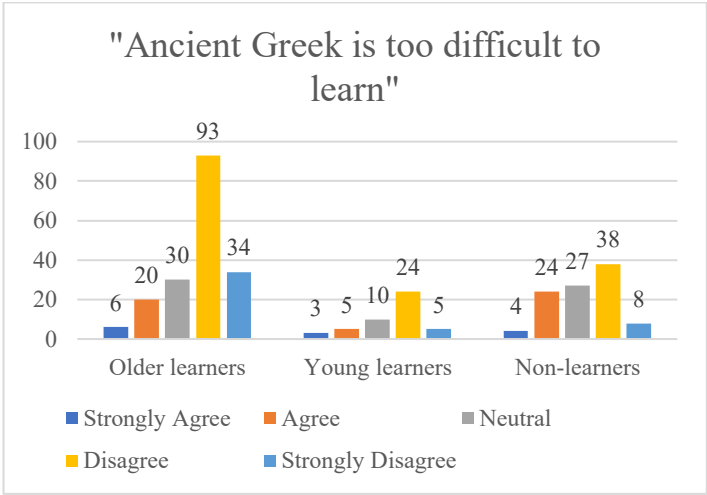


Figure 2.1. Respondents’ answers to “I think ancient Greek is too difficult to learn.”

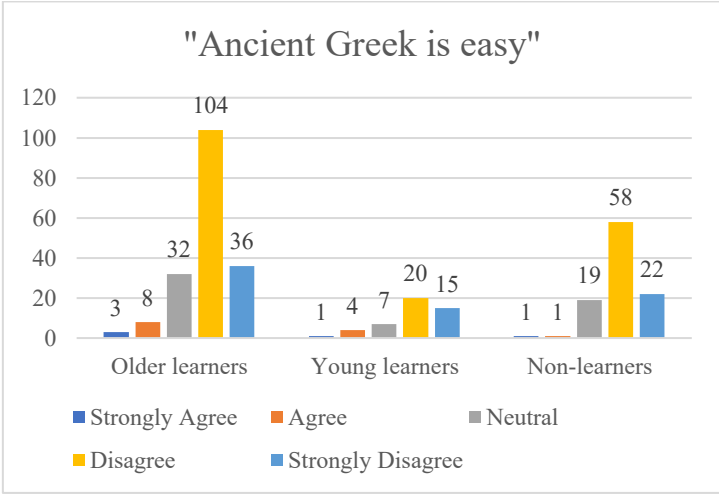


Figure 2.2. Respondents’ answers to “I think ancient Greek is easy.”

Nevertheless, respondents seem to perceive learning ancient Greek as a demanding yet fun challenge, which resonates with data from a following section of the survey, in which some of the main sentiments experienced while learning ancient Greek were both “difficulty” and “fun.” Therefore, it can be hypothesized that most people, although perceiving some difficult aspects

in learning this language, can still recognize an element of fun in it, although that element may be relatively minor, as will be later shown.

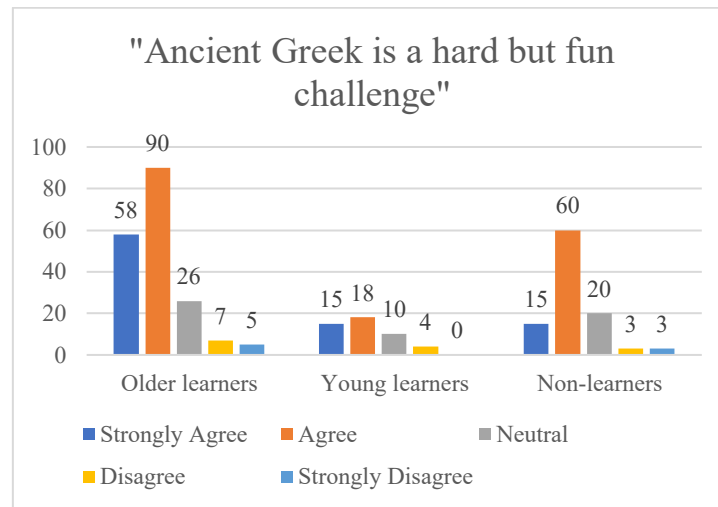


Figure 2.3. Respondents' answers to "I think ancient Greek is a hard but fun challenge."

Moreover, the majority of all categories do not describe Greek as boring. This observation reinforces the previous one, suggesting an interesting and amusing component of ancient Greek. Furthermore, Greek is also not perceived as useless by the majority of all categories.

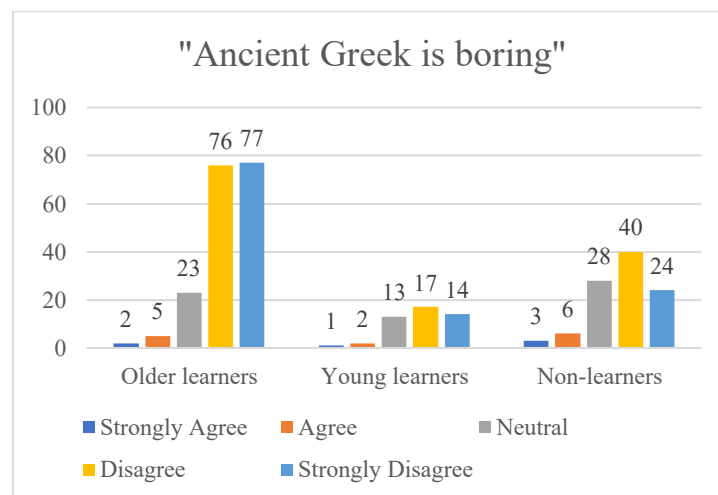


Figure 2.4. Respondents' answers to "I think ancient Greek is boring."

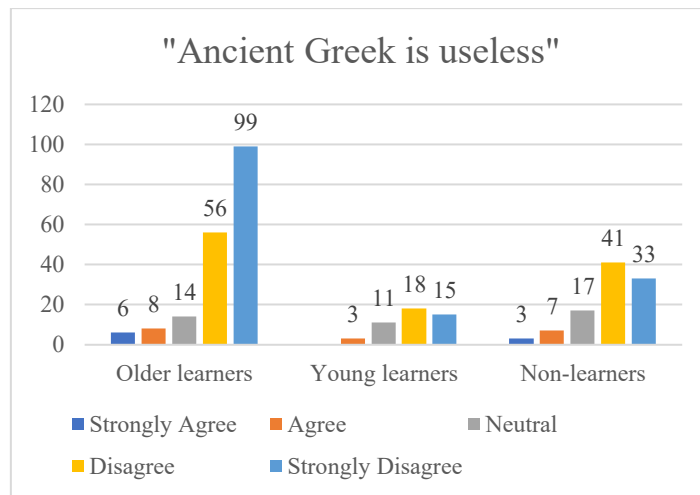


Figure 2.5. Respondents' answers to "I think ancient Greek is useless."

In light of these observations, it is important to emphasize that ideas, experiences and preconceptions by both learners and non-learners about ancient Greek seem to verge more towards a positive pole (e.g., fun, interesting, useful) rather than a negative one (e.g., too difficult, boring, useless), which offers an important starting point for this research: despite its difficulty, ancient Greek seems to nonetheless be perceived as an interesting and useful subject.

2.2. Feelings towards learning ancient Greek

This section dealt with feelings towards learning ancient Greek and was comprised of four questions.

The first question asked respondents to select five feelings or ideas they associate with their experiences learning ancient Greek. As Non-Learners did not have any experience, their answers are interpreted as how they imagine the experience of learning ancient Greek. Even though the question asked respondents to select just five answers, 41 learners selected more. At the same time, some respondents selected less than five answers. However, all answers have been included in the word cloud.

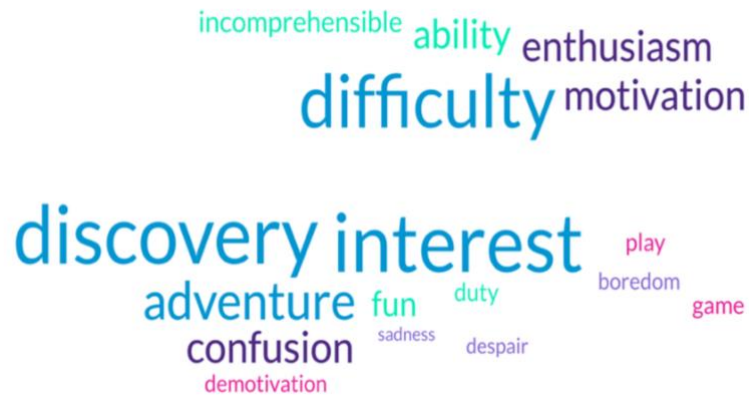


Figure 2.6. Word cloud “feelings about learning ancient Greek” (all respondents).

As can be seen in Figure 2.6, the most selected words associated with learning Greek by the entire sample were “interest” (selected 257 times), “discovery” (256), “difficulty” (228) and “adventure” (149). The fact that the first three words have very close answer rates invite further analysis. These results echo those of the previous section, and strengthen the interpretation of ancient Greek as something apparently appealing to many people. Once again, two main aspects of learning this language emerge, namely its fascinating component, which opens worlds of stories and experiences (reflected by the word “discovery” and “adventure”) but also its inherent difficulty. As the data reflects a very strong interest in the language, the most relevant questions for future research in didactics of ancient Greek deal perhaps not so much with how to make it appealing, but rather how to best facilitate the learning process and foster motivation.

This observation is further strengthened by the second group of most selected words: “confusion” (115), “motivation” (111), and “enthusiasm” (110). The significant difference between the number of answers for “interest” and “motivation” could suggest different interpretations: 1) learners interpreted the word “motivation” as in “feeling motivated while learning:” thus, learners are fascinated by the language, and they feel motivated to learn it, however the motivation is not as strong as the perception of interest, maybe due to different factors (e.g., inappropriate teaching methods, perception of difficulty, etc.); 2) learners interpreted the word “motivation” as in “learning ancient Greek requires motivation:” therefore, given the lower answer rate in comparison to interest, learners think that learning ancient Greek does not require being particularly motivated. In light of the previous section and also of the high answer rate of the words “difficulty” and “confusion” and the low answer rate to “demotivation” (38), the first interpretation is likely more accurate. Therefore, what has been

observed regarding the necessity of facilitating the learning process and fostering motivation rather than only interest seems reasonable, and represents a good starting point for the selected research questions: ancient Greek is interesting to people, but the teaching praxis should be improved to enable more people to learn it and to remain motivated without being overwhelmed by its complexity. Lastly, the least selected words were: “fun” (82); incomprehensible (60); duty (44); game/play (43); demotivation (38); boredom (37); desperation (31); sadness (20); ability (3).

This data corroborates the previous section, showing once again that people associate mostly positive feelings with ancient Greek, rather than negative. However, what stands out in these findings is that people seem not to strongly associate the notions of “fun” (selected by 24,77% of respondents) and of “game and play” (10,27%) with learning ancient Greek. This may implicitly confirm what Reinhardt highlighted regarding the societal perception of playing to learn, namely that working or learning – usually considered challenging and demanding activities – are usually not associated with playing, perceived as a “frivolous” hobby. Nevertheless, the fact that “fun” was selected 82 times (while a small rate of selection overall, but still representing almost twice the rate of selection for “game/play”) could also suggest that these two notions (i.e., “fun” and “game/play”) are not necessarily linked to each other for respondents: this seems to corroborate the idea that not all games are fun and, especially, that games are not fun for everyone.

This observation also represents a good confirmation for this research’s goals: from this study’s perspective, DGBL is a learning *alternative* that aims to *enrich* the pedagogical resources usually used in teaching ancient Greek. Thus, DGBL is not proposed here as a panacea or a method that will work with every single learner, given that, as already mentioned in Chapter 1, a one-size-fits-all method suitable for every single student does not exist. However, looking at Young Learners, the higher answer rate in percentage to “game/play” of this group (25,5%), in comparison to Older Learners (14,75%) and Non-Learners (15,84%), could suggest the positive potentiality of playing to learn ancient Greek, especially for Young Learners.

The second question of this section asked respondents to select the three biggest difficulties they have encountered in the study of ancient Greek. Once again, the answers of Non-Learners are interpreted as their preconceptions towards difficulties in learning ancient Greek. As in the previous question, some respondents selected more than three options that are also included in the chart.

The question offered seven options plus the possibility to add one own’s opinion through the option “other answer.” The seven options were:

- 1) understanding grammatical rules;
- 2) knowing vocabulary;
- 3) transferring grammatical rules to translation practice;
- 4) translating to my first language;
- 5) recognizing grammatical elements (e.g., subject, object etc.);
- 6) understanding the meaning of what I am reading/translating;
- 7) recognizing verbal and nominal forms.

In Figure 2.7 it can be observed that all three categories perceived the understanding of grammatical rules as particularly demanding which reinforces the perceived difficulty of being able to transfer learnt theoretical knowledge to the practice of translation.

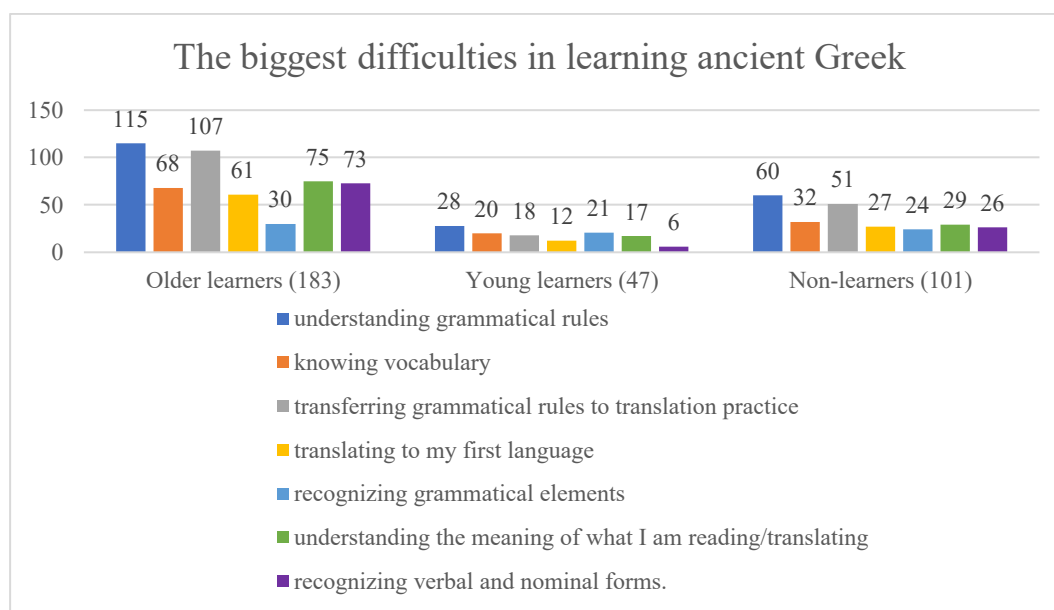


Figure 2.7. The biggest difficulties in learning ancient Greek according to respondents.

Such data is particularly relevant for a didactical intervention as it confirms that translation practice is indeed one of the biggest challenges for learners. Moreover, “knowing vocabulary” was the third most selected option by Young Learners which suggests a perceived importance of knowing vocabulary in the study of ancient Greek. Thus, the lack of vocabulary in learning this language further represents an added difficulty in learners’ experience, confirming previous literature. This observation corroborates this research’s aims regarding vocabulary competence, expressed later on in this chapter.

The last question of this section aimed to understand which activities learners would like to do in an ancient Greek language course. The purpose of this question was to form guidelines for selecting the types of mechanics for the didactical intervention. The 13 options were:

- 1) learning words' meaning;
- 2) multiple choices exercises;
- 3) solving puzzles in ancient Greek;
- 4) doing "fill in the blank" exercises;
- 5) linking images to words;
- 6) analyzing grammatical elements (e.g., subject, verb, etc.);
- 7) talking in ancient Greek;
- 8) actively using the language (e.g., to play games, to perform plays or skits);
- 9) writing short texts in ancient Greek;
- 10) team work;
- 11) reading ancient Greek texts;
- 12) learning grammatical rules;
- 13) watching videos in ancient Greek.

Among Older Learners, the top four choices were "reading ancient Greek texts," "learning words' meaning," "actively use the language (e.g., to play games, to perform plays or skits)," and "solving puzzles in ancient Greek." Conversely, Young Learners selected first "solving puzzles," "learning words' meaning," "reading ancient Greek texts," and at the same rate "talking in ancient Greek" and "actively using the language."

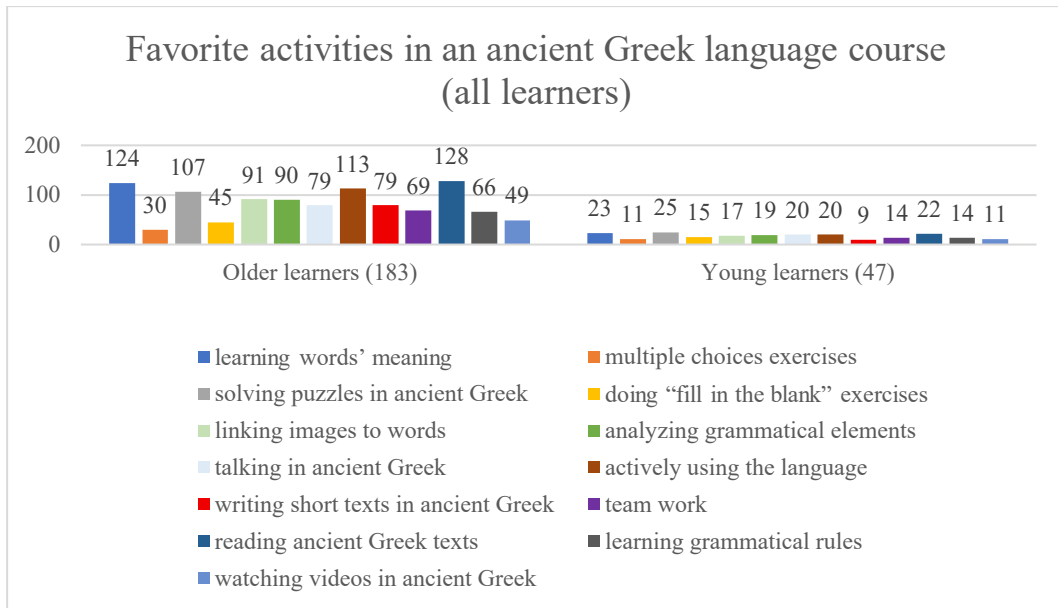


Figure 2.8. Activities that learners would like to do in an ancient Greek language course.

On the other hand, Non-Learners selected “learning words’ meanings,” “linking images to words,” “reading ancient Greek texts,” and “talking in ancient Greek.” The fact that vocabulary learning represented a strong preference in every analyzed category highlights once again the perceived importance of this learning component. Moreover, the desire to actively use the language to play or to solve puzzles (especially in Young Learners) represents a positive point in favor of DGBL, which is based on the idea of “doing.”

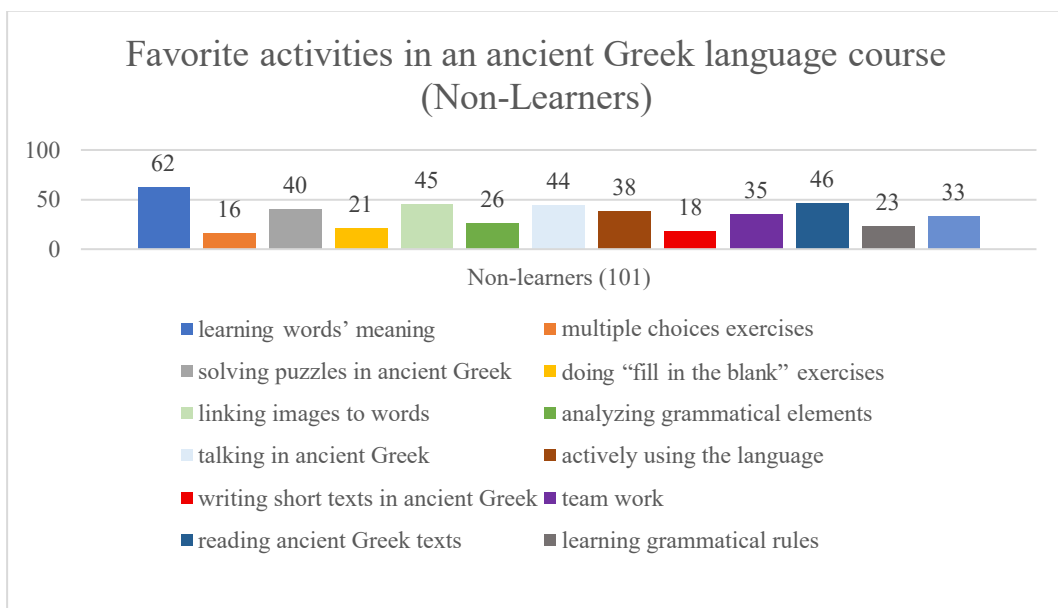


Figure 2.9. Activities that Non-Learners would like to do in an ancient Greek language course.

“Analyzing grammatical elements (e.g., subject, verb, etc.)” is the sixth most selected option by Older and Young Learners, and the ninth by Non-Learners. This discrepancy between learners and Non-Learners could illustrate that people learning ancient Greek are used to and do not dislike a more deductive and analytical grammar instruction or that maybe, according to their experiences, they perceive it as a useful way to understand the language. Therefore, in light of the chosen polytheoretical method, a more deductive grammar learning approach also played an important role in the video game. Conversely, Non-Learners seem uninterested in it and are perhaps discouraged to learn this language, given the strong grammar component.

2.3. A video game to learn ancient Greek

The first question of this section aimed to understand whether the idea of learning ancient Greek via video game could be interesting for some respondents. The question was “Would you like to learn ancient Greek via video game?” and the possible answers were “yes,” “no,” and “maybe.”

Within all learners (230 in total), most respondents (163) answered yes, 49 maybe, and 18 no. It is interesting to note that the majority of respondents between 20-30, 30-40, 50-60 and 60-70 years old answered affirmatively, which debunks the myth that playing video games is an activity only for teenagers. Non-Learners responded similarly to learners, with 67 responding “yes,” 27 “maybe,” and 7 “no.”

Age	No	Maybe	Yes	Total respondents for age
13		2	2	4
14		3	29	32
15		2	9	11
16	2	2	7	11
17		2	10	12
18	1	3	10	14
19		6	9	15
20-30	6	11	53	70
30-40	2	5	16	23
40-50	4	6	6	16
50-60	2	5	8	15
60-70	1		4	5
70+		2		2
Total	18	49	163	230

Table 2.1. Learners answering the question “Would you like to learn ancient Greek via video game?”

As for Young Learners, the majority responded positively, and while some were unsure, none responded with “no,” which seems to suggest at least a general attraction to this method for most young learners.

The majority of positive answers is likely to indicate an open-minded mentality towards the use of video games for learning both amongst learners and Non-Learners of ancient Greek, which is an encouraging starting point for this research.

The final question of Survey A aimed to understand which activities in such a video game would be most appealing to users.¹⁵ The question was molded on Reinhardt’s questionnaire¹⁶ and asked respondents to choose five options. Once again, some respondents chose more than five options, which are also included in the chart.

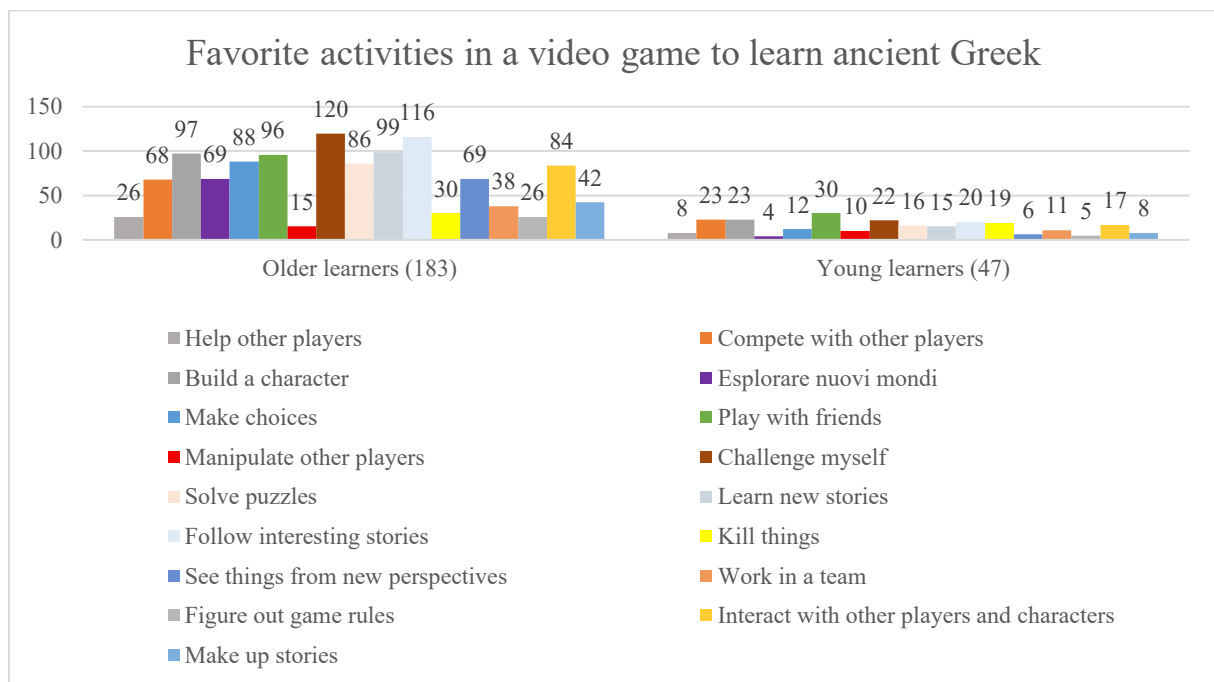


Figure 2.10. Favorite activities in a video game to learn ancient Greek: all learners’ answers.

The favorite activity of Older Learners was “challenge myself” (selected 120 times and connected to the involvement type *strategic*). The following nine most selected activities were:

- 1) “follow interesting stories” (116, *narrative*);
- 2) “learn new stories” (99, *narrative, IF*¹⁷);

¹⁵ It should be noted here that due to an error, the option “esplorare nuovi mondi” (“exploring new worlds”) present in the Italian language form was absent from the English language survey. This option is still present on the chart above but is written in Italian, as only the Italian respondents could choose it.

¹⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 245.

¹⁷ IF stands for Interactive Fiction, which will be discussed in ¶ 3.2.2.

- 3) “build a character” (97, *narrative, IF*);
- 4) “play with friends” (96, *social*);
- 5) “make choices” (88, *strategic, IF*);
- 6) “solve puzzles” (86, *strategic*);
- 7) “interact with other players and characters” (84, *social*);
- 8) “see things from new perspectives”¹⁸ (69, *affective, IF*);
- 9) “work in a team” (68, *social*).

From these answers, it seems that Older Learners are more attracted by a narrative or IF type of involvement. While being strategic and social are important, they are less significant than being involved in the narrative. The affective involvement type seems to play a less relevant role for them.

Conversely, the social activity of “playing with friends” (30, *social*) was the most selected by Young Learners, suggesting the relevance of this aspect for younger players. The other most selected activities by Young Learners were:

- 1) “compete with other players” (23, *social*) and “build a character” (23, *narrative, IF*);
- 2) “challenge myself” (22, *strategic*);
- 3) “follow interesting stories” (20, *narrative*);
- 4) “kill things” (19, *affective*);
- 5) “interact with other players and characters” (17, *social*);
- 6) “solve puzzles” (16, *strategic*);
- 7) “learn new stories” (15, *narrative, IF*);
- 8) “make choices” (12, *strategic, IF*).

From these selections, it seems that for Young Learners, the narrative component also plays an important role, however the social component is likely to be more relevant for them than for Older Learners: by considering the involvement type of the first five selections of these two groups, it looks like Older Learners are more interested in being *individually* involved with the game, as their first five involvement types were strategic, narrative, narrative/IF, narrative/IF, and social. This tendency could be attributed to a stronger level of individuality in older respondents. On the other hand, Young Learners are primarily interested in discovering the game and the narrative *together with others* by collaborating or competing, given that their first five involvement types were social, social, narrative/IF, strategic, narrative. A similar

¹⁸ The same score was reached by “*esplorare nuovi mondi*” which as discussed previously was available only for the Italian respondents. This type of involvement is *narrative*.

observation suggests the pivotal importance of a social component in a video game to learn ancient Greek, especially when targeting younger learners.

Activities in a video game	Involvement type
1. Challenging myself	+ Strategic
2. Playing with friends	+ Social
3. Exploring new games and worlds	+ Narrative
4. Trying to manipulate other players	+ Affective
5. Competing with other players	+ Social
6. Helping other players	+ Social
7. Solving puzzles	+ Strategic
8. Killing things	+ Affective
9. Seeing things from new perspectives	+ Affective, + IF
10. Making choices	+ Strategic, + IF
11. Building a character	+ Narrative, + IF
12. Learning new stories	+ Narrative, + IF
13. Working in a team	+ Social
14. Interacting with other players and characters	+ Social
15. Figuring out game rules	+ Strategic
16. Following interesting stories	+ Narrative
17. Making up stories	+ Narrative

Table 2.2. Activities in a video game connected to involvement type.¹⁹

As for Non-Learners, the first three selections mirror one to one Older Learners' situation, highlighting once again a strong interest towards a narrative type of involvement. From the fourth selection (not considering "*esplorare nuovi mondi*"), there is a slight change in the order of the choices and types of involvement, as Non-Learners chose a social ("interact with other players and characters") and strategic ("solve puzzles") type of involvement in comparison to the narrative and social choices of the Older Learners. However, it is important to highlight that "*esplorare nuovi mondi*" (narrative) received the same amount of answers as "interact with

¹⁹ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 245.

other players and characters.” By taking it in consideration, the succession of the involvement type of Non-Learners would differ from that of Older Learners only in the last option of the first top-five selections. This observation seems to confirm that for older players, whether learners or Non-Learners of ancient Greek, the social component may be less important than for younger ones.²⁰



Figure 2.11. Favorite activities in a video game to learn ancient Greek: Non-Learners' answers.

2.4. Final observations about Survey A

The observations of the previous sections yield several interesting conclusions. Regarding ideas and preconceptions about learning ancient Greek, it has been observed that most people – learners or Non-Learners – seem to associate positive ideas and preconceptions with ancient Greek: ancient Greek is considered difficult, yet not impossible to learn. It is perceived as a hard but fun and not boring challenge. Moreover, people do not associate the adjective “useless” with ancient Greek.

Regarding the feelings or words that one associates with learning ancient Greek, the top-three words were “interest,” “discovery,” and “difficulty.” This triad seems to confirm the previous interpretation that ancient Greek is still perceived as interesting and fascinating, however, its inherent difficulty is closely connected to this appealing nature. Moreover, it has

²⁰ Within the Non-Learners group, there were only three young respondents aged 14-15 years old.

been observed that, although the answer rate for the word “motivation” was not one of the lowest ones, it was still significantly lower than the answer rate for “interest,” as 77,64% of respondents chose the latter while only 33,53% chose “motivation.” This observation could therefore suggest that respondents feel highly interested in the subject, but that they are not as motivated to actually learn it. The reasons underpinning this discrepancy could of course be numerous: however, instead of the hypothesis that respondents perceive ancient Greek as useless (an idea that was not corroborated by the findings), another hypothesis may be that the methods and strategies used to teach this language are not particularly motivating for the respondents, which is an interesting starting point for this investigation.

This hypothesis seems reasonable especially in relation to the answers regarding the perceived difficulties and the activities one would like to do while learning ancient Greek. Regarding the difficulties, Older Learners and Non-Learners selected in their top-three understanding the grammar rules, transferring the theoretical knowledge to the translation practice, and knowing the vocabulary, while Young Learners selected recognizing grammar elements instead of transferring the theoretical knowledge to translation practices, which may resonate with their initial learning state in which translating does not yet play a more predominant role. These answers hint at a shared perceived difficulty in understanding the grammar – perhaps due to a didactical tendency towards a more theoretical approach to grammar rather than a theoretical *and* practical one – and at the observation that knowing vocabulary is fundamental while learning this (or any) language, which is likely to be ignored in traditional ancient Greek class. An example of this didactical tendency to “neglect” vocabulary in ancient Greek teaching is the propensity of instructors to give learners “vocabulary lists” to learn with a one-to-one correspondence between a Greek word and its translation, e.g., ὁ λόγος = word. The one-to-one correspondence is not only tendentially unrealistic from a scientific perspective, as it is rare for any language to allow a perfect one-to-one correspondence with another language,²¹ but it also indicates a non-contextualized approach to vocabulary learning which is not optimal for long-lasting learning.²² Thus, this mainly and almost purely theoretical approach to learning ancient Greek grammar and vocabulary is likely to be one possible reason why respondents do not feel motivated to learn the language. Once more, this hypothesis seems to find confirmation in the desired activities to do in an ancient Greek language course: among the top-four activities of all categories there

²¹ Kuhlmann and Horstmann, *Wortschatz und Grammatik üben*, 29–30.

²² Kuhlmann, *Fachdidaktik Latein kompakt*, 58.

was at least one option implying a kind of active use of the learnt language. Excluding the option “reading ancient Greek texts,” which was understandably the most selected option for Older Learners, the third one for Young Learners and the second one for Non-Learners, all categories would want to learn vocabulary and to actively use the language either to “talk” (Young Learners and Non-Learners), to solve puzzles (Older Learners and Young Learners) or to play games or skits (Older Learners and Young Learners). These findings are of particular relevance for the aims of this investigation as they suggest that, along with reading ancient Greek texts, which is clearly the focus of learning ancient Greek, learners and Non-Learners alike would like to learn the language in a more active rather than theoretical way and that moreover they would also like to learn more vocabulary.

This section also showed that the notions of “fun” and “game/play” are not necessarily linked to ancient Greek learning and that they are also not interconnected with each other in respondents’ minds. The general percentage rates for these two notions were quite low (24,77% for “fun” and 10,27% for “game/play”), which it is likely due to the perceived difficulty and perhaps also to the methodological choices. Moreover, the absence of an interconnection between these two notions seem to suggest that not all games are fun and, especially, that games are not fun for everyone. This finding corroborates the idea of DGBL of this research and its aims: DGBL is here investigated as an alternative pedagogical method that neither excludes others nor aims at replacing all existing methods. Due to the diverse nature of the needs, difficulties and interests of all learners, a perfect univocal method that works with everyone does not exist: this pedagogical research focuses therefore on investigating whether DGBL could be beneficial for some learners.

Lastly, the majority of all analyzed categories of all age cohorts would be interested in learning ancient Greek via a video game. This data highlights a curiosity towards this method, especially in Young Learners. Moreover, findings suggest a particular interest in a narrative type of involvement for all ages and the relevance of the social component especially for Young Learners. The following table summarizes some of the most selected options according to involvement type²³ and hypothesized didactical and learning benefits (cf. Table 2.3).

²³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 245.

Most selected features	Involvement type	Hypothesized didactical benefit
1. Challenge myself <ul style="list-style-type: none"> Selected 120 times by Older Learners (183) Selected 22 times by Young Learners (47) Selected 60 times by Non-Learners (101) 	Strategic	Actively using the language Increase in motivation Increase in engagement Increase in interest Perception of autonomy, proactivity
2. Follow interesting stories <ul style="list-style-type: none"> Selected 116/183 times by Older Learners (183) Selected 20 times by Young Learners (47) Selected 52 times by Non-Learners (101) 	Narrative	Improvement in vocabulary learning Reading ancient Greek texts Practice text comprehension Improvement in perception of fun Increase in motivation Increase in engagement Increase in interest
3. Play with friends <ul style="list-style-type: none"> Selected 96 times by Older Learners (183) Selected 30 times by Young Learners (47) Selected 37 times by Non-Learners (101) 	Social	Increase in motivation Increase in engagement Increase in interest Satisfaction of social component Informal language practice Peer-teaching Peer-learning Improvement in perception of fun and/or game Actively using the language
4. Learn new stories <ul style="list-style-type: none"> Selected 99 times by Older Learners (183) Selected 15 times by Young Learners (47) Selected 47 times by Non-Learners (101) 	Narrative/IF	Improvement in vocabulary learning Reading ancient Greek texts Practice text comprehension Improvement in perception of fun
5. Build a character <ul style="list-style-type: none"> Selected 97 times by Older Learners (183) Selected 23 times by Young Learners (47) Selected 37 times by Non-Learners (101) 	Narrative/IF	Improvement in vocabulary learning Improvement in perception of fun and/or game Perception of autonomy, proactivity
6. Make choices <ul style="list-style-type: none"> Selected 88 times by Older Learners (183) Selected 12 times by Young Learners (47) Selected 32 times by Non-Learners (101) 	Strategic/IF	Improvement in vocabulary learning Reading ancient Greek texts Practice text comprehension Increase in motivation Increase in engagement Increase in interest Perception of autonomy, proactivity Improvement in perception of fun and/or game

Table 2.3. Some of the most selected features by respondents according to involvement type and hypothesized didactical benefits.

The following presents several potential ideas for satisfying the selected options.

To satisfy “challenging myself,” it is possible that the frequent *active* use of the ancient Greek language (e.g., in texts, narratives, tasks etc.) will represent a challenge for many learners, especially if they are used to a more traditional instruction.

“Following interesting stories” and “learning new stories” could be offered through a narrative focusing on a mystery or a detective story in which the given texts contain clues in ancient Greek that allow one to progressively discover the plot and reveal the culprit. At the same time, “solving puzzles with the language” could be easily integrated in the narrative by asking learners to solve linguistic puzzles and riddles in ancient Greek to proceed with the plot. This solution could promote an active yet partially unconscious use of the language as the goal of the exercise is to decipher the enigma and not to explicitly practice the language, even if the latter happens at the same time.

“Playing with friends” could be implemented in the video game through a chat function in which players could interact with each other, asking for help or suggestions and sharing opinions. This function would allow learners to satisfy the key social component of language e-learning,²⁴ for example, by “one-way or two-way information gap tasks, and brainstorming or problem solving tasks that demand a single shared outcome (i.e., a shared goal).”²⁵ According to didactics of modern languages, “interaction between learners and their environment is central to language learning, because this interaction provides opportunity for the negotiation for meaning (NfM).”²⁶ From this perspective, meaning is not directly transmitted from one individual to another or “negotiated only during communication breakdown; rather, it develops between users and is then internalized by the learner.”²⁷ Thus, interaction becomes “the means by which people co-construct meaning.”²⁸ Although ancient Greek is a corpus language and its instruction does not have a communicative goal, the presence of interaction within the gameplay is still extremely relevant. Game and play have a strong social matrix that cannot be underestimated in the creation of the learning environment. Therefore, it would be useful to find a way to allow learners to communicate with each other via chat.

²⁴ Purushotma et al., “10 Key Principles.”

²⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 204.

²⁶ Sykes and Reinhardt, *Language at Play*, 34.

²⁷ Sykes and Reinhardt, *Language at Play*, 34.

²⁸ Sykes and Reinhardt, *Language at Play*, 35.

Thus, the presence of a social element is of great importance for two main reasons. *In primis*, to satisfy the social component of language (e-)learning and to improve NfM;²⁹ *in secundis*, to promote incidental internalization of vocabulary and grammar structures which will gain new relevance in the eyes of the learners as they would need such structures or words to interact with other players. In fact, as Franciosi points out, “a further way that gameplay could influence the use of learned vocabulary is through spontaneous and/or informal communication between game players outside of the game itself.”³⁰ Sykes and Reinhardt offer similar opinions, stating: “group cooperation requires constant analysis, renegotiation of various demands, and communication among players, which can often result in additional authentic language experiences for learners.”³¹

“Building a character” is a key component of some types of video games. As Coleman and Money point out by citing Gee’s work,³² “customization is the principle of players being able to make decisions about the way in which they play the game.”³³ Moreover, as Reinhardt points out, a DGBLL environment should guarantee “spaces for identity work and play, in other words, investing in and experimenting with who you are and might become,”³⁴ as experimenting with mimicry by using new roles or points of view is a key aspect of a video game’s experience. Therefore, this option could be guaranteed by letting players build their characters.

“Making choices” connects with the IF type of video game. Coleman and Money list seven key tenets of a student-centered approach, highlighted by Lea *et al.*³⁵ This approach builds learning environments starting from student’s needs and characteristics, and among these seven key tenets student autonomy and independence play major roles.³⁶ Thus, “an independent student has the ability to seek out further knowledge and develop their skills on their own,”³⁷ which is a desirable characteristic in students of every subject, but particularly in ancient Greek

²⁹ Negotiation for Meaning (NfM) in a video game for ancient Greek could be exemplified in the mutual aid happening through chat or a social page to understand a specific input-text level or an authentic text in ancient Greek encountered during a task.

³⁰ Stephan J. Franciosi, “The Effect of Computer Game-Based Learning on FL Vocabulary Transferability,” *Educational Technology & Society* 20, no. 01 (2017): 124.

³¹ Sykes and Reinhardt, *Language at Play*, 22.

³² Gee, *What Video Games Have to Teach Us about Learning and Literacy*.

³³ Thomas E. Coleman and Arthur G. Money, “Student-Centred Digital Game-Based Learning: A Conceptual Framework and Survey of the State of the Art,” *Higher Education* 79, no. 03 (2020): 418, <https://doi.org/10.1007/s10734-019-00417-0>.

³⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 205.

³⁵ Susan J. Lea et al., “Higher Education Students’ Attitudes to Student-Centred Learning: Beyond ‘Educational Bulimia’?” *Studies in Higher Education* 28, no. 03 (2003): 321–34, <https://doi.org/doi:10.1080/03075070309293>.

³⁶ Coleman and Money, “Student-Centred Digital Game-Based Learning,” 419.

³⁷ Coleman and Money, “Student-Centred Digital Game-Based Learning,” 419.

learners, as translation exercises require autonomous and independent practice. By guaranteeing students' autonomy, the role of the teacher shifts from someone teaching and sharing their knowledge, to a person who facilitates students' intellectual processes and growth. Moreover, from a game design point of view, "a game that does not provide its players a sense of agency quickly loses its market, because no one will play it."³⁸ Therefore, choices should be available to the learners but in a limited number, as by "having limited choices, the player is still able to make reasonable choices, maintaining his or her sense of agency."³⁹

³⁸ Sykes and Reinhardt, *Language at Play*, 19.

³⁹ Sykes and Reinhardt, *Language at Play*, 22.

3. Game design

3.1. Content and skills: theory

As the goal of creating the video game is learning the language, language contents represent a vital part of the development process influencing all other components. That is why it will be discussed as first. Since some of these aspects have been already mentioned in Chapter 1 (cf. ¶ 3.6.1.), a quick summary seems necessary before diving into the development of the content progression.

Firstly, as mentioned in Chapter 1, learning contents should be presented through tasks and not taxonomically.⁴⁰ Grammar and vocabulary contents should be clear and well-defined and their implementation should allow learners to use the language to complete the tasks. To decide the content progression, one should understand which examples of some foreign-language dependent tasks they want the learner to be able to accomplish at the end of the game.⁴¹

Secondly, grammar and vocabulary progression should always consider previously learnt language contents, as new language elements should be introduced gradually and be interconnected with what has been learnt before.⁴²

Moreover, explicit grammar explanations should be offered as support material, but not as a part of the core game. Therefore, one can present the explicit grammar explanations as additional sections of the video game i.e., additional slides available through a link. As Purushotma *et al.* point out, it is preferable not to place “metalinguistic information as [a] central feature of the game; nor should the game require players to name the grammar categories and other metalinguistic concepts in order to make progress in the game, so long as they are able to use them successfully.”⁴³ Nevertheless, as Survey A’s results show that many students around the world want to explicitly learn ancient Greek grammar, it seems sensible to include a small amount of more specifically linguistic exercises during each level, according to the three-tiered approach, mentioned in Chapter 1 and explained later in more detail.

Analyzing in detail the development of the content progression, it is important to point out that grammar, vocabulary, and cultural content progression planning can follow two steps, as

⁴⁰ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202–4; Purushotma et al., “10 Key Principles.”

⁴¹ Purushotma et al., “10 Key Principles.”

⁴² Purushotma et al., “10 Key Principles.”

⁴³ Purushotma et al., “10 Key Principles.”

suggested by didactics of modern languages: a (macro)planning and a (micro)design.⁴⁴ In the former, planning refers to a holistic and global level of learning organization in which the teacher makes hypotheses regarding a specific teaching-learning context (e.g., the video game) by defining competences, contents, materials and aids that they can use. For the latter, design defines each section of the macroplanning by explicating the means of content presentation, the pedagogical techniques required to develop different abilities and competences according to different operational models offered by didactics of modern languages.

According to the Italian school of didactics of modern languages, operational models are prototypes of how each teaching intervention might look.⁴⁵ Thus, a didactical unit is an operational model that takes inspiration from the *Gestalt* theory by German philosopher and psychologist Carl Stumpf. According to this theory, human perception of reality is divided in three moments: globality, analysis, and synthesis. In the first moment, the human mind interprets reality according to holistic principles and categorizes it as a whole entity. Afterwards, in the analysis moment, the human mind tries to segment the perceived whole reality in smaller fragments and finally in synthesis, it reconnects the smaller fragments in a new holistic reality.⁴⁶ Therefore, a didactical unit divides the learning process into three main moments (globality, analysis, and synthesis) adding three other moments (i.e., six in total): motivation, reflection, control.⁴⁷ To summarize, the didactical components of a didactical unit are in sequence: motivation, globality, analysis, synthesis, reflection, and control.

In the motivational moment, some brainstorming activities are proposed to learners in order to elicit pre-known knowledge about the topic with which learners are going to interact in the didactical unit. In the globality moment, learners get in touch for the first time with the input-text and with an activity of global comprehension. In the analysis moment, learners have to dwell on the text and its linguistic or content characteristics; during this phase, learners are invited to interact with the input-text with a heuristic and inductive mindset. In the synthesis moment, activities of reuse of encountered linguistic phenomena should be proposed in order to fix what has been learnt during the other phases. In the reflection moment, linguistic

⁴⁴ Pierangela Diadori et al., *Insegnare l'italiano come seconda lingua* (Carocci, 2016), 251–52.

⁴⁵ Some of the most known operational models are: 1) the lesson, in which the teacher shares their knowledge to a public that is on a lower level of authority; 2) *unità didattica*, namely didactical unit, divided in three learning moments i.e., globality, analysis, synthesis; 3) *unità di apprendimento*, namely learning unit, micro units of a learning process that added up can form an *unità didattica*; 4) *unità didattica digitale*, namely digital didactical unit, that transfer the *unità didattica* online. As the differences within the classification are very subtle, for this research sakes, the term didactical unit will be used as hyperonym.

⁴⁶ Diadori et al., *Insegnare l'italiano come seconda lingua*, 289–94.

⁴⁷ Some researchers unify the last two phases (reflection and control) into one: control. See Villarini, *Didattica delle lingue straniere*, 200.

phenomena are systematized with the teacher to guarantee deep comprehension and internalization. Finally, in the control phase, the teacher checks whether the didactical goals have been reached by proposing specific or global reinforcement.⁴⁸

Therefore, during the macroplanning, teachers should firstly identify the language needs of their students.⁴⁹ Language needs can be either communicative or linguistic. For ancient Greek, the only type of language needs required is linguistic i.e., the grammar, language, vocabulary and stylistic rules that learners need to master to be able to read (or to interact with texts and tasks within the video game), as the goal is not to learn the language to communicate. Secondly, teachers should analyze the context of the learning process e.g., students' characteristics, place, time, modality of the learning process (in-person or online), and available resources. Afterwards, the language contents can be identified. The language contents represent the linguistic, pragmatic, sociolinguistic and cultural elements with which the learners will interact and the set of tasks that the learner will need to complete. Finally, the acquired knowledge testing system should be defined as well.

3.1.1. Grammar content

In light of the aforementioned observations, there are two possible ways of designing the grammar content for ancient Greek (macroplanning and microdesigning): 1) following the language content progression of a specific book; 2) creating a unique and personal language content progression, specifically tailored to the video game's nature. Both options present positive and negative aspects.

The first option has fewer organizational requirements as the content progression is already defined by the book content. Moreover, it more easily fits what one teaches during normal Greek class using the selected course book. However, writing the narrative in ancient Greek may be more difficult as one is bound to the content progression of the book and cannot introduce grammar topics according to the narrative necessity. Further, most commercialized

⁴⁸ As for video games, the didactical digital unit (DDU) can be taken considered the main operational model. DDU refers to the specific nature of a didactical unit when this is offered online. The main differences between a didactical unit and a DDU are connected to the medium's characteristics (e.g. paper, books or online). Such differences can be summarized in: 1) different didactical environment; 2) different teacher's behavior; 3) different student's behavior; 4) different evaluation tools. However, not being the focus of this research, for a more detailed analysis of the differences between online didactics and in presence didactics, see Di Gioia, "Didattica delle lingue online e greco antico," 3–20; Villarini, *Didattica delle lingue straniere*, 211–29.

⁴⁹ According to the Italian school of didactics of modern languages, this process is called *analisi dei bisogni*.

books do not organize their language contents around pragmatic tasks – which is fundamental in DGBLL – given that books’ structures differ vastly from video games.

Conversely, the second option requires more organizational planning as the structure is decided by the developer herself, e.g., through an initial comparison between different course books. It therefore may not fit a specific single book perfectly, but has on the contrary the potential to be adaptable – at least partially – to many different books. Furthermore, given that in DGBLL the pragmatic organization (i.e., the necessary development of the learning contents starting from practical tasks) is essential, this second option gives one more freedom to achieve it. This means that, compared to the first option, the video game’s content progression is here established according to what learners need in order to accomplish tasks (i.e., adventures, challenges, quests, etc.) within the video game itself. Thus, the narrative writing is also more flexible and it may be easier to incorporate tasks.

As the task-based approach will be discussed in the game mechanics section (cf. ¶ 3.3), here it is important to highlight that while developing the grammar content progression (e.g., first declension, second declension, etc.) one should also define which competences they aim to develop (e.g., recognizing the endings, remembering the case functions, etc.).

Competence is an overarching term with different definitions. Being competent normally indicates being able to do something, knowing what one is doing.⁵⁰ Competences are often correlated to the *savoir faire* (knowing how to do things) and contraposed to the mere *savoir* (the knowledge, knowing facts and notions). Being competent therefore means being able to actively take on a certain task (e.g., a translation task) by using one’s own resources, which can be cognitive, affective, etc. As the definitions of competence are various and numerous, here only the European Commission’s general definition and Kuhlmann’s specific definition in relation to ancient Greek will be taken into consideration.

According to the European Commission, competences are a combination of three factors: 1) knowledge, which is “composed of the concepts, facts and figures, ideas and theories which are already established, and support the understanding of a certain area or subject;”⁵¹ 2) skills, which are “defined as the ability to carry out processes and use the existing knowledge to achieve results;”⁵² and 3) attitudes, which “describe the disposition and mindset to act or react to ideas, persons or situations.”⁵³ Trentin echoes this, stating that competences are multilevel

⁵⁰ Bijoy M. Trentin, *Educare le competenze* (Sironi Editore, 2012), 17.

⁵¹ European Union, *Key Competences for Lifelong Learning*.

⁵² European Union, *Key Competences for Lifelong Learning*, 5.

⁵³ European Union, *Key Competences for Lifelong Learning*, 5.

realities that are composed of more visible aspects (e.g., knowledge and abilities), as well as less noticeable aspects such as motivation, attitudes, values, self-esteem, metacognitive strategies, etc.⁵⁴

Competences should be developed “throughout life, through formal, non-formal and informal learning in different environments, including family, school, workplace, neighbourhood and other communities,”⁵⁵ following the idea of lifelong learning. An intertwined and interconnected idea of learning is therefore more suitable for a kind of didactics based on competences: learning a certain subject should not be seen as a separate activity from other learning activities. Learning x or y is not thought of as a non-communicative activity, as if such learning took place in a vacuum. Therefore, competence-oriented didactics of ancient Greek should focus on the interconnection between different levels of knowledge and the promotion of the idea of ancient Greek as a means to discover new knowledge and develop new competences.

Thus, the European Commission highlights eight general key competences, defining them as equally important and deeply interconnected to one another.⁵⁶ However, for the aims of this section, we will take into account a specific competence to ancient Greek, namely the grammar competence. As already mentioned in Chapter 1, according to Kuhlmann, competences, also in relation to Classical languages, have three levels: *Wissen* (declarative knowledge), *Verstehen* (understanding or analytic knowledge) and *Können* (being able to or ability).⁵⁷ The ancient Greek grammar competence can therefore be divided into morphological competence and syntactical competence.

The morphological competence is further divided into verbal and nominal morphology, each focusing on different goals. For example, a goal of the verbal morphology is being able to recognize, understand, and translate personal endings (e.g., I, you, etc.) or to recognize *tempora* and *modi*, while nominal morphology focuses on *inter alia* being able to group together words sharing the same characteristics (case, gender, number). Lastly, the syntactical competence focuses on specific syntactical phenomena such as the genitive absolute and the didactical goals one aims to achieve (e.g., being able to recognize the phenomenon and translating it). These

⁵⁴ Trentin, *Educare le competenze*, 29–31.

⁵⁵ European Union, *Key Competences for Lifelong Learning*, 5.

⁵⁶ 1) literacy competence, 2) multilingual competence, 3) mathematical competence and competence in science, technology and engineering, 4) digital competence, 5) personal, social and learning to learn competence, 6) citizenship competence, 7) entrepreneurship competence, and 8) cultural awareness and expression competence. See European Union, *Key Competences for Lifelong Learning*, 6–14.

⁵⁷ Kuhlmann, *Fachdidaktik Latein kompakt*, 19.

examples are not exhaustive, but aim to point out the importance of operationalizing the didactical goals in the form of observable competences, while also developing a DGBLL for ancient Greek.⁵⁸ Therefore, while drafting the grammar content progression, it is also important to focus on which specific goal of a competence is intended.

3.1.2. Vocabulary content

Regarding the creation of the vocabulary content progression, the same two aforementioned strategies for grammar are implementable here. If one decides to create their own vocabulary content progression, rather than following a specific book, it seems sensible to start by consulting ancient Greek vocabulary frequency lexica, such as that by Cauquil e Guillaumin in the Italian translation by Piazzzi,⁵⁹ or lexica organized by semantic stems, such as that by Ugolini.⁶⁰

As Aguilera García points out, following Sökmen,⁶¹ vocabulary learning should follow seven guidelines,⁶² some of which are mentioned by Kuhlmann as well:⁶³ 1) building a large measure of vocabulary based on frequency or difficulty of words, thus encouraging e.g., learners to create their own vocabulary notebooks; 2) integrating new words with old word in a web-like structure; 3) providing a large number of encounters with a given word to facilitate memorization; 4) promoting a deep level of processing e.g., by letting students link new vocabulary to personal experiences, manipulate words, justify their choices, etc.; 5) facilitating imaging and concreteness e.g., by proposing images or visual aids; 6) using a variety of techniques; and 7) encouraging independent learning strategies.

At the same time, words should also be taught by stems or word families, as suggested by researchers.^{11/18/2025 9:01:00 AM} Learning vocabulary by stems is an efficient way to increase inferential language mechanisms e.g., not knowing a word's meaning but still being able to deduce it.⁶⁴ As Sykes and Reinhardt point out, “when some contextual features are familiar and others are not, we use the familiar ones to infer something about the others.”⁶⁵ At

⁵⁸ For other examples, see Kuhlmann and Horstmann, *Wortschatz und Grammatik üben*, 55–118.

⁵⁹ Francesco Piazzzi, *Lessico essenziale di greco* (Cappelli, 2000).

⁶⁰ Gherardo Ugolini, *Lexis. Lessico della lingua greca per radici e famiglie di parole*, Eikasmos: sussidi 5 (Pàtron, 2018).

⁶¹ Anita Sökmen, “Current Trends in Teaching Second Language Vocabulary,” in *Vocabulary: Description, Acquisition, Pedagogy*, ed. Norbert Schmitt and Michael McCarthy (Cambridge University Press, 1997), 237.

⁶² Aguilera García, “Vocabulary Acquisition in the Language Classroom,” 119-20.

⁶³ Kuhlmann, *Fachdidaktik Latein kompakt*, 60–68.

⁶⁴ Rongoni and Grisendi, “Chioma o radici?” 71.

⁶⁵ Sykes and Reinhardt, *Language at Play*, 77.

the same time, it can be hypothesized that learning vocabulary by stems might decrease cognitive load, as learners are not asked to remember each word's meaning but rather can guess or hypothesize the meaning of some words by knowing just the stem.⁶⁶ Moreover, this mechanism represents an interlinguistic ability that learners can subsequently reemploy with other languages.⁶⁷

As Rongoni and Grisendi suggest, learning ancient Greek vocabulary should inevitably start with the identification of words' structure (i.e., stem, suffixes, infixes, prefixes, desinences, etc.) and with the comprehension of phonetical rules, in particular of apophony, as these two steps allow learners to visually recognize and infer words' meaning, as well as learning many words with the least possible effort.⁶⁸ Integrating tasks in the initial levels focusing on these aspects could therefore be a possible strategy.

An example of how one can learn many words with the least possible effort can be seen in the apophonic stem $\gamma\epsilon\nu(\epsilon)\text{-}\gamma\omicron\nu\text{-}\gamma\nu\text{-}$ from which we have nouns (e.g., $\gamma\acute{\epsilon}\nu\text{-}\omicron\varsigma$, $\gamma\omicron\nu\text{-}\acute{\eta}$, $\pi\rho\acute{o}\text{-}\gamma\omicron\nu\text{-}\omicron\varsigma$), adjectives (e.g., $\acute{\epsilon}\kappa\text{-}\gamma\omicron\nu\text{-}\omicron\varsigma$), verbs (e.g., $\gamma\acute{\iota}\text{-}\gamma\nu\text{-}\omicron\text{-}\mu\alpha\iota$), and adverbs (e.g., $\gamma\epsilon\nu\text{-}\nu\alpha\acute{\iota}\omicron\varsigma$). Being aware of the apophonic mechanisms (i.e., $\gamma\epsilon\nu(\epsilon)\text{-}\gamma\omicron\nu\text{-}\gamma\nu\text{-}$), of the word's main meaning(s) (i.e., to become, to be, to be born), and of prefixes', infixes', and suffixes' meanings, one can infer the meaning of unknown words. For example, the noun $\pi\rho\acute{o}\text{-}\gamma\omicron\nu\text{-}\omicron\varsigma$ is composed of the prefix $\pi\rho\acute{o}\text{-}$ (i.e., before), the stem $\gamma\omicron\nu\text{-}$ (i.e., to become, to be, to be born) and the desinence $\text{-}\omicron\varsigma$. By knowing each component's meaning and function, one can infer that $\pi\rho\acute{o}\gamma\omicron\nu\omicron\varsigma$ may mean "someone who is born before/first," therefore, someone who is older than someone else. This inferential mechanism is undoubtedly not always applicable to all words, as the correct combination of the words' components does not always guarantee the right decoding of a meaning. However, it is a basic vocabulary-learning strategy that can nonetheless aid learners by reducing the amount of unknown words.

Lastly, as already mentioned for the grammar content progression, while choosing the content progression, one should keep in mind the goals of the vocabulary competence.⁶⁹

⁶⁶ Rongoni and Grisendi, "Chioma o radici?" 71.

⁶⁷ Rongoni and Grisendi, "Chioma o radici?" 72.

⁶⁸ Rongoni and Grisendi, "Chioma o radici?" 69.

⁶⁹ See Kuhlmann and Horstmann, *Wortschatz und Grammatik üben*, 30, or chapter 1 (§ 2.1) of this study.

3.1.3. Cultural content

The decision to include cultural content is justified by the awareness that learning a language means at the same time learning its cultural, historical, and literary aspects.⁷⁰ Therefore, conversely to the Italian school's system in which literature and language learning are taught separately at the beginning, a sensible didactical aim seems to unite cultural, literary, and language learning from the start.⁷¹

The idea of systematically presenting literature and culture from the first year of learning is observable in the analyzed books (i.e., *Athènaze I*, *Méthodos esercizi I*, *Kántharos: Schulbuch, Suburani*), which can be therefore taken as a valid example of how to propose such content.

In *Athènaze I*, the cultural matrix is omnipresent. The core idea of this textbook is in fact to present a text which teaches ancient Greek culture and literature at the same time as the language. The narrative is fictional, but the historical setting and aspects are true to the archeological and historical knowledge. This means that, even if the characters of the story are not real, their activities and behaviors are plausible compared to the historical setting. A particularly interesting aspect is the decision to give a cultural macro-context in which the language is taught, while at the same time implicitly or explicitly teaching cultural aspects as well. This decision seems reasonable as it gives students the perception that language and culture are not separate, non-communicating realities: on the contrary, a language is a means to express cultural aspects.

In *Méthodos esercizi I*, many chapters present mythological or historical insights that follow an input-text in ancient Greek.⁷² After a description, most insights offer a related practical activity (e.g., after having read about the birth of coins in ancient Greece, learners should do research together to present in class archeologist D.G. Hogarth's work in the Ephesus' Artemision or Cresus' treasure, which are topics related to the birth of coins). This proposed practical activity after the historical or mythological inserts shows a constructivist pedagogical

⁷⁰ Unless otherwise noted, the term 'cultural' will henceforth be used as a hypernym of 'cultural, historical, religious, and literary.'

⁷¹ In the Italian school system, the subject is called *lingua e cultura greca*, which translates to "Greek language and culture." However, according to culture learning section of the national guidelines, it is specified that "a partire dal secondo anno si potrà avviare la lettura antologica di testi d'autore, secondo percorsi tematici o di genere, allo scopo di potenziare le competenze linguistiche e introdurre gradualmente alla lettura diretta dei classici," MIUR, *Indicazioni nazionali*, DM n. 211/2010, 202. Therefore, the cultural aspects seem to be postponed to the second year, as the first year is only dedicated to language learning, while the last three years of high school mostly focus on literature.

⁷² Neri, *Méthodos: corso di lingua e cultura greca. Esercizi I*.

approach which considers learning an individual *in fieri* process in which each learner actively builds their own knowledge.⁷³ On the other hand, in the section *Ἑλλάδος περιήγησις* (i.e., description of Greece), many famous places of ancient Greece are described through texts of famous writers in ancient Greek and not in translation. At the same time, in the section *Ἐνὶ λόγῳ* (i.e., in one word), important words are described and explained through historical grammar (e.g., the stem *ᾠψ derives from Indo-european *ᾗekw- which expresses the idea of seeing etc.). Such insights play an important role in introducing learners to historical grammar, often seen as a prohibitively difficult subject for high schools. On the contrary, gradually introducing historical grammar to young learners may help them collocate the so-called exceptions in a more meaningful conceptual panorama. This means that they could understand why some words act differently in comparison to the given linguistic rule, as most of the time they are not in reality “exceptions” but rather historically justified linguistic phenomena (e.g., why in ancient Greek the third declension’s accusative in singular presents either an -α or a -ν, while in Latin there is a -m). Thus, historical grammar could potentially help learners with SpLD find a “meaning” and an explanation to phenomena that they are usually asked to simply memorize (e.g., learning the declensions), which is an impossible activity for most learners with SpLD.

The section *Ἑλληνικὴ παιδεία* (i.e., Greek culture) explains cultural ancient Greek aspects such as the use of masks in theaters or the difference between a private soldier and an epic hero. Such insights offer at the end of the description a glossary in which words related to the topic are etymologically explained. The themes are varied and include topics such as everyday clothing, military clothing, religion, magic, theater, symposia, etc. This section plays a very important role in the process of connecting language learning and culture learning; however, in comparison to the other sections, this does not propose any practical activities afterwards.

Finally, the section called *Παράλληλα* (i.e., comparisons) compares words in three languages (i.e., Italian, ancient Greek, and Latin). This section seems particularly sensible as it shows how languages are interconnected with each other and trains learners to pay attention to linguistic phenomena as they can be encountered in other languages as well (e.g., the fact that a movement is often expressed by an accusative).⁷⁴

⁷³ Helene Decke-Cornill and Lutz Küster, *Fremdsprachendidaktik* (Narr Francke Attempto, 2010), 34–35.

⁷⁴ Εἰς + accusative in ancient Greek, in + accusative in Latin, and in + accusative in German: εἰς τὸν ναόν, in templum, in den Tempel.

In *Kántharos: Schulbuch*, each lesson covers a cultural topic such as the conception of power in philosophy or Homer’s poems.⁷⁵ At the beginning of the didactical unit (i.e., lesson), a short page in German about the topic that learners are going to learn is proposed, as well as some practical activities in a constructivist approach (as already seen in *Méthodos*’ historical and mythological insights). Particularly interesting is the chronological bar on top of the page signaling in which historical period the input-text or the characters of the input-text are located. This aspect could help learners notice step by step historical differences in literary periods. Many activities aim to let learners discuss and reason on the proposed cultural topic, and the themes are accompanied by pictures or illustrations of different historical periods (e.g., the lesson about Stoicism is illustrated by Hokusai’s 1831 painting “Under the Wave off Kanagawa,” presumably to symbolize the wave of feelings and emotions by which stoics try not to be overtaken). The decision to combine ancient texts with “modern” illustrations can be helpful to let learners understand that cultural aspects can often be shared by many cultures, despite their broader apparent differences. Additionally, several extra pages are dedicated to actual insights into cultural aspects e.g., the evolution of ancient Greek to modern Greek or the structure of temples. Each insight is accompanied by practical activities to help students better memorize and internalize what has been learnt.

Lastly, although *Suburani* is dedicated to the Latin language, many aspects can be adapted to ancient Greek as well. In fact, *Suburani*:

Encourages students to interrogate the ancient sources. From the first chapters, students investigate the ancient world through textual and archaeological sources, exposing them to:

- literary sources, including some in Latin where accessible, introducing students to evidence from a variety of authors
- epigraphic evidence, including inscriptions and graffiti
- archaeological evidence, including art, artefacts, coins, monuments, and sites

Questions in the book allow students to evaluate and interrogate the primary evidence themselves, and draw their own conclusions.⁷⁶

In each chapter, the book proposes a topic from mythology or history, which is often connected to the civilization content of the chapter and to the storyline. However, it can also be approached separately from the core content. The focus of the mythological section is not to retell the myths, but “to stimulate discussion about the myths and provide relevant literary and

⁷⁵ Holtermann and Utzinger, *Kántharos: Schulbuch*.

⁷⁶ “Suburani. Pedagogy,” *Hands Up Education Community Interest Company*, accessed October 29, 2025, <https://hands-up-education.org/pedagogy.html>.

visual sources through which the myths may be further explored.”⁷⁷ An interesting aspect here is the tendency to connect, where appropriate, ancient myths to other stories from other cultures. This comparison aims to encourage students to reflect on why these stories can be similar and simultaneously different around the world.

On the other hand, the historical insights are not divided chronologically, but rather thematically, and can take inspiration from the storyline or from other cultural aspects of the chapter itself. Another interesting aspect of the cultural section of *Suburani* is its desire to break the highly Eurocentric point of view of the ancient world by proposing analysis of “Roman interactions with civilizations outside of the Empire, widening students’ understanding of the ancient world and acting as a springboard for further research.”⁷⁸ Thus, *Suburani* represents another example of active pedagogy in which students are not asked to merely learn a topic, but rather to discover and reflect on it thanks to their own personal mental schemata and by actively discussing in groups.

In light of these examples, the cultural content represents a crucial moment to encourage active reflection and critical thinking, and to focus on the development of cultural awareness and expression competence. According to the European Commission, this represents the ability to develop an “understanding of and respect for how ideas and meaning are creatively expressed and communicated in different cultures and through a range of arts and other cultural forms.”⁷⁹ It means being curious and open to discovering “cultures and expressions, including their languages, heritage and traditions, and cultural products, and an understanding of how these expressions can influence each other as well as the ideas of the individual.”⁸⁰ Moreover, this competence implies “an open attitude towards, and respect for, diversity of cultural expression together with an ethical and responsible approach to intellectual and cultural ownership. A positive attitude also includes a curiosity about the world, an openness to imagine new possibilities, and a willingness to participate in cultural experiences.”⁸¹

Therefore, such insights should aim not only to teach ancient Greek cultural aspects, but also, when appropriate, to interconnect these aspects to those of other cultures such that students read not just as students, but also as global citizens, such as proposed by Andreotti.⁸² This

⁷⁷ “Suburani. Pedagogy,” *Hands Up Education Community Interest Company*.

⁷⁸ “Suburani. Pedagogy,” *Hands Up Education Community Interest Company*.

⁷⁹ European Union, *Key Competences for Lifelong Learning*, 14.

⁸⁰ European Union, *Key Competences for Lifelong Learning*, 14.

⁸¹ European Union, *Key Competences for Lifelong Learning*, 14.

⁸² Vanessa Oliveira de Andreotti, “Soft versus Critical Global Citizenship Education,” in *Development Education in Policy and Practice*, ed. Stephen McCloskey (Palgrave Macmillan, 2014), 6.

decision is justified by the idea that ancient Greek can represent a place to foster intercultural competence, e.g., by considering other cultures' points of view critically and actively. This place, if organized correctly from a didactical perspective, may have the potential to promote interculturality, multiculturalism, ethnic diversity acceptance, reflexivity, dialogue, contingency, and an ethical relation to difference (i.e., radical alterity),⁸³ as well as to discourage racism, discrimination, and cultural biases and prejudices.

Therefore, the cultural content should be proposed within the storyline, for example, through the personal background of a character or as a task which would promote active learning. However, it could also be offered as an external resource, thematically linked to the narrative arc. Depending upon how one presents these contents, their format (e.g., reading, listening, watching) and language (e.g., English or ancient Greek) can vary: for example, a piece of content can be proposed as a part of a story told by a character in ancient Greek or as an external insight in English.

3.1.4. Content and skills: experiment

3.1.4.1. Grammar and vocabulary content

For the grammar content progression (macroplanning), the researcher selected the English book *Greek to GCSE 1* by John Taylor.⁸⁴ This decision is justified by one main reason: through previous consultations with different British teachers, it emerged that if the grammar content was too different compared to that used in certain schools, it would have been significantly more difficult to find teachers and classes able to participate in the experiment. For this reason, the researcher used as a guideline *Greek to GCSE 1*, which is the most commonly used book in the UK to teach ancient Greek.⁸⁵ However, compared to the book's grammar content progression, the researcher slightly modified the progression due to narrative and game design necessities. Since the video game's experimentation was limited to the first three levels, only the modifications concerning these levels will be discussed in this section.⁸⁶

In comparison to the original book content, some grammar topics have been anticipated for writing purposes (microdesign). For example, in level 1, teaching direct questions was

⁸³ Andreotti, "Soft versus Critical Global Citizenship Education," 6.

⁸⁴ Taylor, *Greek to GCSE*.

⁸⁵ Khan-Evans, "UK: England," 237.

⁸⁶ The content progression of the three experiment levels is available in the appendix (¶ A).

prioritized, as players would need to understand the interrogative form due to the story genre (i.e., a detective fiction). The same happened for personal pronouns.

As for the vocabulary content, the researcher selected different criteria to write the fictional story. In the first place, she tried to use as many words from each chapter of *Greek to GCSE 1* as possible, and further to use them as many times as possible to increase chances of memorization.

In the second place, in order to strengthen vocabulary memorization, inference and derivation competences, and interconnection between new knowledge and acquired knowledge, the researcher planned to describe unknown new words by using periphrasis and already known synonyms in ancient Greek, directly translating unknown words to English only when necessary. For example, in level 10 the unknown verb *σιωπάω* in the phrase *ὁ Φίλιππος ὁ πατήρ ἐσιώπησε* would have been translated with the already many times encountered verb *σιγάω*. An example of how it would have looked like is *ὁ Φίλιππος ὁ πατήρ ἐσιώπησε (= σιγάω)*.

The researcher was planning on using the following symbols to explain words, as used in *Athènaze*:

- = means equal and is used for verbs that are synonyms or equivalent e.g. (*σιωπάω* = *σιγάω*) or for periphrasis, e.g., *ἔνοπλοι* (= *σὺν ὄπλοις*);
- ↔ symbolizes contraries, e.g., (*ἐξάπτω* ↔ *λύω*);
- < indicates derivation, e.g., *τὴν ἀρπαγὴν* (< *ἀρπάζω*) and it aims to enhance the ability to infer meanings;
- ~ indicates similarity⁸⁷ and it is used for words for which the learner has not yet learnt a more suitable synonym, but for which the researcher thinks a direct translation in English can be avoided without compromising text comprehension, e.g., in level 20, *ἔπειτα δὲ ἀνέτειλαν (~ ἐγένοντο) ἐκ γῆς ἄνδρες ἔνοπλοι* (= *σὺν ὄπλοις*).

Direct translation in English has been used where this explicatory system could not be implemented due to a lack of learnt words, where a periphrasis in Greek would have been too difficult or not comprehensible enough, and when it seemed sensible to show a conceptual difference in terminology. Given that the researcher developed only the first three levels, this system of symbols has not yet been fully implemented and was limited to English translations and images, as students still did not have enough vocabulary to learn through the aforementioned symbol system.

⁸⁷ This symbol is not used in *Athènaze*.

Furthermore, some unknown words were neither translated nor paraphrased due to the medium through which the story is being told (e.g., interactive video). Thus, the researcher decided to explain some words through animations, drawings or sound. This aims to emulate what often happens while learning a language, i.e., that one learns new words through different channels (e.g., sight, touch, hearing) and not only through direct translations. An example of such a strategy is in level 2 where the word βασιλεύς in Ὁ Ἀλέξανδρος οὐκ ἔστι δούλος, ἀλλὰ βασιλεύς is shown on the screen as a crown and not directly translated in English. This choice is justified by the desire to activate students' inferential strategies for approaching a word that is yet too difficult for learners (being a word of the third declension). In any case, learners could check any words encountered in the dictionary section of the tool, where an English translation for the term in context was offered. However, it is important to highlight that not all words presented in the narrative were meant to be learnt by learners. For example, βασιλεύς was useful for the narrative as it described Alexander and it was explained to aid comprehension, but being a term of the third declension learners were not asked to learn it, which means that the tasks did not consider this word.

The following discusses some extra didactical decisions made by the researcher in the process of writing the fictional story for the first three levels, along with their rationales.

In level 1, the first level of the story, one of the first words that learners encounter is the third declension word πόλις, “city,” to describe the city of Pella. At the beginning of the writing process, the researcher had opted for the word κώμη, “village,” which is a word of the first declension and therefore more in line with the grammatical content of the first level. However, during the revision process, she decided to opt for the word πόλις, to respect the philological and conceptual difference that exists between the two words. Even though the word κώμη would have perhaps been an “easier” didactical solution in that it is a word of the first declension and could therefore lower the cognitive load, the word πόλις respects more truthfully the reality of Alexander's Pella, which was indeed a city and not a village at the time of Alexander's reign. As for βασιλεύς, πόλις was explained to aid comprehension, but not tested, as it did not represent a target of the vocabulary goals.

In level 1, following the structure of the reference book (i.e., *Greek to GCSE 1*), the didactical grammar journey starts with only the singular forms of the first declension (nominative and accusative singular). That is justified by the desire not to overwhelm the learners who are already acclimating to a new and different way of learning, and to allow them sufficient time to gradually get used to the new setting. Moreover, in this first level, two verbs

in -εω (i.e., οἰκέω and φιλέω) were introduced. This didactical choice is justified by two main reasons: 1) the similarity of the third singular verbal form ending (i.e., -ει as in λέγει and οἰκεῖ), despite deriving from different grammar phenomena, and 2) the necessity for the story to use the verbs “to live” and “to love” to create a more meaningful storyline. Other verbs to express “to live” (e.g., ζῶω, βίωω) were not included as they majorly differ from the third singular ending in -ει, which is one of the learning goals of the level (i.e., ζῶ, βιοῖ), and because the meaning would not reflect what the researcher intended in the text. Moreover, in the phrase Ὁ Ἀλέξανδρος τὴν Μακεδονίαν ἔχει the verb ἔχω is here intended to mean “to possess, to have charge of” as in LSJ.⁸⁸

In level 2, the researcher chose the less common verb συλλαμβάνω instead of βοηθέω in order to avoid a contraction phenomenon that could not yet be understood by student (βοηθέω imperative 2nd plural βοηθεῖτε). The verb συλλαμβάνω is used in the second video in its absolute sense of “to assist” as shown in some authors (Ar. *Eq.* 229; Th. 1.118.3).⁸⁹

In level 3, the researcher decided to follow the Plautine-inspired way of saying *nomen atque omen* (cf. Pl. *Persa* 4.4.79). That is why the three main characters, not including Alexander, have a “speaking-name:” Epicurus, Alexander’s friend, is the wing-man (ὁ ἐπίκουρος, “helper, ally”);⁹⁰ Glauce is the wise young detective (chosen for its assonance with third declension noun ἡ γλαύξ, and the adjective γλαυκός, ἡ, ὄν, animal and adjective associated with Athena, goddess of wisdom);⁹¹ and Aulos is the αὐλητής, the flute-player. About this last name, some considerations need to be made. According to DGE (*Diccionario Griego-Español*), the name Αὐλός was widespread in the Roman period⁹² and not during Alexander’s reign. However, in the storyline the name Aulos is intended as a sort of nickname for the flute player who is therefore called by his entourage “Flute, the flute player.”⁹³ The use of the name Aulos is therefore not intended as a real name used in Alexander’s period nor a historical representation of the period.

Regarding some of the didactical aspects explained in the theoretical section of content and skills, several things ought to be noted. As for the grammar contents, the experiment guaranteed

⁸⁸ LSJ, “ἔχω,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=47212>.

⁸⁹ LSJ, “συλλαμβάνω,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=101038>.

⁹⁰ LSJ, “ἐπίκουρος,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=40989>.

⁹¹ LSJ, “γλαύξ,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=23023>; LSJ, “γλαυκός, ἡ, ὄν,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=23005>.

⁹² DGE, “Αὐλός,” accessed November 6, 2025, <http://dge.cchs.csic.es/xdge/%CE%91%E1%BD%96%CE%BB%CE%BF%CF%82>.

⁹³ LSJ, “αὐλός,” accessed November 6, 2025, <https://stephanus.tlg.uci.edu/ljs/#context=lsj&eid=17872>.

both focus on form and focus on forms by using use tasks and knowledge tasks.⁹⁴ At the same time, the experiment guaranteed the explicit grammar resources as external resources. The structure of the didactical unit was also guaranteed in almost all phases: motivation and globality (video), analysis (inductive approach to rules and text), synthesis (reuse of inducted rules), reflection (external resources as systematization of grammar) and control (feedback through the tasks). For the grammar competence, she focused on the following goals: recognizing and being able to reuse nominal endings (nominative and accusative singular and plural), and recognizing and being able to reuse verbal endings (first, second and third person singular and plural in indicative present of verbs in -ω). However, the research questions focused on the vocabulary competence, therefore data regarding this aspect has not been analyzed.

Regarding the vocabulary, the researcher introduced the words presented in the list at the end of the first two chapters of *Greek to GCSE 1*. As for the seven guidelines to introduce vocabulary,⁹⁵ mentioned in the previous section, points 1, 2, 3, 5 and 6 were guaranteed. Points 1, 2 and 5 can be observed in the vocabulary section which offered students the given word and the context in which they encountered it with corresponding voice overs, a connected image, and finally the English translation and another example of the use of the word by original authors with the corresponding voice over. Point 2 can further be also observed in the web-like structure of the tasks which proposed new words and a recap of learnt ones each time. Point 3 is guaranteed by the structure of the story, which proposes multiple encounters with a word. Points 5 and 6 can be seen in the combination of ways through which vocabulary has been presented (images, text, audio, vocabulary through stems). Learning vocabulary by stems was guaranteed as in each section of the level there was a knowledge task focusing on a stem encountered in the level and connected activities that promoted inferential competences.⁹⁶ For the vocabulary competence, the researcher focused on the following goals: remembering meanings of words and deducing meanings of unknown words.

⁹⁴ For a definition of knowledge and use tasks, see Chapter 1 ¶ 3.6.1.

⁹⁵ 1) building a large sight of vocabulary based on frequency or difficulty of words, thus encouraging, e.g. learners to create their own vocabulary notebooks; 2) integrating new words with old word in a web-like structure; 3) giving a large number of encounters with a word to facilitate memorization; 4) promoting a deep level of processing by e.g. let students link new vocabulary to personal experiences, manipulate words, justify their choices; 5) facilitating imaging and concreteness by proposing, e.g. images or visual aids; 6) using a variety of techniques; 7) encouraging independent learning strategies. See Aguilar García “Vocabulary Acquisition in the Language Classroom,” 119-20.

⁹⁶ From the first level of the experiment, example of inferential activity: If the stem ἀνθρωπ- means “human being, humankind,” what could the adjective φιλόανθρωπος mean? 1) someone who loves a man; 2) someone loved by people; 3) someone who loves humankind and therefore is benevolent, kind; 4) someone who easily falls in love.

Lastly, it is useful to address three possible critiques that the didactical decisions regarding vocabulary could encounter. Firstly, critics might argue that the idea of “learning vocabulary” offered by the experiment implies that: 1) vocabulary is just a decontextualized list of words to learn (e.g., through knowledge tasks asking players to “just” link the word to the corresponding image); 2) the idea of a 1:1 correspondence between words and meanings is sound; 3) vocabulary is not polysemic (as words were offered with only one meaning) and does not also depend on the context it is embedded into. Regarding the first point, it is important to stress that despite the nature of the knowledge tasks, the vocabulary has been always introduced through an input-text in which the words are indeed embedded into a context. Moreover, learners had a dictionary section in which the single words were always connected to the original and to another context, illustrating the importance of contextualized vocabulary learning.

Regarding the second and third points, the researcher is aware of the polysemic nature of words and that a 1:1 correspondence is often impossible, however in the context of the experiment she decided to proceed gradually for didactical reasons: this means that she introduced just one (of the many) meanings of each word according to the specific meaning the word had in the input-text, to avoid cognitive overload. The underlining didactical reasoning is therefore that students should be gradually introduced to the polysemic nature of words (instead of receiving all the meanings of a word at once), and that in proceeding through the story they should gradually learn, due to the story’s context, the other meanings of a word. Through this gradual process, it is thought that learners may notice that a word’s meaning depends on the context in which it is presented, and that a single word can have different meanings. Owing to this gradual introduction, learners should not feel overwhelmed by an endless list of meanings they cannot anchor to any lived experience, i.e., experience made through the story.

Secondly, the choice of introducing vocabulary through icons and/or images represents also a criticizable aspect of this research. Especially on an intercultural level, some of the icons or images chosen by the researcher (i.e., the icon for the word “slave”) might be strongly disputed. An important preamble should be however stressed: the researcher is aware of the questionable and completely subjective choice regarding the icons/images, which is particularly strong in notions that are difficult to define (i.e., happiness). However, the choices made by the researcher do not aim to generalize or objectively define these notions; by contrast, she is aware that each chosen icon derived only from her individual and personal interpretation of the notion, which are the sum of only the researcher’s experiences and cultural background, and therefore she does not imply that her choices have an absolute value valid for each individual or for each

culture. At the beginning of the experiment, in the introduction video “What is the mystery of Pella?” the researcher addressed this topic and declared that the used images and icons depends solely on the researcher’s perception and do not aim at generalizing.

Lastly, connected to the previous point, one might argue that the icons and images chosen to represent the vocabulary are not well-suited for the students’ age as they might appear “outdated,” “boring” or too “childish.” However, this choice is justified by two aspects: first, for the structure of the videos, the researcher was unable to use overly complicated icons as a more complex icon would have taken too much space in the subtitle box and would have therefore complicated the understanding process. Therefore, more modern images such as pictures representing modern actors or actual people have been avoided by the researcher in the videos and consequently in the tasks as well in order to maintain coherency with the videos’ graphics. Furthermore, the researcher decided to maintain a certain “antiquated” aesthetic in the images as she presumed that many new learners approach ancient Greek especially for its “ancient” appearance and that a too modern look might be visually jarring.

3.1.4.2. Cultural content

The cultural content in the experiment has been proposed mostly as an external resource thematically linked to the narrative. In the experimental tool, the researcher proposed three resources in total: 1) the Greek language and standards languages; 2) Nationality? I’m ancient Greek! 3) Alexander the Great, Hellenism and globalization.

Each cultural insight started with a description or an explanation of a cultural ancient Greek topic (e.g., the notion of nationality) introducing afterwards a topic from an intercultural perspective (e.g., xenophobia). The structure of the cultural insights was mostly the same: 1) introduction of the cultural topic; 2) explanation of the topic in the ancient Greek world; 3) link to a similar or contrasting modern reality/other culture(s); 4) theoretical conclusion; 5) practical activity where students should express their opinion on their topic or transfer what has been learnt in the cultural insight to another proposed text/example. The insights were proposed as animated video offering text, native voice over and a final practical activity. The videos lasted between four and five minutes.

An example of how the insights were structured can be observed in the second cultural insight of the project, focusing on the notion of nationality in ancient and modern times.

Therefore, the first section of the cultural insight proposed a small insight into the notion of nationality according to the ancient Greek point of view:

Ancient Greece, as we refer to it, was not a unified country with a central governmental institution, as we are used to today, but rather a collection of cities and regions that shared a mutual cultural core, namely “τὸ Ἑλληνικόν,” or the idea of “being Greek,” as the Greek historian Herodotus put it. Being Greek meant sharing certain commonalities like blood, sacred places, rituals, and customs, just as the Cambridge dictionary noted. However, Greeks often distinguished themselves by comparing themselves to other countries: being Greek meant therefore not being a “barbarian,” a term encompassing linguistic and ethnic differences. Plato, a famous philosopher who lived around the 5th century BC, said for example in his dialogue “Statesman” (262d) that the Greeks “separate the Hellenic race from all the rest as one, and to all the other races, which are countless in number and have no relation in blood or language to one another, they give the single name ‘barbarian;’ then, because of this single name, they think it is a single species.”⁹⁷

The researcher chose two fundamental Greek notions regarding nationality, i.e., τὸ Ἑλληνικόν and ὁ βάρβαρος and consciously bypassed others (e.g., ξένος or ξενία), as the cultural insights have no claims to exhaustiveness, but rather aim at igniting curiosity and understanding of cultural phenomena.

As Plato showed in his Statesman, however, Greeks often used to define themselves as Greeks in contraposition to those not sharing their blood or language, which were indistinctly named βάρβαροι. Plato’s observation offers once again a link to a modern parallelism:

A similar phenomenon can be seen today: for example, someone could define themselves as Italian by saying “being Italian means speaking the Italian language and sharing a particular cultural tradition, such as celebrating the 25th of April, the day of Italy’s Liberation from Nazifascism.” Such an example can be seen as a simple affirmation of identity, and if the affirmation ends there, nothing harmful is usually intended. However, such affirmations can also become the starting point for discrimination, racism and xenophobia (from the Greek ξένος, or foreigner, and φόβος, or fear), which use similar ideas to **distinguish between “us,” usually considered “the right ones”, and “them,” the “dangerous” foreigners** who can change a society’s traditions. Cultural discrimination is unfortunately still very common and present today; contemporary cultural discrimination depicts foreign cultures as potentially harmful and threatening to the integrity of one’s own culture. In ancient Greece, **“barbarians” posed a threat to Greek culture and thus the Greeks avoided adopting barbarian traditions**. An example of this can be found in the **myth of Medea**, a witch from Colchis, the Ancient Greek name for a region in what is today western Georgia. In the pursuit of love, Medea arrives in Ancient Greece where she is not accepted by the citizens of Corinth as they do not accept her foreign way of thinking and behaving. **Foreigners such as Medea are often perceived by observers, here the Greeks of Corinth, as being “in the wrong” because they may not conform to the observer’s expectations**. Consequently, **foreigners may be seen by observers as being**

⁹⁷ Plato, *Statesman*, trans. Harold N. Fowler, Plato in twelve volumes vol. 8 (Harvard University Press and William Heinemann, 1925), 24-5.

in need of “correction,” which usually means the foreigner abandoning or changing their own traditions in favor of the observer’s.

Such is the case of the **colonizers in South America** starting from the 15th century and the new **African colonizers** of the 19th and 20th centuries. **Foreigners are usually very similarly described, no matter if by Greeks, Romans, or European colonizers:** foreigners are barbarians who do not normally have a religion or central government, and who perform abnormal rituals such as incest or cannibalism. But is it really so? Or are such generalizations born merely out of fear and ignorance?

By comparing the Greek way of thinking with many still-extant mechanisms of discrimination, the researcher meant to make students observe how xenophobia often consists of reoccurring patterns (in bold), *inter alia*: 1) *principium individuationis*;⁹⁸ 2) the polarized dynamic of we-they; 3) generalization;⁹⁹ 4) need of correction.¹⁰⁰

Moreover, each insight had comprehension questions during the interactive video and an interactive activity where students were asked to reapply what they learnt to different contexts or to express their opinion. For example, as an interactive activity in the second cultural insight, learners were asked to connect the different mechanisms of xenophobia to a modern speech published by Fox News April 29 2024.

Interactive question. Read the following excerpt of Jeremy Carl's opinion article published by Fox News April 29 2024 and connect the mechanisms of discrimination to the correct phrase.

A more accurate assessment was given by North Carolina Democratic Senator Sam Ervin, who argued it was not possible to design an immigration policy that did not discriminate, so why not discriminate on behalf of those who had made the country? The American Legion said, "It is in the best interest of our country to maintain the present makeup of our cultural and social structure." [redacted]. A Harris poll in May 1965 showed that by a 58%–24% margin, Americans opposed loosening immigration laws. But who cares what the American people — in particular White Americans — thought? [redacted]

To be fair, even many of the bill's proponents professed to be surprised by how radical it proved in practice, how its "family reunification" provisions, intended to help White ethnics, led to chain migration, particularly from Mexico. [...]

Illegal immigration didn't begin en masse until the 1970s, and its history is even more fraught. We are constantly told that illegal aliens do not commit more crimes than natives — another carefully chosen anti-White statement.

Many Whites are not concerned with whether illegal aliens commit more crimes than current legal residents; they're concerned with whether they commit more crimes than their own communities of White Americans — which they most certainly do [redacted]. The fact that there are non-White populations in the United States that commit even more crimes and thus raise the average should not convince Whites that immigration makes them safer. [redacted]

foreigners as a danger to a culture's integrity foreigners as a single category (aliens) immigration is a threat to society

distinction in races (Americans = Whites)

Check

Figure 2.12. Example of cultural insight's interactive activity.

⁹⁸ This refers to the tendency of creating an identity of the alterity (they) and at the same time by contrast defining one own's identity as well (we). See Orlando Paris and Caterina Ferrini, *I discorsi dell'odio. Razzismo e retoriche xenofobe sui social network* (Carocci Editore, 2019), 32.

⁹⁹ Paris and Ferrini, *I discorsi dell'odio*, 24–26.

¹⁰⁰ Paris and Ferrini, *I discorsi dell'odio*, 49–52.

3.2. Narrative design: theory

Narrative design plays an important role in the creation of a DGBLL environment as it provides a context in which the language learning is perceived not (mainly) as the goal of the activity, but rather as a necessary tool to be able to play. Especially in a corpus language such as ancient Greek, the possibility of actively using the language is nonexistent. This might therefore increase in some students the perception of difficulty of the language itself and/or decrease motivation towards learning it, as hypothesized in Survey A's analysis.

The primary goal of ancient Greek language learning is the *accessus ad auctores et ad scripta*, namely the possibility of being able to read ancient Greek authors and their written production.¹⁰¹ To reach this goal, ancient Greek instruction usually focuses on a more theoretical and deductive approach to language, namely the GT method. However, as already mentioned, although the GT method shows some positive benefits (for example a better explicit understanding of grammar), it also presents several problematics, especially regarding inclusivity (cf. Chapter 1 ¶ 4.3.1). Moreover, in a DGBLL environment for ancient Greek, as mentioned, the narrative component and therefore the text should enable learners to “act” with the language. Thus, the most sensible didactical decision for the development of a DGBLL is likely to introduce ancient Greek through a more inductive method, with some elements of the deductive method, through the so-called polytheoretical or integrated method, explained in Chapter 1. This tendency towards the inductive method is typical of didactics of modern languages in which grammar structures are presented directly through the input-texts and not by a first theoretical approach to the grammar rule and only after the text.¹⁰²

3.2.1. Books and projects with an inductive approach

An interesting approach to the idea of introducing the ancient Greek language starting from a text-input and not from the grammar rule¹⁰³ is offered by the aforementioned *Athènaze* (cf. Chap. 1 ¶ 4.1.1) and by *Méthodos*.

¹⁰¹ Camillo Neri, introduction to *Méthodos: corso di lingua e cultura greca. Grammatica*, by Camillo Neri, with Giovanna Alvoni et al. (D'Anna, 2018).

¹⁰² Villarini, *Didattica delle lingue straniere*, 148–50.

¹⁰³ “Anche se non si può trattare il greco come le lingue vive e parlate, bisogna farlo vivere almeno in quel contesto armonico e coerente che, nel nostro caso, un testo, un autore, un'epoca; e occorre non ritardare troppo, per esigenze

In *Méthodos*, each lesson of the two volumes starts with the input-text in ancient Greek (i.e., Lucian's *True story* or Lysias' *On the murder of Eratosthenes*) and its translation in Italian. From the sixth lesson on, learners are asked to translate gradually more and more text from ancient Greek to Italian by themselves. After the input-text and its translation, the words encountered and analyzed in-text are accompanied by a number (1 to 3) which indicates the word's frequency in ancient Greek texts (1 being the most frequent, 3 the least). Afterwards, some encountered grammar rules are briefly introduced, along with language exercises and translation exercises. An interesting aspect is represented by the section *Ἐνὶ λόγῳ* (i.e., in one word) which focuses on the meaning or the use of a particular word, or of frequently encountered words. At the same time, as mentioned in the previous sections of this study, other sections such as *Ἑλληνικὴ παιδεία* (i.e., Greek culture) and *Ἑλλάδος περιήγησις* (i.e., description of Greece) introduce cultural aspects such as military life, everyday life, religion, magic, theater, symposium, or cities' history. Lastly, the book presents a summary of vocabulary organized by roots. This aspect represents a relevant didactical choice that inspired the pedagogical choices of this research as well.

A second example of a textbook following the idea of starting from an input-text is *Kántharos: Schulbuch*. The main course book (*Kántharos: Schulbuch*) is divided into 48 lessons with a common structure: each one starts with an information-text in German anticipating the main theme of the lesson itself or describes cultural aspects (e.g., religion, philosophy, etc.). Afterwards, the original short text in Greek, which represents the core of the lesson, is presented as an input-text in a blue rectangle. At the top of the page, a temporal line is drawn to indicate in which chronological period this input-text was written. Following the input-text, some comprehension and interpretation exercises are presented. Finally, each lesson ends with a revision section including further exercises to consolidate grammar and vocabulary are offered.

An interesting aspect of this book seems to be the lack of grammar explanation within the main textbook. Therefore, it can be hypothesized that the lessons are intended as an actual input-text from which the grammar explanation is later derived by the teacher. The structural conception is noteworthy and seems in line with what didactics of modern languages suggest, given that the offered texts are appropriate for learners' language competence. However, compared to *Méthodos*, a narrative continuity is inexistent, as each lesson represents a unit *per*

‘del sistema grammaticale’, alcune parti importanti. Ci si propone, in sostanza, un andamento ‘circolare’ degli argomenti, con anticipazioni, approfondimenti e riprese,” Neri, introduction to *Méthodos: corso di lingua e cultura greca. Grammatica*.

se. Nonetheless, what seems to be lacking in both *Méthodos* and *Kántharos* is a more inductive and autonomous process of grammar rules discovery. Even if each lesson begins with an input-text, which is already a notable didactical choice compared to older pedagogical approaches to ancient Greek, the possibility for learners to understand, or better discover through a scaffolded structure, the grammar rule by themselves seems to be lacking. Conversely, in didactics of modern languages the structure of each lesson contains a section called “induction of grammar rule” or “analysis,”¹⁰⁴ in which learners discover the language mechanisms through scaffolded exercises.

On the other hand, the core pedagogical approach of *Suburani* is the reading approach which means that language characteristics and mechanisms are introduced by a written input-text, and in this particular case, by illustrated stories (i.e., comics), as images can help with the comprehension of the Latin text. The book tells the stories of different characters living in the neighborhood *Subura* in Rome in 64 AD. This specific neighborhood was known for being particularly poor and dangerous, as the authors’ intention is to give “an honest reflection of life in the Roman Empire, for the enslaved and the poor as well as the wealthy and powerful, for the provincials and for the city-dwellers. Our aim is to help students understand the realities of life in the Empire.”¹⁰⁵ The illustrated story can be considered as a macro-frame, in which original texts may be inserted. As for the first volume, additional original texts in Latin that have not been already included in the storyline itself seem to be lacking: those offered are given in an English translation.

Lastly, *EULALIA* (European Latin Linguistic Assessment) and *IN-EULALIA* (Innovative and Inclusive Instruments for European Latin Linguistic Assessment) projects offer great examples of the combination of characteristics of classical languages (e.g., the primary importance of the written text instead of the spoken one) with pedagogical approaches of modern languages (e.g., the idea of actively using the target language itself). In the types of exercises offered in the *EULALIA* certification, a more active use of the target language rather than a mainly passive one can be observed.

These examples are an important starting point for this research’s structural idea towards narrative design. However, given the structural components of video games themselves, some changes in comparison to the aforementioned example are foreseeable.

¹⁰⁴ Villarini, *Didattica delle lingue straniere*, 200.

¹⁰⁵ “Suburani. Pedagogy,” *Hands Up Education Community Interest Company*.

3.2.2. Considerations on an inductive approach to DGBLL for ancient Greek

In linguistics, the notion of language context can be described from different points of view. The *structural* point of view sees language as an ensemble of grammar rules which means that “once these rules and vocabulary are memorized, texts can theoretically be translated, regardless of whether the translator understands the meaning of what he or she is saying.”¹⁰⁶ This structural perception is often related to GT approaches. On the other hand, a *functional* point of view sees language as a reality that acquires meaning only in the situation in which it occurs, namely the context of a situation¹⁰⁷ which is intertwined with the cultural context, as each linguistic phenomenon occurs within a cultural reality.

Therefore, from this research’s point of view, ancient Greek can be situated in the middle of these two opposite conceptions of language, leaning more towards the functional point of view, as it is necessary to stress for learners the importance of the context in which certain linguistic phenomena occur (e.g., within the text they are reading and translating and its historical, geographical, and cultural characteristics). This way, they can learn to consider different meanings that a structure, which may appear identical to another, could have in different contexts (e.g., ὁ πρέσβυς Ἀλέξανδρος depending on its context could mean “the old man, Alexander” or “the ambassador Alexander”). Therefore, for the aims of this investigation, the researcher planned the following steps for the narrative design.

First, in light of the previous considerations and of the structural characteristics of video games, the most sensible idea seems to be the creation of a main coherent macro-frame in ancient Greek (such as in *Suburani*, *Méthodos* and *Athènaze*) to embed the language in a meaningful context and offer a more inductive experience. As Sykes and Reinhardt point out, referring to the perception of learners of lower-level language courses when they shift to higher-level language courses which are usually more focused on literature and grammar-translation, “these approaches [i.e., the grammar-translation ones] often decontextualize the target language in ways that make it difficult for students who cannot relate to the context of the narrative or lessons presented.”¹⁰⁸ Moreover, didactical approaches that offer a narrative or an overarching story seem to have a more positive effect on SEN students compared to more deductive approaches. This decision further seems reasonable to train vocabulary competence, as

¹⁰⁶ Sykes and Reinhardt, *Language at Play*, 74.

¹⁰⁷ Sykes and Reinhardt, *Language at Play*, 75.

¹⁰⁸ Sykes and Reinhardt, *Language at Play*, 72.

Franciosi suggests that “learners recall words more readily when they judge the concepts represented by the words as success-relevant to a compelling problem-solving scenario.”¹⁰⁹

Thus, the main macro-frame should be written in ancient Greek in order to create a coherent narrative which at the same time becomes progressively harder, giving learners time to get used to the increasing difficulty. Moreover, the fictional narrative would give one the possibility to offer a progressive and constant introduction and recap of new words in ancient Greek: as Survey A showed, one of learners’ and non-learners’ most desired features in ancient Greek learning is indeed learning vocabulary. Therefore, the fictional narrative is justified by the desire to give students texts that they can read in the original language from the beginning (following Krashen’s comprehensible input theory)¹¹⁰ even if they are not original texts.

The tendency to write texts that are non-authentic but plausible and appropriate to the language level of students can also be found in didactics of modern languages, especially in beginner levels (such as CEFR A1-A2), as it can be challenging to find authentic texts at the early stages of language learning. Real or authentic texts (*realia*) are linguistic expressions made and used by native speakers: these differ from an authentic text modified by a teacher or a non-authentic text. As for modern languages, the didactical tendency recently is not to prescribe one or the other, but rather to choose the most appropriate type of input-text for the target class, keeping in mind that – authentic or non-authentic – input-texts must be *plausible*.¹¹¹ As in ancient Greek the input-texts are represented mostly by written literature texts (which therefore present an elaborate and complex language), the creation of non-authentic but *plausible* texts can be considered an initial *alternative*, allowing students to read in ancient Greek from the beginning.

However, some background information should be discussed. The goal of writing a plausible non-authentic text, namely the macro-frame in a DGBLL environment for ancient Greek, is not to falsify or over-simplify ancient Greek, but rather to give students interesting texts that are appropriate to their level from the beginning (adequacy followed for example in *Kántharos*), while also presenting high-frequency vocabulary from the start. Additionally, an attention-grabbing plot is considered a necessity for an adventure video game. As Sykes and Reinhardt

¹⁰⁹ Franciosi, “The Effect of Computer Game-Based Learning on FL Vocabulary Transferability,” 125.

¹¹⁰ Villarini, *Didattica delle lingue straniere*, 113–17. Krashen’s comprehensible input theory refers to the hypothesis that, to allow learner’s learning, the offered input should be of adequate complexity according to learner’s competence. The comprehensible input can therefore be summarized in the formula “i + 1” where “i” stands for learner’s competence and “+ 1” indicates the additional required difficulty in the task in order to progress in the learning process.

¹¹¹ Villarini, *Didattica delle lingue straniere*, 154–5.

point out, “although digital games will never replace all literary content, they can complement it with contexts and narratives that are familiar to learners and that can be connected to traditional literature and literature-oriented approaches.”¹¹² The goal of the non-authentic frame is therefore not to discourage students by offering them authentic but nonetheless too difficult (literary) texts at the beginning; on the contrary, the aim is to let them learn step by step useful words that they will encounter in most authentic ancient Greek texts and to encourage them to actively approach the language from the start. As Sykes and Reinhardt point out “we learn best when we can situate our knowledge and have a framework for new understanding.”¹¹³ Therefore, a text, a game, or an activity “becomes meaningful to them [i.e., the learners] when it is connected to the immediate situation [...]. In other words, unless it is *about* something they can relate to, meaning is difficult to construct.”¹¹⁴ This is why the non-authentic frame represents a context that gives students a reason to interact with the language, as they will engage in an adventure in which the language allows them to act. Therefore, the non-authentic frame is not intended as a substitute for authentic texts, but rather as a γυμνάσιον τῆς γλώσσης, a linguistic gym, through which students can learn and internalize basic vocabulary and grammar structures that enable them to interact with original texts in the future with the greatest ease and comfort possible.

Secondly, in light of the findings of Survey A regarding the importance of a narrative type of involvement, another sensible choice seems to offer an adventure game (in the genres of science-fiction, fantasy, mystery, etc.)¹¹⁵ through an Interactive Fiction (IF), which has proven to be particularly effective in DGBLL.¹¹⁶ IF refers to a text-based game in which “the player makes choices in the games to progress through the story and develop their character differently each time they play,”¹¹⁷ or in other words, IF are “software environments in which players observe textual descriptions of the simulated world, issue text actions, and receive score progress through the story.”¹¹⁸ Therefore, the three main components of IFs are progression, narrative, and role play, which can all be mediated by using the target language. As Sykes and Reinhardt point out, “in gameplay, the language is both a means and an input object – learner-players are using the L2 as the linguistic means of gameplay and the fictional content of the

¹¹² Sykes and Reinhardt, *Language at Play*, 72.

¹¹³ Sykes and Reinhardt, *Language at Play*, 76–7.

¹¹⁴ Sykes and Reinhardt, *Language at Play*, 40.

¹¹⁵ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 92.

¹¹⁶ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 6.

¹¹⁷ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 242.

¹¹⁸ Matthew Hausknecht et al., “Interactive Fiction Games: A Colossal Adventure,” *Proceedings of the AAAI Conference on Artificial Intelligence* 34, no. 05 (2020): 7904, <https://doi.org/10.1609/aaai.v34i05.6297>.

game serves as linguistic input.”¹¹⁹ Moreover, IF offers a “language use [that] is contextualized in stories and fictional words,”¹²⁰ which is a crucial aspect for learning ancient Greek, as learners should learn to perceive any language, including a corpus language such as ancient Greek, not as an abstract reality but rather as something that acquires meaning when contextualized.

As the structure of IF suggests, it would further allow learners to make their own personal choices within the story itself, which is one of the most desired features in a video game to learn ancient Greek according to Survey A’s results. This particular feature allows one to choose during the game between different options that define the development of the story, and it is typical of choice-based games.

Choice-based games usually have some of the following mechanics and gameplay: 1) *choices*: in the form of dialogue choices (e.g., “Do you think she is right?” a. Yes, I agree with her, b. No, she is definitely wrong) or action choices (e.g., “What do you want to do?” a. Investigate, b. Go away); 2) *variables*; namely “anything in a game that can be quantified or numbered.”¹²¹ These variables, e.g., if player goes left or right, influence the gameplay as they can change, for example, what a player is going to encounter on their way; 3) *branching narrative*: it is a narrative technique consisting of creating different branches of the story according to the option selected by the player (cf. Figure 2.13). These branches or paths diverge from the main story and can therefore change its course; 4) *multiple endings*: which derive from player’s choices (cf. Figure 2.13, red and green boxes).

Branching is an effective way to create engaging narratives as, even if the branches mostly rejoin around common important nodes of the story (cf. Figure 2.13, orange boxes), the player has the impression of having agency and autonomy (cf. Figure 2.13, yellow boxes).¹²²

¹¹⁹ Sykes and Reinhardt, *Language at Play*, 26.

¹²⁰ Sykes and Reinhardt, *Language at Play*, 76.

¹²¹ Toiya Kristen Finley, *Branching Story, Unlocked Dialogue: Designing and Writing Visual Novels* (Taylor and Francis, 2022), 8.

¹²² Sam Kabo Ashwell, “Standard Patterns in Choice-Based Games,” *These Heterogenous Tasks*, January 27, 2015, <https://heterogenous-tasks.wordpress.com/2015/01/26/standard-patterns-in-choice-based-games/>.

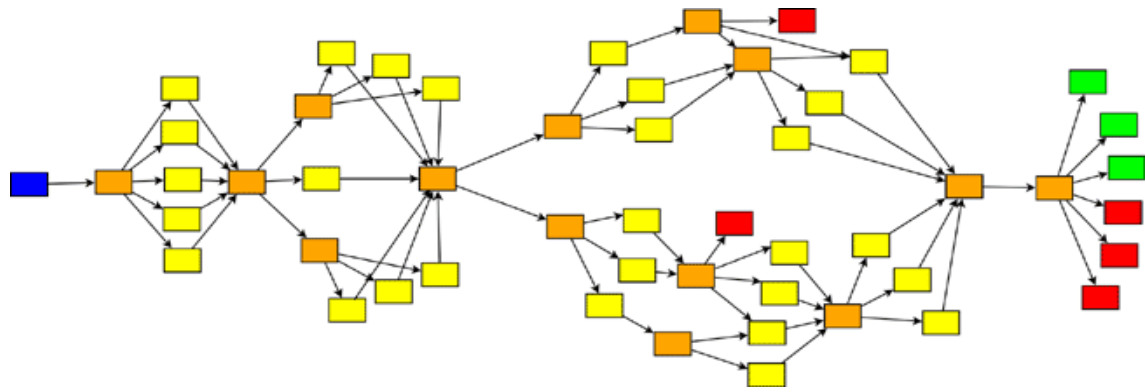


Figure 2.13. Example of branch-and-bottleneck.¹²³

An example of such a mechanism could be the following: the player is talking to an in-game character who asks them a question (Τίνα ἐρωτήσω; i.e., who am I going to ask?). The player must then select their preferred answer to the asked question, e.g., given two answers one can choose between a) Τὸν ἰατρόν, i.e., the doctor; or b) τὸν παῖδα, i.e., the kid. This mechanism is considered useful for two reasons: on the one hand, it allows learner-players to have the perception of autonomy and decision-making, both critical aspects of video games; on the other hand, it allows one to actively use the target language to play, while developing language comprehension and presumably also unconscious grammar internalization. The latter means, for example, that the player might not consciously notice that the Greek verb ἐρωτάω is completed by an accusative,¹²⁴ but by encountering this structure many times, an internalization of the mechanism may occur.

Thirdly, given the goal of ancient Greek instruction, namely *accessus ad auctores et ad scripta*, the fictional macro-frame, offered as IF and written in ancient Greek, would represent a context within which one can gradually insert original texts by real ancient Greek authors, as in *Athènaze*. Therefore, as the story and the video game progress, a practical didactical goal is to introduce more and more authentic texts, slightly adapted. As Sykes and Reinhardt point out, “digital games and traditional literary works have the potential to complement one another.”¹²⁵

¹²³ Ashwell, “Standard Patterns in Choice-Based Games.”

¹²⁴ The verb “to ask” in languages such as German or English is followed as well by an accusative/direct object (to ask someone, *jemanden fragen*), but is not in others, such as Italian or French (*chiedere a qualcuno*, *demander à quelqu’un*). That might imply that for German or English students such a structure could be more easily understood, while for Italian or French students it could on the contrary confuse their understanding process, as language learners may compare the grammar of the language they are learning to that of their own native language.

¹²⁵ Sykes and Reinhardt, *Language at Play*, 72.

3.2.3. Narrative design: experiment

Considering the observations of the previous sections regarding narrative design, this section will clarify the actual development of this component in light of the available resources.

The macro-frame represented a mystery or detective story taking place in 335 BC, in the period between the coronation of Alexander the Great after his father's murder (336 BC) and the destruction of Thebes (335 BC). The researcher chose to set the story in a clearly defined historical period for multiple reasons: in the first place, to offer a description of the culture and events that takes into account authentic sources; in the second place, to introduce original texts that describe those historical events (e.g., Plutarch). However, it is important to note that the original macro-frame was initially comprised of 36 levels of ascending difficulty. Within this macro-frame starting from level 12, the researcher inserted original texts, according to level of difficulty and the learnt language structures. Unfortunately, due to the constraints of experimentation and the difficulty in finding available schools, she developed and tested only the first three levels, which did not present any original text. The narrative has therefore been adapted so that learners could solve the mystery at the end of the third level. Due to the smaller number of levels, the third point of the previous theoretical section has not been investigated.

As a general disclaimer, it is important to mention that even though the historical setting is real and many mentioned events have taken place according to our historical sources (e.g., Plutarch), the main storyline (i.e., the mystery) and almost all its characters and the interpersonal dynamics between them are fictional. The setting is in some regards plausible (e.g., *inter alia*, the presence of an ἐκκλησία and of the ἄριστοι), but other aspects (e.g., the young female protagonist who becomes a detective) are inserted simply for narrative purposes and do not intend to describe the reality of the Greek society in 4th century BC.¹²⁶ The main guideline and ancient historical source used to write the macro-frame is represented by

¹²⁶ The fictional aspects also served as a starting point to critically analyze different cultural topics. For example, the idea of inserting a young, female protagonist, even though implausible for that historical period and for the Greek society in general, was meant to critically address the main male-centric perspective of the ancient Greek world. Therefore, although the researcher is aware of the improbability of the described dynamic between Alexander and the fictional female protagonist Glauce, she declared and warned the players from the very beginning to be cautious in accepting such fictional aspects as a faithful description of IV BC Greek society. Players are shown a disclaimer before the beginning of the video game confirming that some aspects, highlighted then in the cultural insights, are indeed fictional. Given the development of only three levels, the researcher did not address the fictional introduction of the female character, as it was planned for later levels.

Plutarch's *Parallel Lives, Vita Alexandri* 1.1.-12.3, from which many texts were initially inserted in the 36-levels story.

Although these original texts were not ultimately implemented in the experiment, it is nonetheless worth noting the rationale behind the planned text selection for the benefit of future researchers. The researcher followed two principles in selecting texts: 1) variety, and 2) clues and coherence with the story. Thus, she tried to propose as many authors as possible from both poetry and prose (even though some, e.g., Plutarch or Pseudo-Apollodorus, were proposed more than once); moreover she aimed to show different Greek dialects beyond Attic (e.g., by proposing Anacreon or Homer), and different genres (e.g., epic with Homer, biography with Plutarch, mythography with Pseudo-Apollodorus, lyric with Anacreon and the Homeric Hymn, tragedy with Aeschylus, Sophocles, and Euripides, oratory with Demosthenes and Isocrates, geography with Pausanias, philosophy with Plato). The second principle was to connect the text with a clue, necessary to solve the mystery, which had to relate to the development of the story in a coherent and cohesive way. That is why for example in levels 26-27, when the protagonists need to discover where to go next (i.e., to the wine merchant's), the texts and the clue were all connected by the overarching theme "wine" (i.e., the episode of Odysseus and Polyphemus as in Od. 9, 347-370 and Apollod. Epit. 7, and Anacreon's fr. 33 Gent.).

Conversely, to insert the original texts within the narrative, the researcher followed two other principles: 1) the texts inserted within the storyline and the characters' lines were modified to fit the storyline or slightly simplified to help comprehension while watching and listening to the video as much as possible; that is why longer periods were often divided in smaller periods or partially rewritten; 2) the texts containing the clues were modified as little as possible. The latter principle is justified by the researcher's initial development idea, namely that even though the text difficulty of this second type was often high, these texts were meant to represent a decoding/decrypting in-game task (e.g., in the form of a letter received by a character in the game) and not watched in a video. The interconnected structure of original Greek texts and fictional narrative aimed to emulate the mechanics of video games where each task is somehow connected to the next one, as well to build a strong frame where the texts feel necessary and useful for the comprehension of the story. Selecting potentially easier but not content-related texts could have on the one hand given the (great) opportunity to modify as little as possible the original text, but on the other hand it would have caused a less cohesive and interconnected structure that could have affected the cohesion of the narrative structure.

Regarding the implementation of the IF, the pre-experimental version of the video game did not include the possibility of making choices, while the experimental one did. The choices in the second version of the tool were action choices, as learners could choose between what to do within the storyline (e.g., choosing to interrogate the witnesses or looking for clues). However, these choices were written in English and not in ancient Greek, as the learnt material during these three first levels was insufficient to offer more complex decisions written in Greek. In the development of the next levels, these choices would have been presented gradually more in ancient Greek rather than in English.

3.3. Game mechanics: theory

In language learning, practice plays one of the most important roles. In modern language learning, practice is mostly represented by actively interacting with native or non-native speakers and input-texts, and the interaction is vividly encouraged in every language course. However, in corpus languages such as ancient Greek, active practice with natives is impossible to achieve as native speakers no longer exist. Therefore, grammar practice and translation represent two of the most frequent ways of mastering corpus language comprehension.

Even though globally there are a number of small communities practicing ancient Greek by speaking it, this research's focus is not on speaking mastery. Regarding this topic, some stipulations ought to be made.

Speaking a corpus language is considered by some researchers as an “academic frivolity” or even as a “cult-like behavior.” Therefore, academics of classical languages are often divided into two opposite parties: the absolute supporters of speaking a corpus language and the absolute opponents. This research's point of view collocates itself in the middle of this debate.

Speaking and writing a corpus language is pointless when the goal of such practice is to become a hypothetical “native speaker,” which is *per se* impossible, given that ancient Greek is no longer spoken by real natives. However, if speaking ancient Greek becomes a game or an “unconventional” alternative way to *practice* and *internalize* linguistic phenomena, then the goal of speaking a corpus language reacquires a profound and pedagogically justified meaning.

In this research's perspective, speaking the language or at least actively using it by listening and formulating small sentences does not imply the assumption to be able to “speak like the ancient Greeks,” as no one could ever actually prove or disprove that this spoken language is indeed faithful to that language spoken millennia ago by the real ancient Greeks. On the

contrary, this method is here considered as a way to understand that languages – even corpus languages – are *means to express ideas and thoughts* and that mostly by actively using a language, one can better understand and remember linguistic phenomena.¹²⁷ At the same time, the possibility to use different channels (e.g., listening, writing, reading etc.) to experience the language reflects findings on language learning and people with SpLD, as mentioned in Chapter 1.

In light of these observations, an active use of and approach to ancient Greek is one basis of this research project as a means to improve language phenomena internalization, motivation, inclusion, and perception of fun while learning the language. Moreover, it reflects DGBLL structure, namely the necessity of presenting language content through tasks and as game mechanics, i.e., as a group of play activities.

The task-based approach refers to a specific type of teaching planning in which tasks play a core role.¹²⁸ In this type of teaching method, learning is seen as a personal discovery process in which learners build their own competence by experimenting meanings and experiences in their own peculiar way. This means that each learning process is a somehow unique and incomparable process.

Therefore, in the task-based approach, a task is an activity in which the learning language is used by learners as a means to reach a goal. Thus, the approach focuses on these characteristics: 1) there is a *connection with a real activity*; 2) *task accomplishment* is one of the main goals; 3) the *evaluation of efficacy* is represented by the result of the task itself.¹²⁹

The task must be appropriate to learners' level, and should further consider the conditions (e.g., time, speed, input-text length, etc.) in which the task will be completed. However, as Sykes and Reinhardt point out, “the target of task design in TBLT [task-based language teaching] is what people do with language outside the classroom,”¹³⁰ which, in relation to ancient Greek, can be considered the textual comprehension (and translation) of ancient Greek texts.

According to the task-based approach, the ideal task has a focus on form (i.e., meaning) instead of on forms (i.e., formal properties of language). As we saw in Chapter 1 (cf. ¶ 3.6.1),

¹²⁷ “Il greco non è sentito abbastanza come ‘lingua’, come qualcosa che s’impara per gradi e con un approccio basato anche sulla memoria del senso delle parole e del lessico, e sull’esperienza dei costrutti, non solo sulla conoscenza delle regole e delle forme morfologiche (“Prof., so le declinazioni, ma non so tradurre!”)” Neri, introduction to *Méthodos: corso di lingua e cultura greca. Grammatica*.

¹²⁸ Decke-Cornill and Küster, *Fremdsprachendidaktik*, 120–22; Sykes and Reinhardt, *Language at Play*, 14–15; Diadori et al., *Insegnare l’italiano come seconda lingua*, 265–70.

¹²⁹ Diadori et al., *Insegnare l’italiano come seconda lingua*, 266.

¹³⁰ Sykes and Reinhardt, *Language at Play*, 14.

however, both focus on form (use tasks) and on forms (knowledge tasks) can be developed in DGBLL. Therefore, considering ancient Greek and its goals, it seems logical to guarantee both types of foci, as a solid explicit knowledge of ancient Greek grammar is often required by schools or universities. Thus, the explicit grammar knowledge can be fostered within the video game, but it should be introduced and followed by a training of this knowledge through an active use, thereby allowing one to perceive ancient Greek as a γυμνάσιον τῆς γλώσσης.

To choose the task, Diadori *et al.* point out three tendencies in didactics of modern languages:¹³¹ 1) choosing the task according to the linguistic forms that learners need to complete the task; 2) choosing the task according to their connection to the real world;¹³² 3) choosing tasks according to importance of naturalness in the execution. For ancient Greek, it seems evident that the only tendency that can move the task choice is the first. Therefore, according to game design, there are different ways in which a task can be organized. The following table, adapted from Fullerton¹³³ and proposed as in Sykes and Reinhardt's contribution,¹³⁴ shows some example of game mechanics organized according to objectives and tasks.

¹³¹ Diadori et al., *Insegnare l'italiano come seconda lingua*, 267.

¹³² For the difference between real world tasks and authenticated tasks in DGBLL, see Sykes and Reinhardt, *Language at Play*, 17-8.

¹³³ Tracy Fullerton, *Game Design Workshop: A Polycentric Approach to Creating Innovative Games*, 2nd ed. (Elsevier, 2008), 60–65.

¹³⁴ Sykes and Reinhardt, *Language at Play*, 23.

Game mechanic	Objective	Sample Task Types	Common Genres
Capture	Take or capture something	<ul style="list-style-type: none"> • Find a key that will open a door • Capture enemy territory 	Adventure, action, roleplay, strategy
Chase	Catch something, or avoid being caught	<ul style="list-style-type: none"> • Run through a maze • Follow a trace left by a captive 	Adventure, action, roleplay
Race	Reach a goal in a particular time	<ul style="list-style-type: none"> • Finish cooking a dish in time • Drive to the finish line before a competitor 	Adventure, action, roleplay, simulation management, strategy
Rescue/Escape	Lead something or somebody to safety	<ul style="list-style-type: none"> • Enter a cave, release a prisoner, and escort the prisoner back to his or her home 	Adventure, action, roleplay, strategy
Alignment	Arrange or align elements	<ul style="list-style-type: none"> • Put the parts of a secret message in order • Get 5 Xs in a row 	Adventure, simulation management, strategy
Forbidden Act	Avoid a particular activity	<ul style="list-style-type: none"> • Avoid choosing the curtain hiding the goat 	Adventure, action
Construction	Build, collect, maintain, or manage objects	<ul style="list-style-type: none"> • Create a successful farm • Sew a jeweled vest 	Roleplay, simulation management, strategy
Exploration	Explore a given area	<ul style="list-style-type: none"> • Find the capital of a new territory • See the breeding grounds of a rare butterfly 	Adventure, roleplay, strategy
Solution	Solve a problem or puzzle	<ul style="list-style-type: none"> • Translate the secret code • Complete the crossword 	Adventure, strategy
Outwit	Gain and use knowledge in a particular way	<ul style="list-style-type: none"> • Use the invisibility elixir at the right moment and avoid detection 	Adventure, roleplay, simulation management, strategy

Table 2.4. Objective and task types.

However, as the single task cannot guarantee an accurate and complete understanding of language phenomena, the learning process should involve a pre-task phase and a post-task phase as well.¹³⁵ The pre-task aims to improve task effectiveness by explaining the complexity of linguistic structures and by eliciting those structures that will be needed in the task

¹³⁵ Task can also be called task-cycle, and post-task language focus, as in Decke-Cornill and Küster, *Fremdsprachendidaktik*, 121.

accomplishment. On the other hand, the post-task helps learners with the metalinguistic reflection with the goal of internalizing encountered language phenomena. As the accomplishment of a single task cannot guarantee a profound internalization of treated linguistic phenomena, a constant monitoring of acquired structures which involves learners' self-evaluation is also required.¹³⁶ At the same time, the language phenomena should be incorporated and proposed many times and in many contexts to strengthen linguistic competence, following a network-like structure.¹³⁷

3.3.1. Learning mechanics: the LM-GM model and the three-tiered approach

As introduced in Chapter 1, learning mechanics (LMs) are activities that aim to support learning and are based on instructional theories, while game mechanics (GMs) are in-play activities. In order to make a didactical game “work,” learning mechanics and game mechanics need to be aligned, which means that learning mechanics need to be instantiated as game mechanics and not simply added to pre-existing game mechanics: learning mechanics must become an “integral part of the game play.”¹³⁸ Moreover, while choosing the game mechanic to implement a specific learning mechanic, developers should follow the following criteria: 1) the game mechanic must not introduce too much extraneous cognitive load (cf. Chapter 1 ¶ 3.1); 2) the game mechanic must not reduce the mental effort too much, in that it cannot make the learning process “too easy;” and 3) the game mechanic must not introduce unrequired confounds, e.g., additional unknown information that players need to know to be able to learn specific content.¹³⁹

A useful tool in the development of learning mechanics can be seen in the Learning Mechanics-Game Mechanics (LM-GM) model by Arnab *et al.* which aims to improve analysis of learning games and to support specification of new developments.¹⁴⁰ This model is not

¹³⁶ Diadori et al., *Insegnare l'italiano come seconda lingua*, 268–70.

¹³⁷ The idea of a network-like structure indicates the interconnected nature of learning phenomena. This means that the content progression should always present and represent language contents in different ways and many times in order to guarantee students the possibility of a multilevel internalization and the possibility of practice and improvement of encountered language phenomena. Villarini, *Didattica delle lingue straniere*, 198.

¹³⁸ Jan L. Plass et al., “Learning Mechanics and Assessment Mechanics for Games for Learning,” white paper no. 01/2011 (G4LI, 2011), 4, <https://doi.org/10.13140/2.1.3127.1201>.

¹³⁹ Plass et al., “Learning Mechanics and Assessment Mechanics,” 7-10.

¹⁴⁰ Sylvester Arnab et al., “Mapping Learning and Game Mechanics for Serious Games Analysis,” *British Journal of Educational Technology* 46, no. 02 (2015): 391–411, <https://doi.org/10.1111/bjet.12113>.

prescriptive, but rather descriptive as it allows users to “freely relate learning and gaming mechanics to describe SG [Serious Game] situations by drawing a map and filling a table.”¹⁴¹

To understand this model (cf. Figure 2.14), it is important to know that: 1) it is structured on two axes (horizontal and vertical) representing the root nodes (LMs and GMs); 2) on the horizontal axis, the root nodes are disposed “in breadth,” meaning that all mechanics are scanned at the same level in a broad overview, without going into detail; 3) on the vertical axis, the root nodes branch “in depth” into core components (i.e., the single mechanic), meaning that moving downward each component is analyzed in detail; and 4) the side or leaf nodes are functional mechanics supporting the core components.¹⁴²

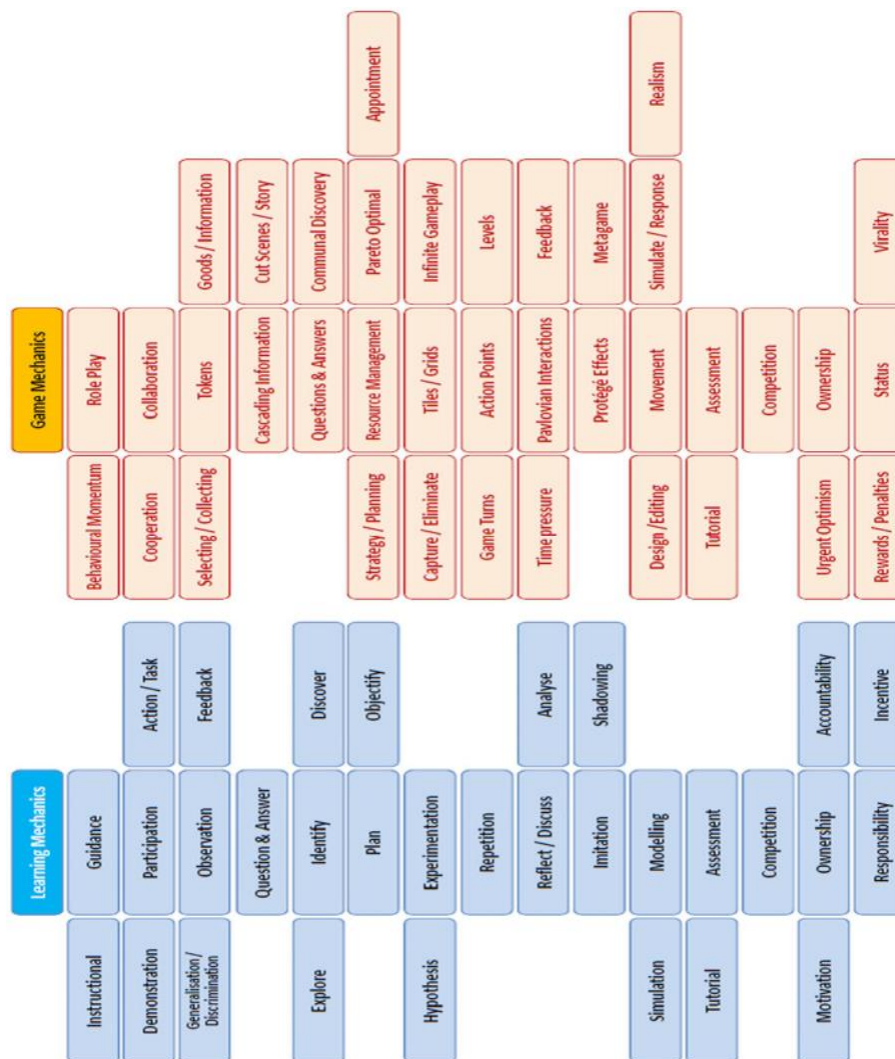


Figure 2.14. The LM-GM model.¹⁴³

¹⁴¹ Arnab et al., “Mapping Learning and Game Mechanics,” 396.

¹⁴² Arnab et al., “Mapping Learning and Game Mechanics,” 396.

¹⁴³ Arnab et al., “Mapping Learning and Game Mechanics,” 397.

The LM-GM model is generic and descriptive in that it is potentially adaptable to any development situation.¹⁴⁴ However, in order to be able to use it for ancient Greek, it seems important to adapt it to one's own situation. Although in theory the combinations of LMs and GMs are more or less potentially infinite, the actual combinations seem to depend on a series of factors, for example which resources one has – as not all GMs are implementable on all environments – or which target group one is addressing, and therefore more broadly they depend on the game context.¹⁴⁵

Thus, the researcher considered a possible strategy of adapting it to ancient Greek instruction, namely by screening the potential LMs and GMs to be implemented for the development plan through some questions or “filters.” The researcher has called these filters: available resources, target group, and type of gameplay.¹⁴⁶

The first filter (resources) concerns the developing resources and the “ancient Greek resources.” When evaluating the former, it is necessary to assess possible environments for video game development and to select the most suitable according to time, financial costs, and starting competences required for. For example, it is probable that between a game development tool such as Unity and a Moodle platform, the latter requires fewer starting competences, and, if the developer works at a university, is also probably free of costs. As “ancient Greek resources” one can consider textbooks and other e-learning examples for ancient Greek from which one can take inspiration for developing the LMs.¹⁴⁷ A possible strategy to find inspiration could be to analyze and evaluate activities in the most commercialized ancient Greek textbooks

¹⁴⁴ For a description of LMs and GMs present in the model, see Theodore Lim et al., “Strategies for Effective Digital Games Development and Implementation,” in *Cases on Digital Game-Based Learning: Methods, Models, and Strategies*, ed. Youngkyun Baek and Nicola Whitton (IGI Global Scientific Publishing, 2013), <https://doi.org/10.4018/978-1-4666-2848-9.ch010>, and Azeneth Patino et al., “Analysis of Game and Learning Mechanics According to the Learning Theories,” *2016 8th International Conference on Games and Virtual Worlds for Serious Applications (VS-GAMES)*, IEEE, September 2016, <https://doi.org/10.1109/VS-GAMES.2016.7590337>.

¹⁴⁵ Patino et al., “Analysis of Game and Learning Mechanics According to the Learning Theories.”

¹⁴⁶ A template of these questions is available in the appendix (¶ C).

¹⁴⁷ For a description of the learning theories sustaining the LMs in the LM-GM model, see Patino et al., “Analysis of Game and Learning Mechanics According to the Learning Theories.”

and then subsequently to sort these activities out according to the competences (grammar and vocabulary)¹⁴⁸ one wants to train.¹⁴⁹

Completing this first filter will allow one to exclude some LMs and GMs from those available in the LM-GM model. For example, if one chooses Moodle as a development environment, the GM “capture/eliminate” is unlikely to be implementable. After having used this first filter, one can proceed to the second (target group), skimming the LM-GM model according to one’s learning group. For example, depending upon whether one is designing it for a specific real class, or in general, one GM can be more suitable than another. Lastly, with the third filter (type of gameplay), one can focus on the type of gameplay they want to offer (linear or emergent). In linear play one has a progression design in which the “game designer explicitly determines the possible ways in which the game can progress,”¹⁵⁰ while in emergent play the rules are combined to offer variation. After having used these three filters, one should have a smaller and more manageable amount of implementable LMs and GMs for their project.

Thus, through this list one can more easily connect the list of analyzed activities (see *supra*) with a corresponding LM and GM. However, it is important to highlight that implementation of grammar and vocabulary learning mechanics should follow some criteria.

The implementable tasks in DGBLL can be knowledge tasks or use tasks. Knowledge tasks focus on control of acquired grammar knowledge, which is usually the focus of ancient Greek instruction. Although, as argued in Chapter 1 (cf. ¶ 3.6.1), the three-tiered approach prescribes excluding explicit grammar instruction from the core video game, some considerations in relation to ancient Greek ought to be made. Given that ancient Greek is a language that is globally learnt first and foremost through its explicit grammar (given that communicative goals are utopistic and meaningless for a corpus language), the presence of grammar within the video

¹⁴⁸ To these two competence, previously analyzed, the researcher added the *alphabetic competence*, which represents a crucial aspect of learning ancient Greek. Compared to Latin, learning ancient Greek represents an additional difficulty for native of languages using the Latin alphabet (e.g., the Romance languages), namely the Greek alphabet with its accent, breathings, and graphic rules. Even if Latin presents accent rules as well, ancient Greek’s may be perceived as more difficult, given that in ancient Greek accents and breathings can differentiate two homograph words which have however completely different meanings (e.g., ἦν, first person of the imperfect of the verb εἶμι, with soft breathing and circumflex accent compared to ἦν, accusative singular feminine of relative pronoun ὅς, ἥ, ὅ with rough breathing and acute or grave accent). In light of these motives, this competence seems to be particularly important to be trained in learners, especially for SEN students with dyslexia or dysgraphia who can perceive ancient Greek as impossible to approach from the beginning.

¹⁴⁹ An example of a similar analysis is available in the appendix (¶ B). The analyzed textbooks or projects were *Méthodos esercizi 1*, *Greek to GCSE 1*, *Kántharos: Schulbuch*, *Athénaze 1* with its exercise book *Meletémata 1*, the *EULALIA* project, and *Suburani*. As aforementioned, all of them, except *Greek to GCSE 1*, have been selected for their input-first approach. Although not corresponding to the selection criterion, *Greek to GCSE 1* has been selected as it is the most used textbook to learn ancient Greek in the UK. For *Meletémata 1*, see Carmelo Consoli, *Meletémata 1* (Edizioni Accademia Vivarium Novum, 2005).

¹⁵⁰ Juul, *Half-Real*, 56.

game seems to play a very important role for learners, as Survey A's results confirm. In light of these observations, it seems reasonable given the specific nature of ancient Greek to include (some) grammar in the video game itself, but through an inductive approach. Therefore, grammar should be elicited in students after the encounter with the input-text, and should be presented after a first active approach to the text. Only afterwards should the grammar explanation follow a more deductive approach.

According to the three-tiered approach: 1) the first interaction with the game requires the player to only accomplish a task without focusing on metalinguistic terminology; 2) if players cannot complete the task by just focusing on it, they can be asked to consider the language in different ways due to the different possibilities offered by video games' features, but not yet to consider grammar; and 3) students should be able to "interact with the system in order to receive whatever explicit grammar instruction they still need to understand the forms being highlighted."¹⁵¹ An example of how the three-tiered approach could be adapted to the specific nature of ancient Greek is presented in the following.

The first tier should involve use tasks. This means that at the beginning of the level, after contact with the input-text, learners should actively use the language e.g., to understand what happened in the narrative, to make choices within the storytelling, and/or to actively play with the language. Therefore, exercises that let one actively use the target language (i.e., ancient Greek) are preferred in this section, as well as in the third one.

In the second tier, the tasks should also include knowledge tasks, aiming to elicit the grammar rule of the input-text and to make learners reflect on the language phenomena, however still within the logic of the video game and the game mechanics. These activities focusing on linguistic content are here considered "wraparound activities (i.e., activities related to the gameplay that occur before, during, and after gameplay),"¹⁵² thus aiming at promoting an analytic type of learning. It is important to clarify that the elicitation of grammar phenomena and eventual explicit explanations of grammar are not in ancient Greek, but in the *lingua franca* (i.e., for this research's video game, English). This decision is justified by two main facts.

In the first place, explicit grammar knowledge, which plays an important role in corpus languages, is not tested or evaluated in the target language (i.e., ancient Greek). This means that it would not be useful to introduce grammar definitions (e.g., nominative, accusative, etc.) in the target language, given that it is unlikely that ancient Greek learners will ever use these

¹⁵¹ Purushotma et al., "10 Key Principles."

¹⁵² Sykes and Reinhardt, *Language at Play*, 37.

definitions in ancient Greek. In the second place, this decision is justified by the desire to reduce learners' cognitive load. As the video game's structure already requires an intense effort from students, given that most parts of the video game itself are written in ancient Greek, teaching grammar with grammar terminology in ancient Greek seems to be from this research's point of view a risky decision as it could overwhelm students and induce too much stress and cognitive load.

Finally, in the third and last tier of the game segment, other use tasks are proposed to reuse and consolidate what players have learnt in the second tier. At the same time, learners can consult the external grammar resources, where an explicit grammar explanation is offered in English.¹⁵³

This interpretation of the three-tiered approach is not only based on the specific nature of ancient Greek, but also considers two other main points. First, as shown by Reinhardt, combining at the same time extrinsic and intrinsic learning games in a DGBLL environment appears to be an effective solution.¹⁵⁴ As mentioned in Chapter 1, extrinsic learning games, according to Malone,¹⁵⁵ focus exclusively on learning the content, while intrinsic learning games focus simultaneously on both playing and content learning. Secondly, this structure mimics didactical unit's structure to learn languages and the subdivision in pre-task, task, post-task of the task-based approach, which have been discussed in detail in the previous section.

Regarding LMs for the vocabulary competence, it is important to highlight that vocabulary is better remembered when connected to a practical activity (90% retained vs. 10% forgotten). Conversely, by merely reading only 30% is retained and 70% is forgotten (cf. Table 2.5). In light of these observations, it seems sensible to present a multisensorial vocabulary learning

¹⁵³ A practical example can be as follows: The grammar rule of the lesson is the accordance of relative pronouns and the relative clause. In order to let students discover the rule by themselves, the video game proposes a part of the narrative with relative pronouns and relative clauses before having explained the rule itself. After the narrative encounter (input-text) and some active comprehension exercises (e.g., being asked to do a specific activity based on the content of the narrative), a knowledge task is proposed. The first exercise asks the learner to identify the forms that may derive from ὅς, ἧ, ὅ. This kind of request is expected to be of medium difficulty as learners already know declension mechanisms and may be able to infer which forms derive from the given pronouns at the nominative case, even not knowing the declension of the pronoun itself. After having underlined the forms, another task asks the student to reflect on the grammar rule by filling the blanks with the given terms: e.g., "In a relative clause, the pronoun agrees in ... [gender] and ... [number] with the noun it is replacing (noun that is called ... [antecedent]), but not necessarily in ... [case], as this one depends on the ... [logical function] that the pronoun is going to have in the relative clause." Afterwards, use tasks are proposed in order to train and consolidate the discovered grammar rule. This short example shows how grammar rules may be actively discovered by learners themselves. However, in light of what has been discussed about the alignment of LM and GM, a possible risk is that learners perceive these activities as a "chocolate-covered broccoli," to use the very fitting metaphor that has been mentioned from the beginning of this dissertation. Further research should continue user testing with ancient Greek learners and collect their opinions on this topic.

¹⁵⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 204.

¹⁵⁵ Malone, "Toward a Theory of Intrinsically Motivating Instruction," 360–1.

that includes as much as possible reading, listening, speaking and “doing” as well.¹⁵⁶ As Franciosi points out, “the proactive role of the player in games could facilitate deep processing of concepts represented by targeted words.”¹⁵⁷ Therefore, including an active part in the video game is likely to promote vocabulary retention in ancient Greek learners.

Learning vocabulary with	How much vocabulary is retained	How much vocabulary is forgotten
Ear: listening	20%	80%
Eyes: reading	30%	70%
Mouth: speaking	70%	30%
Hands: doing	90%	10%

Table 2.5. Learning vocabulary with all senses.¹⁵⁸

According to Survey A’s results, one of the most desired activities in an ancient Greek learning course is to acquire vocabulary, both for learners and Non-Learners. This result is particularly relevant as it presumably indicates that even ancient Greek learners (and Non-Learners) perceive the importance of acquiring vocabulary to be able to read ancient Greek texts. This relevance has already been discussed, however it is important to point out once again that a non-progressive acquisition of vocabulary prevents ease of reading, given that to read original texts in ancient Greek one should have a rich vocabulary that allows one to understand without having to constantly check the dictionary. Therefore, as Kuhlmann suggests, vocabulary acquisition in corpus languages learning should follow three methodological principles:¹⁵⁹ 1) the quantity of new given vocabulary in each lesson should be calibrated, as the risk is to overwhelm the learner with cognitive load; 2) vocabulary should be introduced through similarities, opposition, semantic fields or connections with previously acquired vocabulary; and 3) vocabulary exercises should be as differentiated as possible. With these three principles in mind, use tasks focusing on the vocabulary competence should always be guaranteed as well.

¹⁵⁶ Franciosi, “The Effect of Computer Game-Based Learning on FL Vocabulary Transferability,” 126.

¹⁵⁷ Franciosi, “The Effect of Computer Game-Based Learning on FL Vocabulary Transferability,” 124.

¹⁵⁸ Translated from German: Decke-Cornill and Küster, *Fremdsprachendidaktik*, 167.

¹⁵⁹ Kuhlmann, *Fachdidaktik Latein kompakt*, 60.

3.3.2. Game mechanics: experiment

Due to the available resources, not all discussed design criteria have been developed. Regarding the task-based approach, both task types (knowledge and use) have been implemented, however the variety of GMs was strongly limited. Following Fullerton’s description in the summary by Sykes and Reinhardt (cf. Table 2.4), the only implemented GMs were alignment, solution, and outwit. Conversely, according to the LM-GM model, the following figure represents the first steps of the first level (cf. Figure 2.15).

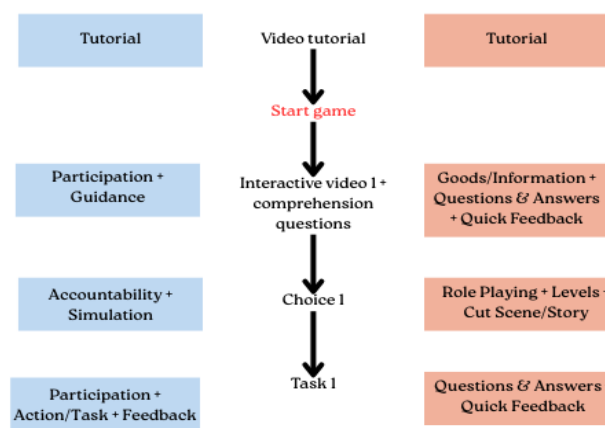


Figure 2.15. Example of LM-GM model for the first mechanics of the first level.¹⁶⁰

The three-tiered approach has been followed to introduce the grammar, as shown in the following example. In level 1, the protagonist (Glauce) and her friend (Myrrine) are going back home cutting through the marketplace. While there, they witness a strange encounter between two friends of theirs and an unknown man. Myrrine however cannot hear what they are saying and asks the protagonist to help her understand. Thus, in the first tier of the three-tiered approach, learners are asked to choose between ancient Greek options to repeat what they have overheard, but no explicit grammar is introduced.

¹⁶⁰ The use of the LMs and GMs in this figure follows the description by Lim et al., “Strategies for Effective Digital Games Development and Implementation,” 177–83.

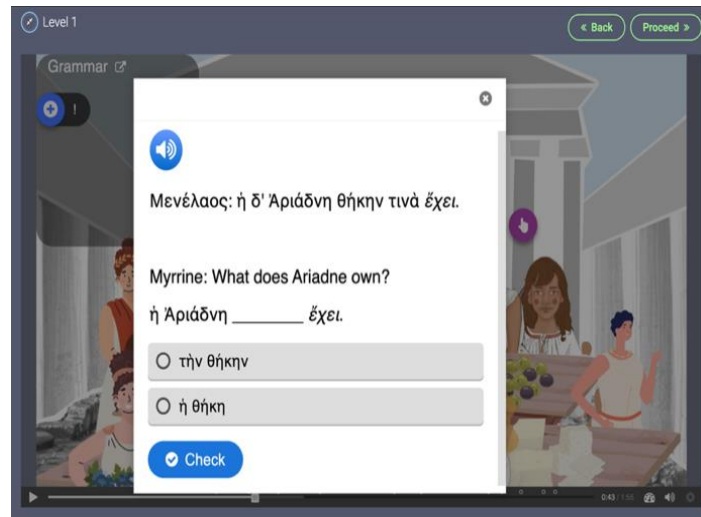


Figure 2.16. Example of a first tier of the three-tiered approach.

In the second tier, Myrrine tells Glauce that she should practice her spoken Greek because sometimes it is not clear what she is saying. Luckily Myrrine's brother has a piece of papyrus that he received from a teacher through which Glauce can review her Greek. Thus, in this knowledge task, learners must explicitly reason on the grammar rule (i.e., difference between nominative and accusative singular of the first declension).

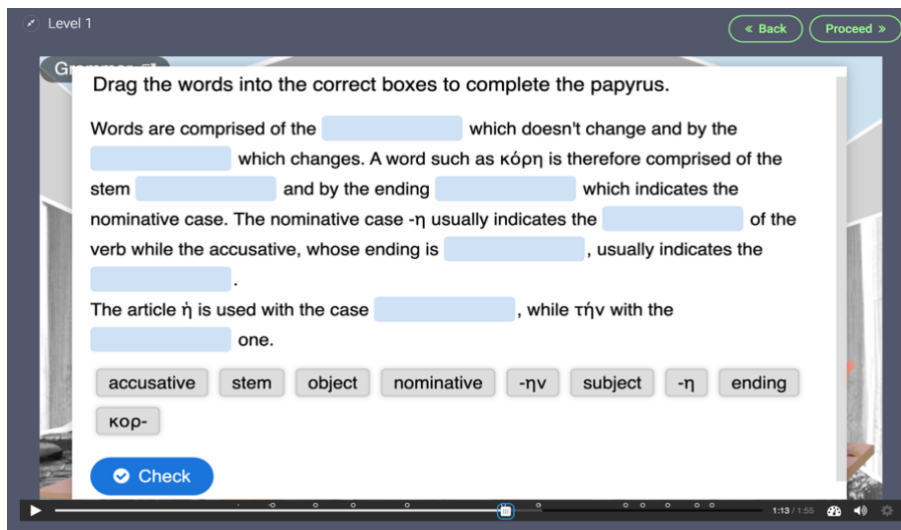


Figure 2.17. Example of a second tier of the three-tiered approach.

In the last tier, the group of people they saw speaking in the marketplace part ways and one of them (Ariadne) takes a mysterious chest out of the city. Since Myrrine must go home, Glauce decides to follow Ariadne on her own, taking mental notes of what she saw in order to recap

everything to Myrrine once they meet again. Thus, in this use task, learners are asked to describe in Greek what they are seeing as if they were taking mental notes of the events.

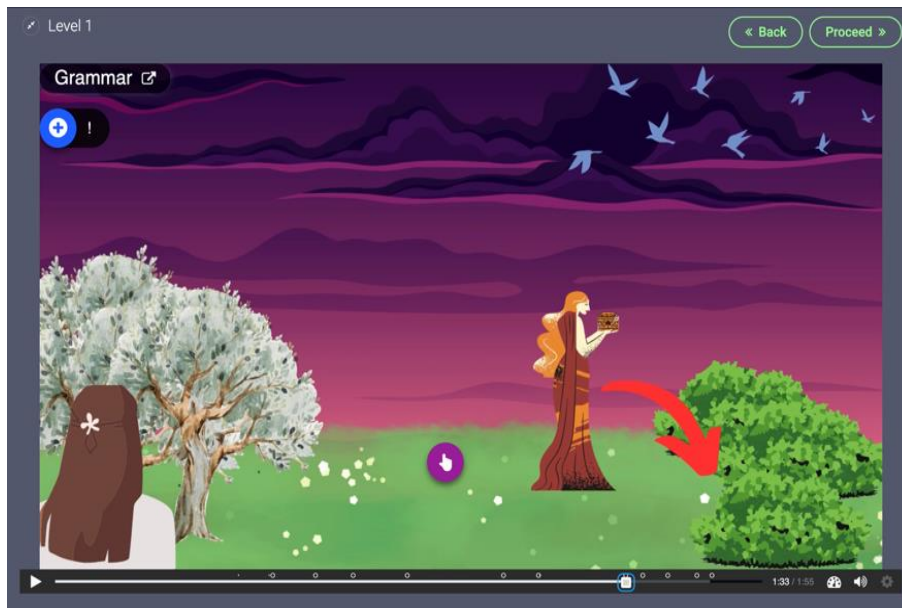


Figure 2.18. Example of a third tier of the three-tiered approach (part 1).

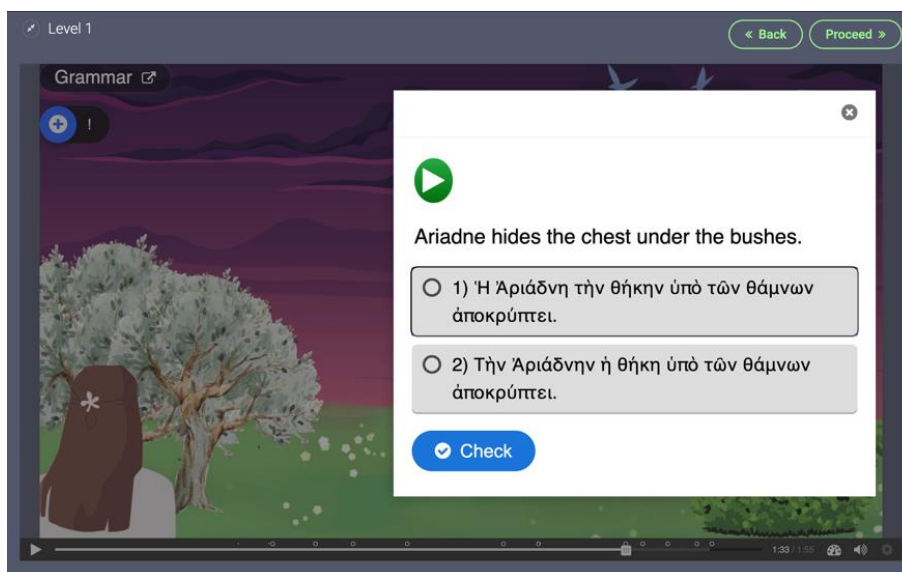


Figure 2.19. Example of a third tier of the three-tiered approach (part 2).

When possible, the written texts are presented alongside a voiceover of the English and Greek parts (e.g., the green play button in figure 2.19). Although the three-tiered approach has been introduced, the constraints of the platform did not allow the offering of variation in the format of the tasks, which therefore were primarily multiple choices.

Regarding the vocabulary, as mentioned, each video introduced many new words due to the narrative's needs, however only a few were targets of the didactical intervention. Learners were therefore asked to understand (with help) *all* words, however the tasks were limited to a maximum of six words each time. Therefore, Kuhlmann's first principle has been observed. Regarding the principle of introducing vocabulary through similarities, oppositions etc., the researcher planned for the 36-levels adventure the symbol system to help learners (cf. ¶ 3.1.4.1), however in the experimental levels this system could not be tested, due to the small amount of learnt words. Nevertheless, vocabulary was introduced through stems in order to enhance deductive abilities. Finally, the last principle (i.e., differentiation of exercise types) could not be followed due to the aforementioned constraints of the platform.

Regarding the most selected options of Survey A, "solving puzzles" has been offered through letters or messages that learners were asked to decipher or recompose to further investigate (cf. Figure 2.20). Given that these puzzles required many language structures that learners had not yet learnt, the researcher added the English translation to reduce cognitive load.

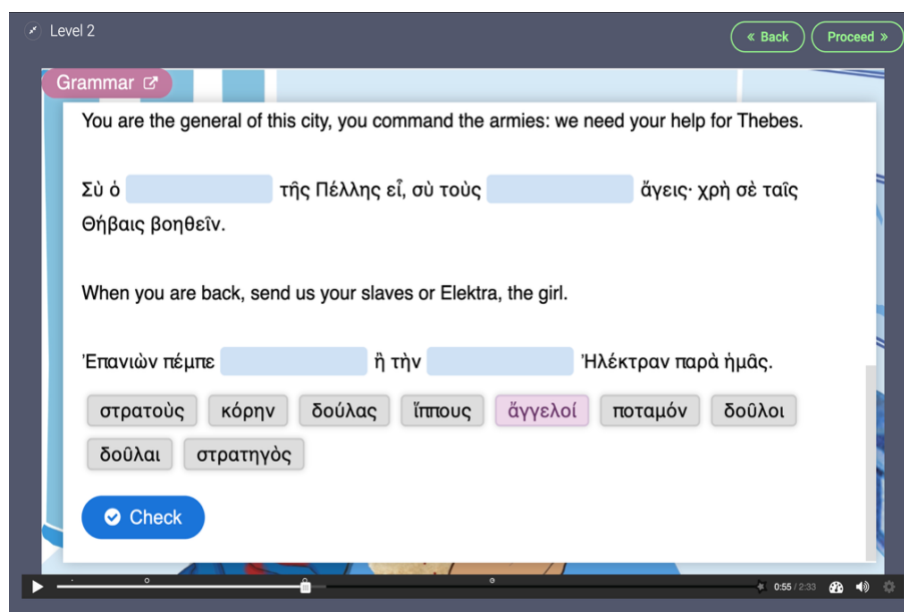


Figure 2.20. Example of "solving puzzles."

"Following interesting stories" and "learning new stories" have been offered through the mystery narrative. "Playing with friends" and any social interaction within the platform has been impossible to develop due to the fact that learners were not allowed to make accounts to play the game due to privacy protection. Thus, a group chat for the game could not be implemented. However, since the experimental class was learning ancient Greek online,

participants interacted with each other in the video call chat and in a private chat, which guaranteed a minimal social component.¹⁶¹

“Challenging myself” and “making choices” has been addressed through the structure of the experiment (i.e., understanding the mystery written in ancient Greek and making choices within the narrative). “Building a character” has not been developed due to the platform’s structure.

3.4. Visual aesthetic and sound designs: theory

The design of both visual aesthetic as well as sound plays a relevant role in DGBL. Thus, multimedia design refers to principles, connected to the Cognitive Theory of Multimedia Learning (CTML),¹⁶² that one can apply to reach different instructional aims, including: 1) reducing extraneous load or processing; 2) managing essential processing; and 3) fostering generative processing.¹⁶³

To reduce extraneous processing, one can apply different principles. Three of them are signaling, redundancy, and immersion. The first principle is connected to CTML’s rationale that learners learn better through the combination of words and pictures, rather than through words alone.¹⁶⁴ Thus, signaling refers to the observation that “by integrating cues into learning materials, extraneous processing can be reduced by directing learners’ attention to the key elements and the connection between them.”¹⁶⁵ In relation to a DGBLL environment for ancient Greek, signaling can be offered e.g., by visual cues (arrows, colors, etc.) highlighting relevant pieces of information that learners need for a task.

The redundancy principle states that environments offering only spoken words rather than spoken and printed words can reduce extraneous cognitive processing.¹⁶⁶ However, findings on this principle strongly vary according to game design and learners. For ancient Greek, which is a language usually learnt only through the written channel, it can be hypothesized that this principle does not apply, and that, conversely, spoken words should be accompanied by written words as well.

Lastly, the immersion principle refers to the observation that a 3D immersive environment, compared to a 2D environment, may add extraneous cognitive load due to its realistic details

¹⁶¹ A more detailed description of these interactions is available in chapter 3 (§ 4.1.1).

¹⁶² For a description, see chapter 1 (§ 4.1).

¹⁶³ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 310.

¹⁶⁴ Mayer, “Cognitive Theory of Multimedia Learning,” 31.

¹⁶⁵ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 315.

¹⁶⁶ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 316.

limiting space for relevant cognitive processing.¹⁶⁷ Therefore, to maximize transfer and retention a 2D environment seems preferable.

To manage processing of information relevant to the learning goals, other principles can be followed, namely pretraining and modality. The former indicates that offering scaffolding of key concepts before embarking on the DGBL experience maximizes transfer, as cognitive resources during gameplay can be applied to connect and apply the previously learnt key concepts.¹⁶⁸ Therefore, applying this principle to ancient Greek, it seems sensible to offer prior scaffolding before gameplay. The modality principle states that environments with spoken rather than printed words seem to maximize retention, although findings are not unequivocal.¹⁶⁹ However, due to the characteristics of ancient Greek, this principle may not be applicable, as both spoken and written words seem necessary for facilitating language comprehension.

Lastly, to foster generative processing to understand instructional content, Nelson and Kim analyzed six multimedia design principles: self-explanation, explanatory feedback, prompting, personalization, image, and narrative theme. According to their findings, learners score better on transfer tests when they are asked to choose an explanation for their decisions; here, they are offered explanatory feedback after key moves and are then asked to reflect on their learning (prompting).¹⁷⁰ Moreover, transfer is improved when words are offered in conversational style rather than formally (personalization), and further when the narrative theme is not overly strong. Lastly, learners do not learn much better when an agent's image is present on screen.

Regarding the narrative theme principle, it can be argued that due to the selected game genre (IF) and the nature of the learning goal (language learning) a more (but not overly) complex narrative could offer a contextualization of the language phenomena. As observed, “when using a story to convey information it is important that the to-be-learned material is well integrated into the overall narrative; otherwise, the learners may pay more attention to the story but ignore the factual content.”¹⁷¹ Thus, it can be hypothesized that the nature of language learning (which is based on words, phrases and “stories”) may be supported by the contextualization offered by the narrative theme.

¹⁶⁷ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 317.

¹⁶⁸ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 317.

¹⁶⁹ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 318.

¹⁷⁰ Nelson and Kim, “Multimedia Design Principles in Game-Based Learning,” 319.

¹⁷¹ Deanne M. Adams et al., “Narrative Games for Learning: Testing the Discovery and Narrative Hypotheses,” *Journal of Educational Psychology* 104, no. 01 (2012): 247, <https://doi.org/10.1037/a0025595>.

3.4.1. Visual aesthetic and sound designs: experiment

The video game was developed through three main interactive videos¹⁷² showing the story in ancient Greek, and other interactive videos for the tasks.¹⁷³ Regarding the three main interactive videos, each one offered a part of the story in ancient Greek by introducing the learning goals of the corresponding level as well. Thus, these three videos represented the main input-texts.

Each video had the following structure (cf. Figure 2.21): 1) the characters and the background as illustrations in 2D (immersion principle); 2) a box at the bottom of the screen with the Greek text in Gothic A;¹⁷⁴ 3) icons and/or English translations of specific single words that the researcher wanted to highlight above the words (signaling principle); 4) a box in the right corner as a reminder of what the different colors in the text meant (signaling principle); and 5) voice over in ancient Greek made by the researcher.¹⁷⁵

¹⁷² Interactive videos are resources that enable one to add tasks or exercises within the video.

¹⁷³ The three main videos showing the narrative were developed thanks to the support of Prof. Dr. Peter Kuhlmann and to the financial support of the *Seminar of Klassische Philologie* of the University of Göttingen, by the researcher herself, the illustrator Elena Micheli and the video maker Morgana Libera Rizzo. The remaining interactive videos were developed by the researcher herself.

¹⁷⁴ Gothic A1 has been chosen as font since the other fonts suggested in the theory section (e.g., Book Antiqua, Koiné, etc.) proved problematic (e.g., some Greek letters did not appear on screen).

¹⁷⁵ The three main videos were dubbed by the researcher. The male voices of the videos containing the tasks were dubbed by a German collaborator. Regarding the pronunciation, the researcher adopted to the best of her abilities the Erasmian pronunciation of ancient Greek. Due to her native language (Italian), she pronounced: θ , ϕ , χ as <th> (as in English *think*), <f> (as in Italian, *fare*), <ch> (as in German, *doch*); η , ω as open vowels (as in Italian *bène* and *òtto*), and ε , o as closed vowels (as in Italian, *bére* and *mólto*); v as the French <u> or German <ü>, while $\alpha\upsilon$, $\epsilon\upsilon$, $\eta\upsilon$, $\omega\upsilon$, as the Italian <u>. See Camillo Neri, *Méthodos: corso di lingua e cultura greca. Grammatica*, with Giovanna Alvonì et al. (D’Anna, 2018), 23–24.



Figure 2.21. Example of a main video.

For inclusion goals and the nature of ancient Greek as corpus language, the video presented the input-text in written and spoken form, as learners could read the text and/or listen to it. Therefore, the researcher decided not to follow the aforementioned redundancy and modality principles, due to Greek specific characteristics. Learners also had the option to pause the video and to slow down or speed up the audio. Texts were offered in a conversational way (personalization principle). During the tasks, the researcher followed the explanatory feedback and prompting principle whenever possible.

Furthermore, learners had at their disposal a video tutorial entitled “What is The Mystery of Pella?” that showed them the different parts of the platform and how to navigate the environment within the levels. This video tutorial had the goal of guiding learners in the platform, avoiding extra cognitive processing for understanding the environmental structure.

3.5. Incentive system and feedback: theory

The incentive system is comprised of different forms of rewards – also categorizable in intrinsic or extrinsic¹⁷⁶ – aiming at directing and influencing player’s behavior. Some of these rewards are:¹⁷⁷ 1) score system which represents numbers marking player performance and

¹⁷⁶ Tam and Pawar, “Emerging Design Factors in Game-Based Learning: Incentives, Social Presence, and Identity Design,” 368.

¹⁷⁷ Hao Wang and Chuen-Tsai Sun, “Game Reward Systems: Gaming Experiences and Social Meanings,” *Proceedings of DiGRA: Think Design Play* (2011): 3–5, <https://doi.org/10.26503/dl.v2011i1.594>.

usually serving as a self-assessment and comparison tool; 2) experience point and developable avatars, representing the possibility of enhancing an avatar's ability (e.g., strength or intelligence) through the accomplishment of specific tasks; 3) item-granting system, describing virtual items usable by players or avatars; 4) obtaining resources, differing from the previous system as resources usually have a practical in-game use, while items hold value through collecting or social comparison; 5) achievement systems, indicating titles associated with players or avatars for completing specific tasks or quests; 5) feedback messages, which refer to the instant verbal, audio, or visual reward such as "great!" popping up on screen after successfully completing a task; 6) plot animations and pictures, usually following a major successful event such as the defeat of an enemy; and 7) unlocking mechanics such as levels or special environments becoming accessible only after having met certain requirements. All of these components – and more – can be found arranged in different combinations in video games.

Another fundamental aspect of video games is represented by the feedback system, which will represent the focus of this section. Corrective feedback (CF) plays a crucial role in the L2 learning process, as it allows one to restructure erroneous production in L2 and at the same time satisfies Self-Determination Theory's needs of competence.¹⁷⁸ In L2 teaching, CF is given particular relevance. Thus, according to the importance attributed to implicit or explicit knowledge, CF can be seen as *not* particularly useful in implicit theories about learning (e.g., Krashen's theory) as it contributes to strengthening knowledge but not acquisition; conversely, in explicit theories about learning (e.g., SLA), it is considered useful as it promotes noticing and conscious processing.¹⁷⁹

Empirical research in L2 development has shown remarkable outcomes, as in most cases, a more explicit CF seems to be beneficial for language learners; in fact, "CF types that include metalinguistic information (such as grammar rules) and/or which function as prompts (signaling the error without providing the correct response) aid language development more than CF types which are generally subsumed under the header 'implicit,' such as recasts."¹⁸⁰ Recasts represent the "(relatively implicit) reformulation of a learner's sentence that is ungrammatical or otherwise deviant from the conventions of a target language."¹⁸¹

¹⁷⁸ Frederik Cornillie et al., "Between Learning and Playing? Exploring Learners' Perceptions of Corrective Feedback in an Immersive Game for English Pragmatics," *ReCALL* 24, no. 03 (2012): 262, <https://doi.org/10.1017/S0958344012000146>.

¹⁷⁹ Cornillie et al., "Between Learning and Playing?" 259.

¹⁸⁰ Cornillie et al., "Between Learning and Playing?" 259.

¹⁸¹ Frederik Cornillie, "Educationally Designed Game Environments and Feedback," in *Language, Education and Technology*, ed. Steven L. Thorne and Stephen May, *Encyclopedia of Language and Education* (Springer, 2017), 366, https://doi.org/10.1007/978-3-319-02237-6_28.

However, general GBL research seems not to prescribe CF as the best option to support learning progress in gaming. In digital games, the feedback system can be divided into both a positive feedback system, aiming at giving “a certain advantage that makes the system unstable,”¹⁸² and a negative feedback system, aiming to “re-stabilize the system by taking away certain advantages.”¹⁸³ These two systems often work together through a variety of feedback mechanisms such as a combination of leveling, points, asset building (i.e., collectable in-game resources obtained by the player), tips and hints, sounds effects, etc.¹⁸⁴ Thus, although GBL literature agrees on the importance of feedback in general, different opinions regarding the beneficial effects of CF are apparent due to the following reasons.¹⁸⁵

Firstly, in commercial game environments (i.e., those not intended primarily for educational purposes), explicit and direct solutions are not usually given, as games’ mechanics push players to explore and understand why their action has not worked out and therefore to find the “correct answer” themselves.¹⁸⁶

Additionally, “problem-solving in games follows a fixed pattern of being exposed to a concrete experience and to data, making reflective observations, construing mental generalizations and hypotheses about the experience, and testing these hypotheses through active experimentation.”¹⁸⁷ Thus, in the game experience, discovery patterns and mechanisms are a crucial aspect of the whole game environment: they encourage game engagement by promoting the process of pattern seeking, a typical process of human brains and of language learning/acquisition. As Koster points out, human brains are always looking for patterns even when we do not actively notice that.¹⁸⁸

Lastly, feedback in video games fulfills two tasks simultaneously: on the one hand, it deals with failure and errors (i.e., negative feedback/penalties/CF) helping learners in navigating the digital world, and on the other hand, it reinforces and rewards positive behaviors as well as maintains motivation towards playing (i.e., positive feedback/rewards).¹⁸⁹

In DGBL for language learning, feedback should take into account learners’ and learning situations’ unique natures: as observed, “well-designed game feedback is real-time, or provided

¹⁸² Sykes and Reinhardt, *Language at Play*, 60.

¹⁸³ Sykes and Reinhardt, *Language at Play*, 60.

¹⁸⁴ Sykes and Reinhardt, *Language at Play*, 60–61.

¹⁸⁵ Cornillie et al., “Between Learning and Playing?” 261–62.

¹⁸⁶ Kristian Kiili, “Digital Game-Based Learning: Towards an Experiential Gaming Model,” *The Internet and Higher Education* 8, no. 01 (2005): 17, <https://doi.org/10.1016/j.iheduc.2004.12.001>.

¹⁸⁷ Cornillie et al., “Between Learning and Playing?” 259–60; Kiili, “Digital Game-Based Learning,” 18.

¹⁸⁸ Koster, *A Theory of Fun for Game Design*, 14.

¹⁸⁹ Cornillie et al., “Between Learning and Playing?” 260.

just when it is needed in the amount it is needed, it is individualized, or targeted at the learner's specific need at that moment, and it is instructional, meaning it is not punitive, but constructive and geared towards improvement."¹⁹⁰ Considering Krashen's theory of comprehension input, feedback mechanisms should be organized with extreme care, given that "if input or feedback is too hard, it will be over the learners' heads, but if it is fully comprehensible, it will not encourage growth by pulling the learners up."¹⁹¹

Another relevant approach to feedback is offered by Vygotsky's notion of zone of proximal development (ZPD) which considers language learning as a social interactive phenomenon rather than as an individualistic activity as in Krashen's theory. ZPD is therefore "the developmental space between what a learner can do alone and what he or she can do with help."¹⁹² In light of these observations, according to Vygotsky, actual learning occurs "when a learner encounters feedback at critical periods of development and in contexts where resources can be immediately applied to what is being learned."¹⁹³ According to this view, feedback becomes a means to teach and learn rather than an instrument to judge performance. However, it is crucial that any given feedback is "revised or incorporated into future learning experiences,"¹⁹⁴ according to the idea of a network-like structure (cf. ¶ 3.3.1). Only if given feedback is reused many times can it be internalized by learners: as observed, "when feedback is untimely and not recycled into further learning, internalization is minimal."¹⁹⁵

Moreover, it is important that failure states are more carefully considered than success states, as success can be boring compared to failure, which instead pushes learners to try to understand where the error occurred.¹⁹⁶ Nevertheless, especially in language learning, mistakes represent a key aspect of learning as they refine, improve, and develop language mastery. As Sykes and Reinhardt point out, "the feedback systems in digital games [...] not only guide the players in successfully navigating the digital space, but also play a significant role in the player's decision to continue playing or abandon the game."¹⁹⁷ Thus, in DGBLL, a correct balance between negative feedback mechanics and positive feedback mechanics seems to be essential in order to satisfy most learners' necessities.¹⁹⁸

¹⁹⁰ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 125.

¹⁹¹ Sykes and Reinhardt, *Language at Play*, 52–53.

¹⁹² Sykes and Reinhardt, *Language at Play*, 53.

¹⁹³ Sykes and Reinhardt, *Language at Play*, 55.

¹⁹⁴ Sykes and Reinhardt, *Language at Play*, 56.

¹⁹⁵ Sykes and Reinhardt, *Language at Play*, 56.

¹⁹⁶ Sykes and Reinhardt, *Language at Play*, 57; Purushotma et al., "10 Key Principles."

¹⁹⁷ Sykes and Reinhardt, *Language at Play*, 57.

¹⁹⁸ Cornillie et al., "Between Learning and Playing?" 261.

Research on students' feedback perceptions shows that negative or positive perceptions of feedback largely depend on learners' personal characteristics (e.g., anxiety, motivation, perceived competence, game experience, etc.): for example, DeKeyser found that learners with high extrinsic motivation performed better without systematic and explicit feedback. Conversely, students with lower extrinsic motivation did better when they received systematic feedback.¹⁹⁹ Explicit CF is considered as "CF which contains a rule [...] and explicit information about the correctness of learners' responses (positive/negative feedback), which is immediately given when mistakes are made, and which offers students the opportunity to reconsider the options after they have responded,"²⁰⁰ while implicit CF is "adapted to the game environment (i.e., the characters' reactions), which stimulates autonomous inquiry by learners, and in which errors and rules are only shown after the task."²⁰¹ Explicit CF reflects the notion of scaffolding which refers to "a pedagogical framework for providing feedback targeted within a learner's ZPD."²⁰² If feedback is well scaffolded, the result will consist of a well-targeted, real time response and aid to learner's needs. As Sykes and Reinhardt suggest, "scaffolding may involve breaking down a complex activity or idea into manageable parts or providing tools such as charts, rubrics, outlines, or other organizing systems that can mediate successful completion of the activity."²⁰³

Regarding how to implement CF, literature suggests giving dynamic assessment and correcting mistakes in a playful and humorous way, as overly subtle correction might be inefficient, but overly explicit correction might be perceived as too harsh.²⁰⁴

CF can further satisfy the need for competence of the Self-Determination-Theory if learners perceive CF as useful for their learning and if they can use what they learnt through the CF to complete tasks in the game.²⁰⁵ As shown by Cornillie *et al.*:

Students found the CF useful in general, and that they found immediate and explicit CF (containing metalinguistic explanation) more useful than and preferable to implicit CF (delivered through the characters' responses and designed to stimulate autonomous inquiry). However, these findings do not imply that implicit and more playful feedback are not relevant. In the interviews, several respondents replied that the implicit CF was fun and

¹⁹⁹ Cornillie et al., "Between Learning and Playing?" 261; Robert M. DeKeyser, "The Effect of Error Correction on L2 Grammar Knowledge and Oral Proficiency," *The Modern Language Journal* 77, no. 04 (1993): 511, <https://doi.org/10.1111/j.1540-4781.1993.tb01999.x>.

²⁰⁰ Cornillie et al., "Between Learning and Playing?" 269.

²⁰¹ Cornillie et al., "Between Learning and Playing?" 269.

²⁰² Sykes and Reinhardt, *Language at Play*, 53.

²⁰³ Sykes and Reinhardt, *Language at Play*, 30.

²⁰⁴ Cornillie et al., "Between Learning and Playing?" 262.

²⁰⁵ Cornillie et al., "Between Learning and Playing?" 272.

made them feel immersed. What seemed optimal for them was a combination of elaborate and immediate CF (type A) with feedback that is adapted to the game (type C).²⁰⁶

Thus, it seems that a combination of immediate explicit CF – perceived as useful and effective for learning – and more adaptive and implicit CF – perceived as fun, playful and immersive – works best in a DGBLL environment. To summarize, Cornillie *et al.*'s research pointed out that:

First, language learners generally found CF useful in an immersive educational game and found implicit CF that lacks correct responses or metalinguistic explanation too weak for L2 learning. Secondly, individual difference factors related to learners' self-perception determined the perceived usefulness of and preferences for explicit CF in the immersive game (not so for implicit CF): learners who were intrinsically interested in learning English, who perceived themselves as competent during the game, and who had an enjoyable game experience had more positive perceptions of explicit CF (i.e., they found it useful and preferred it). Third, learners reported 'fun' and a sense of immersion when being confronted with CF that was implicit and adapted to the game (the characters' comments).²⁰⁷

Furthermore, the researchers highlighted that effectiveness of feedback in DGBLL depends on learners' perceptions of the usefulness of feedback itself and on feedback's capacity to stimulate intrinsic motivation.²⁰⁸

These findings are of particular interest for this research. According to this data, implicit CF i.e., that which does not give a direct explanation or metalinguistic clarification of why such an error is indeed an error, is perceived as not sufficiently effective for L2 learning. However, implicit CF is perceived as fun and playful. Thus, a similar observation suggests the necessity of an accurate weighing of the ratio between implicit/explicit CF in the video game's implementation: in a video game to learn ancient Greek, one should guarantee both explicit CF to increase usefulness and effectiveness of the learning tool by offering suggestions, prompts, and necessary resources (e.g., "not quite/wrong, remember that...") and allowing them to retry by correcting their answer or action, as well as implicit CF to increase immersion and playfulness.

²⁰⁶ Cornillie et al., "Between Learning and Playing?" 272.

²⁰⁷ Cornillie et al., "Between Learning and Playing?" 273.

²⁰⁸ Cornillie et al., "Between Learning and Playing?" 274.

3.5.1. Incentive system and feedback: experiment

In the experiment, the incentive system was almost nonexistent. Learners could collect points at the end of tasks or levels, but, due to the platform's limitations and the fact that learners could not be asked to create an account due to privacy, these points were not actually collected and shown at the end of a level. As will be discussed in the next chapter, some participants expressed the desire for a more present incentive system in the video game.²⁰⁹

Regarding the feedback system, CF was present most of the time, but due to the platform's limitations, it was impossible to implement explicit CF all the time, as some mechanics did not allow it. Therefore, sometimes players knew only whether they had chosen the right or wrong answer, but no tailored reply, explanation, or suggestion was offered to them in response. An explanation of the solution could be found in the available resources by consulting the grammar or the dictionary, however it was not direct and it required learners to reason on their own (implicit CF). Thus, the tool presented an imbalance between implicit and explicit CF.

As will be discussed in the next chapter, the fact that explicit CF was sometimes missing causing an imbalance between implicit and explicit CF seems to confirm what was noted by Sykes and Reinhardt, i.e., that “the feedback systems in digital games [...] not only guide the players in successfully navigating the digital space, but also play a significant role in the player's decision to continue playing or abandon the game,”²¹⁰ and therefore that feedback strongly influences learners' motivation, as Cornillie *et al.* also observed.²¹¹

²⁰⁹ One pre-experimental participant wrote regarding improvements: “More like a video game, add high scores to see who could get the best, add an air of competitiveness to it.” Another wrote: “I wish there was an element of competition in a game to motivate you to play.”

²¹⁰ Sykes and Reinhardt, *Language at Play*, 57.

²¹¹ Cornillie et al., “Between Learning and Playing?” 274.

4. Conclusions

This chapter outlined in detail the design process of the individual components of a didactical video game for ancient Greek language learning. Thus, it illustrated in the praxis the theoretical considerations of the previous chapter.

In the first macro-section of this chapter, Survey A was analyzed: its findings offered valuable insight into learners' perceptions and expectations regarding ancient Greek and DGBL. These results were combined with the theoretical aspects of the previous chapter for shaping the game's design.

The second macro-section detailed the core elements of the DGBL design, namely content and skills, narrative structure, game and learning mechanics, visual and sound design, as well as incentive systems and feedback. These elements were grounded in the principles of DGBL and of inclusion discussed in the previous chapter and were described both from theoretical and practical perspectives, highlighting the difficulties in bridging the gap between theory and actual implementation. This detailed analysis offered the basis for the creation of the didactical tool used to carry out the didactical experiments. Thus, in the next chapter, together with the research design, the experimental tool and the experimental results will be discussed.

Chapter 3

Research design and results

1. Introduction

In light of the previous theoretical and didactical chapters, the third chapter describes the research design, along with its methodology, methods, and ethical principles, while also addressing reflexivity, validity and reliability. It further analyses the results of the experiment and its limitations, as well as offering ideas for future research.

The first macro-section (§ 2) focuses on the research design; therefore, it describes the ethical principles that shaped the research (§ 2.1). It also offers explanations on the type of sampling and timescale that have been adopted (§ 2.2), as well as a short description of the pre-experimental and experimental versions of the tool (§ 2.3). In § 2.4, the researcher describes the methodologies and methods used, and explains how she analyzed the qualitative data she collected. Lastly, in § 2.5 she addresses how she guaranteed reflexivity, validity and reliability in her research.

The following macro-sections (§ 3 and § 4) focus on collected data from the experiment in relation to the research questions. In section § 3 the focus lies on intrinsic motivation and perceived usefulness by participants during the experience, while § 4 focuses on the description of DGBL and UDL features.

In § 5, the researcher addresses the limits of the research conducted, while in § 6 she offers practical guidelines on how to create a DGBLL environment, taking into account the previous theoretical guidelines, discussed in Chapter 1 (§ 3.6.1) and Chapter 2, together with her experience without the implementation itself. Conclusions are drawn in § 7.

2. Research design

2.1. Ethics

Before diving into the structure of the experiment itself, the ethical principles that lead the research ought to be clarified. As Cohen, Manion, and Morrison point out,¹ ethics does not represent a rule-following approach, as each researcher must take responsibility for their own projects. Individual responsibilities are therefore different and unique according to the context they are inserted into and to the specific development of the research itself.

Hence, the authors affirm that there is no dichotomous distinction between ethical and unethical, even though norms tend to prescribe (i.e., ought) and proscribe (i.e., ought not).² The authors rather suggest conceiving judgements about ethics as being located on a continuum that goes from clearly ethical to clearly unethical; thus, ethical principles cannot be absolute, as they must be considered relative to their contexts. Therefore, this research does not aim to pursue a deontological nor a consequentialist view of ethics,³ but an in-between view that considers some aspects from an absolutist perspective and others from a more relativist position. Thus, some principles will be used as absolute values, while others will depend on the context, situation and environment they are placed in. This approach to ethics is what has been referred to as ‘situational ethics,’ meaning that “what we should do or what is right to do depends on the situation in question, i.e. judging what to do cannot simply be determined, calculated or logically derived from principles but has to be decided in respect of the presenting situation (i.e. ‘bottom-up’ rather than ‘top-down’): ethical principles *inform* but do not simplistically *determine*.”⁴

This research has followed the University of Göttingen’s ethical research code⁵ which is inspired by the *Deutsche Forschungsgemeinschaft*’s ethical research code.⁶ The University of Göttingen’s ethical research code has been adapted to this research’s specific context, actors, and situation. As Cohen, Manion, and Morrison point out, “ethical codes are a guide, but they

¹ Cohen et al., *Research Methods in Education*.

² Cohen et al., *Research Methods in Education*, 112.

³ Cohen et al., *Research Methods in Education*, 112–3.

⁴ Cohen et al., *Research Methods in Education*, 114.

⁵ Georg-August-Universität Göttingen, *Ordnung der Georg-August-Universität Göttingen zur Sicherung guter wissenschaftlicher Praxis* (November 5, 2021).

⁶ Deutsche Forschungsgemeinschaft, “Leitlinien zur Sicherung guter wissenschaftlicher Praxis. Kodex,” *Zenodo*, January 27, 2025, <https://doi.org/10.5281/zenodo.14281892>.

cannot dictate to the researcher what to do in a specific, unique situation, nor can they absolve the researcher of responsibility for action taken in the research.”⁷ However, three key ethical (absolute) principles have guided the creation of this specific ethical code: minimization of harm, respect for autonomy and informed consent, and the protection of privacy, as suggested by Hammersley and Traianou.⁸

Moreover, as the following experiment includes minors, the seven key statements highlighted by Graham *et al.*,⁹ have been followed and taken as absolutes:

- ethics in research involving children is everyone’s responsibility;
- respecting the dignity of children is core to ethical research;
- research involving children must be just and equitable;
- ethical research benefits children;
- children should never be harmed by their participation in research;
- research must always obtain children’s informed and ongoing consent;
- ethical research requires ongoing reflection;

Furthermore, as the primary ethical duty of any research is the “production of valid, relevant, worthwhile and significant knowledge,”¹⁰ the following ethical code has been divided into three separate stages of research development that are specific for the following research: 1) ethics in research design; 2) ethics in data analysis; and 3) ethics in reporting and dissemination. These three stages correspond to two main and guiding areas of responsibility: responsibility to the research, and responsibility to participants and audiences.¹¹

Ethics in research design (1) is comprised of:

- informed consent: it means that experimental participants has received a fair explanation of the procedures, purposes, risks, benefits and privacy of the research; participants had had the right to refuse to participate or to withdraw from the research at any time; they were completely free in choosing to take part or not and, as participants were young adolescents, consent was obtained beforehand from the

⁷ Cohen et al., *Research Methods in Education*, 118.

⁸ Martyn Hammersley and Anna Traianou, *Ethics in Qualitative Research: Controversies and Context* (Sage, 2012).

⁹ Ann Graham et al., *Ethical Research Involving Children* (UNICEF Office of Research-Innocenti, 2013), 23.

¹⁰ Cohen et al., *Research Methods in Education*, 121.

¹¹ Cohen et al., *Research Methods in Education*, 142.

school, teachers, parents or legal guardians, and lastly to the minors themselves.¹² If any of the four involved actors did not have consent, the participant was not considered in the research and their refusal was not questioned; participants had the right to ask questions about any aspect of the research.

- malfeasance, benevolence and human dignity: it means that the researcher took responsibility for not deliberately damaging the participants physically, psychologically, emotionally, professionally, or personally.¹³ However risk of harm was impossible to completely eliminate, but the researcher took in any case the responsibility to minimize it. In particular, risk of overly long exposure to digital tools, which must be considered in experimenting with digital tools, cannot be completely removed: however, as the experiment lasted only a couple of weeks, with no continuous exposure to the digital tool, risk was minimized. On the other hand, the researcher assured participants that research goals are grounded in benevolence as the research aims to investigate perceptions of a pedagogical approach (inclusive DGBL) for learning ancient Greek. Participants received also a clear explanation of how data would be collected and stored through their informed consent. Moreover, they were assured that their participation in the experiment and their data would not influence their education in any way.
- Privacy: it is a basic human need¹⁴ and it is deeply interconnected with anonymity, confidentiality and informed consent. As it has been highlighted, “the right to privacy means that a person has the right not to take part in the research, not to answer questions, not to be interviewed,”¹⁵ implying that privacy means “freedom from” and “freedom for.”¹⁶
- Anonymity: participants’ identities were not used to expose data and findings (see more on the following point).
- Confidentiality: was chosen as a way to protect participants’ rights to privacy given that complete anonymity cannot be guaranteed in online research. Confidentiality means that the researcher takes responsibility for “not disclosing information from a participant in any way that might identify that individual or that might enable the

¹² Cohen et al., *Research Methods in Education*, 124.

¹³ Cohen et al., *Research Methods in Education*, 127.

¹⁴ Cohen et al., *Research Methods in Education*, 128.

¹⁵ Cohen et al., *Research Methods in Education*, 129.

¹⁶ Cohen et al., *Research Methods in Education*, 129.

individual to be traced.”¹⁷ Only the researcher was able therefore to identify participants through an identification code that participants created and shared with the researcher. This choice is justified by the impossibility of guaranteeing complete anonymity: no single participant was identified with their name, addresses or personal information. In this report, every mentioned participant received a pseudonym, and their real identity is known only to the researcher who takes responsibility of not sharing it with anyone. The process of giving a pseudonym has followed Frankfort-Nachmias and Nachmias’s techniques¹⁸ of deletion of identifiers (e.g., full name or initials, date of birth, etc.) and crude report categories (e.g., general categories such as year of birth, instead of specific such as date of birth). Given that the sample was very small, it is however difficult to guarantee participants’ confidentiality with their teachers as they may be able to recognize their own students due to specific characteristics (e.g., the only certified SEN), which therefore represents a limitation of the present study.

- Gaining access and acceptance into the research setting: the researcher 1) obtained official permission to undertake the research in the target schools through informed consent (see *supra*); 2) clarified to target schools the aims, practical application, design, methods, procedures, size of samples or groups, type and modality of the experiment, observational needs, time, degree of disruption and intervention, arrangements for confidentiality, timetable, role of findings, and eventual assistance needed of the research; 3) negotiated access with teachers and schools; and 4) proposed to give a copy of the final report to each school, if explicitly requested by the school.¹⁹

Ethics in data analysis (2) means that the researcher takes responsibility for not using inappropriate data-analysis techniques, not being unfairly selective towards collected data, not omitting, ignoring or concealing data in order to reach a certain goal, not making false claims, not breaching ethical requirements of confidentiality and anonymity, and not judging rather than analyzing data. The researcher points out that, as Oliver suggests,²⁰ raw data are property

¹⁷ Cohen et al., *Research Methods in Education*, 130.

¹⁸ Chava Frankfort-Nachmias and David Nachmias, *Research Methods in Social Sciences*, 4th ed. (Edward Arnold, 1992).

¹⁹ Cohen et al., *Research Methods in Education*, 135.

²⁰ Paul Oliver, *The Student’s Guide to Research Ethics* (Open University Press, 2003), 63.

of the participants but as soon as they are analyzed and interpreted, they belong to the researcher.

Ethics in reporting and dissemination (3) means that the researcher takes responsibility for fair, credible and accurate data reporting without misrepresentation or unfair selectivity.²¹ The report aims at being honest, true, fair and respect confidentiality. The audience to which this research is addressed is the academic audience and the ancient Greek teaching.

As the research has been conducted online, more ethical duties were observed. Internet research is defined as that type of research that uses the Internet to retrieve data using an online tool, or comprises studies of Internet use and how it is used.²² Thus, Internet research can be divided into three categories, according to Farrimond:²³ passive, active (i.e., the researcher is a participant of the online reality) and online traditional forms.²⁴ The following Internet research is active as the researcher was present and interacted with participants online.

As mentioned previously, ethical issues in Internet research are broad. Some of the most important for the following project are *inter alia* privacy, confidentiality and anonymity, disclosure and data quality, informed consent, permission and ensuring that participants know what they are consenting to, the age of consent, opportunity for one participant to send in multiple completed online surveys, ownership of data and copyright concerns.²⁵

To obtain informed consent, the researcher provided documents to every single actor involved (i.e., school, teachers, parents or legal guardian, participants) through the collaboration of the teachers involved. Minor participants received information through every online questionnaire which asked participants to answer with “I accept,” in order to be able to participate. Due to the questionnaire’s length and time constraints, informed consent was offered as a short, bulleted list. The opportunity to withdraw from interviews, even after having given initial consent, was reoffered before the start of every single interview.²⁶

²¹ Cohen et al., *Research Methods in Education*, 139.

²² Cohen et al., *Research Methods in Education*, 144.

²³ Hannah Farrimond, *Doing Ethical Research* (Palgrave Macmillan, 2013).

²⁴ Cohen et al., *Research Methods in Education*, 144–5.

²⁵ Cohen et al., *Research Methods in Education*, 145.

²⁶ To ensure privacy, Solove’s taxonomy of privacy was applied, see Daniel J. Solove, “A Taxonomy of Privacy,” *University of Pennsylvania Law Review* 154, no. 03 (2006): 477-560. The following taxonomy is reported as in Cohen, et al., *Research Methods in Education*, 147: 1) information collection: surveillance; interrogation (probing of information); 2) information processing: aggregation (combining data about a person); identification; insecurity (improper access and information leaks); secondary use (information collected for one purpose being used without consent for another purpose); exclusion (failure to inform the person of data on them held by others and failure to involve the person in the use of such data); 3) information dissemination: breach of confidentiality; disclosure (of information that affects how others judge a person’s character); exposure (e.g., of bodily functions, nudity, grief); increased accessibility; blackmail (threat to disclose information); appropriation (use of a person’s identity to serve

Another important aspect of Internet research is that the researcher must decide how the participants will perceive the environment they are in i.e., as a public, private, or somewhere in-between environment.²⁷ The following research conceives the project's environment as an in-between environment, meaning that data can be both public and private. As scholars point out, "in Internet research, drawing a distinction between public and private may be difficult, but in principle, this distinction is identical to the one that applies to all forms of research: the researcher cannot indiscriminately register private information even though it may be openly available."²⁸ In fact, even though it might seem the contrary, not all online information is public and can be made "an object of research without informing and obtaining consent from those concerned."²⁹ Therefore, the researcher took responsibility for informing participants about which data she used, assuring confidentiality.

Moreover, as participants in the following online research were young adolescents (12-17 years old), they were entitled to special protection.³⁰ Therefore, privacy was safeguarded by "scrubbing data to remove all personal identifying material, or by providing restricted access and anonymity in the data-collection process, or by using pseudonyms, or by using encryption techniques."³¹ However, as it is almost impossible to fully guarantee complete anonymity, confidentiality was preferred and participants were informed.³² Control has been constant in order to prevent risks of cyber-bullying, intrusion, or repeated submissions of data by the same person.

Both experiments took place on the OpenILIAS platform of the University of Göttingen. However, access to the material was available through a link that did not require any account registration. Thus, students' behaviors on the platform were not observed by the researcher, in order to guarantee their anonymity.

the purposes or interests of another person); distortion (spreading false or misleading information about a person); 4) invasion: intrusion (into a person's solitude or tranquility); decisional interference (governmental incursion into a person's decision on private matters).

²⁷ National Committee for Research Ethics in the Social Sciences and the Humanities. "A Guide to Internet Research Ethics," *National Research Ethics Committees*, June 8, 2019, <https://www.forskningsetikk.no/en/guidelines/social-sciences-and-humanities/a-guide-to-internet-research-ethics/>; Cohen et al., *Research Methods in Education*.

²⁸ National Committee for Research Ethics, "A Guide to Internet Research Ethics," 9.

²⁹ National Committee for Research Ethics, "A Guide to Internet Research Ethics," 9.

³⁰ National Committee for Research Ethics, "A Guide to Internet Research Ethics," 12.

³¹ Cohen et al., *Research Methods in Education*, 147.

³² National Committee for Research Ethics, "A Guide to Internet Research Ethics."

Privacy policy and data storage followed the University of Göttingen's ethical code³³ which states that scientific data are storable for up to ten years in the GWDG (*Gesellschaft für wissenschaftliche Datenvereinbarung*) of University of Göttingen.³⁴

2.2. Timescale and sampling

In this section, the researcher analyzes the timescale and samplings of both experiments. Although the analysis of the results mainly concerns the experimental results, the researcher also made use of some results of the pre-experiment. The experimental participants have been indicated by the letter E followed by a number (e.g., E1, E2, etc.). Conversely, pre-experimental respondents are indicated by the letter P and a number (e.g., P1, P2, etc.). Lastly, involved teachers are indicated by the letter T and a number. T1 and T2 are the teachers of the pre-experiment, while T3 of the experiment.

The researcher started working on the pre-experimental tool's development at the beginning of November 2023. However, due to external constraints, she started creating the pre-experimental material on the platform itself and developing the videos only around the end of July 2024. She worked on the development until the second week of September 2024. Between the 17th and 20th of September 2024, T1 and T2 administered the pre-questionnaire of the pre-experiment to 24 respondents. Starting from the 23rd of September until the 4th of October pre-experimental respondents had the platform at their disposal. The platform was introduced for the first time at school by T1 and T2 who let their students play for 45 minutes together directly at school. Between the 8th and 9th of October, 22 respondents completed the post-questionnaire. Between the 10th and 17th October, the researcher interviewed six respondents (three female,

³³ Georg-August-Universität Göttingen, *Ordnung der Georg-August-Universität Göttingen*, 10.

³⁴ A related topic to ethics is decolonization. Decolonization normally refers to “an approach that is used to challenge the Eurocentric research methods that undermine the local knowledge and experiences of the marginalised population groups,” see Mpoe Johannah Keikelame and Leslie Swartz, “Decolonising Research Methodologies: Lessons from a Qualitative Research Project, Cape Town, South Africa,” *Global Health Action* 12, no. 01 (2019): 1, <https://doi.org/10.1080/16549716.2018.1561175>. While decolonization normally refers to Indigenous people, with Indigenous defined by the Cambridge Dictionary as a term, “used to refer to, or relating to, the people who originally lived in a place, rather than people who moved there from somewhere else” (Cambridge Dictionary “Indigenous”), in this research's specific case the term decolonization is used in reference to non-European cultures. Even if the researcher comes from Europe and the involved schools are in the UK – which is usually connected with Europe, even after Brexit – it nonetheless seems important to pay particular attention to the cultural differences that may occur. The researcher's aim is therefore not to impose her European background (Italian and German) and point of view on the different cultures that participated in the experiment (British), as far as she is able to do so. To avoid this issue, she asked T1 (British) to review the material.

two male, and one student that preferred not to reveal their gender) as well as the two involved teachers (one female, one male).

At the beginning of April 2025, the researcher started working on the improved version of the experimental tool, which was built starting from the analysis of data collected during the pre-experiment. With this tool she tried to correct all problematic aspects that were mentioned by pre-experimental respondents. The second experiment (henceforth, indicated as “the experiment” in opposition to “the pre-experiment”) took place completely online in two sessions, on June 3rd and June 10th, 2025. During the first session (1h 30), participants (11) completed the pre-questionnaire, played the first level, and then completed the mid-questionnaire. During the second session (1h 30), participants (8) played the second level and then completed the post-questionnaire. During the same week, four volunteers (three female participants, and one that preferred not to reveal their gender) as well as the involved teacher (female) were interviewed.

Regarding sampling, the researcher encountered significant difficulties in recruiting experimental schools in the UK. In the end, she recruited one private British school and a British national charity that operates in collaboration with a university to offer ancient Greek beginners’ courses.

The private school had 24 young Greek learners (13-14 y.o.), who were divided into a male class (10) and a female class (13) and had two different teachers (T1 and T2).³⁵ Among the learners, one person preferred not to disclose their gender. This school completed the pre-experiment. Among the 24 learners, there was only one certified SEN student (male). The majority of participants were 13 years old, in addition to two girls who were 14 years old, and one respondent who preferred not to answer. Almost all respondents had English as their first language except for two boys (one native Chinese speaker and one native Romanian speaker). Only one boy did not have as country of origin the UK, as he declared that his country of origin was China. All students had been learning Greek for less than one month at the time of the

³⁵ T1 is in the age range 30-40 years old, and he is Head of Classics at the pre-experimental school. He has been teaching ancient Greek for twelve and a half years, along with Latin, Ancient History and Classical Civilization. He has studied Classics at the university, but he has never “formally” studied didactics of ancient Greek: his teaching derives almost entirely from experience in the classroom. He has a qualification to teach in schools, but he studied for it while teaching full-time and he was taught only a little specific theory about teaching. He is interested in didactics of ancient Greek, but only in a casual way: he has read a little about it in books about teaching, although he has never really tried to change his usual method of teaching because of what he has read. No data are available regarding T2 except that she looked aged 20-30 and had just started teaching Greek at the time of the pre-experiment, after having taught Latin for some time.

questionnaire, with the exception of one boy who noted that he had been learning Greek for two months.

On the other hand, the online class that carried on the experiment was comprised of 11 young Greek learners³⁶ of different ages (12-17 y.o.) guided by a female teacher (T3).³⁷ The sample was comprised of six girls, two boys, two people that preferred not to disclose their gender, and one genderfluid person. One girl (E4) was 12 years old; two girls (E5 and E7) and two boys (E1 and E11) were 13; and the genderfluid person (E6) and two girls (E2 and E9) were 14. One person that did not disclose their gender (E3) and one girl (E8) were 15, and one girl (E10) was 17. Most participants came from the UK and had English as first language; however, one girl (E5) came from Brazil and had Portuguese as her first language, while one boy (E11) came from China and had Chinese as first language. Regarding how long they had been learning Greek prior to the experiment, data is heterogenous e.g., from a minimum of six months (E6) to a maximum of one year (E9). No certified SEN students were present in this sample.³⁸

Both samples are therefore non-probability convenience samples,³⁹ as the researcher was specifically targeting first year Greek learners in British schools. Due to their characteristics, the samples do not attempt to represent the wider population; results have no statistical power and generalization is here negligible.

³⁶ However, four learners did not participate in both sessions or failed to return all three questionnaires. Therefore, only seven participants completed all three questionnaires while an eighth participant completed the pre- and post-questionnaires. For the purposes of this research, only the seven participants who successfully returned all questionnaires and the eighth participant, who completed pre- and post-questionnaires, will be analyzed when the aim is to see the difference after the intervention. However, comments from the other three participants in the pre- or mid-questionnaires will also be considered if needed.

³⁷ T3 is in the age range 40-50 years old, and she has been teaching Greek for 22 years only in state schools before moving to university to work online with the national charity. She completed her undergraduate M.A. in Latin and ancient History with Greek, before completing her PGCE (Postgraduate Certificate in Education) and M.Ed.; moreover, she has received various certifications in subjects such as museum learning and digital learning. Although she has never taken courses specific for didactics of ancient Greek, she conducted action research while being a teacher in state schools.

³⁸ T3 offered a written description of her class: “The students started at different points in the year, with around half starting in September and around half of the group beginning in November due to circumstances outside of everyone’s control. This had an impact on some of the students’ confidence in their Greek attainment: even when they were understanding the lessons and achieving well, there was a sense that they should be ‘doing better’ that some of them could not quite shake. Some of the students certainly struggled to maintain a sense of achievement and consequently motivation when facing material they found challenging: this has definitely been an issue with online learning where much rests on students’ ability to see how far they have come and the teacher is less able to offer consistent personalized and personal encouragement. Some students, whenever we encountered anything challenging, certainly imagined that everyone else was breezing through material with no effort and felt that they were not achieving in line with expectations. This was not true, but was difficult to show them when working remotely.” T3’s comment seems to confirm the hypotheses made by the researcher regarding the motivation tendencies of the experiment sample (see ¶3.1.1).

Regarding prior grammar and vocabulary knowledge, see appendix A. As can be there observed, the experimental group had already encountered all grammar content offered in the adventure, though not all offered words.

³⁹ Cohen et al., *Research Methods in Education*, 218.

The researcher opted for an exploratory case study to qualitatively investigate these two British classes' perceptions of an inclusive DGBL environment for ancient Greek learning.⁴⁰ She opted for a case study, given that, as Yin suggests, one may consider choosing this type of research when the research questions focus on “how” or “why,” when one has little or no control over behavioral events, and when the main research focus is a contemporary (and not entirely historical) phenomenon, thus a “case.”⁴¹

2.3. Experimental tool design

As in the second chapter the individual specific game design elements have already been described, in this section the focus lies on the synthetic analysis of the general structures of the two versions of the didactical tool (pre- and experimental), called “The Mystery of Pella.” Thus, this section aims to offer a holistic understanding of the entire tool.

Both versions of the adventure have been developed on the OpenILIAS platform of the University of Göttingen, which is the public version of the ILIAS platform of the university. The ILIAS platform of the University of Göttingen is a LMS (Learning Management System), namely a platform for the management of didactical content and learning activities, and the administration of courses, teaching staff and student enrolments.⁴² These platforms represent the didactical evolution of CMSs (Content Management Systems), initially conceived for the management of Web content. Thus, they are, effectively, CMSs “specialized” for the teaching-learning process. A LMS allows different actions e.g., creating classes with teachers and learners, managing registration and access, monitoring activities, evaluating the course, and also offers other functionalities aimed at language teaching:⁴³ learning activities (quizzes, lessons, etc.); one-way communication tools (calendars, etc.); synchronous communication and collaboration tools (forum, wiki, chat, video); tracking and evaluation tools; and tools for integrating external resources. Although the potentialities of LMS are numerous, so too are the limitations, among which the main one is clearly the system's own rigidity: thus, attempts at innovating the structure through external resources could compromise the system's functions.⁴⁴ In spite of the structural constraints, the ILIAS platform has been chosen as the environment to

⁴⁰ Cohen et al., *Research Methods in Education*, 377.

⁴¹ Robert K. Yin, *Case Study Research and Applications: Design and Methods*, 6th ed. (SAGE, 2018), 3.

⁴² Gerardo Fallani, “Oltre le piattaforme didattiche. E-Learning 2.0 e apprendimento nell'open web,” in *Insegnare italiano con i MOOC*, ed. Andrea Villarini (Pacini, 2020), 144.

⁴³ Villarini, *Didattica delle lingue straniere*, 221.

⁴⁴ Fallani, “Oltre le piattaforme didattiche,” 146.

develop the experiment tool for the following reasons: availability of resources, familiarity, financial and time costs, and required competences.

According to different sources, the number of schools and universities as well as individuals adopting and using LMSs is increasing.⁴⁵ This observation encouraged the researcher to opt for this hosting platform. An existing familiarity with the platform might increase the possibility of a teacher experimenting with the development or experimentation of similar game-like adventures. Moreover, given that these resources are quite widespread, it is likely that the school or university already has this resource at their disposal, which would decrease the financial costs involved.

Nevertheless, the competences required for the development of this platform are likely less extensive than those required to develop a video game with game development packets (such as Unity, Unreal Engine, Gamefroot, or Blender), as the majority of teachers would already be acquainted with the LMS platform of their institution. Furthermore, privacy issues regarding minor users could be better managed by using the official platform of the educational institution. For all these positive reasons, the researcher chose a LMS platform as host for the development of the adventure. However, the negative implications of this choice are still significant and will be discussed throughout the entire analysis.

The pre-experimental version of the adventure was comprised of three levels: the first one called “ἡ Πέλλα,” the second one “ὁ Ἀλέξανδρος καὶ ὁ Βουκέφαλος,” and the third one “ὁ νεκρὸς ἐν τῇ οἰκίᾳ.” Moreover, in both versions of the tool, an initial introduction video, created on *Canva* by the researcher, was added before the first level, called “What is The Mystery of Pella?” This resource was designed to show participants what to expect from this adventure and how to interact with the different sections of the platform.

In the pre-experimental version, participants were able to ask for help or support on the page “Questions and Doubts.” The researcher had planned to indicate a fixed date and time for a video-call for those who might need face-to-face help, but it was not feasible due to the school’s policy. In the experimental version, this section was replaced by the presence of the researcher online as an “informatic help-desk.” She attended both sessions of the experiment and helped the participants that encountered technical problems with the platform live and in real time.

⁴⁵ “More Internet Users Turn to Online Learning in 2024,” *Eurostat*, updated January 24, 2025, <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20250124-1>; Imed Bouchrika, “51 LMS Statistics: 2025 Data, Trends & Predictions,” *Research.com*, September 2, 2020, <https://research.com/education/lms-statistics>.

In the pre-experimental version, each level of “The Mystery of Pella”⁴⁶ was comprised of five subsections: 1) the input video with a transcription that had words with internal links to the vocabulary section (see Figure 3.1); 2-3) two pages of different types of exercises (see Figure 3.2); 4) the cultural insight resource as text and audio (see Figure 3.3); and 5) the vocabulary section (see Figure 3.4).



Figure 3.1. Example of a main video in the pre-experiment (Level 3).

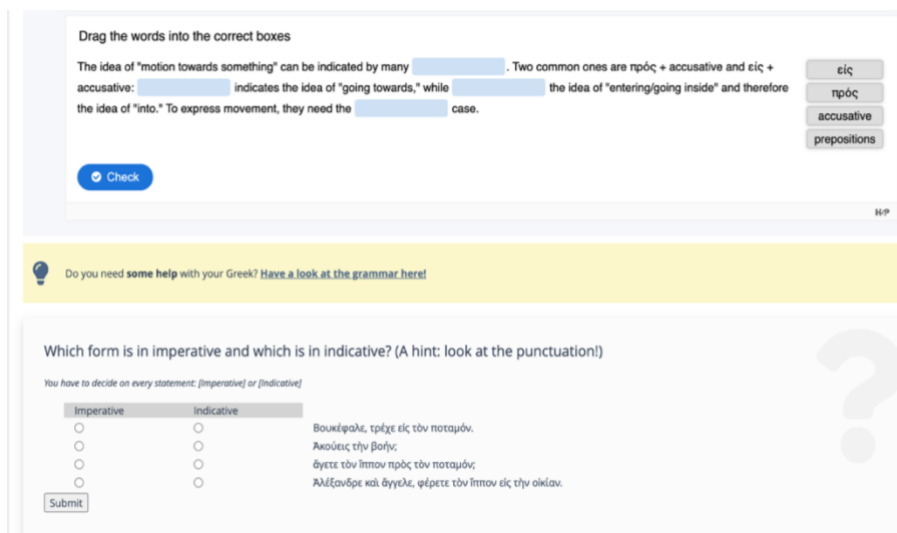


Figure 3.2. Example of inductive grammar and example of grammar exercise in the pre-experiment (Level 2).

⁴⁶ For a more detailed description of each subsection, see Chapter 2.



Figure 3.3. Example of the cultural insight resource in the pre-experiment (Level 2).

Level 1: ἡ Πέλλα (5/5)

Figure 3.4. Example of an entry in the vocabulary section in the pre-experiment (Level 1).

Participants could navigate the platform thanks to a menu at the link side of the page, through the navigation buttons at beginning or bottom of the page – which however allowed one to only go to the previous or following section of the same level – and also through a section highlighted in yellow that allowed one to jump from section to section within the same level (see Figure 3.5). However, the structure of the pre-experimental tool was still fragmented and not cohesive. Moreover, the narrative component was present only in the main videos in Greek and the game component was limited to a few exercises.

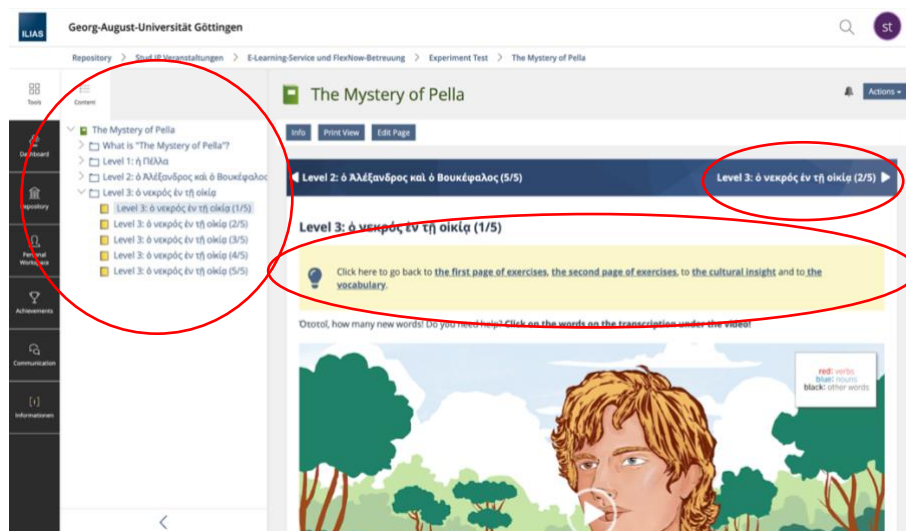


Figure 3.5. Example of navigation possibilities within the levels in the pre-experiment.

After the pre-experiment, the researcher worked on the entire structure of the game, deeply modifying it. This time the researcher changed the structure of the tool by focusing on the resource “Branching Scenario,” available on the LMS through H5P.⁴⁷ “Branching Scenario” is a resource that allows one to create branching storylines through course presentations, texts, images, interactive videos or videos. Through the branching questions, users can make their narrative choices and proceed with the story “influencing” its development. For developing a DGBL environment for ancient Greek, this resource might initially seem impractical as there are no exercise options between the available content types. However, the researcher found a way to insert exercises within the branching. The solution is to work mainly with interactive videos: these resources allow one to add exercises within the video itself which thereby allows tasks to be inserted within the storyline. However, a negative aspect of this resource is that the range of possible exercise types in an interactive video is inferior in comparison to those normally offered by H5P.⁴⁸

The new version of the tool was comprised of only two playable levels (“ἡ Πέλλα” and “ὁ νεκρὸς ἐν τῇ οἰκίᾳ”) with a narrative bridge in-between (“ὁ Ἀλέξανδρος καὶ ὁ Βουκέφαλος”). Given that the researcher had at her disposal only two sessions for the experiment, she decided

⁴⁷ “Branching Scenario,” updated February 25, 2019, <https://h5p.org/branching-scenario>.

⁴⁸ Within the interactive video in the branching scenario, the available content types are: Multiple choice questions with one or more correct answers; True/False questions; Crossroads; Navigation Hotspot; Multimedia Choice; Fill in the blank; Drag and drop; Statements; Single choice question sets; Mark the word activities; Drag the word; Images; Tables; Labels; Texts; Links. Even though at a first glance may seem like there are many useful options, the reality of creating goal-oriented tasks to learn ancient Greek required the researcher to rely heavily and mostly on “drag the words” and “drag and drop” exercises. As will be later discussed, the fact that the tasks were often similar represented a negative aspect for some participants.

to focus on the first and third implemented videos (namely those for the pre-experimental levels “ἡ Πέλλα” and “ὁ νεκρὸς ἐν τῇ οἰκίᾳ”) which were the most interesting from a narrative and didactical point of view. The second video (corresponding to the video of the second level in the pre-experiment) became a narrative bridge to show learners the development between the two playable levels.

Both levels were comprised of an initial main video in ancient Greek, which presented the narrative. In comparison to the pre-experiment, these videos were developed as interactive videos which offered comprehension or vocabulary questions to help learners “digest” and understand the story in Greek. As visible in Figure 3.6, in the interactive videos, tasks were integrated within the video-flow and not separated from it. This aspect was changed thanks to the suggestions collected through the pre-experiment. Moreover, in comparison to the pre-experimental version, all contents (except for dictionary and grammar resources) were included into the “Branching Scenario,” offering a smoother and more game-like experience. Players were no longer asked to navigate the platform through a menu, but rather to proceed or go back within the narrative and its tasks through the navigation buttons on the right corner.

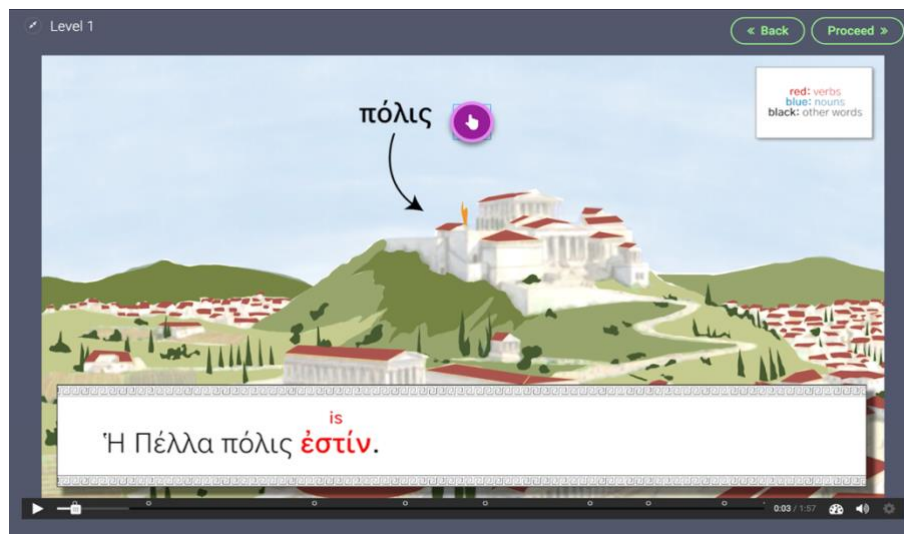


Figure 3.6. Example of the main video (interactive) in the experiment.

The pivotal difference between the two versions was represented by the omnipresent narrative and the possibility of making narrative choices. After the main video in Greek, players were presented with a shorter video in English that narratively pre-introduced the task. The implementation of the goal-oriented tasks within shorter videos connected with the narrative was followed for both levels. Players were then asked to make a choice (see Figure 3.7).

According to their choices, players could choose between two tasks that covered the same learning content, but with different storylines. In the first level, the task followed by two asterisks indicated more difficult tasks. When possible, the task included the slowed down voiceover of the Greek texts (see Figure 3.8).

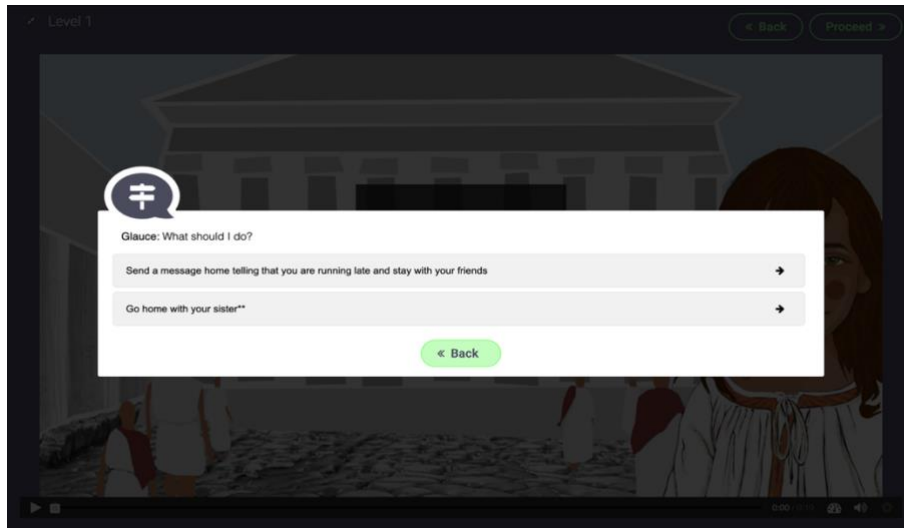


Figure 3.7. Example of the process of making decisions in the experiment.

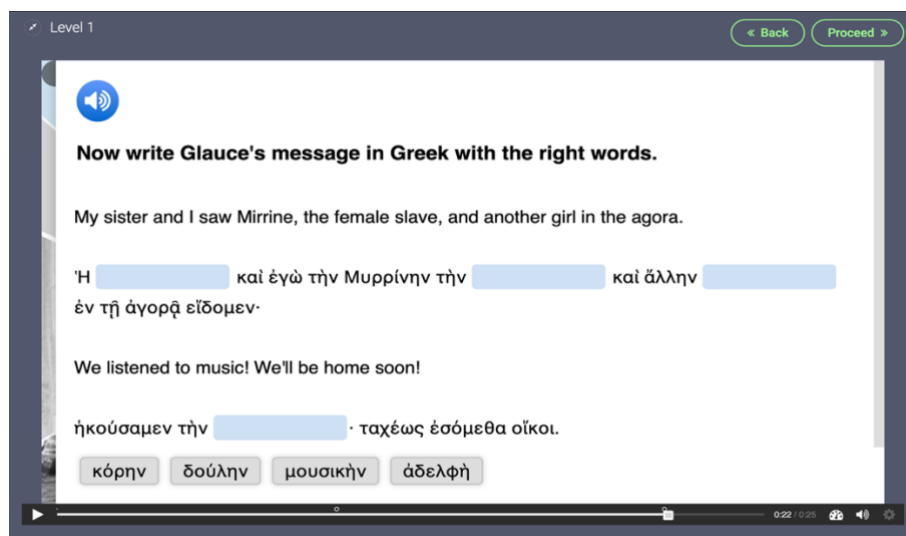


Figure 3.8. Example of a goal-oriented task with voiceover in Greek (blue button) in the experiment.

Within the task, learners had access to the grammar resources through an external link that they could click. Regarding the dictionary, players were instructed to open it on another tab before entering the game, as its consultation mid-game was unfortunately precluded.

In both versions of the tool, each level also had related grammar slides made with Google presentation. The slides were created using standard prescription for inclusive written material

e.g., bigger font, bigger linespacing, Tahoma font, etc. Moreover, words in Greek were recorded by the researcher and added to the slides as audio (Figure 3.9).

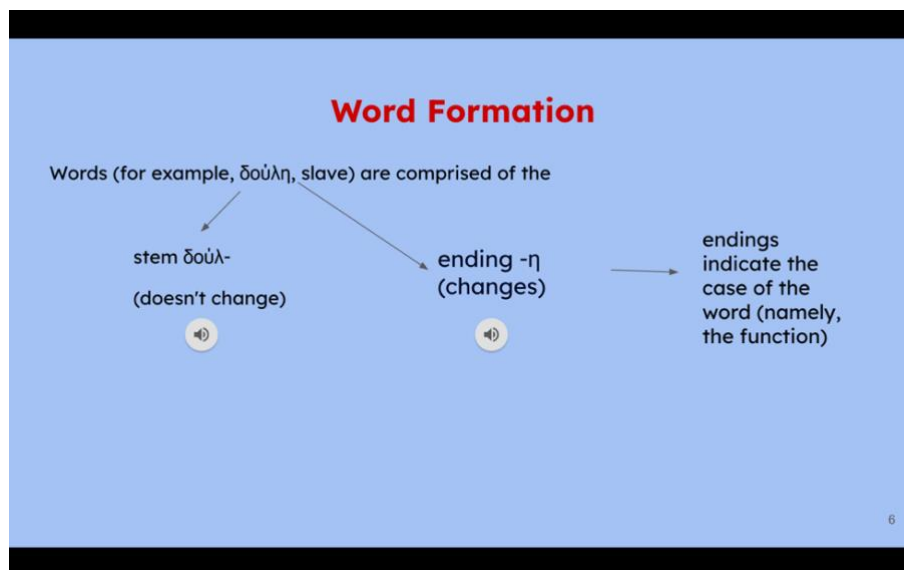


Figure 3.9. Example of page 6 of Level 1's grammar slides with audios.

In the new version, the cultural insights were implemented as interactive videos (with no more separation of audio and text). Moreover, they were integrated in the storyline: the first one as a “bedtime story” within the narrative of the first level, while the other two insights were proposed as information to find clues to solve the mystery (Figure 3.10).

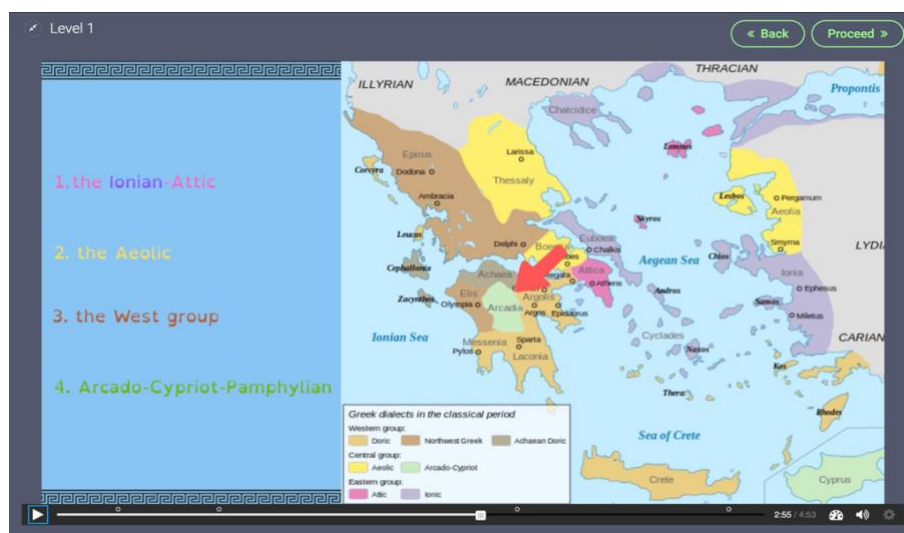


Figure 3.10. Example of the cultural insight as interactive video in the experiment.

The narrative of the first level focused more on the introduction of the characters and their background; on the other hand, the second level asked players to actively solve the mystery by collecting clues and reporting their findings to Alexander (see Figure 3.11). A final important difference between the two levels was that the first level mainly focused on choosing the difficulty of a task, while the second one also offered the possibility of choosing the order of what one learns.⁴⁹

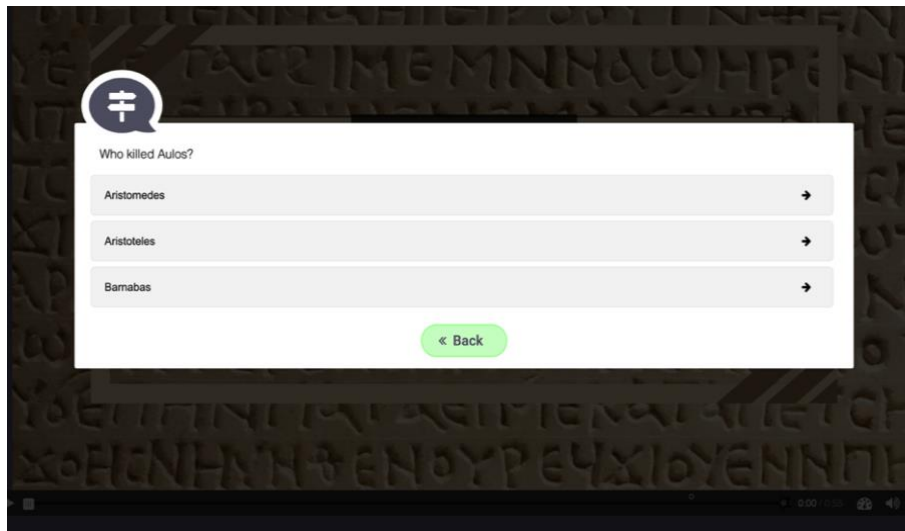


Figure 3.11. Example of the closing section of the mystery in the experiment.

Lastly, the structure of the dictionary was improved by the addition of a “controller” and other visual cues through which learners could better navigate the section (see Figure 3.12).

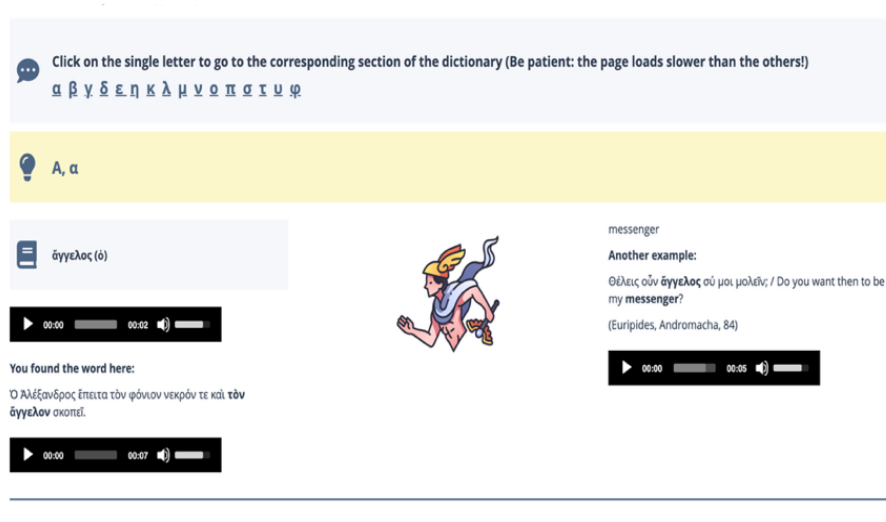


Figure 3.12. Example of the improved dictionary section in the experiment.

⁴⁹ For a detailed description of the differences of levels 1 and 2, see ¶ 4.1.3.

2.4. Methodologies, methods and data analysis

The researcher used one main methodology (i.e., the exploratory case study)⁵⁰ as well as a secondary methodology (i.e., internet survey for Survey A). She used three different methods of data collection: quasi-experiment, questionnaires, and interviews.

Surveys “gather data at a particular point in time with the intention of describing the nature of the existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events.”⁵¹ Thus, surveys are particularly useful when one wants to scan a great number of issues, people, programs etc. in order to describe them. However, caution must be taken, especially regarding sampling: in Survey A for example, the researcher had a non-probability volunteer sampling, therefore a type of sampling comprised of only volunteers. She was consequently very cautious regarding generalizability as “volunteers may be well intentioned, but they do not necessarily represent the wider population, and this has to be made clear.”⁵² Moreover, as mentioned in Chapter 2 (¶ 2), due to the sample’s nature, the nationalities and age groups of respondents were not equally distributed, as the majority of the 331 respondents were Italians (224) in the 20-30 years old age group (123).

The internet survey was piloted with a small sample of colleagues and friends, before being administered to the real sample.⁵³ As previously described in Chapter 2, it aimed at gathering general data from learners and non-learners of ancient Greek regarding their interest, perceptions, ideas, and feelings towards ancient Greek and DGBL for ancient Greek. It was therefore mainly qualitative. This methodology was selected because of the geographical distance between researcher and researched; the reduced costs presented, the increased speed and volume allowed, and the overall ease of administration motivated this choice. Google Forms was selected as the main tool to conduct the survey. To create this tool, the researcher followed the guidelines by Cohen, Manion, and Morrison.⁵⁴ No claims for generalizability nor

⁵⁰ Due to case studies’ characteristics, the researcher is aware of the limitations of the following experimental results, namely their non-generalizable nature, their susceptibility to observer bias and therefore the increased difficulty of guaranteeing cross-checking, reliability and validity, and the minimal control over extraneous variables, thus the difficulty at drawing cause and effect conclusions.

⁵¹ Cohen et al., *Research Methods in Education*, 334.

⁵² Cohen et al., *Research Methods in Education*, 222.

⁵³ For a detailed description of the internet survey and its findings, see Chapter 2 ¶ 1.1.

⁵⁴ Cohen et al., *Research Methods in Education*, 364.

representativeness of the wider population were possible, and therefore data analysis is descriptive.

The entire process of testing the tool has been called “experiment” throughout the different chapters, as the structure of the testing emulated the structure of quasi-experiments in the form of pre-experimental design “one-group pre-test – post-test.”⁵⁵ hence, the researcher administered a pre-questionnaire (O₁),⁵⁶ then the experimental tool (X), and afterwards the mid-questionnaire (O₂). She subsequently used experimented the tool again (X), and finally she administered the post-questionnaire (O₃) and conducted the interviews (O₄).⁵⁷ However, it is important to highlight that, given the type of available sample (non-probability convenience sample), the impossibility of isolating, controlling or manipulating extraneous variables, and the generally qualitative nature of the research, the experiment makes no claims at demonstrating causality or at generalization. Thus, this design was simply used as tool to qualitatively describe the results of the non-probability convenience sample.



Figure 3.13. Experiment timeline.

The pre-, mid- and post-questionnaires of the experiment were structured with some open questions and mainly closed questions. The researcher structured the questionnaires using validated scales to measure intrinsic motivation and perceived usefulness, namely the subscales “Interest/Enjoyment” and “Value/Usefulness” from the Intrinsic Motivation Inventory (IMI), which is a “multidimensional measurement device intended to assess participants’ subjective

⁵⁵ Pre-experimental design indicates quasi-experiments where there is little or even no control over extraneous variables, see Cohen et al., *Research Methods in Education*, 407. The structure of this design: O₁ X O₂.

⁵⁶ O stands for “observation or measurement,” X for “exposure of a group to an experimental variable or event, the effects of which are to be measured,” see Cohen et al., *Research Methods in Education*, 402.

⁵⁷ The pre-experiment had the following structure: O₁ X O₂ O₃. On the other hand, the experiment’s structure added a mid-questionnaire and divided the intervention into two sessions: O₁ X O₂ X O₃ O₄

experience related to a target activity in laboratory experiments.”⁵⁸ The IMI subscales aim at assessing intrinsic motivation and perception of usefulness during the activity. Due to the novelty of this case study and the goals of the investigation, the researcher self-constructed the other closed questions for the measurement of the investigated features, following the structure of the aforementioned IMI subscales. The questionnaires were piloted with a small sample of colleagues before being administered to the real sample. However, for further research, validated questionnaires for the measurement of these features are pivotal.

The questionnaires presented mostly rating scales, some open-ended questions in the form of sentence-completion, and some multiple-choice questions. Since the researcher wanted participants to give a score to variables (items),⁵⁹ she opted for rating scales. She opted for this approach rather than presenting dichotomous questions because the former are particularly useful for “tapping attitudes, perceptions and opinions.”⁶⁰ However, even though they are more sensitive than dichotomous scales, rating scales are still quite strict and fixed as they “force” respondents to choose from given choices. To counteract this, the researcher included some open questions as well.

In the pre-experiment, rating scales were offered as 5-items (strongly disagree/disagree/neutral/agree/strongly agree) or as numeric scales of 0 to 10 ranging from strongly disagree and strongly agree. However, after having perfected the tools, in the experiment, the researcher included the IMI subscales which are structured as 7 items, ranging from “not at all true” to “very true.” In order to guarantee more cohesion across the different questionnaires, in the experiment, the researcher therefore limited the options to only 7-items rating scales (strongly disagree, disagree, somewhat disagree, neither agree nor disagree, somewhat agree, agree, strongly agree), avoiding the numeric scales 0-10.

To analyze data from rating scales, some cautionary factors were considered:⁶¹

1. Equal intervals: “there is no assumption of equal intervals between the categories, hence a rating of 4 indicates neither that is twice as powerful as 2 nor that is twice as strongly felt; one cannot infer that the intensity of feeling in the Likert scale between ‘strongly agree’ and ‘agree’ somehow matches the intensity of feeling between ‘strongly disagree’ and ‘disagree’. There are illegitimate inferences.”⁶²

⁵⁸ “Intrinsic Motivation Inventory (IMI),” *Center for Self-Determination Theory*, accessed October 29, 2025, <https://selfdeterminationtheory.org/intrinsic-motivation-inventory/>.

⁵⁹ Cohen et al., *Research Methods in Education*, 485.

⁶⁰ Cohen et al., *Research Methods in Education*, 485.

⁶¹ Cohen et al., *Research Methods in Education*, 481–85.

⁶² Cohen et al., *Research Methods in Education*, 481.

2. The meaning of numbers or words: for example, one person could consider 7 out of 10 a high score, while another person would consider it moderate. Similarly, one person could perceive “good” as a middle descriptor, while another one as a positive one.
3. Unrealistic choices: some rating scales are unbalanced i.e., lacking a neutral midpoint; therefore, participants are forced to make unrealistic choices. This is why the researcher always created rating scales with equal quantities of positive and negative descriptors as well as a neutral option.
4. Layout effects: participants are biased towards the left-hand side of a bipolar scale, therefore ratings that have positive descriptors on the left-side and negative ones on the right-side will have different results as others that have negative descriptors on the left-side and positive ones on the right-side. To avoid that, it is advisable to mix the direction of positive and negative descriptors. The researcher however decided to stick to just one direction for all questions (i.e., negative descriptors on the left-side, positive ones on the right-side) to minimize confusion.
5. Direction of comparison: within a comparison, the order of the two items makes a difference to results. For example, the first item of a comparison seems to be more selected than the second one.⁶³
6. Truthfulness of responses: no one can be sure that participants are telling the truth.
7. Inadequate categories: participants may want to add comments or tell why they chose that specific descriptor; however, the rating scales do not allow that.
8. Number of scale points: extreme poles of a rating scale (e.g., 0 or 10) are usually avoided. Therefore, for fine-grained responses it is preferable to choose larger rather than smaller scales in order to still leave a reasonable number of points to choose from.
9. Labelling scale points: rating scales with verbal label for each point are “more reliable than rating scales that provide labels only for the end-points of the numerical scales.”⁶⁴ Unfortunately, due to the structure of Google Forms, it was possible to label only the endpoints of the scales.
10. Ratio data: to use ratio data, rating scales should use an eleven-point scale from 0 (lowest score) to 10 (highest score).

⁶³ Cohen et al., *Research Methods in Education*, 482.

⁶⁴ Cohen et al., *Research Methods in Education*, 483.

11. End-point descriptors: the end-point descriptors influence responses: extreme descriptors such as “terrible” or “marvelous” are usually avoided in opposition to “very bad” or “very good.”
12. Number, nature and order of scale points: the nature of the scale influences responses.
13. Terminology of response categories: terms and how they are used may influence responses, especially if phrasing is ambiguous or vague.
14. Clustering of responses: participants tend to cluster their responses in a particular section (e.g., at one or the other end or in the middle). Therefore, their responses to one particular item may influence other responses.
15. Forced choices: choices may be “forced” by omitting neutral categories (e.g., no opinion, neutral, etc.). This is generally considered unacceptable as it forces participants to give an opinion on a topic they may have no real opinion about.
16. Mid-points: participants tend to choose the middle section of a scale. To avoid that, one could use an even-numbered scale, however researchers suggest keeping the mid-points in order to increase reliability and validity.

For the interviews, the researcher used standardized open-ended interviews, in which all interviews consisted of a set of fixed, identically-worded questions.⁶⁵ The interviews and the transcription criteria used are described in depth in ¶ 3.

The following results have been qualitatively analyzed. As Cohen, Manion, and Morrison state, “qualitative data analysis is often heavy on interpretation, and there are often multiple interpretations to be made of qualitative data – that is their glory and their headache!”⁶⁶ Thus with that in mind, the researcher focused on avoiding indefensibly privileging one interpretation over another and she tried gaining multiple perspectives on the same phenomenon. The qualitative data derive from two main sources (transcribed interviews and questionnaires).

With the principle of *fitness for purpose* – typical of qualitative research – the researcher decided to use data to explore, describe, and discover patterns and generate themes on the research topics. This is why she opted for thick descriptions⁶⁷ of groups (class), smaller groups,

⁶⁵ Cohen et al., *Research Methods in Education*, 510.

⁶⁶ Cohen et al., *Research Methods in Education*, 643.

⁶⁷ “In short, anthropological writings are themselves interpretations, and second and third order ones to boot. (By definition, only a ‘native’ makes first order ones: it’s his culture.) They are, thus, fictions; fictions, in the sense that they are ‘something made,’ ‘something fashioned’— the original meaning of *fictiō* — not that they are false, unfactual, or merely ‘as if’ thought experiments,” see Clifford Geertz, “Thick Description: Toward an Interpretative Theory of Culture,” in *The Interpretation of Cultures. Selected Essays*, 3rd ed., ed. Clifford Geertz (Basic Books, 1973), 24.

and individuals.⁶⁸ The researcher analyzed data through pre-fixed categories deriving from the research questions (e.g., vocabulary, DGBL, etc.) and also, through a hermeneutic process and coding of the raw data, the researcher found out new categories of analysis (e.g., difficulty, game features, etc.). She used verbatim data.

She presented data through tables, summaries, by groups and by individuals, and also by issues or themes. She used the methodology analytic induction.⁶⁹

2.4.1. Experimental questionnaires: structure

The researcher structured three questionnaires to investigate the research questions during the experiment. All three questionnaires had a first section regarding privacy and data policy with which participants had to agree in order to proceed.

Through its second section, the pre-questionnaire collected personal data such as age, gender, nationality, first language, information regarding how long they have been learning Greek, and availability to be interviewed after the end of the experiment. The third section focused on participants' perceptions regarding the motivating potential of specific DGBL and UDL features according to their experience up until the commencement of the experiment and a personal assessment of how motivated they felt towards learning Greek in relation to their past learning experience (a 7-points scale from Strongly Unmotivated to Strongly Motivated). Those features that were not considered "common practice" in standard Greek class (e.g., being able to make narrative choices) were here investigated by asking participants to imagine alternative new ways of learning ancient Greek and give their evaluation on how motivating they could be according to their opinion. Moreover, this section further asked participants to state their expectations for the "adventure" through an open question, and to choose between different options what might hinder them in successfully working with the material.

In the fourth section, other features of DGBL and UDL were investigated for their potential use in aiding students to remember meanings of ancient Greek words or to deduce meanings of unknown Greek words, according to their learning experience up until the commencement of the experiment.

⁶⁸ Geertz, "Thick Description," 12–38.

⁶⁹ (a) data are scanned to generate categories of phenomena; (b) relationships between these categories are sought; (c) working typologies and summaries are written on the basis of the data examined; (d) these are then refined by subsequent cases and analysis; (e) negative and discrepant cases are deliberately sought to modify, enlarge or restrict the original explanation/theory. See Cohen et al., *Research Methods in Education*, 666.

The fifth section investigated respondents' preconceptions regarding learning Greek culture and its motivating potential. Lastly, the sixth section focused on a screening of SEN students. The researcher modelled this section using the document "Secondary School Dyslexia Checklist," a tool created by the British Dyslexia Association. In this checklist, the Association points out that if the respondent has more than ten ticks in the 'mostly like me' and 'very much like me' boxes, they may want to consider getting a diagnostic assessment for dyslexia. In the questionnaire, participants were asked to check in the checklists only those features with which they agreed or strongly agreed. Therefore, just as the checklist implied, this section represented a rough guide to indicate the possibility that someone might need to speak with specialists, though it made no claims at medical nor professional diagnosis, as the researcher is aware of the complexity of the multifactorial SEN diagnostic process. The section thus had a merely descriptive goal, which did not represent in any way an attempt at diagnosing SEN students.

The mid-questionnaire was shorter in comparison to the other two and aimed at screening immediately after the first level whether participants had experienced intrinsic motivation while playing and how they found the experience of making narrative choices. To measure the intrinsic motivation, the IMI subscale "Interest/Enjoyment" was used. Both a scale as well as an open question regarding their experience with making narrative choices were presented, along with an open question for free comments and an assessment of how motivated they felt towards learning Greek after the first level (on a 7-point scale from Strongly Unmotivated to Strongly Motivated).

The post-questionnaire was structured similarly to the pre-questionnaire, with some differences. In comparison, the post-questionnaire did not include the second and fifth sections of the pre-questionnaire. The second section of the post-questionnaire measured intrinsic motivation through the IMI subscale, as in the mid-questionnaire, as well as through an assessment of how motivated they felt towards learning Greek after the entire experience (on a 7-point scale from Strongly Unmotivated to Strongly Motivated). The third section measured the motivating potential of DGBL and UDL features after the experience, while the fourth dealt with the perceived usefulness of other features for remembering meanings of ancient Greek words or for deducing the meanings of unknown Greek words. The fifth section focused on culture and its motivating potential through the same questions of the pre-questionnaire and an open question for free comments. The last section focused on the perceived usefulness of the experience (measured through the IMI subscale for value and usefulness) and open questions asking respondents to describe the positive and negative aspects of the experience as well as to

suggest improvements. Finally, it asked participants where and how they would envision using this tool and whether they foresaw anything that could potentially hinder them in successfully working with the material.

2.5. Reflexivity, validity and reliability

Reflexivity is a key concept of qualitative research as it represents researchers' actions of looking at themselves and their "positionality" within the research process:⁷⁰ thus, the researcher, being part of the researched world, was aware that she was bringing to it her own biography, hence her own values, thoughts, ideas, cultures, gender, etc. Qualitative research is not a neutral activity, and nor are researchers and researched neutral identities,⁷¹ thus researcher bias here plays a pivotal role. As completely eliminating personal bias is impossible due to the researcher's own participation in the researched world, throughout her investigation she focused on efforts to "consciously and deliberately acknowledge, interrogate and disclose"⁷² her own self, aiming at understanding her part in, and influence on, her research.

On the other hand, validity is a broad notion which indicates to what extent a certain claim made by the researcher is valid according to theories and evidence. This means that "a piece of research is valid if the warrants that underpin it are defensible and, thereby, if the conclusions drawn and the explanations given can stand their ground in the face of rival conclusion and explanations."⁷³ Especially in qualitative research, where phenomena can be abstract, unclearly or indirectly observable (e.g., motivation, intelligence, anxiety, etc.) it is fundamental to analyze the meaning of validity and the methods used to assure it.

Validity can be divided into many different categories. It is however important to point out that "it is impossible for research to be 100 per cent valid [...] validity should be seen as a matter of degree rather than as an absolute state."⁷⁴ In this case study, the researcher focused on three main aspects of validity, as suggested by Yin: internal, construct, and external.⁷⁵

Internal validity "seeks to demonstrate that the explanation of a particular event, issue or set of data which a piece of research provides can actually be sustained by the data and the research"⁷⁶ and refers to "inferred and found relationships between elements of the research

⁷⁰ Cohen et al., *Research Methods in Education*, 302.

⁷¹ Cohen et al., *Research Methods in Education*, 302.

⁷² Cohen et al., *Research Methods in Education*, 303.

⁷³ Cohen et al., *Research Methods in Education*, 245.

⁷⁴ Cohen et al., *Research Methods in Education*, 246.

⁷⁵ Yin, *Case Study Research and Applications*, 42–45.

⁷⁶ Cohen et al., *Research Methods in Education*, 252.

design and outcomes.”⁷⁷ Internal validity in case studies can be addressed by: (a) pattern matching, where “a predicted pattern (a theoretical pattern) in the data is matched to an observed operational pattern and any plausible alternative theories are removed;”⁷⁸ or (b) “building explanations and considering rival, alternative explanations, and using logic models where the dependent variable at one stage becomes the independent variable in the next stage of the causal research in a time sequence and in which predicted and observed events are compared.”⁷⁹ However, due to the explanatory nature of this case study, data analysis is here not concerned with casual explanations,⁸⁰ but rather with an exploratory description of these themes. Possible casual explanations might be given during the analysis, but they are simply possible interpretations drawn from the combination of different data. Therefore, in this case study, internal validity has been addressed by matching patterns of results, by ensuring that findings and interpretations derive from the data transparently, by showing *possible* causal explanations based on evidence, and by showing that rival explanations and inferences have been considered but found less acceptable than the main explanation made.⁸¹

Construct validity refers to the “inferences made about the nature and manifestations of theoretical factors.”⁸² This type of validity focuses on the constructs or explanations instead of on the methodological factors. Construct refers to an abstract that derives from theory, e.g., intelligence, motivation, interest, etc. In order to establish construct validity, the researcher focused on assuring that her construction of issues (e.g., motivation), as well as used proxies and indicators were warranted and in-line with other theories on the same topic.⁸³ To do so, she not only confirmed the construction through valid and relevant literature, but also through the examination of counter-examples that could undermine the construction itself.⁸⁴ Furthermore, to address construct validity in her case study, following Yin, the researcher used:⁸⁵ (a) multiple sources of evidence, and (b) a chain of evidence, which refers to the action of allowing “the reader of the case study to follow the derivation of any evidence from initial research questions to ultimate case study findings;”⁸⁶

⁷⁷ Cohen et al., *Research Methods in Education*, 246.

⁷⁸ Cohen et al., *Research Methods in Education*, 284.

⁷⁹ Cohen et al., *Research Methods in Education*, 284.

⁸⁰ Yin, *Case Study Research and Applications*, 44.

⁸¹ Cohen et al., *Research Methods in Education*, 381.

⁸² Cohen et al., *Research Methods in Education*, 246.

⁸³ Cohen et al., *Research Methods in Education*, 256.

⁸⁴ Cohen et al., *Research Methods in Education*, 256.

⁸⁵ Yin, *Case Study Research and Applications*, 42–43.

⁸⁶ Yin, *Case Study Research and Applications*, 134.

External validity indicates to what degree one can generalize found data to the wider population, i.e., the transferability of findings.⁸⁷ This type of validity faces many threats and challenges. Due to case studies' nature, external validity, hence also generalizability, can be limited or even absent. Given that this research is a case study of a small non-probability convenience sample, results here have no claims at generalization.

Moreover, for this case study, another type of validity seems relevant: cultural validity. Cultural validity is strictly connected to cross-cultural validity⁸⁸ and represents the will to create research that it is appropriate to those researched, given that researcher and researched come from different cultures. In order to create the most appropriate research according to different cultures, Cohen, Manion, and Morrison, mentioning Joy's private work,⁸⁹ list twelve questions that the researcher asked herself while attempting to create culturally valid research.⁹⁰ To address cultural validity, the researcher was helped by T1, who is British as well. T1 revised and commented the material before the administration.

To assure a full, rich, and complex analysis of human behavior, triangulation is a technique used in social sciences that uses qualitative and quantitative data at the same time. Cohen, Manion, and Morrison point out that "exclusive reliance on one method [...] may bias or distort the researcher's picture of the particular slice of reality she is investigating. [...] The more the methods contrast with each other, the greater is the researcher's confidence."⁹¹ Triangulation is therefore normally defined by a mixed methods approach and can be divided into different categories. As the researcher decided to carry out qualitative research, she did not use mixed methods. Due to the nature of the study, the researcher could not assure time triangulation –

⁸⁷ Cohen et al., *Research Methods in Education*.

⁸⁸ Cross-cultural validity tries to understand "the extent to which there are similarities and differences between cultures and their members," see Cohen et al., *Research Methods in Education*, 259. In order to demonstrate that it is important to "ensure that appropriate models of cross-cultural features and phenomena are developed, making clear their causal rootedness in cultural variables (rather than, e.g., psychological, economic or personality variables), that these models are operationalized into specific variables that constitute elements of culture, and that these are then tested empirically," see Cohen et al., *Research Methods in Education*, 260.

⁸⁹ G.T. Joy, "A Brief Description of Culturally Valid Knowledge," Sophia Junior College, Hakone-machi, Kanagawa-ken, Japan, 2003, quoted in Cohen et al., *Research Methods in Education*, 264.

⁹⁰ 1) Is the research question understandable and of importance to the target group? 2) Is the researcher the appropriate person to conduct the research? 3) Are the sources of the theories that the research is based on appropriate for the target culture? 4) How do researchers in the target culture deal with the issues related to the research question (including their method and findings)? 5) Are appropriate gatekeepers and informants chosen? 6) Are the research design and research instruments ethical and appropriate according to the standards of the target culture? 7) How do members of the target culture define the salient terms of the research? 8) Are documents and other information translated in a culturally appropriate way? 9) Are the possible results of the research of potential value and benefit to the target culture? 10) Does interpretation of the results include the opinions and views of members of the target culture? 11) Are the results made available to members of the target culture for review and comment? 12) Does the researcher accurately and fairly communicate the results in their cultural context to people who are not members of the target culture? See Cohen et al., *Research Methods in Education*, 264.

⁹¹ Cohen et al., *Research Methods in Education*, 265.

which considers change and process using cross-sectional and longitudinal designs – and space triangulation – which considers change and process in different places and cultures through cross-cultural techniques. However, she used: a) combined levels of triangulation by analyzing both individuals and groups findings; and b) theoretical triangulation by taking into consideration opposite and alternative theories.

Lastly, reliability is “an umbrella term for dependability, consistency and replicability over time, over instruments and over groups of respondents.”⁹² Therefore, research is considered reliable when, if the same research was to be carried out on a similar group of researched in a similar context, the results would be similar. However, qualitative research does not forcefully strive for replication, due to its nature; therefore, reliability has been addressed in this research as “a fit between what researchers record as data and what actually occurs in the natural setting that is being research, i.e. a degree of accuracy and comprehensiveness of coverage.”⁹³ Moreover, reliability has also been addressed by making “as many procedures as explicit as possible.”⁹⁴

2.5.1. Validity and reliability in interviews and questionnaires

Validity and reliability in interviews try to overcome bias such as the tendency to make errors in the same direction (i.e., overstate or understate the value of an element). The researcher was aware that in interviews, researcher bias and interviewer neutrality is almost a chimera, as the interviewer (and the interviewees) inevitably and unconsciously brought to the interviews their personal, experiential, and biographical histories, as well as their culture, religion, gender, social class, and age.⁹⁵ However, to address reliability, the researcher created a highly structured interview process, with the same structure, words, and format for every interviewee, as well as trying to carefully pilot the interview schedules.⁹⁶ She took care to avoid leading questions, namely questions that make assumptions about the interviewees by phrasing towards a certain response (e.g., “how satisfied are you with x?” which already assumes a degree of satisfaction, compared to a more neutral e.g., “what is your opinion of x?”), thus she avoided them to the best of her ability. Moreover, in order to assure reliability and reduce bias, the researcher carefully worded all questions to prioritize clarity.

⁹² Cohen et al., *Research Methods in Education*, 268.

⁹³ Cohen et al., *Research Methods in Education*, 270.

⁹⁴ Yin, *Case Study Research and Applications*, 46.

⁹⁵ Cohen et al., *Research Methods in Education*, 272.

⁹⁶ Cohen et al., *Research Methods in Education*, 273.

Although questionnaires tend to be more reliable compared to interviews given their anonymity, and are further more economical in terms of time and financial costs involved, the researcher was aware that they can still face some reliability and validity threats (e.g., the fact that the same questions could have different meanings for different respondents; or that if only closed items are used then the questionnaire could lack coverage and authenticity but if only open items are used then respondents could not be willing to answer). Hence, to address validity and reliability in questionnaires, the researcher piloted, revised, and improved the questionnaires many times before administering them, while incorporating feedback from the collaboration of several fellow academics as well as linguistic revisions made by two native English speakers.

3. Results: intrinsic motivation and usefulness

In the following sections, the results of the experiment are analyzed in light of the research questions (RQs). The results are divided in two macro-sections: 1) intrinsic motivation and usefulness; and 2) DGBL and UDL features.

As a reminder, the *experimental participants* are indicated by the letter E followed by a number (e.g. E1, E2, etc.); *pre-experimental respondents* are indicated by the letter P and a number, e.g. P1, P2, etc.; *involved teachers* are indicated by the letter T and a number. T1 and T2 are the teachers of the pre-experiment, while T3 of the experiment. Lastly, given the researcher led the interviews, her comments and interactions during the interviews are reported through the letter I (i.e., interviewer).

Data from the interviews played a crucial role in the analysis. The researcher opted for standardized open-ended interviews in which interviewees were presented with a pre-determined set of questions, the exact wording of which was fixed for all interviewees.⁹⁷ This type of interview was chosen to prevent, insofar as possible, interviewer's bias, as well as to increase comparability of responses. Due to the constraints of this interview type, namely its limited flexibility which might limit naturalness of responses, the interviewer in some cases had to rephrase questions in order to clarify their meaning for some young respondents, therefore she used so-called prompts i.e., phrases that "enable the interviewer to clarify topics or questions, particularly if the interviewee seems not to have understood, or to have misunderstood."⁹⁸ She also used probes i.e., phrases that "enable the interviewer to ask respondents to extend, elaborate, add to, exemplify, provide detail for, clarify or qualify their response."⁹⁹ Some were anticipated probes (i.e., pre-scripted probes as follow-up to an initial question), and others were spontaneous (i.e., not pre-scripted but rather decided on the spot).¹⁰⁰

The interviews were devised bearing in mind Arksey and Knights' suggestions,¹⁰¹ namely that vocabulary should be kept as simple, clear and straightforward as possible to avoid ambiguity and imprecision. The researcher also had T1 an English native speaker revise the

⁹⁷ Cohen et al., *Research Methods in Education*, 510.

⁹⁸ Cohen et al., *Research Methods in Education*, 513.

⁹⁹ Cohen et al., *Research Methods in Education*, 514.

¹⁰⁰ Cohen et al., *Research Methods in Education*, 514.

¹⁰¹ Hilary Arksey and Peter T. Knight, *Interviewing for Social Scientists* (Sage, 1999), 93–5.

questions in advance to ensure maximal comprehensibility for English native speaker respondents. The questions were mostly descriptive and experiential questions.¹⁰²

The pre-experimental interviews took place online via Google Meet on two different days, on the 10th and the 17th of October 2024. The interviewees (6) were at school at the time and were interviewed during their lunch break. The interviewer and the interviewee could not see each other, given that the teachers suggested turning off the video to prevent privacy problems, therefore the interviews took place only through audio. As the respondents were minors and under the supervision of their teachers, both teachers preferred to be present during the interviews. T1 was present for the female respondents' interviews and T2 for the male respondents'. Even though experts suggest avoiding the presence of teachers during the interviews in order to not interfere with or otherwise influence the answers of interviewees,¹⁰³ the researcher decided to accommodate the school's requests.

On the other hand, experimental interviews took place online on the 12th and 13th of June 2025 in a breakout room on Google Meet. This time, interviewees (4) could decide whether to switch the camera off or on, according to their preference. Moreover, the involved teacher (T3) was not present during the actual interviews as she remained on the main call as support, if the involved interviewee were to need help.

All pre- and experimental interviews were recorded (only audio) for transcription goals with full consent from schools, teachers, parents, and respondents. All pupils' and T2's interviews lasted between 7 and 13 minutes; T1's interview lasted up to 20 minutes; and T3 up to 45.

The interviews' transcription criteria follow some aspects of the adaptation of *SLX Corpus of Classic Sociolinguistic Interviews*,¹⁰⁴ developed by the Department of Linguistic at the University of Pennsylvania and available online.¹⁰⁵ The researcher however found it necessary to make some minor changes for research purposes.¹⁰⁶

¹⁰² Cohen et al., *Research Methods in Education*, 515.

¹⁰³ Cohen et al., *Research Methods in Education*, 530.

¹⁰⁴ Stephanie Strassel et al., "SLX Corpus of Classic Sociolinguistic Interviews," *Linguistic Data Consortium*, September 30, 2003.

¹⁰⁵ https://www.ling.upenn.edu/~wlabov/L560/Transcription_guidelines_FAAV.pdf, accessed October 18, 2025.

¹⁰⁶ The following presents a small legenda of used criteria from the SLX Corpus as well as several additional criteria added by the researcher: 1) Partial words have been transcribed with a single dash (-) without preceding space to indicate point at which word was broken off, e.g. "it's *helpful* developing like different eh different skill-skills;" 2) Double dash surrounded by spaces has been used to indicate when speaker restarted, e.g., "I watched the video a couple of times and I -- I couldn't really..." 3) When a section of speech was difficult or impossible to understand, researcher used double parentheses (()) to mark the region of difficulty, e.g., "I just really loved it (()) while I was playing it." If it had been possible to make a guess about speaker's words, researcher has transcribed what she thought she heard and surrounded the stretch of uncertain transcription with double parentheses, e.g., "Add an ((air)) of *competitiveness* to it." 4) Silences, external noises, interruptions, etc. have been transcribed with

3.1. Intrinsic motivation: overview

RQ1: Does a DGBL environment, built upon an inclusive pedagogical framework (UDL) influence intrinsic motivation to learn the ancient Greek language? If so, how?

Before the experiment, participants (11) were already motivated. The majority of respondents answered within the range of positive motivation (e.g., 1 “Somewhat Motivated,” 5 “Motivated,” and 2 “Strongly Motivated”), two participants defined themselves “Neither Motivated nor Unmotivated,” while 1 was “Somewhat Unmotivated.” Concerning the type of motivation, the majority showed an intrinsic motivation, with others displaying extrinsic,¹⁰⁷ which resonates with results of the pre-experiment.

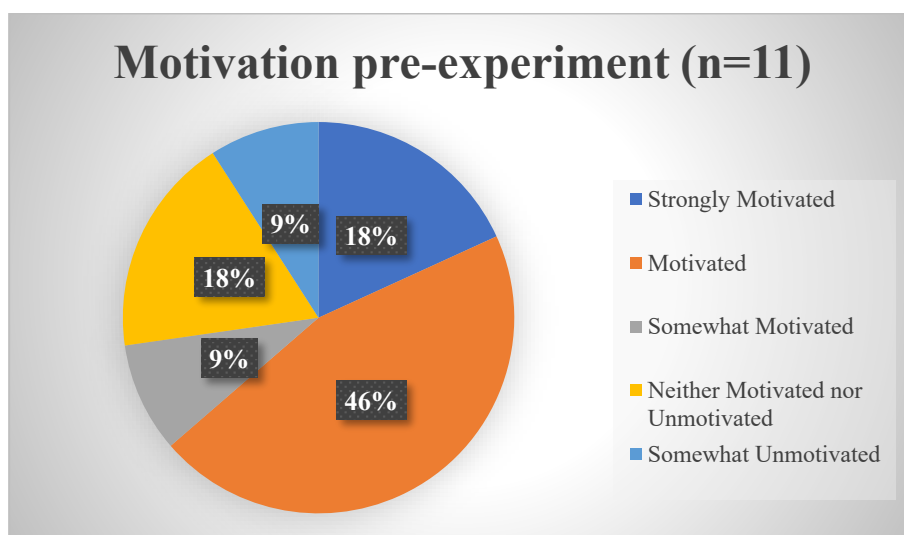


Figure 3.14. Motivation of 11 participants, pre-experiment.

After the first level, participants showed a high intrinsic motivation. On the IMI scale rating from 1 being the minimum to 7 the maximum, the average of the 9 participants¹⁰⁸ that answered

[], e.g. “[teacher comments something inaudible in the background] Yeah, yeah [interrupts teacher].” 5) Emphasized words while speaking have been transcribed with cursive e.g., “I’d *absolutely* play it again.” 6) Filled pauses and hesitations sounds has been restricted to four items: “ah,” “eh,” “uh,” and “um.” 7) Three dots have been used to indicate a small pause within the speaking flow that however was no restart nor repetition, e.g., “It was just like a bit... *hard*... to like piece together things.” 8) Relevant parts of the interviews that the researcher wants to highlight for reasoning’s sake have been bolded, e.g., “Umm ... And maybe in the video I don’t know whether there was but **if there was the grammar note in the video... then you could recall it and then answer.**”¹⁰⁷ The most commonly mentioned intrinsic reasons were the desire to learn a new language, general interest in Classics, and desire to learn Greek after having learnt Latin. The extrinsic reason was that having learnt Greek “would look good on a resume or cv as an extracurricular.”

¹⁰⁸ The mid-questionnaire was not returned by E1 and E2.

lies around 6.05 out of 7.¹⁰⁹ Moreover, to the question “After this first level, how motivated are you to learn ancient Greek?” every participant answered positively (3 “Strongly Motivated,” 5 “Motivated,” 1 “Somewhat Motivated”). On an individual level, four participants showed a positive change in their opinion: in particular, E7 changed her opinion from “Somewhat Unmotivated” to “Somewhat Motivated,” scoring on the IMI scale 5.28 out of 7. Overall, these results suggest that after the first level, participants remained at least as motivated as before, or became more motivated. This seems to imply that the combination of DGBL and UDL had a positive motivating effect on all participants.

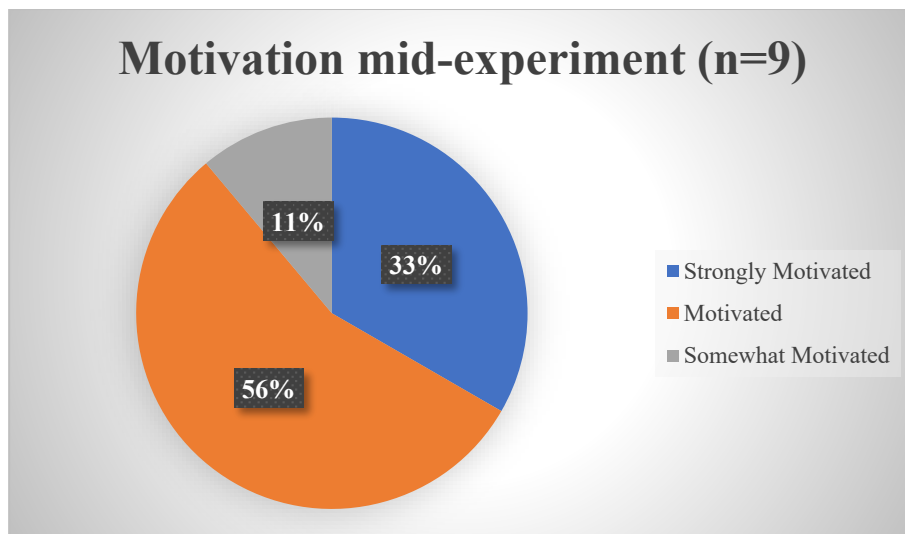


Figure 3.15. Motivation mid-experiment (9 participants)

After the second level, participants showed again high intrinsic motivation, however lower than after the first level. The average of the 8 participants that answered lies around 5.53.¹¹⁰

A consideration is however due. As mentioned, four participants did not complete both mid- and post-questionnaires. Specifically, E2 completed only the pre-questionnaire. E8 and E11, who scored 7 on the IMI scale as average motivation in the mid-questionnaire, did not complete the post-questionnaire. E1 scored 3.28 as average motivation in the post-questionnaire, but did not complete the mid-questionnaire. Given that these three last scores were diametrically opposed, it is therefore understandable that the average between the mid-questionnaire and the post-questionnaire shows a considerable difference. However, by excluding these three participants that did not complete both questionnaires (and not having E2’s score), both

¹⁰⁹ In detail, on the IMI scale participants scored as follows. E3: 6; E4: 5.71; E5: 6.42; E6: 6.42; E7: 5.28; E8: 7; E9: 6.42; E10: 4.28; E11: 7.

¹¹⁰ The post-questionnaire was not returned by E2, E8 and E11.

averages for intrinsic motivation mid-experiment and post-experiment lies exactly around 5.8 out of 7 for the remaining seven participants. This observation seems to confirm the validity of data.

A closer look at the data yields other interesting observations. Among the seven participants that completed both mid- and post-questionnaires, only two scored lower in the IMI scale of the post-questionnaire than in the mid-questionnaire.¹¹¹ Conversely, the other four participants showed a higher score on the IMI scale in the post-questionnaire, while a fifth scored the same in both questionnaires.¹¹² Therefore, it seems that the intrinsic motivation stayed consistent or increased during both levels for most participants, suggesting a positive influence of an inclusive DGBL environment for intrinsic motivation in the study of ancient Greek.

These assumptions seem to be corroborated by the change in the answers to “how motivated are you?” Before the experiment, the answers among the seven analyzed respondents were more variegated, including also a “Neither Motivated nor Unmotivated” and a “Somewhat Unmotivated.”

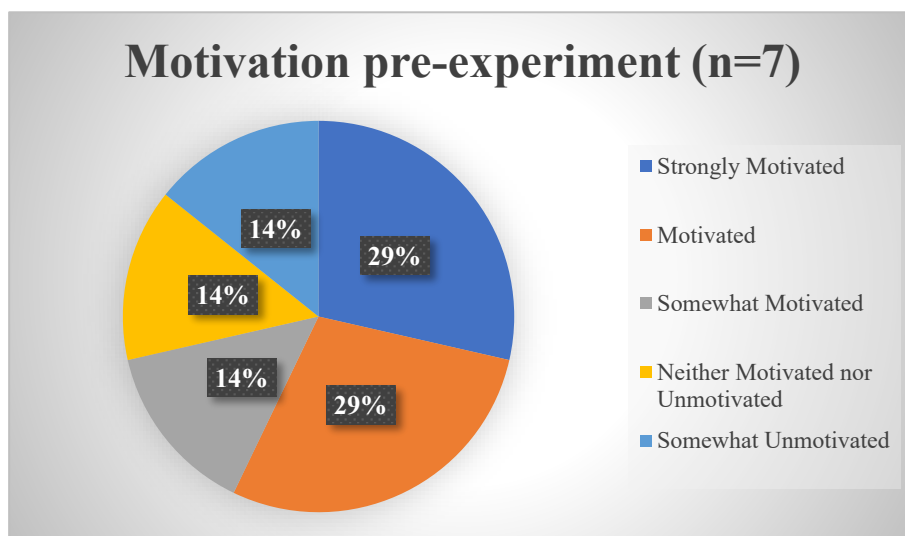


Figure 3.16. Motivation pre-experiment (7 participants).

After the first level, all seven participants were mostly motivated or strongly motivated and remained so after the second level (the only exception is represented by E7 and will be later discussed in detail).

¹¹¹ E6 scores 6.42 in the mid-questionnaire and 6 in the post-questionnaire, while E7 scored 5.28 and 4. E7's case will be later discussed in detail.

¹¹² The mid-questionnaire score is shown first, followed by the post-questionnaire. E3: 6 – 6; E4 5.71 – 6.85; E5: 6.42 – 6.57; E6: 6.42 – 7; E10: 4.28 – 4.57.

In conclusion, from a general perspective, a DGBL environment built upon a framework for inclusivity seems to have a positive influence on intrinsic motivation for the study of ancient Greek, as it can help keep already motivated learners motivated or help further motivate the less motivated ones.

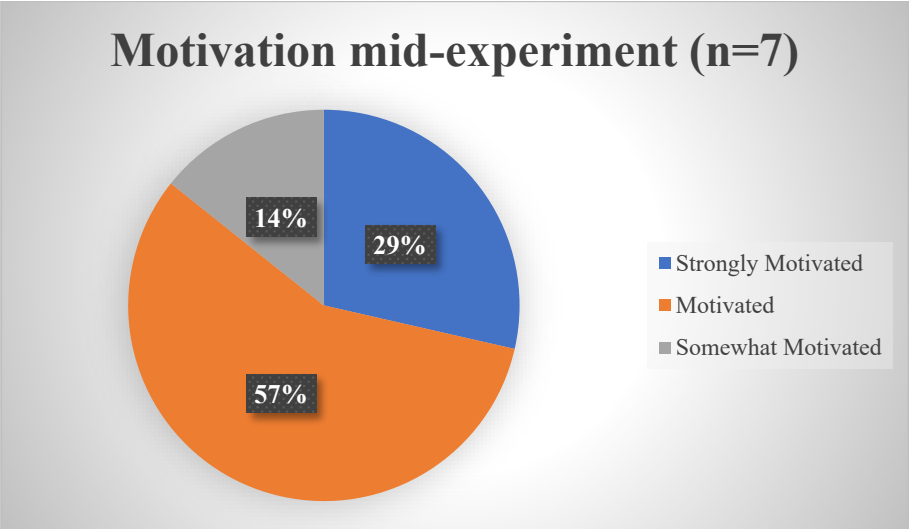


Figure 3.17. Motivation mid-experiment (7 participants).

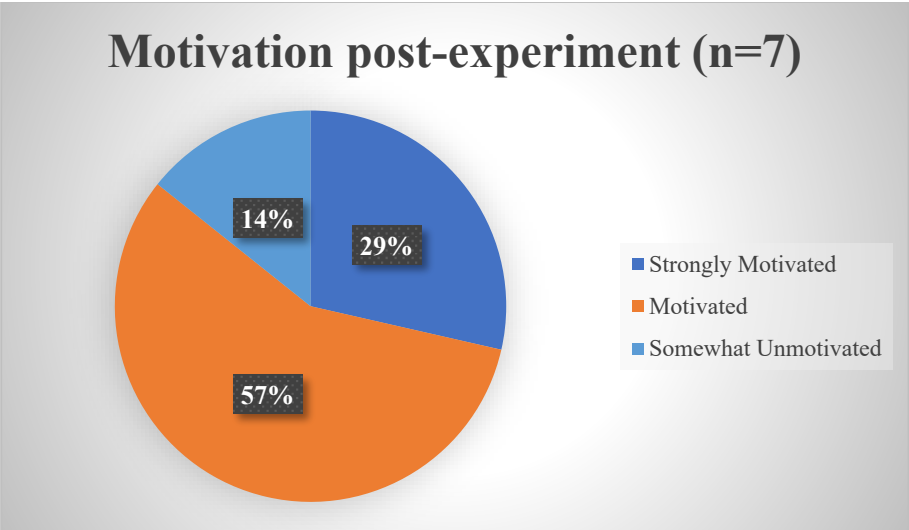


Figure 3.18. Motivation post-experiment (7 participants).

3.1.1. Intrinsic motivation: learning resilience and player-learner categories

The following analyzes three tendencies that the researcher observed in player-learners' motivational behaviors. In order to do so, it is necessary to first introduce the notion of resilience in language learning.

Resilience is a notion used in psychology and the theory of human development¹¹³ and, among other definitions, it can be described as a “dynamic process encompassing positive adaptation within the context of significant adversity.”¹¹⁴ As Shin and Kim point out, the notion of resilience has been introduced in the field of second language learning as a new research area receiving a new adapted meaning:¹¹⁵ resilience in language learning becomes “students' ability to deal effectively with academic setbacks, stress, and study pressure”¹¹⁶ and, in this research case, also to deal with minor or major difficulties encountered within the learning material. Shin and Kim's study conducted on South Korean elementary school English learners showed a positive influence of learning resilience on intrinsic motivation and a negative influence on demotivation.¹¹⁷ In spite of the differences between Shin and Kim's study and this dissertation (e.g., age group, L2, sample, etc.), a similar correlation was also qualitatively observed by the researcher in player-learners' motivational behaviors.

The first type of observed player-learner takes inspiration from Bartle's “explorers” and “achievers” (see Chapter 1 ¶ 3.2) and has been renamed “resilient adventurers.” In this category one can include E3, E5, E6, E9 and E10s' experiences. The precise demarcation between Bartle's “explorers” and “achievers” is not clear here, as most participants showed evidence of both tendencies; thus the researcher decided to describe them as a single overarching category. The characteristics that define this type seem to be the desire to discover and experiment with the mechanics of the game – as in Bartle's “explorers” – while also achieving the main goal, i.e., solving the mystery – as in “achievers.” The adjective “resilient” derives from the persistency with which they kept playing in spite of the encountered difficulties. For example:

¹¹³ Jiwon Shin and Tae-Young Kim, “South Korean Elementary School Students' English Learning Resilience, Motivation, and Demotivation,” *Linguistic Research* 34 (2017): 71, <https://doi.org/10.17250/KHISLI.34..201709.004>.

¹¹⁴ Suniya S. Luthar et al., “The Construct of Resilience: A Critical Evaluation and Guidelines for Future Work,” *Child Development* 71, no. 03 (2000): 543, <https://doi.org/10.1111/1467-8624.00164>.

¹¹⁵ Shin and Kim, “South Korean Elementary,” 72.

¹¹⁶ Andrew Martin, “Motivation and Academic Resilience: Developing a Model for Student Enhancement,” *Australian Journal of Education* 46, no. 01 (2002): 35, <https://doi.org/10.1177/000494410204600104>.

¹¹⁷ Shin and Kim, “South Korean Elementary,” 88.

E3: [The most interesting aspect of the adventure was] I think following a story along and **having that *mystery* aspect of it was really good.**

E3: difficulties were when I had no idea *what* the word *was* and couldn't... I struggled to find it in the dictionary section a bit.

E3: **I really enjoyed it** and I think it's a *good way* to learn new languages.

E5: [The most interesting aspect of the adventure was] the story, for me. **I liked solving the mystery. I liked making decisions.**

E5: [The biggest difficulty was] the actual Greek [...] it was just a lot of words that I didn't know.

E5: I think it was nice that **you got to actually interact with the screen** because I think a lot of other people would have just had you watch the video, so I liked that you got to yeah, *interact* with the screen. And I *did learn* some new words, so that was good. I really liked it.

E6: I think for me it [i.e., the most interesting aspect] was the fact that you could *pick* where you went. It wasn't like... yes there was a set storyline, but **you could make your own decisions, and I feel like that really helped make it interesting for me** with the fact that **you could just sort of go different ways depending on what you did**, so.

E6: [The biggest difficulty was] I think sometimes some of the ((grammar ones)) caught me out a bit, but I think I could be down to the fact that I did join the Greek lessons a bit *later* than most people, so if it was that, it was stuff I hadn't covered (()).

E6: [My experience with the adventure was] all I can say is that it's just *amazing* [laughs]. I really, *really* enjoyed doing it. **I was quite proud when I did manage to solve it.**

Even though this type of player-learner encounters minor or major difficulties while playing, their drive to discover specific aspects of the game (e.g., the development of the story for E5 and E6) or to finish the game helps them stay motivated and keep trying, or it motivates them even more. Examples of this are E5 and E6s' experiences:¹¹⁸ E5 declared herself "Neither Motivated nor Unmotivated" in the pre-experiment. After the first and second levels, in which she scored 6.42 and 6.57 on the IMI scale, she declared herself motivated. On the other hand, E6 was strongly motivated from the beginning and stayed so after both levels. E6's score on the IMI scale improved from 6.42 mid-experiment to 7 post-experiment.

The second type of player-learner is represented by the "non-resilient insecure players." This category includes E1 and P5 from the pre-experiment. The characteristics of this type of player-

¹¹⁸ Another positive example is represented by E10. As E10 did not discover their gender, the researcher will refer to them using the neutral "they." E10 was somewhat motivated in the pre-questionnaire, motivated in the mid-questionnaire (scoring 4.28 on the IMI scale) and strongly motivated in the post-questionnaire (4.57). The incongruity between their statements of being strongly motivated and the relatively average score on the IMI scale requires some observations. From E10's score on the IMI scale for "usefulness" (6), it can be hypothesized that E10 felt themselves motivated by the perception of usefulness of the tool rather than by the perception of fun and enjoyment, on which the IMI scale for intrinsic motivation focused. That is why on the IMI scale for motivation E10 scored lower albeit declaring themselves strongly motivated. From E10's case, it can already be seen how interconnected the notions of "motivation" and "usefulness" were in this tool, as it will also be argued later on in detail.

learner seem to be low self-esteem, low learning resilience, and a need for constant support, even though they show a desire for or interest in the playful experience. These four main characteristics combined seem to cause in players a general, almost immediate paralysis as soon as they encountered the first minor or major difficulty. This can lead them to almost immediately stop playing (e.g., P5) or trying further for a short period of time (e.g., E1), and also to a general decrease in motivation. For example, E1 defined himself as motivated in the pre-questionnaire, and somewhat motivated in the post-questionnaire. Moreover, his score on the IMI scale in the post-questionnaire was the lowest and only negative one of the entire group (3.28). Unfortunately, E1 did not complete the mid-questionnaire which could have potentially explained what demotivated him, especially given that he affirmed in the free comment section that the most interesting aspect of the entire adventure was for him the first level. In the post-questionnaire, E1 answered as follows when asked to describe positive and/or negative aspects of the experience: “it feels very independent, no support if you don’t understand, no difficulty customization.” From this comment, it can be observed that E1 perceived a positive aspect in this experience, namely its feeling “very independent,” while this aspect seemed to prove a double-edged sword given the subsequent criticism.

From his answers in the pre-questionnaire, it seems plausible that E1 suffers from low self-esteem and the independence offered by the game, even though interesting, soon became too much for him (he wrote “no support if you don’t understand,” although the support was present in game as external resources and off game as the researcher was the IT). In the free comments of the pre-questionnaire asking learners about how they learn and how they feel about themselves, E1 wrote “I often doubt myself.” Moreover, he also agreed with the statements “When I start a new activity (e.g., a new sport, a new language), I don’t feel capable,” “When I start a new activity e.g., a new sport, a new language, I don’t think I will succeed at it,” and “When I have to do my homework I get aggressive because doing homework frustrates me.”

These answers seem to confirm the hypothesis regarding E1’s low self-esteem. Moreover, when asked in the post-questionnaire to explain whether something specifically hindered him in successfully working with the material, he selected: “I got bored,” “the game was too difficult,” “I didn’t feel confident in working on my own,” “I got frustrated,” and “I did not try hard enough.” Even though he also attributed the causality¹¹⁹ of his “failure” externally by choosing “the game is too difficult,” the fact that he chose both statements referring to an internal attribution (“I didn’t feel confident in working on my own” and “I did not try hard

¹¹⁹ See Weiner, *An Attributional Theory of Motivation and Emotion* in Chapter 1 ¶ 2.2.

enough”) may corroborate the low self-esteem hypothesis. Unfortunately, E1 did not agree to be interviewed, therefore further data and explanations are not available.

A similar experience can be seen in P5. In the section “About me and how I feel about myself and my competences” of the pre-experimental questionnaire, P5¹²⁰ agreed that when they start a new activity, they do not think they will succeed at it. This information is again suggestive of possible low self-esteem. Similarly to E1, P5 mentioned the lack of support and a general difficulty with the entire experience (“I watched the video and went to the first task, but I – *did not really know* what to learn”).

Therefore, it can be argued that for this type of player-learner, the amount of independence and autonomy offered by a learning game, together with the necessity of overcoming difficulties with offered support, can easily become overwhelming, discouraging them from trying further (E1: “I did not try hard enough”). From these data, it can therefore be inferred that “non-resilient insecure players,” like E1 and P5, tend to be more easily overwhelmed by an “independent” experience, in which support is not omnipresent or “in their face,”¹²¹ and therefore also that this type of player-learner is more easily discouraged and demotivated even when they perceive potential positive aspects – which seems to resonate with Shin and Kim’s result on the negative influence of learning resilience on demotivation. Possible solutions to this problem will be later discussed in ¶ 4.3.5.

A last category is represented by the “easily bored yearners.” In this category one can include E7’s experience as well as many other pre-experiment respondents.¹²²

The chief characteristic of this category seems to be the constant desire for ever more inputs (e.g., Greek mythological stories or ancient culture, more images, crosswords, or match up vocabulary questions, different types of questions) – leading to the name “yearners.” This desire is presumably accompanied by a tendency to get bored (and demotivated) easily, even though they are initially intrigued by the “novelty” represented by the experience. In this specific category, learning resilience seems not to play a particularly important role. An example of this category is E7’s experience.

¹²⁰ Respondent 5 preferred not to disclose their gender. Therefore, the selected pronoun for R5 will be the neutral “they.”

¹²¹ On this topic, see ¶ 4.3.4. and ¶ 4.3.5.

¹²² As the pre-experimental tool was poorer in variety and gaminess than the experimental tool and given that many “desires” from pre-experimental respondents were implemented in the experimental tool, the researcher will take only E7 as major example.

E7 stated in the pre-questionnaire that she was somewhat unmotivated. After the first level, however, she affirmed being somewhat motivated, therefore showing an improvement that resonates with her score on the IMI scale (5.28). However, after the second level her score on the IMI scale dropped to 4 and she declared feeling again somewhat unmotivated: from her comments in the free section of the post-questionnaire and from the interview, it seems possible that her drop in motivation was due to the lack of exercise variety. E7 commented the following regarding the least interesting part of the adventure for her: “Um, maybe the *same* style of questions. It was the um, ‘oh, could you pick this option’ or ‘could you write this in?’ That would probably be the least intriguing part for me.” Once again, in the questionnaire she suggested implementing “different styles of questions” to improve the actual version of the tool. Her mentioning this aspect twice in two different settings, accompanied by her suggesting types of exercises that one could implement to improve the game, may support the relevance of this topic for E7:

E7: there'll be words but there will be two of the exact same words? And they'll be put on different tiles [interviewer says hmhm] and you have to try and find both of them? So it's basically using your memory [interviewer says hmhm] to try and find both of them. So if let's say the word “to run” was in the right corner [interviewer says “yeah”], but (()) “to love” I'd have to put “to love” down and “to run,” but then if in the next round I picked up “to run” and then I remember there was one in the top right corner and I picked them both up then that would show that I remembered what that word was ... and where it was.
[It looks like E7 is suggesting a mechanism similar to the popular boardgame *Memory*]

E7 affirmed that she liked the experience (“I think I find it *much better* than the um ‘can you please fill out this worksheet? Can you do this? Can you do that?’ It's - - it's - - I found a *new* experience and a *good* new experience”), however it also looks like the monotony of the question types (caused by the limitations of the resource “Branching Scenario”) played an important role in her demotivation. This hypothesis seems to be corroborated by the initial positive motivational increase after the first level.

It can be thus hypothesized that E7 initially felt more motivated by the “good new experience” (reflected on her 5.28 on the IMI scale) which she generally liked and she “was happy doing,” as she commented in the interview. However, once she started level 2 and noticed that the types of tasks were similar or identical to the first level, she again lost her motivation and went back to her pre-experimental demotivation. Even though the examples of respondents in this category are limited to one participant, a similar tendency was also seen in the pre-experiment, although the two tools were very different in the amount of variety. Thus, it can be

argued that in order to avoid demotivation in this category, one should increase the variety of tasks as much as possible and further randomize their presentation (e.g., showing task type A in level 1 and then in level 3, using task type B for level 2, etc.).

In conclusion, the researcher observed these three tendencies in player-learners' motivational behaviors both in the pre-experiment and in the experiment. The first category partially resonates with Bartle's player categorization, while the other two seem peculiar of the playing-learning experience. The first two categories are strictly interconnected with the notion of learning resilience, which was introduced earlier in this section. Nevertheless, due to sample sizes, both caution in interpretation and additional research are recommended.

The first and most numerous category, "resilient adventurers," seems to have benefitted most from the combination of DGBL and UDL, which from the data looks to play an important potential role on a motivational level: in spite of the encountered difficulties, the "gameful" and accessible environment pushed this type of player-learner to endure, and either kept them motivated or increased their level of motivation to keep going.

On the other hand, the second category of "non-resilient insecure players," due to their tendency towards low self-esteem and being easily discouraged was not positively influenced by the inclusive DGBL environment, even though they recognized positive aspects in the tool. It is however hypothesized that with the appropriate changes – later discussed – learners in this category could also at least partially benefit from the experience.

Lastly, the third category – the "easily bored yearners" – was shown to have partially benefitted from the positive influence of this approach; however, in order to maximize the potential benefits for this type of player-learner, further research on potential improvements is required.

3.2. Usefulness of the experience to learn ancient Greek

RQ2: Do player-learners perceive a sense of usefulness in an inclusive DGBL environment for learning ancient Greek?

To investigate RQ2, the researcher used the 7-item Value and Usefulness subscale of the IMI. The scale had a minimum of 1 ("not at all true") and a maximum of 7 ("very true"). After the experience, the general perception of value and usefulness of the activity for all eight

participants was 5.65 out of 7. Not considering the two most negative scores (E1: 4.2 and E7: 3.4), the average for the remaining six participants was 6.2.¹²³ Both values suggest a positive perception of usefulness of an inclusive DGBL experience for learning ancient Greek.

Interestingly, although the researcher initially decided to investigate motivating potential and usefulness of the different features and of the entire adventure separately, the data shows that these two notions were often strongly interconnected in participants' perception, as will be later discussed (§ 4.3).

When looking at the free comments or at the interviews, the word “helpful” was used by participants a total of eight times to describe the adventure or a specific component, the structure “it helped with” or equivalents eight times, while “useful” three times. From these comments it is apparent that the adventure was particularly helpful to learn new words despite not knowing many of them or even without noticing it (incidental learning):

E3: I liked it and enjoyed having the story to go along with it and found that **helpful to learn words and remember them.**

E3: [...] It was just *fun* to do and I enjoyed playing it. **It didn't really feel like I was learning and yet I was [...].**

E10: I found it really helpful as I could follow along with the story despite not knowing all of the words, and **I even learnt some throughout the time playing.**

When asked what could improve the usefulness of the actual version of the game to learn ancient Greek, participants mentioned: 1) general platform accessibility¹²⁴ (E5 and E10); 2) more testing of vocabulary¹²⁵ (E1 and E4); 3) more straightforward support¹²⁶ (E3 and E6); 4)

¹²³ In detail, participants scored as follows: E3: 6; E4: 6,2; E5: 7; E6: 7; E9: 5,4; E10: 6.

¹²⁴ This was mentioned by E5 whose biggest difficulty with the adventure was “actually *getting* the things to go into the boxes [laughs]. Because I would - - I would click and then it would work and then after a while it would just stop working and that was a little bit difficult. So it slowed me down a little bit.” E10 said instead: “I think it could be helpful to have (or to have the option) to pause after each sentence [sic] to give a moment to process and translate it, as I found that I needed to pause it a lot but changing the overall speed was mildly frustrating, another option to make the speed feel nicer could be to increase the space in between words when slowing it down rather than making the words themselves take longer to say.”

¹²⁵ E1: vocab being tested repeatedly [sic]; E4: stages to help you remember the meanings before the tests.

¹²⁶ E3: Having the option to get the meaning of a word while doing one of the matching activities if you don't know it (like being able to press on the word and get the meaning as a pop up); Interestingly so, a similar comment was made by a pre-experimental respondent: “a button so when you click it it gives you the definition so if you are stuck on a word, it gives you the definition and you can learn from it and expand your vocabulary.” E6 commented in the interview: “*maybe* if the help pop-ups were a bit more... It wasn't like a separate link thing if it was a bit more in your face, but if you took a certain time struggle, it could say, ‘Hey, you could have this pop-up that could help you,’ but that's the *only* thing I'd say, really.”

different styles of questions (E7); 5) difficulty customization (E1 and E5);¹²⁷ and 6) incrementing the game component (E7).¹²⁸ The last four aspects in particular were also the four main suggestions for improvement received in the pre-experiment. Therefore, even though after the pre-experiment the researcher implemented the suggestions in the new version, further modifications in this direction are still needed to maximize the usefulness of the adventure.

On the other hand, teachers mentioned the need for more straightforward support (T1), difficulty customization (T2), more accessibility and usability (T3), corrective feedback everywhere¹²⁹ (T3), and a check on reading comprehension at the end of each level (T3):

T1: **if you want maximum engagement** with the story you need to make it *quick* and the best way to make it *quick* is that **you don't even have to go to another page to see the meaning of a word.**

T2: either *saying* that they *need* a *certain* level of prior knowledge before being able to play or making it accessible to everyone without prior knowledge by **adding the *easier* stuff beforehand.**

[it is important to mention that T2 is referring to the pre-experimental tool that did not have difficulty customization]

T3: I was just thinking about it in terms of ***accessibility and usability*** in its current format. But I don't know if this is the intended format. Um, if that is helpful at all to think about. But, um, you know, for example, for me, it wasn't always immediately obvious what I was supposed to do: is it a drag and drop or is it a click and click? Do I click something to start something? When do I hit "proceed" and when do I hit "play?" And when do I hit "go to next thing" over here? So, there were often three or four different places, which all seemed *to me* to say "*next*." And I got into the swing of it after messing it up a couple of times, *but* I was wondering if you're student tracking later on, you know, if you've got these accounts and the teachers are able to follow student movements, there may well be a bit of *adjustment* to wh-what - - which one is the "go to the next thing" and which one is the "skip everything and go," you know? Which I accidentally did a couple of times [laughs].

T3: I'm not sure, I personally would know as a student, "well, what standard of Greek am I supposed to be at now? At the end, like, what is my comprehensibility level? I know what *I'm not* supposed to comprehend, but I'm not quite sure *what I am* supposed to comprehend. Is there, you know, is there a **reading check**?" You know, it doesn't need to be huge, but just the words that I've learned, the grammar that I've learned and some kind of, you know,

¹²⁷ E5 commented in her interview: "Maybe if you could have more options of the adventures? That you do? Instead of just with Alexander and stuff. But I know this is like in the *early* stages, so. [I: So you mean like if you could like choose between different stories?] Yeah, like for example, this might be a *difficult* story and then like the *smaller* the mystery, the *easier* the level."

¹²⁸ E7 was the only experimental participant that asked for more "gameful" activities (in comparison to the four of the pre-experiment). E7 said: "Um, maybe it being *more* of a game style? Because right now it's - - it's in the middle of a learning resource I - - I mean, it's going to be a learning resource all the time, but it's *way* more of a learning resource than a game at this point." On the other hand, when asked whether the actual version of the adventure had a good balance between learning and gaming activities, E6, which is a gamer, commented: "I think *it was*! I think it didn't feel like I was having to do *too much* ((in order to)) progress, but I also wasn't sitting there *for ages* like on the story wondering what I ((oh)) would have to do next. So I think it was *definitely* well balanced."

¹²⁹ Due to the platform restraints, corrective feedback could not be implemented in every type of exercise.

summary recap in Greek? Again, like the beginning where it's just, "okay, yeah, no, no, I got that, I understood that. Therefore, I'm doing okay." You know.

In conclusion, from a general perspective, an inclusive DGBL adventure has been perceived as useful by learners and their teachers to learn ancient Greek. Participants mentioned having learnt words without noticing it and having benefitted from the different inputs that were offered (i.e., images, audio, video, text, etc.). In spite of the necessity for further improvements to maximize its usefulness, a DGBL adventure, built upon a framework for inclusivity, was considered by participants as "a *good way* to learn new languages" (E3) and in this case, the ancient Greek language.

4. Results: DGBL and UDL features

The following sections analyze the DGBL and UDL features offered in the adventure. These features are discussed according to their motivating potential and their usefulness for vocabulary competence, in particular for remembering and for deducing/infering meanings of Greek words. The sections are divided as follows: first, the researcher analyzes the features that were investigated only for their motivating potential; afterwards, the features that were investigated only for their usefulness for vocabulary competence; lastly, the features that were analyzed for both their motivating potential and their vocabulary usefulness. In this last section, the researcher further describes those features that were initially created to investigate either motivation or usefulness, but which in one way or another were freely mentioned by participants themselves in terms of the other category.

In order to analyze data, the researcher classified the following features according to DGBL design elements. To assure that the implemented DGBL components reflected inclusivity principles, each design element was also analyzed from the UDL perspective: for example, "choosing what I want to learn" has been interpreted as a component of the game-learning mechanics from the DGBL perspective, and as consideration 7.1 from the UDL perspective. Hence, the features are analyzed as single entities which can however be interpreted from both perspectives.

Regarding UDL, the researcher encountered some difficulties in discerning the more suitable consideration to link to a specific DGBL component, since some considerations seem to be interpretable in different ways. This corroborates what has already been observed by Zhang *et al.*, namely that many considerations conceptually overlap with one another, therefore

complicating the analysis.¹³⁰ In order to tackle this challenge, the researcher used the UDL Report Criteria,¹³¹ provided theoretical references for the design decisions,¹³² aligned designed components to UDL guidelines and considerations, and highlighted potential interacting influences between different guidelines and considerations.¹³³ Moreover, as can be observed (see Table 3.1), the majority of implemented features are connected to UDL principle A (7, “representation”) and principle C (4, “engagement”), while none corresponds to principle B (“action & expression”), which was therefore not investigated. Another problem is connected to consideration 7.1 (“optimizing choice and autonomy”) which often overlaps with other considerations (e.g., 8.2 “optimizing challenge and support”), according to the specific type of choice one wants to consider in the analysis (e.g., task, difficulty, etc.): for example, both 7.1 and 8.2 mention offering or embedding “options/choices for the tools or supports available,” therefore making the difference between the two considerations ambiguous. Given this uncertainty, the researcher decided to link consideration 7.1 to a certain feature when she considered this particular feature to be explicitly linked to the autonomy component of CET (Cognitive Evaluation Theory).¹³⁴ Thus, it is important to note that due to these conceptual difficulties in the analysis of UDL, the classification is based on the description of this pedagogical approach, but it also represents the researcher’s interpretation of it, leaving therefore space for other understandings.

The classes of the analysis are so divided:

- (A) represents the first principle of UDL, namely designing multiple means of representation;
- (B) the second principle of UDL, namely designing multiple means of action and expression;
- (C) the third principle of UDL, namely designing multiple means of engagement;
- (*) represents components of DGBL;

¹³⁰ Zhang et al., “Unraveling Challenges,” 21.

¹³¹ Kavita Rao et al., “UDL Reporting Criteria. Developed by a Working Group of the Universal Design for Learning Implementation and Research (UDL-IRN) Research Committee,” updated May 10 2019, <https://www.cast.org/what-we-do/research/udl-reporting-criteria/>; Kavita Rao et al., “Validation of the UDL Reporting Criteria With Extant UDL Research,” *Remedial and Special Education* 41, no. 04 (2020): 219–30, <https://doi.org/10.1177/0741932519847755>.

¹³² The theoretical references mentioned in the table are described in previous chapter. For CET, see Chapter 1 ¶ 2.2; for Cognitive Load Theory, see Chapter 1 ¶ 3.1; for CTML and Cognitive Styles, see Chapter 1 ¶ 4.1; for task-based approach, see Chapter 2 ¶ 3.3; for ZPD, see Chapter 2 ¶ 3.5.

¹³³ Zhang et al., “Unraveling Challenges,” 24.

¹³⁴ Zhang et al., “Unraveling Challenges,” 19.

Features	Classes
1) Having fun ¹³⁵	C: nurture joy and play (UDL consideration 7.3)
2) Trying to independently understand how some ancient Greek language structures work	A: cultivate multiple ways of knowing and making meaning (3.3) * game-learning mechanics Theoretical reference: autonomy in CET
3) Making my own choices within the narrative	C: optimize choice and autonomy (7.1) * game-learning mechanics, narrative Theoretical reference: autonomy in CET
4) Choosing what I want to learn (e.g., grammar, vocabulary, culture)	C: optimize choice and autonomy (7.1) * game-learning mechanics Theoretical reference: autonomy in CET
5) Cultural insights ¹³⁶	C: optimize relevance, value and authenticity (7.2) A: highlight and explore patterns, critical features, big ideas, and relationships (3.2), and maximize transfer and generalization (3.4) * game-learning mechanics Theoretical reference: see chapter 2 ¶ 3.1.3
6) Seeing a single word accompanied by its English translation (e.g., φιλέω = to love)	A: clarify vocabulary, symbols and language structures (2.1) *visual aesthetic design Theoretical reference: CTML
7) Learning about the root of a word (e.g., the root <i>skop-</i> “to observe” and the root <i>mikr-</i> “small” in the word “micro-scope”)	A: clarify vocabulary, symbols and language structures (2.1) * game-learning mechanics Theoretical reference: see chapter 2 ¶ 3.1.2

¹³⁵ The researcher decided not to associate this feature with any DGBL design elements, given that fun in games usually results from the combination of different components (i.e., challenge, autonomy, competence). See Rigby and Ryan, “The Player Experience of Need Satisfaction (PENS).”

¹³⁶ This feature represents an overlap, as according to the CAST description, it could be aligned to three different UDL considerations. Although it represents a limitation to the analysis, the researcher decided not to choose a single one, as each consideration described this feature from different perspectives.

Features	Classes
8) Using learnt material to reach an external goal (e.g., solving a mystery and completing its tasks)	C: optimize relevance, value and authenticity (7.2) *narrative, game-learning mechanics Theoretical reference: Task-based approach
9) Variety of inputs ¹³⁷	A: support opportunities to customize the display of information (1.1), support multiple ways to perceive information (1.2), and illustrate through multiple media (2.5) *visual aesthetic and sound designs Theoretical reference: CTML and Cognitive Styles
10) Narrative component	A: cultivate multiple ways of knowing and making meaning (3.3) *narrative Theoretical reference: see chapter 2 ¶ 3.2-3.2.2
11) Difficulty customization ¹³⁸	C: optimize challenge and support (8.2) *game mechanics, learning mechanics Theoretical reference: Cognitive Load Theory
12) External resources	C: optimize challenge and support (8.2) *incentives and feedback Theoretical reference: ZPD

Table 3.1. Descriptions of the analyzed features according to DGBL design elements and UDL considerations.

¹³⁷ This feature represents an overlap as some characteristics of this feature can be described with consideration 1.1., others with 1.2., and from a general perspective also with 2.5.

¹³⁸ Here the researcher aligned the feature to the consideration 8.2. “optimize challenge and support” due to its explicit mention of “options with varying modes of complexity or difficulty.” However, the consideration 7.1. “optimize choice and autonomy” could represent a possible overlap as on the CAST website, this consideration is described as it follows: “Depending upon the learning goal, choices can be offered in how the goal can be pursued, such as the context for achieving the goal or the tools or supports available.” See “Universal Design for Learning Guidelines version 3.0,” CAST. Since the presence of tools or supports can influence difficulty, these two considerations seem to be showing a conceptual overlap.

4.1. Motivating potential

RQ3: Do students perceive some components of DGBL and UDL as motivating in learning the ancient Greek language?

Regarding RQ3, the experiment offered relevant data. At a first glance, it can be observed that all features were rated between “neither agree nor disagree” and “strongly agree.” Therefore, no offered feature seems to have been perceived as demotivating for participants. The only exceptions, i.e., the only features that presented some negative responses, are represented by “having external resources (e.g., grammar or dictionary) to use according to my needs,” with which E1 strongly disagreed, and “having fun while learning,” with which E1 again somewhat disagreed.¹³⁹ Moreover, “trying to independently understand how some ancient Greek language structures work” was the feature which registered the majority of neutral responses (3). Therefore, all selected and analyzed components of DGBL and UDL seem to be perceived as motivating by most participants.

By analyzing in detail the single features, some interesting observations can be made.

4.1.1. Feature 1: having fun while learning

The general positive response to “having fun while learning”¹⁴⁰ shows that a fun-component – which is usually associated with playing – is desirable in ancient Greek learning and that therefore a ludic approach could be a winning pedagogical strategy for some students, especially to keep them motivated towards the study of the ancient Greek language in the long term. During the interviews, all four interviewees (E3, E5, E6, and E7) expressed a positive opinion towards the potential of playing a game to keep one motivated in the long term:

I: Do you think that playing additional levels of this game or another similar game could keep you motivated to learn the ancient Greek language in the future or long term?

¹³⁹ For an analysis of E1, see ¶ 3.1.1.

¹⁴⁰ In an open question of the post-questionnaire, in which they were asked to describe their experience, all eight participants expressed at least one positive feeling or perception (fun, amazing, like, enjoyed, helpful, very independent, ok, liked a lot, love, quite good altogether, challenging but not too difficult). The word “fun” was used by two different participants to describe the experience. Only two participants expressed negative feelings (“a bit difficult,” “no support if you don’t understand”). In comparison to the pre-experiment, in which had 40,91% reported only positive feelings, 31,81% reported both positive and negative feelings, and 27,28% reported only negative feelings, the experiment shows a positive improvement: 75% reported only positive feelings, while 25% reported both positive and negative feelings, showing that the adventure did not represent a completely negative experience for anyone.

E3: Yeah, **I think the aspect of levelling up almost is motivation to keep going in it** and following through with the story.

E5: Yeah, I think I - - it would, yeah.

I: And what would be motivating for you, for example?

E5: [sighs] *Again, it being less like work and more like play* and also ‘cause there is a dictionary and we don’t really have that in less than unless we ask our teacher. So, I think that would be very helpful.

E6: Yes, yeah, definitely. I think **when you make it into something fun, like a game, it does make it a lot more engaging.**

E7: Yeah, I think it could.

I: And what - - why would you think that could help you keep being uh motivated in the long term?

E7: um, it’s the - - it’s the idea of going back and **keeping going over the - - the wor- the things that you’ve learned through a game.** So it’s not you sitting at a desk writing on a piece of paper, **it’s ... using the things like visuals, for example, so it will stick in your mind?** Because often if people are staring at a piece of paper for too long they’ll just forget everything, but **if there are visuals and icons and that sort of thing to help, then it’s much more likely to - - for you to actually remember it.**

E7 also commented that she would play this game or a similar adventure in her spare time for the following reasons: “[I would play it because of] the game probably and the fact that it’s probably also helping me with the um - - helping me with learning and it’s something I’m doing that’s *fun*. So, I think **it’s the fun that’s the incentive?**”

In comparison to the pre-questionnaire, both E3’s and E7’s opinions of the motivating potential of having fun while learning ancient Greek slightly improved: E3’s opinion changed from “Agree” to “Strongly Agree,” while E7’s moved from “Neither Agree nor Disagree” to “Agree.” The only negative change is visible in E1’s experience,¹⁴¹ as their opinion towards this feature changed from “Neither Agree nor Disagree” to “Somewhat Disagree.”

Further, T2 and T3 mentioned the fun component as a positive didactical aspect of the adventure:

I: What convinced you to agree to join the experiment?

T2: Um, well, teacher 1 asked me [laughs] if I would and **I said yes, that sounds like fun.** So I think just **the idea of playing a game to learn a language sounded really fun.** I thought the kids would enjoy it, so... I was happy to agree.

I: What are in your opinion the positive didactical aspects of such a project?

T3: In general or specifically your project?

I: For this project. Yeah, of this project.

¹⁴¹ For an insight on E1’s experience, see ¶ 3.1.1.

T3: So, um, **at that bigger level that the fun aspect of it, I think, and the engagement aspect,** um, for the students that we are working with as well, **that idea that Greek is fun and engaging** [laughs] **is what gets them - - that's what their starting point anyway,** they're doing this language because they're already excited by and interested in it and what has interested them in it primarily is storytelling and stories, mythology [...].

Both teachers seem to recognize the importance for learners to be engaged with the subject and they both seem to consider playing a good way to do so. T3 also commented while talking about how the experience was for her students:

I: In your opinion, how was the experience for your students?

T3: Oh! I mean, I think the *biggest - - the biggest* thing was um that - - you didn't see their initial exposure to the video when I showed it to them. **They were immediately engaged and excited and interested. The format of it really grabbed them from the beginning.** Um, **I think it was very motivating for all the students,** which again, I was interested by, and you know, **it was good to see that it didn't matter where they came at it from, like with their own confidences or lack of confidences or you know, learning needs as well. Is all of them just got straight on with it and found it very, very easy to get into?** And then **the amount of questions they were asking really shows how straightforward it was for them and how engaged they were because they weren't talking to us very much, especially in the second session.** They were just *doing it* and they do have their own group chat. They've got a WhatsApp that I do know runs in the background, but **they weren't talking to us and they usually do say a lot more. And it's because they were busy** [laughs]. **It's because they were doing it. And that was just lovely that,** you know, **they were so confident, that they were motivated, that they were engaged, and they just wanted to keep going with it.** And the fact that *they asked you, "can you keep the site live" so they can finish the story?* You know I think that's so - - regardless of - - if they learned *no Greek whatsoever*, right? If the aim is getting - - **if one of the aims is getting them in, getting them engaged, getting enthusiastic about Greek, about learning, about staying engaged with challenging projects, because it wasn't easy, but it was clearly engaging and they were persevering with things that they found hard.** You know, **that's clearly overcoming those obstacles to learning Greek, which exist for many students. So yeah, the motivation angle is huge.**

From T3's comment, some important points stand out: 1) the game format acts as a universally approachable medium towards learning Greek, regardless of personal confidence, learning levels or learning needs¹⁴² – this comment seems to corroborate the choice of implementing DGBL, attending the UDL approach, as important step forward towards a stronger accessibility in ancient Greek learning;

2) especially during the second level, which required players to solve the mystery, it is likely that some participants experienced a state of flow (see Chapter 1 ¶ 3.3), given that, in

¹⁴² Even though T3's comment highlights the potential of these approaches towards accessibility, it is important to take into account participants' actual experiences as well. Their experiences confirm a very strong potential of this method, but also highlight needs for improvements, especially in the difficulty customization and support and help system, as will be later discussed.

comparison to the previous session, they did not interact as much with the teacher and the researcher via chat asking questions, but were instead interacting with each other via private chat¹⁴³ or focusing on their own tasks and happily communicating in the shared chat afterwards when they succeeded in solving the mystery;

3) in comparison to the pre-experiment, the experiment was not available online for participants to play in their spare time. The researcher decided to hold two live sessions in order to be available as a helpdesk and to manage possible frustration if participants were to encounter any difficulties with the platform. Both during the first and the second sessions, participants asked the researcher via chat if she could keep the game live after the sessions so they could finish their adventure on their own. These comments are noteworthy as they show participants' high engagement during the adventure as well as the potential of a similar approach in fostering long-term motivation (as also mentioned by interviewees in the comments above). According to T3, this approach, regardless of its usefulness for actual learning,¹⁴⁴ seems to be a way to keep players engaged with challenges and a method for fostering perseverance towards overcoming obstacles.

Hence, in general, this data resonates with literature regarding the strong motivating potential of DGBL (see Chapter 1 ¶ 3.4) and with what has been hypothesized regarding the implementation of a similar pedagogical approach in the study of ancient Greek. Moreover, it demonstrates strong potential for fostering engagement and perseverance and, with the suggested improvements later discussed, also for offering a more universally accessible experience – regardless of learning level, learning needs or self-confidence – in the study of the ancient Greek language.¹⁴⁵

¹⁴³ The assumption that players were privately interacting with each other seems to be confirmed by E5's comment: "No, I think I just *looked* for clues and examined the body and ((I don't)) [laughs]. Yeah, probably should have - - because **everyone's like, "oh, do this!"** and I was like, "no, I'mma just do the clues" [laughs]." As participants were participating to the experiment online and no comment regarding suggestions to follow a certain path rather than another was written in the common videocall chat, it seems plausible that participants privately interacted with each other. This assumption is very interesting as it shows a personal attempt at compensating for the experiment's lack of social interactions which also represents a *desideratum* for future improvements. Moreover, it highlights the relevance of this component in an efficient DGBL environment, as literature confirms (Chapter 1 ¶ 3.6.1).

¹⁴⁴ T3 commented that "regardless of - - if they learned *no Greek whatsoever*" the adventure is a good method to keep learners engaged and motivated towards learning Greek. From participants' comments that will be later discussed, the adventure was not only engaging, but also useful for vocabulary training. For example, E5 commented during her interview: "I learned what 'slave' was. I think it was 'doulas' [Gr. δούλας]? [I: Yeah, exactly] I didn't know that before."

¹⁴⁵ The UDL consideration 7.3 "nurture joy and play" has been implemented in this experiment through the entire structure, namely a game to learn.

4.1.2. Feature 2: independently understanding language structures

The feature “trying to independently understand how some ancient Greek language structures work” was positively and/or neutrally rated by all participants. However, it was the feature that in general received the most neutral responses in the post-questionnaire (3) and the fewest “strongly agree” responses (1). At first look, it might seem that this feature was less motivating than others. A possible explanation could be that in this experiment the focus was more on vocabulary training and the grammar aspects were not predominant (contrary to the pre-experiment). Therefore, given that encounters with inductive grammar were less frequent, it could be possible that participants simply had fewer examples of this feature upon which to base their opinion.

However, upon closer examination, several more plausible interpretations can be observed. Interviews reveal that when encountering difficulties with the grammar, some participants did not check the available resources to understand the rules.

I: Did you try, for example, to have a look at the grammar resources that I put inside? You had like a link where you could watch - - go to other resources and read the grammar?
E6: If I am honest, no [laughs] I think I should have, but I did kind of manage to figure it out after a bit, so.

The tendency of not looking at available support resources (e.g., dictionary or grammar) seems to appear throughout the entire experiment in some questionnaires’ comments and in the interviews. A similar hypothesis resonates with data from some pre-experiment participants: when asked about their experience with discovering the grammar on their own, they affirmed that they did not know where to look or what to look for. P5 answered: “I watched the video and went to the first task, but **I - *did not really know what to learn***. I watched the video a couple of times and I - - I couldn’t really- ((anything)).”

Even if explicitly asked about this experience, no interviewed pre-experiment participants – even those that reported a positive experience with this feature – explicitly mentioned consulting the external grammar resources. It therefore seems that in the pre-experiment as well, players relied mostly only on the offered “clues” within the task. P8 said for example: “Um, I guess it was *harder* because um... I didn’t know off the hand straight away ... *what* the grammar note was... but you can always apply what you know because in one of them there was -- it said like the ‘*stem*’ and it had the gap to...fill in the word ‘*stem*’ but you knew that at the start of the word is the stem and at the end it is the ending so... it- there were *clues* in there

but it -- it is much harder.” From her comment, it seems clear that she relied mostly on her previous knowledge and on the information offered by the task itself, but that she did not look for extra help in the available external grammar resources. This observation also resonates with T1’s observation during his interview.

T1: [...] when I saw them playing this game for 45 -- 45 minutes which we did a few weeks ago um [coughs] **what I saw was a lot of them relying on things that they had been taught... rather than looking really closely at the material and deducing things from that?** And that is a really hard skill. [...] **kids of that age need to be told stuff as well as given material from which they can work it out?** Um, it’s -- it’s an ultimate ambition for teachers to be able to *basically* get- teach kids to teach themselves by giving them the most accessible material and saying *now* “can you work out what it is” that’s it’s a good thing to do in teaching but... in a *class* that isn’t *so...* ambitious I imagine that *more* of them would have said “this is too hard I’m giving up” rather than “*this is hard* I’m going to ask for help, I’m going to try and work it out” [...].

Two points can be derived from these comments. First, some participants seem to have experienced this feature without benefitting from the corresponding support material (e.g., the explicit grammar), which unmistakably increased the difficulty of such experience. Secondly, participants need support, help, and scaffolding, but they need it “a bit more in [their] face,” as E6 put it in their interview i.e., immediately accessible and straightforward. It seems possible that the motivating potential of this feature has been negatively affected by the fact that the grammar resources in both experiments were not as straightforward as students would have preferred, in that they did not offer learners the exact info they were looking for, requiring them to instead “help themselves” by looking for it among other information.

This hypothesis seems to find confirmation in the comparison with pre-experimental data. Experimental data of this feature show a comparable percentage of neutral responses (37,5% experiment vs. 36,36% pre-experiment), higher positive responses¹⁴⁶ (62,5% experiment vs. 54,55% pre-experiment) and the absence of negative responses in the experiment, in comparison to 9,09% in the pre-experiment. A similar comparison seems to suggest a generally perceived motivating potential:

P4: Um, **I find it really helpful to go – to do things at my own pace** rather than like... listening to a teacher **because sometimes they go a bit too fast for me to understand**, it

¹⁴⁶ Sum of responses to “Strongly Agree,” “Agree” and “Somewhat Agree,” in the experiment, and of “Strongly Agree” and “Agree” in the pre-experiment. The absence of “Somewhat Agree” in the pre-experiment is an important difference to bear in mind while comparing the data: the absence of this intermedium option between the neutral and positive choices might have obliged participants to choose an option that was not 100% fitting to their perception.

was just like a bit... hard... to like piece together things where I was doing it on my own – at my own pace using a game to understand grammar. I really liked that idea.

P6: [...] I liked that part because, yeah, it was easy enough to be able to do ... by yourself **if it's still being a challenge and you're still... You're not just getting given the answers? You're working them out ... at your own pace.** And you could, like, jump between the tasks? So ... you could skip stuff and you could ... re-repeat stuff and it was very free the actual platform to be able to do that.

However, some other aspects emerged from T3's interview which can further explain participants' experiences with this feature. One of T3's comments echoes resonates with the aforementioned comment of T1:

T3: I think **my students were able to deal with it pretty well, like in getting engaged with it, but because they'd already learned some Greek.** And I'm just wondering at what level you sort of had this *pitched at* as a *starting point*, because **I think they would have been a bit lost if they'd been at any other level. I don't think they could have started with this.** And I'm not sure they would have *learned* the grammar from this, *but* they were able to do it all because they had already done it.

Therefore, according to all three teachers,¹⁴⁷ the level of the adventure in the actual version is too high for complete beginners (as the pre-experimental respondents were), and according to T1, asking learners aged 12-13 to deduce grammar rules on their own even with the “most accessible material” is too high of an ambition. T3 seems to disagree with this opinion and when asked how one could make the adventure accessible to complete beginners while maintaining the main structure, she answered:

T3: So, um, **I think I would be tempted to mirror first language word-order more closely to start off with and maybe play with an element at a time.** So, um, at the moment, it moves very quickly from sentences that have nominative at the beginning, then, um, you know, prepositional phrase, then verbs at the end, very quickly to the nominative moving to where it might more naturally be in a Greek sentence. And **I thought perhaps that might be a bit fast when not all the sentences are designed to be fully comprehensible by the students without the English support.** So, if they're reading a sentence that is a bit *longer* in some of the, like, later on exercises, what you're asking them to do is actually fairly straightforward, but the *words* are all over the place now, and **it seems to them, perhaps, a bit harder than it needed to be because they were having to try and guess what some of those words were because they weren't ones you wanted them to learn, like in the**

¹⁴⁷ T2 commented: “I think... a few of them, the *more... those who knew the alphabet the best, um they were quite happy playing along in the corner, getting on with it. I think the students who struggled with the alphabet found it quite hard* um and they were quite, you know, **they needed a lot of support from me, they needed a lot of help from me.** So, I think it was a *more positive experience for those who had a bit better prior knowledge and who are more resilient* [laughs] **um as people.** So, um that's not necessarily... a *criticism* of the game, it's more kind of... **the level of the game and the level of the students didn't necessarily match up at that stage.** And so, for some of them, they thought, I will *rise* to the challenge, this is great. And for some of them, they thought too hard. [interviewer says “yeah”] No... So... yeah.”

letters and the investigation ones later on. A lot of those words, you *didn't want them to learn*. They were housing the words that you did want them to learn. But because it was a Greek word order, it was *a lot harder* perhaps for them to find. [...] So, um, having that -- the grammar more effectively embedded throughout, for example, like, um -- if you want them doing the parts of the verb -- a verb, you know, with verb endings is introducing it to them *multiple times* and then doing something that is *just all the I's, all the you's, you know, all the different parts together so they can see the consistency* 'cause they don't always *spot the thing that's changing, right?* Or they spot it as a bit of vocab. They don't necessarily spot the ending as like, when you've got your, um, running around in the meantime, they will go "run," but **they won't necessarily even look at the ending until you tell them to look at the ending?** So they won't -- **pure exposure won't have got them to pattern form, especially as your sentences are one on the screen and then it goes away and then, so the comparison base isn't there.** [...] So that was something I was thinking was a *step* in between because they -- the narratives are really engaging, and you can follow them even if you don't know *all the words and everything*. You know, the exposure is working, that bit's working really well, **but then when you go into the exercise, perhaps you haven't done the pattern forming bit always in the middle?** And that's a bit, I think that my students had already done that, the pattern forming. **So they were already knew what to look for and they already could do the exercises because they already had the patterns or most of them, but I'm not sure without that middle step** -- something that gets them to actually focus on, but look at the difference between, you know, "ego trecho" [Gr. ἐγὼ τρέχω] and "Alexander trechei" [Gr. ὁ Ἀλέξανδρος τρέχει] you know, and yeah.

Therefore, according to T3, a similar adventure could be also played by complete beginners if the following modifications were to be implemented:

1) the Greek word-order of the written fictional narrative should mirror players' first language word-order, in this case English (SVO), and not show, at least at the beginning, the other possible word-orders of the ancient Greek language. From the researcher's point of view, this modification, that could be implemented in early stages (for example for the first 3 or 4 levels) to facilitate and aid players in the comprehension tasks, should however gradually also introduce in the following levels the other possible positions of ancient Greek verbs (e.g., verb at the beginning or at the end of the phrase).¹⁴⁸ This way, players would be gradually exposed and introduced to several possible word-orders of ancient Greek texts and would not be completely overwhelmed by completely novel structures, if they were to read original texts.

2) Words and language structures needs to be presented consistently and repeatedly to enable students to notice patterns forming. Moreover, explicit indications such as "notice this" or "notice that" should also be present. Both aspects have already been implemented throughout the game, however, according to T3, they should be even more present and persistent in order to facilitate noticing and understanding for players. By reinforcing these aspects even more, one could still encounter the "chocolate-covered broccoli" risk i.e., that the game becomes too

¹⁴⁸ Eduard Bornemann and Ernst Risch, *Griechische Grammatik*, 2nd ed. (Diesterweg, 1978), 163.

unbalanced towards the learning part, leaving the game component suffering, which could negatively affect players' motivation. For example, even though all interviewees defined this adventure as a game, E7 already commented: "[...] it's in the middle of a learning resource I - I mean, it's going to be a learning resource all the time, but it's *way* more of a learning resource than a game at this point [...]" E7 also commented regarding the difficulties of developing a game to learn Greek: "I think it would be like *balancing how much* of it is learning language and how much of it is the actual story of the game?" A possible solution to this problem could be to develop these aspects more explicitly in the first levels to help manage the initial cognitive overload and then gradually make them available, but less explicitly or persistently so that the game component could also take the lead. However, in light of these considerations and comments, more research on where this "good balance" between game and learning for ancient Greek lies is needed.

Finally, for future developments, this feature can be considered potentially motivating, but the entire "discovering" experience needs to be even more scaffolded. The support materials need to be immediately accessible and directly connected to the exact information players need in the moment. Another possibility could be for the game to automatically offer help or suggest consulting the support section (e.g., through a pop-up or additional remark by one of the characters such as "we should check this!"), if players get stuck for more than a pre-determined amount of time on a specific task. This observation resonates with the three-tiered approach, mentioned by Purushotma, Thorne, and Wheatly¹⁴⁹ and discussed in previous chapters. Moreover, players should not be asked to search through a large volume of information, but rather be immediately redirected to the right piece of information they need in order to complete the task.¹⁵⁰

¹⁴⁹ Purushotma et al., "10 Key Principles."

¹⁵⁰ The researcher encountered some difficulties in linking a UDL consideration to this feature, as 7.1. "optimize choice and autonomy" could have been selected for the "autonomy" component. However, 7.1's focus on choices has guided the researcher rather towards 3.3. "cultivate multiple ways of knowing and making meaning." The description of this consideration includes using "explicit prompts for each step in a sequential process to help learners develop a logical flow specific for their understanding and create a structure of complex tasks," see "Universal Design for Learning Guidelines version 3.0," CAST. As expressed in the consideration, the idea of this feature was in fact to guide learners in recognizing and understanding patterns and aspects through a sequential process, and to let them apply what was learnt to "unfamiliar problems," meant here as unknown texts.

4.1.3. Feature 3 and 4: making choices¹⁵¹

Before analyzing the data, the following should be noted. The researcher implemented the possibility of making choices within the narrative in both levels. However, there were important differences between them.

In the first level, the learning progression was linear i.e., learners could not navigate and choose the sequence of their learning path: after content A came learning content B, etc. Learners could only make narrative choices, which however corresponded to the difficulty level (e.g., option A “go home” was the easier task, while option B “stay there with your friends**” was the more difficult task). This correspondence between difficulty level and narrative choices had the goal of both giving participants the impression of being able to influence the narrative and allowing them to choose the difficulty, while also simultaneously enabling the researcher to better control the amount and progression of the didactical material to create.

However, even though the narrative options were bound to the difficulty level, from comments on the video call chat during the experiment¹⁵² and from the interviews, it seems that participants were extremely captivated by the idea of influencing the story and the corresponding tasks. For example, E6 commented in their interview regarding the most interesting aspects of the adventure: “I think for me it was the fact that **you could pick where you went**. It wasn’t like... yes **there was a set storyline, but you could make your own decisions** and I feel like **that really helped make it interesting for me** with the fact that you could just sort of go different ways depending on what you did, so.”

Moreover, when asked whether and how they would use this tool outside the experiment, they said:

I: Okay. And how would you use it, for example, to learn something new, to revise, to have fun?

E6: I think I’d probably try to find like a *certain* part of the game that touched anything I needed to properly recall? But **I um honestly ((like would play it)) all ((over)) again and maybe make different decisions just to see what would happen.**

Therefore, this dynamic offered different tasks according to one’s decisions and the illusion of influencing the narrative.¹⁵³ On the other hand, in the second level, learners could choose the

¹⁵¹ This section summarizes two features: “making my own choices within the narrative” and “choosing what I want to learn (e.g., grammar, vocabulary, culture).”

¹⁵² For example, some participants asked in the video call chat during the first session of the experiment what the others were doing in a specific section of the game, namely lying or telling the truth to the protagonist’s mother.

¹⁵³ Regarding the problems and risks of the gauntlet branching structure, used in this first level, see ¶ 6.2.

progression of their learning path and jump from content A to content B or C and *vice versa*, but the narrative decisions were not as prominent as in the first level. Here participants could mainly choose the difficulty of the task and the content-narrative progression, as the focus of this second level was on the possibility of choosing the order of the learning material.¹⁵⁴

In light of this preamble, results resonate with this structural difference. In the mid-questionnaire, where participants had the perception and/or illusion of actively influencing the narrative, all participants agreed or strongly agreed with the motivating aspect of this feature, all showing a positive increased perception between their initial expectation and their actual experience.¹⁵⁵ On the contrary, in the post-questionnaire, some participants maintained their improved positive opinions (E4 and E6), while others went back to their initial expectations (E3, E7), one negatively changed their opinion while still remaining on the positive range of ratings (E10) and one became neutral towards the feature (E9) while having strongly agreed in the mid-questionnaire.

A similar change suggests some important observations. First, the possibility to make their own narrative choices seems to be particularly motivating for learners, as shown in the mid-questionnaire. A meta-analysis conducted by Patall *et al.*¹⁵⁶ found out that instructionally irrelevant choices, meaning choices that do not influence the learning process, had the greatest influence on intrinsic motivation. It has been hypothesized that this more positive effect could depend on the role of this type of choices as expression of personal identity.¹⁵⁷ Although the narrative choices were here instructionally relevant as they determined the difficulty of the task, they still seem to have played an important motivating role for participants. It can be hypothesized that even though participants were aware of the interconnection between narrative choice and difficulty level, this has not negatively influenced the motivating potential of the narrative choices. It is however important to highlight that in future development, difficulty level and narrative choices should be divided so as to benefit as much as possible from the motivating influence of instructionally irrelevant (narrative) choices.

¹⁵⁴ Option A was “examining the corpse (grammar);” option B was “looking around the room (vocabulary),” and option C was “interrogating the people in the palace (culture).”

¹⁵⁵ The only exceptions are represented by E1 (who did not complete the mid-questionnaire, but somewhat agreed in the pre-questionnaire and became neutral in the post-questionnaire), and by E5 who steadily strongly agreed with this feature throughout all three questionnaires.

¹⁵⁶ Erika A. Patall et al., “The Effects of Choice on Intrinsic Motivation and Related Outcomes: A Meta-Analysis of Research Findings,” *Psychological Bulletin* 134, no. 02 (2008): 270–300, <https://doi.org/10.1037/0033-2909.134.2.270>.

¹⁵⁷ Patall et al., “The Effects of Choice,” 295.

The change in opinions after the second level seems to confirm it: in both levels participants had a “unique” experience as their adventure “depended” on their choices; however, in the second level the possibility (or the illusion) of being in control of the narrative of the story was not as predominant as in the first one and it was limited to only four choices in the entire level, in comparison to the six encounters in the first level that asked to make a choice between two options. Parall *et al.* found in their meta-analysis that “choice has the greatest effect when participants chose a single option from a list of options and did so repeatedly, as opposed to making just a single choice or multiple choices from a single list of options.”¹⁵⁸ Thus, it can be argued that data from the experiment confirm previous findings.

E6 commented on the least interesting aspects of the adventure saying: “[..] I guess the parts where my brain was least involved was when I wasn’t making decisions, just *watching* it [...].” This change in the structure of the levels resonates with collected data and seems to confirm by contrast the motivating relevance of this feature in a game-based experience to learn ancient Greek.

On the other hand, the possibility of choosing what one wants to learn – implemented in and investigated through the second level – was also positively motivating. However, interestingly, only E7 unprompted referred to this feature and commented on it, saying:

E7: [...] being able to *choose* where they [the players] go and *choose* what they learn is much more of an incentive as to someone telling them “okay, so today we’re going to learn about verbs” and then (()) you may be not wanting to learn about verbs, but ((a tense)). So I think that that would be really good.

Her comment shows that both features are considered motivating, a stronger “incentive” to learning than being told what to learn. However, the fact that “choosing what I want to learn” was mentioned only once in the interviews, in comparison to the five unprompted mentions of “making my own choices within the narrative” during the interviews could be a sign of the stronger motivating potential of the latter. Moreover, these results echo Survey A’s results regarding the possibility of “making my own choices,” which was one of the most selected features (see chapter 2 ¶ 2.3).¹⁵⁹

¹⁵⁸ Patall et al., “The Effects of Choice,” 295.

¹⁵⁹ The UDL consideration 7.1 “optimize choice and autonomy” has been here implemented through the possibility of making narrative and learning material choices.

4.1.4. Feature 5: cultural insights

The cultural insights were offered as videos within the adventure. In the first level, the cultural insight “the Greek language and standard languages” was implemented at the end of the level. In order to thematically link it to the narrative, it was disguised as a “bedtime story” told by the protagonist’s mother at the end of the day. The first insight was watched by five participants.

The other two cultural insights, “Nationality?! I’m ancient Greek!” and “Alexander the Great, Hellenism and globalization,” comprised the third branch of the second level, namely the option “interrogate the people in the palace (culture).” The former was watched by four people and the latter by two.

The decreasing views number could be connected to the inadequate amount of time that participants had to finish the level (more or less an hour and a half). However, the length of the videos (around 5 minutes) seemed to have also played a role in this decrease. Speaking about the possible improvements for the actual version of the game, E3 referred to the cultural insights and their length:

E3: **With some of the videos, it was *less* interactive and those were a bit harder to get through.** So possibly with those ones having more interactions in it?

I: Hmm, can you - - do you remember like an example of these less interactive videos? So that I can understand?

E3: I can’t remember *which* part, it was in level two, but **it was like a four-minute video and I think it only had *one* interaction at the end of it.**

I: Is it possible that it was the cultural insight part? Where you had this video about the culture?

E3: Possibly, yeah, maybe.

I: Okay, or maybe do you mean the section where the characters were talking in English between the tasks?

E3: No, I think it was during the cultural bit, actually yeah.

All cultural insights had more than one interaction, but in comparison to other offered videos (e.g., the videos in Greek or the task-videos), the interactions were numerically inferior. It therefore seems possible that the weaker interactivity of this type of videos discouraged participants from watching them. Out of the eight participants, only E5 and E10 did not watch any cultural insights. When asked whether she watched any of them, E5 commented during the interview: “No, I think I just *looked* for clues and examined the body and ((I don’t)) [laughs]. Yeah, probably should have - - because everyone’s like, ‘oh, do this!’ and I was like, ‘no, Imma just do the clues’ [laughs].” Her comment is particularly interesting as it reflects the perception

of independence and autonomy that participants experienced in the adventure, namely deciding how and to what extent discover certain paths.

According to the questionnaires, the (inter)cultural insights could positively influence participants to further learn ancient Greek.¹⁶⁰ Moreover, even if focused on culture, they could still help in learning the ancient Greek language¹⁶¹ and understanding how some aspects of modern world work¹⁶² (which is an aspect of intercultural competence). Nevertheless, participants appreciated the possibility of applying what they were learning to modern examples (e.g., to analyze a recent press article).¹⁶³ From the interviews, the cultural insights were described as “informative” and “interesting” rather than “motivating.”

E7: It was - - **it was informative and I think that’s sort of the main point about a culture insight is it being informative** and I felt like I got that.

I: Um in these cultural insights, we learned how the ancient Greek culture and our modern world are still connected for example through the Greek notion of nationality and modern cultural discrimination. Was this approach then interesting or motivating for you?

E7: **I would approach it more as *interesting* than *motivating*?** Because it’s funny to see how our discrimination has gone back *thousands* and thousands of years and it’s not just an issue today and that it’s been one of them humanity’s lesser positive trait and it’s just interesting to see that I think.¹⁶⁴

A similar remark (“I would approach it more as interesting than motivating”), reinforced by E3 similar comment (“I think it’s *interesting*, more so than motivating”), seems to suggest a strict division between the notions of interest and motivation that seem not to necessarily interact with one another. These two very similar comments echo what has been hypothesized observing the data of Survey A (see Chapter 2 ¶ 2.2), namely that interest and motivation are for participants not always mutually influenced and that therefore even if respondents are

¹⁶⁰ The statement “Discovering the interconnections between the ancient Greek culture and modern cultural topics (e.g. discrimination) motivates me to further learn the ancient Greek language” was rated 4 times “Somewhat Agree,” 1 time “Agree” and 1 time “Strongly Agree.”

¹⁶¹ The statement “Discovering the interconnections between the ancient Greek culture and modern cultural topics (e.g. discrimination) are useful for me to further learn the ancient Greek language (e.g. because I remember the meaning of a specific Greek word connected to the topic “discrimination”)” was rated 2 times “Neither Agree nor Disagree,” 1 time “Somewhat Agree” and 3 times “Agree.”

¹⁶² The statement “Learning ancient Greek culture helps me understand how some aspects of modern world work (e.g. discrimination)” was rated 1 time “Somewhat Disagree,” 1 time “Somewhat Agree,” 1 time “Agree” and 3 times “Strongly Agree.” E1 presumably selected “Somewhat Disagree” because, as he wrote in the questionnaire, he watched only the first insight focusing on the notion of standard languages. On the contrary, the example included in the statement referred to the second insight.

¹⁶³ The statement “I liked the fact that I could apply what I had just learnt to another modern example (e.g. recognizing the mechanisms of discrimination in a recent press article)” was rated 1 time “Neither Agree nor Disagree,” 4 times “Agree” and 1 time “Strongly Agree.”

¹⁶⁴ This comment links to UDL consideration 3.4 “maximize transfer and generalization” since the researcher embedded “new ideas in familiar ideas and contexts (e.g., use of analogy, metaphor, drama, music, film, etc.) to make learning more relatable,” as noted in “Universal Design for Learning Guidelines version 3.0,” CAST.

interested in a specific aspect or subject, they are not always motivated to learn it. However, according to Deci and Ryan, “intrinsic motivation is based in interest and enjoyment,”¹⁶⁵ therefore it is possible that by offering interesting insights, the intrinsic motivation might benefit from it. A way to increase this perception of interest seems to be a focus on the interconnections between the ancient Greek world and the modern world. E6 commented: “Yeah, when I find like things, especially in history sort of things, when you learn about something that happened in the past that can relate it to modern day, and what you see and experience in the modern-day world, I think that definitely makes it more interesting, so.” E6’s comment resonates with T3’s opinion regarding the cultural insights:

T3: Something I was just talking about with my colleagues here, just before we came on the call, was the way that the cultural context - content *in particular* was embedded within the narrative? was *really* nice, um, *thematic way* of doing it? [...] it was lovely to go in sort of at level one at more, a big- **a bigger conceptual level um and talk about the “big ideas”** rather than go, “okay, so we’ve discussed the, um - - the town. Okay, let’s look at the layout of a Greek town.” And I thought, you know, it seemed for - - **for my students anyway, much more what they talk about, much more like their reactions.** They don’t - - they don’t go on about, “oh, his house is so interesting, his palace is so interesting,” they go, “oh my goodness, um, he reacted like that?! Why are they using the word barbarian?” **You know, it’s - - it’s what they actually ask questions about.** [...] So I thought - - **I thought that was really interesting, quite pulling the students in a much - - much higher level, higher order thinking, critical angle, which I think prepares them better for if they do get onto reading authentic Greek texts, it’s engaging with the ideals underlying them, rather than, you know, some of the more simplistic stuff.** Um, it was nice. And again, it was all *related* to the narratives that they’re dealing with, which was, yeah.¹⁶⁶

In T3’s comment, two very important aspects stand out: 1) cultural insights that focus on “big ideas”¹⁶⁷ and therefore are not only descriptive, but rather argumentative, are more in line with what students are usually interested in (which is also confirmed by E3’s, E6’s, and E7’s comments); 2) an argumentative approach, focusing on a “higher order thinking,” prepares them better for original Greek texts as it reflects their underlying ideals. Thus, according to T3,

¹⁶⁵ Ryan and Deci, “Intrinsic and Extrinsic Motivation,” 4.

¹⁶⁶ T3’s comment is conceptually linked to UDL consideration 7.2 “optimize relevance, value, and authenticity” as the researcher focused on including socially relevant themes (e.g., discrimination) and providing tasks for active participation, exploration, and experimentation (e.g., finding the same discrimination mechanisms analyzed in the Greek culture to modern newspaper). Moreover, T3’s comment links also to consideration 3.2 “highlight and explore patterns, critical features, big ideas, and relationships” as the researcher highlighted and emphasized key elements in the cultural insights (e.g., through colors or animation) while also offering multiple examples to emphasize critical features (e.g., examples of discrimination in different cultures). Nevertheless, she planned tasks to let learners use the learnt skills to solve other problems (see *supra*). For a more detailed description of this feature, see Chapter 2 ¶ 3.1.4.2.

¹⁶⁷ From her comments, it seems that T3 considers “big ideas” concepts or themes connected to socially relevant aspects such as discrimination or globalization.

a similar approach does not only aid intrinsic motivation by fostering interest – a component of motivation – but it also represents a sort of “introduction” or “pre-workout” for the conceptual complexity of original ancient Greek texts.

Therefore, even if from the interviews the cultural insights were described more as interesting than motivating, the different opinions seem to confirm the potential of this approach towards the general pursuit of fostering intrinsic motivation. Thus, even if the insights themselves seem not to be motivating *per se*, they could still play an important role in the general scheme of motivating students towards the language, fostering at the same time some aspects of the intercultural competence e.g., an “interest” between two cultural entities (see Chapter 1 ¶ 2) and acting as a “pre-workout” for authentic Greek texts.

However, in order to foster both motivation and intercultural competence through these resources in a DGBL environment, two major modifications seem necessary: 1) the interactivity of these resources should be comparable to that of the other resources so that the received information still requires the continuous active role of the player; and 2) they should preferably not exceed 3 minutes in length.¹⁶⁸ A possible solution to the reduction of available time for the resource, which may cause an oversimplification of the topic, could be to follow a *Fundamentum-Additum* type of differentiation.¹⁶⁹ The *Fundamentum* would refer to the basic resource with which every player interacts: this section should therefore respect the suggested parameters (namely more interactivity and inferior length). Separately, the *Additum* would be a more in-depth sort of “extra resource” for those players (like E6 or E7) that are particularly interested in the cultural aspects. This way, all players would benefit from the positive motivating and intercultural potential of this resource without being overwhelmed by too much information. At the same time, however, those who are particularly attracted by the cultural aspects would cultivate even further their interest and presumably benefit from this in terms of intrinsic motivation.

In conclusion, from this preliminary investigation, an intercultural approach to ancient Greek culture seems to be potentially positive both for intrinsic motivation and for preparing to engage with authentic Greek texts in the future.

¹⁶⁸ This number is just hypothetical. The optimal length of similar resources should be further investigated.

¹⁶⁹ Kuhlmann and Horstmann, *Wortschatz und Grammatik üben*, 26.

4.2. Usefulness for vocabulary competence

RQ4: Are some components of DGBL and UDL perceived as useful for remembering meanings of new Greek words?

RQ5: Are some components of DGBL and UDL perceived as useful in deducing meanings of unknown Greek words?

Regarding RQ4, all offered features were once again mostly positively rated as useful to remember ancient Greek words (between “neither agree nor disagree” and “strongly agree”). The only exceptions are represented by E7’s “somewhat disagree” with the features “having someone else reading the text out loud with emphasis (e.g., using a scared voice when something scary happens)” and “learning about the root of a word (e.g., the root *skop-* “to observe” and the root *mikr-* “small” in the word “micro-scope”).” Therefore, all offered components seem to be generally useful to remembering ancient Greek words.

Regarding RQ5, even though all offered features were positively rated as useful in deducing meaning of unknown Greek words by the majority of participants, more features received negative opinions in comparison to RQ4. E7 somewhat disagreed once again with “having someone else reading the text out loud with emphasis (e.g., using a scared voice when something scary happens)” and with “learning about the root of a word (e.g., the root *skop-* “to observe” and the root *mikr-* “small” in the word “micro-scope”).” The consistency towards these two features could therefore suggest that for E7’s specific approach to learning vocabulary, both features might not be generally useful. E1 disagreed with the usefulness of “seeing a single word explained through icons, images or drawings (e.g., a heart for the verb φιλέω, “to love”)” which may suggest a less imagery cognitive style of the participant. A similar consideration seems to be corroborated by E1’s other ratings towards the visual components which both for motivation and for usefulness were always “neither agree nor disagree” or “somewhat agree.” Lastly, E5 disagreed with “using the vocabulary I’m learning to complete tasks related to the narrative (e.g., helping a character by using the words I’m learning).” This perhaps suggests what could have helped E5 deduce the meaning of unknown words could have been to first see the word used in many different contexts and afterwards trying to use it in a “trial and error” dynamic, as mentioned by Gee’s “probing principle” (see Chapter 1 ¶ 3).

By analyzing the single features in detail, some interesting considerations can be made.

4.2.1. Feature 6: English translation

The feature “seeing a single word accompanied by its English translation (e.g., φιλέω = to love)” was considered useful both in remembering and for deducing meanings of Greek words by all participants. When asked whether they think their skill in learning Greek vocabulary has improved through the adventure, E6 commented that it did and elaborated: “I think it was more like, you know the tasks where you have the English translation and you have to fill in the gaps in the Greek? I think it helped me with that, in like remembering word order as well, where the words were going in a sentence, because I wasn’t exactly sure about it at the beginning?”

Therefore, according to E6, having Greek words accompanied by their English translation helped them deduce and notice the structure and the word order of the unknown Greek text. This comment seems to conceptually link to T3’s comment, that was analyzed while describing feature 2: the different possibilities of ancient Greek word-order can represent a difficulty for some learners; to mitigate this difficulty, a solution could be to offer in the earlier stages only an English-mirroring SVO word order, as T3 suggested, before introducing other Greek word-order possibilities later.

As expected, from this comment and the questionnaire responses, it seems that having a direct translation of an unknown word is still perceived as very useful by learners. However, interestingly, in the free comment sections, no participant explicitly mentioned the need for *more* English translations. Even those participants who expressed suggestions for improvements in the vocabulary section did not suggest adding more English translations, but rather expressed the desire for more immediate accessibility of the given translations,¹⁷⁰ more testing and repeating of vocabulary,¹⁷¹ and more visual aids.¹⁷² It therefore appears that even if rated as useful, participants did not perceive English translations as the most pivotal feature offered. It could be argued that the accessibility of the already given features (such as the visual components), their quantity and their frequency played a more important role for them. This observation is even more relevant if compared to the results of the pre-experiment, in which three participants explicitly mentioned the need for more English translations. However, it is

¹⁷⁰ E3: Having the option to get the meaning of a word while doing one of the matching activities if you don’t know it (like being able to press on the word and get the meaning as a pop up).

¹⁷¹ E1: vocab being tested repeatly [sic]; E4: stages to help you remember the meanings before the tests.

¹⁷² E5: [...] however i think there needs to be more images explaining what words mean.

worth mentioning that a predictive factor of this difference in responses may be attributed to the significant disparity in competence levels of the two samples.

In any case, a striking result seems to be that even if having the English translations is still perceived as useful in order to deduce or remember Greek meanings, it is rather the combination of it with other features (e.g., visual components, audio, frequency, etc.) that really makes the difference in vocabulary training. This result corroborates previous literature (see Chapter 2 ¶ 3.1.2) and points out once more the relevance and almost absolute necessity of a multisensorial approach in ancient Greek vocabulary learning.¹⁷³

4.2.2. Feature 7: vocabulary by learning roots

Even though the feature “learning about the root of a word (e.g., the root *skop-* “to observe” and the root *mikr-* “small” in the word “micro-scope”)” was generally positively rated, the two least motivated participants (E1 and E7) and a third one (E10) showed a decrease in the perceived usefulness of this feature for deducing unknown meanings – and for E1 and E7 also for remembering meanings. Regarding E1 and E7, this decrease appears to be symptomatic of a general decrease in motivation as for almost all features these two participants showed a more negative perception after the adventure, even though they still positively rated them most of the time.

However, notably, no participant showed an increased perception of usefulness of this feature after the adventure and no explicit comments on this feature were made in the questionnaires or during the interviews. From data, it therefore seems that this feature was already perceived as useful by the participants both for remembering and for deducing Greek meanings; for most of them this positive perception was confirmed through the experiment, which resonates with the pre-experiment’s results as well.

Finally, the relevance of learning Greek vocabulary by roots seems to be already perceived by Greek learners and the approach used in both experiments likely confirmed this positive perception. However, additional research is needed to better understand the potential of this approach for learning Greek vocabulary.¹⁷⁴

¹⁷³ This feature links to UDL consideration 2.1 “clarify vocabulary, symbols, and language structures” as the researcher offered support for vocabulary within the text (i.e. translation), as suggested by the consideration.

¹⁷⁴ This feature links to UDL consideration 2.1 “clarify vocabulary, symbols, and language structures” as the researcher offered alternative representations (e.g., roots) to clarify and make more explicit the semantic relationships between elements, as suggested by the consideration.

4.3. Motivating potential and usefulness

4.3.1. Feature 8: using learnt material to reach an external goal¹⁷⁵

Before the experiment, participants had positive expectations towards the motivating potential of “applying what I learnt to reach a goal that is not connected to language learning (e.g., solving a mystery).” Each participant rated this feature between “Somewhat Agree,” “Agree” and “Strongly Agree.” After the experiment, the three participants that showed a general decrease in intrinsic motivation after the adventure (E1, E7 and E9) negatively changed their rating towards this feature. E1 changed from “Agree” to “Neither Agree nor Disagree,” while E7 and E9 from “Agree” to “Somewhat Agree.” On the contrary, two participants showed a positive increase in their rating (E6 and E10). The other three participants reaffirmed their initial high expectations.

In general, this feature seems to have been confirmed as potentially motivating. When asked what the adventure’s most interesting aspect for her was, E3 commented as follows: “I think following a story along and **having that mystery aspect of it was really good.**” E5 also expressed her appreciation for the mystery: “[...] I liked solving the mystery.”

Even if, due to the structure of the pre-experimental adventure, pre-experiment respondents could not solve the mystery as actively as the experiment participants, their comments nonetheless offer interesting insights into this feature:

I: Independently from your experience with this adventure, what do you think of the idea of learning ancient Greek by actively solving a mystery?

P4: I think um... *for me...* **I find it really interesting and makes me like want to learn ancient Greek more actively? I find it ehh... very... helpful? With ancient Greek?** ‘cause like um... *actually* solving like mysteries, reading, listening, doing exercises based on that um helps with eh -- **helps a lot with understanding different words.** The -- how English relates to those words and like how eh the stems and the (()) endings work?

P5: Yeah, **the concept of learning a game through, say, a mystery or a game is a very good idea.** I think, as I’ve *said so many times* already, something I do repeating in myself, is ... **it wasn’t interactive enough for it to be like a mystery.**

P6: I think- I think yeah, I think that *really* makes it **more of a game instead of a revision** or like an actual ... subject, which makes it **more interesting** ... to actually like *learn it* if

¹⁷⁵ The following feature is the summary of two different questionnaire questions. It is therefore comprised of two different items: “Applying what I learnt to reach a goal that is not connected to language learning (e.g., solving a mystery)” and “using the vocabulary I’m learning to complete tasks related to the narrative (e.g., helping a character by using the words I’m learning).” For the purposes of the analysis the researcher decided to analyze them in a single section.

you're not ... like **you don't feel as forced to play the game, because there's a ... kind of story aspect to it.**

P7: I think eh... my opinion like eh is eh **good to have like adventure**, this kind of activity to learn because I think **learning is not just to sit in the classroom to learn the grammar or other kind of things, it's also good like to combine with other activities** so maybe we can learn better.

I: Mhmh... Um, and the idea of solving a mystery? What do you think about that?

P7: Um, my idea of solving a mystery [repeats]... Is quite... is **quite eh interesting**. My idea is... Eh... [short silence] I don't have so much idea of what ... **I just think is great, it's amazing** [laughs].

P8: [smiling voice] I like that idea because I'm... **I think I learned better through that sort of um ... interactive way?** And it's **more interesting** and it gives you **more of an urge to learn Greek**.

Therefore, the idea of “*actually* solving a mystery” or “having that mystery aspect,” which represents a goal that is not strictly connected to language learning, seems to potentially give participants an “urge to learn Greek” and make them “*want to* learn ancient Greek more actively.” This observation resonates with several of Gee’s principles mentioned in Chapter 1 (§ 2.2), namely Number 17 (situated meaning principle),¹⁷⁶ Number 18 (text principle),¹⁷⁷ and Number 29 (transfer principle).¹⁷⁸ In particular, P4’s comments (“*actually* solving like mysteries, reading, listening, doing exercises based on that um helps with eh -- helps a lot with understanding different words. The -- how English relates to those words and like how eh the stems and the (()) endings work?”) relate to Gee’s principles 17 and 29; and P7’s comment (“I think learning is not just to sit in the classroom to learn the grammar or other kind of things, it's also good like to combine with other activities so maybe we can learn better”) with Numbers 18 and 29. Moreover, the comments confirm the motivating importance of a task-based approach, mentioned in earlier chapters, as well as its usefulness.

Nevertheless, from these comments and from experimental data, it is also clear that participants found having an external goal or a narrative-bounded goal not only motivating, but

¹⁷⁶ “The meaning of signs (words, actions, objects, artifacts, symbols, texts, etc.) are situated in embodied experience. Meanings are not general or decontextualized. Whatever generality meanings come to have is discovered bottom up via embodied experiences,” Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 224.

¹⁷⁷ “Texts are not understood purely verbally (i.e., only in terms of the definitions of the words in the text and their text-internal relationship to each other) but are understood in terms of embodied experiences. Learners move back and forth between texts and embodied experiences. More purely verbal understanding (reading texts apart from embodied action) comes only when learners have had enough embodied experience in the domain and ample experiences with similar texts,” Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 224.

¹⁷⁸ “Learners are given ample opportunity to practice, and support for, transferring what they have learned earlier to later problems, including problems that require adapting and transforming that earlier learning,” Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 226.

also useful, especially for helping them remember the meaning of ancient Greek words. In the experimental group, when asked to rate the usefulness of the feature “using the vocabulary I’m learning to complete tasks related to the narrative (e.g., helping a character by using the words I’m learning),” participants positively rated this feature.¹⁷⁹

The slightly more negative rating towards the usefulness of this feature for deducing unknown words, however, requires some extra considerations. According to Gee’s 15th principle (probing principle),¹⁸⁰ a constant, active “trial and error” dynamic is one of the positive aspects of DGBL. However, in order to experiment with “trial and error,” one has to receive a conspicuous and continuous amount of input (see Gee’s 10th principle) with which one can practice. Given that the experiment was limited to only two levels and two hours of playtime, it is inevitable that the amount of available input with which participants interacted was not sufficient to probe and test their hypotheses regarding unknown meanings. Therefore, even if the general rating of this feature for deducing unknown Greek meanings is still mostly positive, it can be hypothesized that if participants had had more input at their disposal through which they could have tested their hypotheses, the rating towards this feature could have been even more positive.

Lastly, the motivating potential of IF and of the mystery genre and their usefulness for contextualized learning (see Chapter 2 ¶ 3.2.2) also seems to be confirmed by the data.¹⁸¹

¹⁷⁹ For remembering meanings of ancient Greek words: 1 “Strongly Agree,” 5 “Agree,” 2 “Neither Agree nor Disagree.” For deducing meaning of unknown Greek words: 3 “Agree,” 3 “Somewhat Agree,” 1 “Neither Agree nor Disagree,” and 1 “Disagree.”

¹⁸⁰ “Learning is a cycle of probing the world (doing something); reflecting in and on this action and, on this basis, forming a hypothesis; reprobating the world to test this hypothesis; and then accepting or rethinking the hypothesis,” Gee, *What Video Games Have to Teach Us about Learning and Literacy*, 223.

¹⁸¹ This feature links to UDL consideration 7.2 “optimize relevance, value, and authenticity” as the researched offered tasks (i.e., solving the mystery) focusing on exploration and experimentation (i.e., finding the clues, testing possible solutions), as the consideration suggested.

4.3.2. Feature 9: variety of inputs¹⁸²

The variety of inputs (e.g., visuals, audio, and text) had a positive motivating effect on participants and was considered a good aspect of the adventure.¹⁸³ Furthermore, the possibility to choose how one wants to interact (e.g., watching, listening, reading) was also positively rated from a motivating perspective.¹⁸⁴ While talking about the future developments of the adventure and its possible difficulties from the player-learner's perspective, E6 commented:

E6: [...] in language learning [...] some people learn by visually, some people learn by sound, some people learn by doing other things themselves. So, I think, it will just *depend* on what kind of *learner* you are, really? But **I feel like in the actual game that we did, it was good because you heard the words, you saw the words in various different ways, and you were kind of like, in a way, interacting with them? So, I think the game already does that really well**, but that would be like something that *could be* ((difficult)) for the player.

E6's comment resonates with UDL's notion of inclusion and highlights a positive perception of these multi-input environment: not having a variety of interactive options and therefore being obliged to access the material through a single channel (e.g., through text as commonly happens in Greek language teaching) could represent a threat to inclusion and to a positive and fruitful Greek learning experience.

The visual components in particular seem to have played an important role not only for motivation, but also for their perceived usefulness for both remembering and deducing new words. While answering whether a similar adventure could help her stay motivated in the long

¹⁸² For the purposes of the analysis, this section is comprised of and examines at the same time four different features, initially investigated for their motivating potential: "visual components (e.g., images, drawings, etc.)" "audio (e.g., being able to listen to the material), "text (e.g., being able to read the material)" and "choosing how to interact with the material (e.g., listening, watching, reading)."

This feature links to UDL consideration 1.1 "support opportunities to customize the display of information" as the researcher offered the possibility of customizing volume and speed of video and therefore also of the speech/audio. It links also to consideration 1.2 "support multiple ways to perceive information" as the researcher offered in the videos subtitles in Greek, Greek text read out loud, Greek transcription at the end of the video, and animation matching sounds/text (e.g., an image of a scared character with a scared voice).

¹⁸³ Regarding the motivating potential of the visual components, five participants (E3, E4, E5, E6 and E10) showed a positive increase in the motivating perception of the visual components, two confirmed their initial positive perception (E7 and E9) and only E1 showed a decrease. Regarding the audio component, five participants (E5, E6, E7, E9 and E10) showed a positive increase, two confirmed their initial positive perception (E3 and E4) and only E1 showed a decrease. Regarding the textual component, four participants (E1, E3, E4, and E7) showed a positive increase, three confirmed their initial positive perception (E5, E9 and E10) and only E6 showed a decrease.

¹⁸⁴ The feature "choosing how to interact with the material (e.g., listening, watching, reading)" was investigated for its motivating potential and aimed at seeing whether giving more agency to students in choosing how to interact with the material could have a positive motivating effect. After the experiment, three participants (E4, E5, and E9) showed a positive increase in the perception of motivating potential of this feature, two confirmed their initial positive perception (E3 and E6), while the remaining three showed a decrease (E1, E7, and E10). However, all ratings remain in the positive spectrum (i.e., "Somewhat Agree," "Agree," or "Strongly Agree") after the experiment.

term, E7 comments: “it’s not you sitting at a desk writing on a piece of paper, it’s ... *using* the things like *visuals*, for example, so it will *stick* in your mind? Because often if people are staring at a piece of paper for too long they’ll just forget everything, but if there are *visuals* and *icons* and that sort of thing to *help*, then it’s *much more* likely to - - for you to actually remember it.” E7’s perception that images and icons aid with remembering vocabulary finds confirmation in previous literature.¹⁸⁵ E3 also pointed out the importance of a multifactorial approach for vocabulary learning:

I: Do you think that your skill to learn Greek vocabulary has improved through this adventure?

E3: Mh, I think so, yeah, because **being able to read and listen was really helpful for me because I can sometimes struggle with pronunciation of words?** So I think it has aided with my vocabulary.

I: And do you have the feeling that it helped you, for example, deducing or/and remember the meaning of words - - of unknown words?

E3: Yeah, it did. **I can remember not knowing a word and then the next time I saw it remembering what it was because I had heard it previously.**

I: And with deducing meaning of unknown words, did you...

E3: Pardon?

I: And for example, do you think that the game helped you learning how to deduce meaning of unknown words or to train how to?

E3: Yeah, um being able to *know* like pictures and stuff with it was helpful because then it would kind of go, “oh, it’s similar to this picture. So what could it be?”

I: Okay. So, am I right in thinking that you’re implying that the combination of the visual part and um acoustic part was helpful to deduce the meaning of unknown words?

E3: Yes.

Participants’ positive experience with the variety of inputs echoes teachers’ opinions: all three involved teachers noted the variety of inputs as a positive pedagogical aspect of the project during their interviews.

I: What are in your opinion the positive didactical aspects of this project?

T1: Um, **the combination of media?** Would you call it? The combination of *videos* with a *story read aloud with pictures* to help with the *vocabulary* um and also the *variety* of exercises accompanying the videos. Um, like **a lot of the... girls who I taught said “there was something for” -- the aim seemed to be there was something for everyone and that aim was fulfilled [...].**

T2: [...] I think the *videos*... **kids love paying attention to a video**, they *prefer* videos to human beings. **So you know, I think that’s really, really good as well.** And it just - - **it’s a different way of learning.** Like some people *much* prefer learning with someone telling them and learning together, like with a teacher *telling* them to do something. Other people do prefer taking it at their own pace and learning something *on their own* so that they can think through it themselves. **So for people who prefer learning on their own, I think playing a game on your own is very good.**

¹⁸⁵ Kuhlmann, *Fachdidaktik Latein kompakt*, 61.

T3: [...] So **they've got the - - the Greek, they can see the Greek, but they're hearing the Greek, and that's so important.** There's *so many times* that I've um seen courses, *especially* to do with Greek, that *don't have the sound of it*, and the students are expected to read it aloud *for themselves* without ever hearing it. And actually, I think for Greek in particular, when it's an unfamiliar alphabet for the students, hearing it is *hugely important*. And then also the - - **the images that you have where the story is playing out encodes that information and the vocabulary items in a context.** So it's not even just the single item that's coming up or whatever, but the *whole scene*, the *whole picture*, means that **an object is placed within its place of use.** And so, you see, um, you know, Alexander *in relation* to people as well as seeing Alexander, which again is - - **is incredibly um useful, I think, for creating that filmic aspect for students being able not just to hear the Greek and see the Greek, but to "see" the Greek, to actually play the Greek in their head as a film and see the story unravel- you know, coming together.** [...]

T3's comment ("I think for Greek in particular, when it's an unfamiliar alphabet for the students, hearing it is *hugely important*") finds a perfect correspondence in E3's comment ("being able to read *and* listen was really *helpful* for me because I can sometimes struggle with pronunciation of words? So, I think it has aided with my vocabulary"), highlighting the importance of the audio component in Greek learning.

Furthermore, all three teachers spontaneously commented on different aspects of UDL: 1) the idea of offering a learning place that could satisfy the majority of (or potentially all) different learners and their ways of learning (T1: "the *aim* seemed to be there was something for everyone and that aim was fulfilled") and their learning pace (T2: "Other people do prefer taking it at their own pace and learning something *on their own* so that they can think through it themselves. So for people who prefer learning on their own, I think playing a game on your own is very good");¹⁸⁶ and 2) the idea of offering a meaningful context for their learning (T3: "creating that *filmic aspect* for students being able not just to *hear* the Greek and *see* the Greek, but to "*see*" *the Greek*, to actually *play the Greek* in their head as a *film* and see the story unravel- you know, coming together").¹⁸⁷

In conclusion, the variety of inputs, especially the visual components and the audio component, encouraged by UDL and enacted through the DGBL environment, seems to be a very motivating and positive aspect, which further may be useful for vocabulary training, in the study of the ancient Greek language. Results support evidence from previous findings.¹⁸⁸

¹⁸⁶ T1's comment resonates with UDL considerations 1.1, 1.2. and 2.5., while T2's to 7.1.

¹⁸⁷ T3's comment resonates with UDL consideration 1.2., 2.5 and 3.3.

¹⁸⁸ Kuhlmann, *Fachdidaktik Latein kompakt*, 61; Aguilar García, "Vocabulary Acquisition in the Language Classroom," 119-20.

4.3.3. Feature 10: narrative component

“Experiencing a meaningful narrative while learning” also seems to have played an important motivating role in participants’ experiences.¹⁸⁹ Not only did the majority agree or strongly agree with the motivating aspect of this feature, but some participants also mentioned spontaneously the story as a positive aspect in the open question that asked them to describe their experience:

Q: How would you describe your experience with the adventure (positive and/or negative aspects)?

E3: I liked it and **enjoyed having the story to go along with it and found that helpful to learn words and remember them.**¹⁹⁰ Some words I didnt [sic] know and couldn’t find in the dictionary however which made it a bit difficult but it was really quite good altogether.

E5: **i [sic] think it was very fun** and **i [sic] am loving solving the mystery** however i [sic] think there needs to be more images explaining what words mean.

E10: **I found it really helpful as I could follow along with the story** despite not knowing all of the words, and **I even learnt some throughout the time playing.**

For participants, the narrative was not only enjoyable or fun, but was also helpful for improving their vocabulary competence, corroborating previous literature and this research’s standpoint regarding the role of context and narrative. For example, E5 commented:

I: Do you think that your skill to learn Greek vocabulary has improved through this adventure?

E5: Yeah, because I kind of guess - - **I kind of was able to guess more based off of the context of the story. So that helped me work things out.**

I: Okay, and for example, to deduce new words? [participant says “yeah”] through the rules?

E5: Yeah, **I learned what “slave” was. I think it was “doulas” [Gr. δούλας]?**

I: Yeah, exactly.

E5: **I didn’t know that before.**

E5’s comment shows how the narrative plays a fundamental role for motivation and comprehension also in those learners with more difficulties, as E5 commented at the beginning of her interview that the level of the Greek was too hard for her. Nevertheless, even if she

¹⁸⁹ This feature links to UDL consideration 3.3 “cultivate multiple ways of knowing and making meaning,” as the researcher incorporated storytelling and problem solving (i.e., the mystery) as ways to make meaning, as the consideration suggests.

¹⁹⁰ E3 mentioned the narrative aspect once again during her interview when asked about the most interesting aspects of the adventure: “I think following a story along and having that mystery aspect of it was really good.”

encountered difficulties and the language level was beyond her competences (E5: “it was just a lot of words that I didn’t know”), E5 was one of the most motivated participants. From the frequency with which she mentioned the narrative component (i.e., four times in the interview and once in the questionnaire), it can be hypothesized that the narrative component – along with the playful environment – was exactly what motivated her to keep going and ultimately also enabled her to learn some words in spite of the initial difficulty.

E5’s experience relates to E3’s comment, which highlights the importance of words embedded in a meaningful context. When asked whether the combination of playing and learning is in her opinion effective to learn the ancient Greek language, she defined it as “*really* effective because then **it’s telling stories rather than just learning random words that don’t really mean anything.**” T3 too supports E5 and E3’s opinions: “[...] that *narrative aspect* of it really helps as well, it works hand in hand with that [i.e., playing Greek in their head as a film]. The fact there is a **comprehensible narrative for them to play as a film** and see um as they go ahead.”

These comments underscore how important the narrative context was for participants: the mystery story was not only engaging¹⁹¹ or motivating, but it also gave meaning to the learning material avoiding “learning random [meaningless] words.” Further, it offered a context – reflecting the notion of γομνάσιον τῆς γλώσσης which was the reason why the researcher opted for the fictional narrative (see Chapter 2 ¶ 3.2.2) – through which one could learn how to “deal with the unknown.” On the topic, T3 commented:

T3: I think that if your goal was to be able to read some basic Greek and to *develop a range of strategies* for approaching Greek, *in particular*, if you *don’t know* what some chunks of it mean, I think one of the additional strengths behind this is the fact that you are puzzling out, well, “which bits - - when I’m dragging the word, and okay, it’s might just be worth the ‘angelos’ [Gr. ἄγγελος] in,” I need to actually work out how the rest of the sentence is putting it together. So **you get used to working with a sentence where you may not have all the information straight away**, and you have to match things up and things. And *in practice*, actually, *that’s a pretty good* - - **you’re developing a pretty good toolkit there for dealing with the unknown.** [...] So, in working with those bits of texts where you *don’t expect* the students to be able to translate it, **they still have to work out um how to find out the answer within the Greek.** And that’s actually pretty good as a - - you know, **you’re developing a range of strategies by asking them to do that (())** if not towards parsing Greek. And I think that’s a difference. **So I think if your learning outcomes are restricted to um certain aspects of what is considered Greek**, or being able to read Greek or *do Greek* or whatever, **which is to be able to take a piece of text and read it and**

¹⁹¹ E6: [...] the story itself was *really* well done.

T3: [...] the narratives are really engaging and you can follow them even if you don’t know *all the words and everything* [...];

T1: the *tension* in the story was *palpable* [...] a *compelling narrative* was a *really* positive aspect to it as well.

understand, comprehend the bulk of it, and to be able to dissect the ideas in - - amongst it, if I'm saying to logical conclusions with your cultural aspects and things, **and to be interested in the thing you're reading for its inherent meaning**, as opposed to "oh, look at the verb endings," **I think, you know, that's - - that's where this is going towards.**

T3's comment highlights how a narrative-driven experience in learning ancient Greek allows learners to "develop a range of strategies" and get used to working with sentences where one may not have all the information straight away. These strategies represent a "pretty good toolkit" which will help learners to become able to "take a piece of text and read it and understand, comprehend the bulk of it."

T3's observation seems to corroborate what has been said at the beginning of this dissertation regarding the goal of ancient Greek learning, namely that one of the most relevant goals in ancient Greek language learning is typically obtaining a reading ability that allows one to read as much of an original text as possible without the need for constant external aids (see Chapter 1 ¶ 2.1).¹⁹²

Lastly, T3 expressed her overall impression after the conclusion of the experiment mentioning once again the narrative component and its importance especially in beginner's material:

T3: Hm! I think, I mean - - I think that the - - the way you set it up is *fabulous*, actually. The - - the fact that the students get so many choices and options, and that **they feel engaged with a narrative that is interactive, rather than passive, that they have got lots of different things to do in it, it's - - it's the kind of thing I would hope to see more of in Classics, to be honest? Um you know, we can't just sit back and go, "maybe one day, if you're lucky, you'll read some Homer."** The students need to be excited *from day one about the thing that they're doing today*, and so much beginner material, certainly in the UK, is *turgid* and *promises future rewards* of reading great literature. Well, **let's give them a great thing to read today, and this was a great thing to read today, and make them want to be in the room.** For me, that's - - **that's a huge thing, is getting them excited about doing Greek**, and I think this - yeah. I know that from an educational point of view, that's perhaps not exactly, you know - - but **I think motivation is, within languages, is the biggest hurdle that we face, is that continued showing up, continued thinking, and staying with the target language all the time, and yeah, this is definitely a way to do that, a way to overcome those problems.**

From her comment, one main aspect emerges: the necessity of an interactive and engaging narrative at each learning stage, but especially at beginners' stage, as the promise of "maybe one day, if you're lucky, you'll read some Homer" does not guarantee persistence in motivation

¹⁹² Hunt and Lloyd, introduction to *Communicative Approaches for Ancient Languages*, 1.

towards learning ancient Greek, which is one of the two variables of intrinsic motivation (see Chapter 1 ¶ 2.2). T1 offers a similar observation regarding beginner’s learning material:

T1: [...] **the best textbooks... for... engaging pupils in a subject are ones which are narrative driven... and... pretty much the only tex -- the only Greek textbook that is used by English schools, certainly the only schools I know, is -- um, it takes a long time to become narrative driven? [...] Um, but it’s really hard – it’s really hard to write stories for beginners that are interesting enough to keep their attention and... easy enough that they can read them, so any- anything that can be -- any work towards getting compelling stories is absolutely worth it** and the best *Latin* textbooks, and there are lots of good *Latin* textbooks, are narrative driven in a way that is *not too* ambitious so [interviewer says “mhmh”] yes... **there is a... place for it um... in -- yeah in... teaching Greek beginners in a way that is more narrative driven.**

In conclusion, in light of these comments and observations, it seems that offering a compelling story-driven adventure for beginners may have three positive didactical effects: 1) short-term motivating effect: active experience with the narrative seems to make some learners more likely to endure a challenge in spite of the difficulties (see E5 and E10s’ cases);¹⁹³ 2) long-term motivating effect: instead of promising future rewards of reading great literature once they have learnt the language, learners can start engaging with stories and narratives in Greek from day one. This may contribute towards one variable of intrinsic motivation, namely persistence; and 3) incidental vocabulary learning: due to the engaging environment, learners learn vocabulary without noticing it.¹⁹⁴

4.3.4. Feature 11: difficulty customization

“Being able to choose a task according to its difficulty” was also motivating for participants. In the mid-questionnaire, administered after the first level, participants were asked to describe their experience with this feature. Each participant expressed a positive opinion about it. Some of the most interesting comments were the following.

Q: In this first level you could choose a task according to its difficulty. Describe your experience with this feature.

¹⁹³ It is important to note that this assumption does not extend to two participants (E1 and E7).

¹⁹⁴ E3: It didn’t really feel like I was *learning* and *yet* I was.

E5: Yeah, I learned what “slave” was. I think it was “doulas” [Gr. δούλας]? [...] I didn’t know that before.

E6: There were words that I don’t think I recognize [sic] before that I *do* recognize now because of this. [...] I think it [the game] would help people recall a lot more of the information they learned because they were so engaged, even if they don’t *notice* it’s happening currently.

E3: I found it good as then if it was easy you can make it harder but if it was difficult you can make it easier so I think it's a good idea.

E7: It was helpful to me as **I sometimes struggle with how hard things may ne [sic] in a Greek class.**

E8: **I like having the chance to challenge myself when I feel confident**, but also not being too pressured into picking the hard option.

E9: It is good as **I can build my confidence.**

E10: I feel like this is a good feature and **makes it more enjoyable** as someone is **less likely to get frustrated.**

Participants found this feature “good,” “helpful,” “very useful” or “very good” because they could choose how much they wanted to challenge themselves and always go back and try the other easier or more difficult option. This feature can also help participants build their confidence towards more difficult tasks and help them go at their own pace, assuring more learning independence and adaptivity and avoiding the risk of immediately getting frustrated and overwhelmed by the task. The positive expectations of four participants (E3, E4, E5 and E7) towards this feature, investigated in the pre-questionnaire,¹⁹⁵ were met in their actual experience with the two levels and did not change after the experience. However, for the other four participants, the experience changed their opinion positively (E1, E6 and E9) or slightly negatively (E10).¹⁹⁶

Therefore, this feature, implemented after the results of the pre-experiment, was perceived by participants as potentially motivating before the experiment. After the experience, the feature was confirmed not only to be motivating for almost all participants, but also to be useful for the general learning process especially on an emotional level (e.g., preventing frustration, encouraging confidence, optimizing enjoyment, etc.), which resonates with literature on DGBL (see Chapter 1 ¶ 3.3).

However, several further considerations should be noted. While describing his experience, E1 wrote “it feels very independent, no support if you don't understand, no difficulty customization.” A similar comment shows that even if participants with more difficulties or

¹⁹⁵ The statement to be rated was: “imagining alternative ways of learning ancient Greek, being able to choose a task according to its difficulty could be motivating for me.”

¹⁹⁶ E10 rating changed from “agree” in both pre- and mid-questionnaires to “somewhat agree” in the post-questionnaire. E10 did not comment on this feature in the post-questionnaire, while they commented “very good” in the mid-questionnaire when asked to describe their experience with this specific feature after the first level.

insecurities already consider the possibility of choosing between an easier and a more difficult level very motivating, this possibility is still not enough.¹⁹⁷

A first possible solution to this problem could be to offer not only two difficulty levels, but rather three with an increasingly less explicit scaffolding (“easy,” “standard,” and “hard”), as in most commercial video games. This way, one could start from the easiest level and later try to challenge themselves with the more difficult level. However, it is clear that the perception of difficulty is subjective and even if one guarantees a standardized difficulty for each level, as was seen in the experiment tool, this solution could still represent a problem for some students, as shown by E1’s experience.

Another solution to this problem of difficulty standardization, which relates to UDL’s principles, could be to offer variable difficulty levels for different aspects of the game: in commercial video games, for example, players are sometimes able to customize the difficulty of specific features, e.g., the difficulty of the fighting sections, according to their experience as player or to their desires. In DGBL, one could, for example, offer different difficult setting options related to e.g., the amount of spoken Greek, the amount of help and support available, etc. During her interview, while talking about the possible difficulties of further developing the game, E3 addresses exactly this topic by suggesting a “language customization” feature:

E3: I think the difficulty would be that **people progress at different rates so it might switch more dramatically than some people are ready for but then it might also switch less than people are ready for? And so that could frustrate either way which might decrease someone’s motivation for it?**

I: And do you have an idea how one could - - could go against this difficulty for example?

E3: Possibly **having the option to change more of it into the native language**. So start with getting *more* into Greek and then if someone thinks “no it’s too hard” they can change it *back* to more in their native language.

E3’s idea would leave the decision making in the hands of the players, assuring a high level of autonomy. However, one could not be sure that learners are “experiencing” enough Greek language, as they could for example choose to only play in their native language, thereby diminishing the didactical effectiveness of the approach. On the other hand, E5 offers another perspective on the topic:

E5: [...] I think **it would be better to change the difficulty based on the success rate of the questions** and not just “you’ve passed this level, it doesn’t matter your score you move on,” I think it should be based on the score ((so that they struggle)).

¹⁹⁷ For an analysis on this type of learner, see 3.1.1.

I: Okay, so, a development of the story according to the score you made, you achieved.
E5: You said that there would be less of the native language, I mean like, the better the score, the less of the native language, based off of previous...
I: Ah okay. Am I right in thinking that you're implying that according to your score, for example if you get a higher score, you get *more* Greek dialogue? [participant says "yeah"]
Okay, if you get a lower score you get more native language dialogue.
E5: Yeah.

Hence, E5 suggests calibrating the amount of Greek dialogue and in general of the difficulty based on the success rate of the single player. Even though this solution would presumably guarantee that the difficulty is tailored as good as possible to the actual competence of the player, it would drastically diminish one's perception of autonomy: therefore, one could not challenge oneself or playing an easier version, if they wanted to, as the difficulty would be automatically decided by the system. In video games, the latter is called Dynamic Difficulty Adjustment (DDA) and allows "the automatic mapping of playing experience with the individual skills [...] [and the] automatic real-time adjustment of scenarios, parameters, and behaviors in video games, which follows the player's skill and keeps them from boredom (when the game is too easy) or frustration (when the game is too difficult)."¹⁹⁸ In practice, this simply means that when a player is performing well, the game automatically increases the game's difficulty in response.

Therefore, the most practical solution seems to be the first one. This is also due to the fact that if the goal were, for example, to take all player-students to the same education goal (e.g., reading original Greek texts in Greek), the second or third difficulty customization would further complicate the actualization of such goal, since each learner would arrive at the original text with very different learning experiences and competences. Nevertheless, further research on this topic seems essential.¹⁹⁹

4.3.5. Feature 12: external resources

Connected to the feature 11 is the notion of "having external resources (e.g., grammar or dictionary) to use according to my needs." This feature was rated by the majority as motivating, as it presumably offered them the opportunity to autonomously find the required information. However, some comments merit further discussion.

¹⁹⁸ Mohammad Zohaib, "Dynamic Difficulty Adjustment (DDA) in Computer Games: A Review," *Advances in Human-Computer Interaction* (2018): 2.

¹⁹⁹ This feature links to UDL consideration 8.2 "optimize challenge and support" as the researcher offered options to vary modes of complexity or difficulty, as suggested by the consideration.

It is clear from the comments that participants wished for the possibility of having even more “in their face” (i.e., direct) help and support²⁰⁰ – this observation was also one of the most requested aspects that came up in the pre-experiment’s data analysis. Furthermore, they wished to automatically receive suggestions or offers of help from the system when stuck on a task for too long (as usually happens in video games). For example, some participants’ comments in the post-questionnaires regarding possible improvements seem to confirm this observation:

E3: Having the option to get the meaning of a word while doing one of the matching activities if you don’t know it (like **being able to press on the word and get the meaning as a pop up**).

E6: I think maybe if the help pop-ups were a bit more... It wasn’t like a separate link thing if it was a bit more in your face, but if you took a certain time struggle, it could say, “**Hey, you could have this pop-up that could help you,**” but that’s the only thing I’d say, really.

P1: A button so **when you click it, it gives you the definition so if you are stuck on a word, it gives you the definition** and you can learn from it and expand your vocabulary

The consistency regarding the desire for immediate support in the data seem to confirm the importance of Purushotma, Thorne, and Wheatly’s “three-tiered approach,”²⁰¹ already mentioned in Chapters 1 and 2. However, regarding the third tier of the aforementioned approach, namely the possibility for students to interact with the system and receive the metalinguistic information they need for completing the task, an important aspect needs to be stressed.

In future developments of similar tools for ancient Greek, it seems fundamental to link the explicit explanations and support to player’s exact requests of help. For example, if the player wants to receive information on the nominative, the offered support needs to be focused *only* on and bring them directly to this topic: players should not be required to look for the information they are looking for, as this additional time seems to cause frustration and confusion. The same observation seems to further be important for the other type of offered support, namely the vocabulary section. For example, E3 commented on the difficulties she experienced: “Um difficulties were when **I had no idea what the word was** and couldn’t... **I struggled to find it in the dictionary section a bit**. And there were some words that I just

²⁰⁰ If the support resources are not “in their face,” as E6 put it, but are for example offered through an external link as in the experiment, it seems like some players do not take the time to look at them. For example, E5 commenting on the difficulty of having to interact with many unknown words: “Ah, I didn’t really look in the dictionary [laughs]. That’s probably *my bad*, but yeah, probably should have looked in the dictionary.”

²⁰¹ Purushotma et al., “10 Key Principles.”

couldn't see *at all* in the dictionary. I don't know if that was just an *accident* or if I just couldn't remember the word. **I think that was the hardest part of it though, yeah.**²⁰²

²⁰² This feature links to UDL consideration 8.2 “optimize challenge and support” as the researcher offered tools and scaffolds aligning with the learning goals, as suggested by the consideration.

5. Limitations and future research recommendations

The current study is limited by the available resources at the time of the game development, by the sample size, and by some other aspects.

Regarding the resources, although the available platform allowed the implementation of an embryonal inclusive DGBL environment, due to platform limitations, it was not possible to guarantee a range of game mechanics, nor a more structured incentive system, which are essential for a real DGBL experience. For example, the resource “Branching Scenario,” through which the entire adventure was developed, drastically limited the variety of implementable types of game mechanics. The workaround that the researcher found in order to have some variety in the task types, namely, to only work with interactive videos, was still reductive in terms of mechanics’ diversity. Moreover, it required additional, simultaneous work with an external tool (here, *Canva*) to create the videos, which may be a problem and disincentive for teachers who are less confident with technology.

Nevertheless, in comparison to the pre-experiment, the experiment developed the narrative component, obtaining positive results both in terms of perceived usefulness and of motivating potential. Thus, the pre-experimental tool cannot be considered an actual example of DGBL, but rather an attempt at developing some aspects of gamification or even as a “[not so] chocolate-covered broccoli” experience,²⁰³ as mentioned in Chapter 1 (§ 3.4.2). On the other hand, the experimental tool, in spite of its limitations, was still defined as a game by the interviewees themselves. The researcher avoided using the word “game” during the interviews to refer to the experimental tool, as she did not want to influence interviewees and wanted to see whether players perceived the experience as a game. As Reinhardt points out, the distinction between what is a “lesson” and what is a “game” depends on “the perspective of the learner-player, a lesson acting like a game is gamification, while a game acting like a lesson is an educational game.”²⁰⁴ When asked whether they considered the experience a game, interviewees commented:

Q: Would you describe this adventure as a game?

E3: Yeah, I think I would, yeah.

²⁰³ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 10.

²⁰⁴ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 195.

I: And why would you describe it as a game?

E3: The aspect that it's not just schoolwork and that **you can do it outside just for a bit of fun**? Is what I think it makes it a sort of game?

E5: Yeah!

I: Okay.

E5: **Because you level up** when you're done and you... Yeah (()).

E6: Um, yes, I think I would. Based on games I played in the past, it does kind of play out like a **story game**, if you know what I mean? So where **you can make your own decisions and have to do tasks to achieve what you want**? So, yeah.

E7: I think I - - **I haven't really come across anything like it before**, so I don't really know what category we're going, so I've just put it in "game" because **it's interactive and you know, it's a video**, that sort of thing.

Thus, while it lacks some fundamental components of DGBL, the experimental tool can still be considered an amatorial example of inclusive DGBL for ancient Greek. Nevertheless, in future development and research, the game mechanics and the incentive system need to be incorporated.

Secondly, UDL was adopted as a guiding framework to develop an inclusive learning tool. On a research level, as observed by Zhang *et al.*, the theoretical overlap of some UDL considerations made their analysis particularly difficult.²⁰⁵ In spite of these difficulties, the framework still represents a useful guide for addressing inclusion and diversity in learning environments. However, this study seems to confirm the necessity of stronger theoretical (and practical) indications from the UDL research community on how to effectively implement the UDL considerations in light of explicitly mentioned evidence-based theories.²⁰⁶

On a didactical level, not all considerations of UDL were developed due to the platforms' constraints. Moreover, some of the analyzed considerations (such as 1.1, 1.2, and 2.5) were not always completely implemented. For example, in some exercises, the researcher could not add her voice reading the text, therefore not implementing 2.5. Further, she could not always align the text left nor modify fonts, dimensions or line spacing, which are suggested beneficial measures for dyslexic students (see Chapter 1 ¶ 4.3.2).

Thirdly, while scaffolding or more elaborated corrective feedback that guides towards the right solution has been generally implemented more in comparison to the pre-experimental version, this was not possible to incorporate to all exercises due to platform constraints. Overall,

²⁰⁵ Zhang et al., "Unraveling Challenges," 22.

²⁰⁶ Zhang et al., "Unraveling Challenges," 3.

it is evident that to create a more efficient and inclusive DGBL environment for ancient Greek learning, other host platforms should be considered.

A second resource problem derives from the lack of a real vocal synthesizer that can read ancient Greek. An ensemble of different Italian universities and high schools have been working on a vocal synthesizer for ancient Greek since 2003, but the tool is not yet commercially available.²⁰⁷ The lack of this tool at the time of development drastically increased time costs, as the researcher had to personally read all Greek texts. Moreover, the manual uploading of all of these audio files to the LMS platform frequently caused crashes, increasing time costs once again.

Another limitation derives from the available sample. Due to the small sample size, caution must be applied, as findings are not generalizable, although they highlight many points of scientific interest for further investigation. Even though quasi-experiments require a control group and the lack thereof has been criticized in many past DGBL studies,²⁰⁸ the purposes of this qualitative exploratory case study did not require it, as the goal of this research was to explore participants' perceptions and to identify emergent themes regarding DGBL for ancient Greek.

Furthermore, the absence of certified SEN learners in the samples did not allow investigation of the potential of this approach for SEN learners.²⁰⁹ Further investigation with a more significant sample, including SEN learners, is needed to gain a better, systematic understanding of the potential of an inclusive DGBL environment for ancient Greek.

Furthermore, the initial goal of embedding original Greek texts into the game was not achieved due to the experiment timeline. On this topic, T3 offered interesting opinions:

T3: if the *fake Greek* doesn't intersect *incredibly carefully* with real Greek, you hit a wall rather than a smooth progress into, and often, certainly what I find, is it's those security of patterns, and whilst I'm not saying - - I'm definitely not a big fan of chanting or anything, but it's the *act of noticing* and it's the moving *beyond exposure and beyond using L1 predictions, L1-based comprehension strategies, and moving into L2-based comprehension strategies, that transition point between one and the other is hard!* Especially if the L2 you're moving into is not *designed to*, well, obviously it's not designed to intersect with English, right? But it's not designed to intersect *with people speaking it* on a daily basis either. Yeah, yeah, that exactly, that - - the introductory Greek, I think, will be fine. It's - - it's that point of how do - - **how do you make a firm enough platform to make the transition?**

²⁰⁷ Silvia Gianferrari, "Scripting fonetico. Nuove risorse per leggere il greco antico mediante la sintesi vocale," *Tecnologie didattiche* 52 (2011): 61–3; Gianferrari and Neri, "Una sintesi vocale (anche) per la dislessia."

²⁰⁸ Aeschbach et al., "Systematic Review," 4.

²⁰⁹ Within the two samples of the experiments, there was a single ADHD certified SEN learner in the pre-experimental sample.

The risk of plateauing and facing a “brick wall as they hit Greek-Greek,” as she commented and as already observed for the IC method (see Chapter 1 ¶ 4.3.1), is an important aspect that needs to be further investigated. When asked how one could avoid this “transitional shock” between “fake-Greek” and real-Greek in a game, she commented:

T3: [...] **I genuinely think that some of the things that you’ve got in your platform here are, in my opinion, the way to go, things like staying in the Greek as much as possible**, and not saying, “this is a proxy for your home language, this is the language itself.” So when you’re talking about *staying in Greek* in your 3D world,²¹⁰ that’s exactly - **I think that that has to be the way to go, is staying in the target language from day one, if you can, or as much as possible. But there does need to be some discussion around what’s happening with it**, so that when students meet something else, they can - - they’ve got a *platform* for making - - for their noticing of things. Even if it’s just “notice that, notice that,” pointing at things, comparing things [...] Yeah, **so I think it can be built in, but it needs to be carefully scaffolded, so that they’ve got all these opportunities all the time to see**. And it’s hard work, I know because this is what I do [teacher laughs] is yeah, we write these stories, and it’s, yeah, it’s hard to *put it in, really hard*.

From her comments, several noteworthy research suggestions emerge: further studies could perhaps focus on this transitional phase between “fake-Greek” and Greek-Greek, investigating which factors could facilitate the process, or they could analyze a longer period of learning time with a DGBL tool that also offers original Greek texts.

Another suggestion for future research concerns intercultural competence. Intercultural competence has been here investigated only in terms of its motivating potential and usefulness for ancient Greek learning. Future research is recommended to investigate which specific aspects of intercultural competence can be fostered through the approach used for writing the intercultural insights. It could moreover systematically explore which characteristics the intercultural insights need to satisfy in order to effectively foster intercultural competence.

Lastly, the researcher did not make use of generative AI (Artificial Intelligence).²¹¹ Generative AI refers to “generative modeling that is instantiated with a machine learning

²¹⁰ T3 is referring to a possible development of the platform that the researcher mentioned during the interview asking her opinion about it.

²¹¹ Artificial Intelligence is not a new phenomenon given that its first references go back to the 1950’s, as observed by Damodar Singh Rajpurohit and Seal Rishika, “Legal Definition of Artificial Intelligence,” *Supremo Amicus* 10 (2019): 87. Moreover, AI is present in many everyday realities: for example, the search algorithms by Google and co., the recommendation systems by Netflix, Amazon, YouTube and others, the automatic word suggestions in texting etc. are all common example of everyday (mostly unaware) use of AI, as highlighted by Andrea Beyer and Konstantin Schulz, “Reflexion mit und über KI im AU,” Bundeskongress des Deutschenaltphilologenverbandes, Wuppertal, April 3, 2024, 10, <https://zenodo.org/records/10909593>.

architecture (e.g., a deep neural network) and, therefore, can create new data samples based on learned patterns.”²¹²

Interest in generative AI has risen in recent years because of the release of the tool ChatGPT by OpenAI in November 2022. ChatGPT is only one of the numerous generative AI realities that have been created in the last few years, and as Beyer and Schulz showed, it is almost impossible to keep track of every single new generative AI tool, as they seem to multiply at an incredible speed.²¹³

Since the release of the free version of ChatGPT by OpenAI in November 2022, many researchers have started considering the possible didactical use of tools based on generative AI and researchers of ancient Greek didactics have followed this trend. ChatGPT is an example of chatbot based on AI which already in its free version (ChatGPT 3.5) had shown incredible results in creating sensible, coherent and (mostly) cohesive responses to various queries. As Ross pointed out, ChatGPT’s release has instilled in researchers two antithetical feelings: fear or amazement.²¹⁴ The former group fears that AI based technology could replace human (real) intelligence in the future, while the latter group considers AI as the future for drastic improvement in various fields. Ross reckons that in Classics these two feelings are mostly combined and that it is however crucial for researchers and teachers of Classics “to continue to

AI is however not so easily definable since researchers do not agree on a single definition. The etymology can help one getting a closer understanding of the phenomenon, as observed by Rajpurohit and Rishika, “Legal Definition of Artificial Intelligence,” 87–89. The term “artificial” indicates firstly, something that is made by a human being and secondly and often linked with the first notion, it indicates something that reproduces a natural phenomenon, and which is *per se* not natural. On the other hand, “intelligence” indicates the ability to acquire and apply knowledge and/or skills, which is usually typical of animals. Hence, AI indicates an entity that emulates (thus, it is artificial) a natural phenomenon i.e., human intelligence: AI aims to reproduce the human intelligence mechanism e.g., reasoning, drawing inferences, communicating, etc., in order to do something. It is therefore an ability of digital computer and computer-related realities (e.g., robots). A well-rounded definition of AI could therefore be the following: “Artificial intelligence (AI) [is] defined as a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation” one may add, just like a human mind. See Andreas Kaplan and Michael Haenlein, “Siri, Siri, in My Hand: Who’s the Fairest in the Land? On the Interpretations, Illustrations, and Implications of Artificial Intelligence,” *Business Horizons* 62, no. 01 (2019): 17, <https://doi.org/10.1016/j.bushor.2018.08.004>.

²¹² Stefan Feuerriegel et al., “Generative AI,” *Business & Information System Engineering* 66 (2024): 112, <https://doi.org/10.1057/9781137005267>.

Generative AI differs from traditional AI. The latter aims to the generation and processing of big data, which implied the personalization, normalization and standardization of reality and truth through statistics, but implied also bias coming from machine-machine interaction. Moreover, AI implies that machines are able to learn, communicate, and take decisions. Therefore, traditional AI “performs specific tasks according to the pre-set rules and algorithms, [...] follows the pre-written program and performs the task accordingly, [...] does not create new content or respond to new situations without extra programming,” see “Generative AI vs. Traditional AI: Key Differences and Advantages,” *ARTiBA*, updated October 19, 2023, <https://www.artiba.org/blog/generative-ai-vs-traditional-ai-key-differences-and-advantages>.

²¹³ Beyer and Schulz, “Reflexion mit und über KI im AU,” 11.

²¹⁴ Edward A. S. Ross, “A New Frontier: AI and Ancient Language Pedagogy,” *Journal of Classics Teaching* 24, no. 48 (2023): 143, <https://doi.org/10.1017/S2058631023000430>.

learn and develop with the arising of new technologies so that we can provide the best teaching practice to ancient language students in this evolving, technical world.”²¹⁵

On a didactical level, Beyer and Schulz have recognized two macro-areas for the application of generative AI in schools, namely, the creation of didactical materials and the empowerment of “knowledge” (dt. *Wissen*).²¹⁶ According to them, AI could didactically help in the creation of images, presentations, audios, videos, texts (e.g., analyzing, explaining, interpreting, summarizing, correcting, paraphrasing, rewriting, translating, etc.), and exercises (e.g., automatically grading). As for the category “knowledge,” AI could help doing research, answering research questions, and representing knowledge graphically. However, there are several concerns on the use of AI, especially in the didactical field.²¹⁷ Amongst many, some of the most problematic consequences of AI are those concerning machine bias, copyright and privacy, quality, transparency, and ecology.²¹⁸

²¹⁵ Ross, “A New Frontier,” 143. The investigation about the use of AI and classical language is not something new and an exhaustive survey of published articles concerning this topic has already been conducted by Thea Sommerschild et al., “Machine Learning for Ancient Languages: A Survey,” *Computational Linguistics* 49, no. 03 (2023): 703–47, https://doi.org/10.1162/coli_a_00481.

²¹⁶ Beyer and Schulz, “Reflexion mit und über KI im AU,” 12.

²¹⁷ Beyer and Schulz point out the problematic aspects connected to the didactical use of AI: 1) results are more and faster to obtain, but that implies often an excessive amount of inputs that require orientation knowledge and basic skills from both teachers and students; 2) texts, images, audios, and videos are more easily, fast, and (for users, not for the planet) inexpensive to create, but one’s own creativity can be in danger as cognitive initial hurdles are lowered and structures are predefined; 3) distortions, hallucinations, bias and generalizations are very common, therefore it is impossible to confidently handle results without a proper education to AI; 4) AI tools only appear to be educationally appropriate as they are easily accessible, but without basic skills i.e., text competence, rates of user success drastically diminish. See Beyer and Schulz, “Reflexion mit und über KI im AU,” 50.

²¹⁸ Machine bias often implies a distortion or hallucination of reality that derives from the quality and quantity of data that the AI has at its disposal. It is important to remember that the data AI works on are only based on statistics and *not* on knowledge: thus, AI just collects and assembles in a different way *already existing data*, but does not create *new* knowledge. Therefore, if one for example asks AI to show the image of “someone intelligent,” different AIs tend to reproduce a similar image: a white, old, Caucasian man with glasses that somehow resembles Albert Einstein. This distortion of reality derives from the databases AI are trained on, which statistically overrepresent *inter alia* men, white people and people from the USA. Didactically speaking, a similar distortion of reality could thus reinforce dangerous stereotypes about race, gender and cultures. See Beyer and Schulz, “Reflexion mit und über KI im AU,” 17-21.

As for privacy and data protection, AI works with everything available on the Internet, therefore every data, even personal, could become freely accessible and freely used by the tool to reach whatever its goal is, which is even more dangerous when talking about minors in schools.

Moreover, quality of training data varies greatly and is often not specifically tailored to a specific area of application, which clearly enhances the danger of disinformation and false information. Nevertheless, AI works in the so-called “black box,” i.e., neural networks that do not allow one to understand where and how AI has found and elaborated data. This fact illustrates the transparency problem of AI. Finally, creating and using AI causes extremely high CO2 emissions and the consumption of enormous quantities of ecological resources (e.g., energy and drinking water) and money: just to make an example, ChatGPT (or any AI) has an extraordinary “water footprint” i.e., it “requires” each time 550ml of clean fresh water to carry out a simple conversation of 20-50 questions and answers, arising many ethical and ecological questions. See Beyer and Schulz, “Reflexion mit und über KI im AU,” 31-46.

For this specific research, generative AI could have helped create images, audios, videos and texts for the development of the game. However, being aware of the still not “error-free” nature of the generative AIs to write and read ancient Greek,²¹⁹ as well as the implied risks in creating images, the researcher decided to avoid working with generative AI. With the rapidly increasing quality of generative AI to work with ancient Greek, further research may also consider using it to create didactical material, while nonetheless remaining aware of the aforementioned implicated risks and costs.

²¹⁹ Edward A. S. Ross and Jackie Baines, “Treading Water: New Data on the Impact of AI Ethics Information Sessions in Classics and Ancient Language Pedagogy,” *Journal of Classics Teaching* 25, no. 50 (2024): 182, <https://doi.org/10.1017/S2058631024000412>.

6. Guidelines to create a DGBLL environment for ancient Greek: practice

Building upon the DGBLL theoretical guidelines of Chapter 1 (§ 3.6.1), the didactical theory of Chapter 2, and the experimental results, this section aims to list practical guidelines and causes for reflection in building a DGBLL environment for learning the ancient Greek language. It further offers suggestions on how to use a similar adventure in the classroom and/or on how to involve learners in the creation of the adventure itself.

Although many aspects require further research, as stated in the previous section, the following is built on the knowledge acquired through this specific research and therefore reflects mainly this experience. Nevertheless, it is conceived as *vademecum* for ancient Greek teachers or instructors without professional pre-competences in game design and without professional resources that still desire to experiment with DGBLL for ancient Greek. The suggestions specifically refer to the game genre IF and to the story genre mystery. Moreover, the implementation is described in relation to the used resources, namely a LMS platform, H5P's "Branching Scenario," the website *Canva*, and Google Presentation, and in relation to the implementation of the first level.

6.1. Step 1: choosing L2 and game proficiencies

In order to develop a DGBLL for ancient Greek, one must decide with which game proficiency and L2 proficiency one wants to work. The experiment was based on Reinhardt's option number three (see Chapter 1 § 3.6.1), namely developing different L2 proficiency variants for each task and letting players progress "according to the development of the game and language skills separately."²²⁰ From this developing experience with this specific typology, remarkable outcomes have been observed.

Firstly, difficulty customization appears to be one of the most important features to avoid demotivation, to guarantee the highest participation and enjoyment rates and to also maximize learning outcomes (§ 4.3.4).

Secondly, a two-option difficulty customization seems to be insufficient to avoid losing players along the way. A reasonable approach to tackle this issue could be to offer not only two difficulty levels, but at least three ("easy," "standard," and "hard"), as in most commercial video games. This modification could have positive effects on intrinsic motivation and engagement,

²²⁰ Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 202.

as literature shows that “choice had the greatest effect when participants were provided with three to five options among which to choose compared to when provided with only two options or more than five options.”²²¹ However, the risk of three options still not being enough to avoid learners’ demotivation persists.

Another possible strategy, echoed in participants’ comments, might involve implementing the possibility of choosing the difficulty level of single specific learning aspects in the game (as for the fighting sections in commercial video games). An example can be choosing the amount of spoken Greek or the amount of help and support. A last possible solution would be to let the system adjust the difficulty of the learning tasks according to success rate, as in DDA.

However, these last two options present some problematic aspects: first, time and resources, as for example neither option could be implemented on H5P’s “Branching Scenario” which is commonly used on LMS platforms; second, especially with the second option, one’s perception of autonomy would be threatened as players could not autonomously decide whether to play an easier version or a more difficult one compared to their own language proficiency if the system automatically decides the difficulty for them; thirdly, if the main didactical goal of the game was to guarantee that at the end of the adventure all player-learners had reached equal or comparable competences (e.g., reading competences to be able to understand small original Greek texts), the increased difficulty customization of different didactical parameters would also increase the number of players’ reachable outcomes in terms of experiences and competences. Consequently, some players could reach the main didactical goal without the required set of competences to interact with the original texts.

In conclusion, for a development on a LMS with “Branching Scenario,” a three-option difficulty customization seems to be the best solution in terms of time and resources.

6.2. Step 2: planning learning content progression, narrative and goal-oriented tasks

In step 2.1, one should decide the learning content progression and ideally divide it into the selected number of levels that one intends to develop (e.g., 10). The learning content progression should consider grammar, vocabulary, and cultural content.²²²

²²¹ Patall et al., “The Effects of Choice,” 295.

²²² For a detailed explanation of grammar, vocabulary, and cultural content, see Chapter 2 ¶ 3.1.1-3.1.3. Moreover, for some suggestions on how to improve the grammar tasks, see in this chapter ¶ 4.1.2. For suggestions of improvement for the cultural insight, see in this chapter ¶ 4.1.4.

Once done, one should start outlining the mystery narrative according to the number of levels (step 2.2),²²³ keeping in mind that the game's end goal is represented by uncovering the mystery, and the rewards for the completion of (some) tasks should be clues that help with this goal. This first draft should be schematic and simple, as the more complicated branching will be created in a second moment. As a guideline, at this stage, one should answer the following questions: 1) what is the context (i.e., setting)? 2) what is the mystery? 3) who are the characters? 4) what are the clues?

Before starting to sketch out the more detailed narrative and its connected goal-oriented tasks,²²⁴ it is suggested to first assess (step 2.3) which task types it is possible to develop with the available resources.²²⁵ Although it may sound self-evident, this is crucial to avoid wasting time planning unfeasible tasks and risking necessary major adjustments. Working simultaneously on these three aspects, despite the difficulty at an organizational level, seems to be the most effective way to guarantee cohesion within the game and save time in the long term.

Once it is determined which task types are available, using the schematic draft of the 10-level content progression and the schematic narrative, one should sketch on paper a storyboard developing the IF structure, meaning developing the branching options (step 2.4). Here the goal is to organically connect and elaborate learning content, narrative and goal-oriented tasks.

The experiment's branching structure was a foldback structure with two possible choices for tasks. A foldback structure is a mix between two different branching structures, namely the branch-and-bottleneck technique, already mentioned in Chapter 2 (§ 3.2.2), and the gauntlet. A gauntlet has "a relatively linear central thread, pruned by branches which end in death, backtracking, or quick rejoining."²²⁶ A gauntlet therefore usually tells "one anointed story, which can be adorned with optional content or prematurely ended with failure."²²⁷ Thus, in comparison to branch-and-bottleneck, a gauntlet offers a more linear structure that roughly corresponds to the "chain-structure" usually used in didactics to introduce content: namely,

²²³ For more information on how to write a compelling narrative, see Reinhardt, *Gameful Second and Foreign Language Teaching and Learning*, 213–14.

²²⁴ To work simultaneously on these three aspects (content progression, tasks and narrative), a simple three-column table can help visualize the development and interconnections between levels, while still having a general overview of the progression.

²²⁵ See Chapter 2 § 1.3. Using the resource "Branching Scenario," the researcher considered possibly developing only "alignment," "exploration," and "solution." Unfortunately, the available resources penalized the possible task type variety, which negatively influenced some respondents on a motivational level. This problem seems to be only solvable by choosing other resources for development.

²²⁶ Ashwell, "Standard Patterns in Choice-Based Games."

²²⁷ Ashwell, "Standard Patterns in Choice-Based Games."

content A precedes content B, content B implies thus content A; content B precedes content C which implies therefore content B, etc.

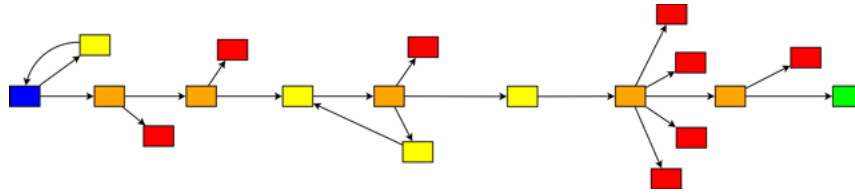


Figure 3.19. A gauntlet.²²⁸

However, a similar chain-structure, based therefore on a meticulously planned succession of contents that cannot be inverted, although it is replicable in a video game reality, could hinder the perception of making choices. In the pre-experiment, T2 offered a possible solution to this problem by saying: “if you were doing the *same* content but *choosing* different types of game for it, I think that would be *easier* um to manage because then people would just *pick* whatever game they find more fun, but they’re *still* learning the *same* content in the *same* order.” A similar solution would therefore at the same time guarantee that player-learners are learning the same content (e.g., content A) which is necessary for the following content (e.g., content B), but also that player-learners still have the perception of autonomy and choice – which for example could not be guaranteed in the pre-experimental tool. This solution, successfully implemented in the experimental tool, can be achieved through what Nelson calls “foldback structure.”²²⁹ As Figure 3.20 shows, the purple rectangles (i.e., the didactical contents) maintain the central chain structure of the gauntlet, while the orange rectangles (i.e., the different “quests” or ways of interacting with the connected content input) resemble the branch-and-bottleneck.

²²⁸ Ashwell, “Standard Patterns in Choice-Based Games.”

²²⁹Paul Nelson, “Designing Branching Narrative,” *The Story Element*, February 11, 2015, <https://thestoryelement.wordpress.com/2015/02/11/designing-branching-narrative/>, quoted in Finley, *Branching Story, Unlocked Dialogue*, 68.

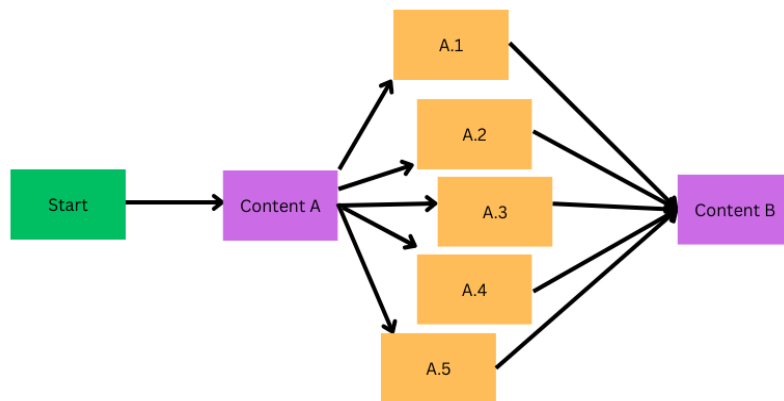


Figure 3.20. Foldback structure of didactical contents.

Therefore, through the foldback structure, one should here sketch on paper for each content in the level between three to five branching options, namely the narrative choices that are each connected to a goal-oriented task, while also keeping in mind that each task should also have three difficulty options, as mentioned in step 1.

Another important aspect to take into consideration in this phase is the repetition of material. Especially during the experiment, participants suggested implementing two aspects: 1) a vocabulary check with more vocabulary repetition and 2) a reading comprehension check at the end of the level (§ 3.2). In order to do so, it is recommended to plan a vocabulary task for each grammar content. For example, if content A concerned nominative singular and plural, a strategy could be to develop two narrative choices/tasks on this topic and the third one on the repetition of the pre-encountered vocabulary. On the other hand, regarding the reading check comprehension at the end of the level, it is advisable to organize the narrative so that at the end of each level there is another (shorter) interactive video completely in Greek (as the main one was) that briefly develops the narrative without adding new learning nor vocabulary material. Through this concluding interactive video, players can check their comprehension and vocabulary competences and decide whether they need to explore the other narratives in the level to strengthen their competences or proceed to the next one.

Although the results with this structure were positive in terms of motivation, it is important to mention that the researcher studied this structure through a single level played in a single experimental session, therefore she cannot predict the effects of a similar structure on players' motivation in the long term, if not through the participants' comments (§ 4.1.1 and 4.3.3). As

Finley points out, the danger of a foldback structure is that players might quickly lose interest as soon as they understand that every choice they make will always lead to the same conclusion,²³⁰ namely that their choices do not actually influence the development of the story.²³¹ Nevertheless, for a first non-professional implementation, the foldback structure seems the best didactical option in terms of time, resources and motivational outcomes.

6.3. Step 3: feedback and support

In this last step, the focus is on the feedback and support system. In both experiments, this system represented one of the biggest challenges. Due to platform constraints, it was extremely difficult to develop this section to a satisfying degree. However, after both experiences, the researcher collected some suggestions and causes for reflection on how to develop this system with the available resources.

First, it is important to restate what the researcher found impossible to implement with the resources at their actual state (i.e., August 2025): 1) corrective feedback in all tasks of H5P, as some types of content do not allow it; 2) pop-up vocabulary windows, namely hovering over a word with the mouse and receiving the translation or any kind of support; 3) dictionary section and grammar notes *within* the “Branching Scenario” and not as external resources; and 4) direct link between request of help and support material (e.g., players do not need to look though the support material to get the required piece of information, but they receive it as soon as they ask for it). All four points were also mentioned by participants as suggestions for future improvement.

Nevertheless, in spite of these limitations, some modifications within the bounds of the resources are feasible.

Regarding the grammar external resources, a possible compromise towards a solution for the fourth aforementioned limit would be to separate the grammar notes into small different Google presentations. The researcher prepared a single compact presentation per level of all grammar

²³⁰ Finley, *Branching Story, Unlocked Dialogue*, 68.

²³¹ Some other difficulties also emerge from a didactical perspective in creating a similar project. Among others, how can one guarantee that, no matter which quests they choose (e.g., in content A), player-learners are going to be equally “equipped” (e.g., vocabulary, syntax, etc.) for the next quests, (e.g., content B)? Is it possible to create multiple endings in order to guarantee autonomy and choice, even if the structure of the branching is quite obliged due to didactical contents? How can the original Greek texts be introduced within the quests? How can one optimize costs and time while guaranteeing all the above? All these aspects suggest the need for further investigation.

For a quick guide for creating a choice-based project, see Finley, *Branching Story, Unlocked Dialogue*, 177–207.

contents that would appear in that specific level (e.g., a presentation for all grammar contents of level 1, one for level 2, etc.). The links inside the level redirected each player to this kind of compendium and the players needed to look for the desired information on their own. Instead of creating a similar general compendium, a strategy could be to divide the information into smaller presentations so that each grammar content of the level would have a specific link that could be incorporated into a task focusing on this specific content. For example, if content A is nominative and singular plural, instead of adding the link to the general compendium of level 1 (including content A, B, C, etc.) into the task, one could instead add the specific link to nominative and singular plural of level 1 (including only content A). This strategy would indubitably require the creation of more presentations and therefore the management of more links, and players would still need to look for the piece of information, even though through less material. However, it would allow a more direct response to the request of support and *partially* address participants' suggestions for improvement.

Regarding the vocabulary, there seems to be no solution for the pop-ups that directly give meanings of words inside of "Branching Scenario." Even though the LMS allowed one to create anchors (i.e., internal links that target a specific anchored part of the platform), the researcher could not opt for this solution inside the "Branching Scenario." Moreover, hypothetically anchoring every word to its meaning in the dictionary section would require an incredible amount of time: the quantity of necessary anchors would be incredibly high and the dictionary page would continuously slow down the system because of the amount of material it would host. On the other hand, for the dictionary page, offering a sort of "controller" at the beginning of the page (see Figure 3.21) through anchors and anchored sections seem to be a solution to facilitate the search of a word.

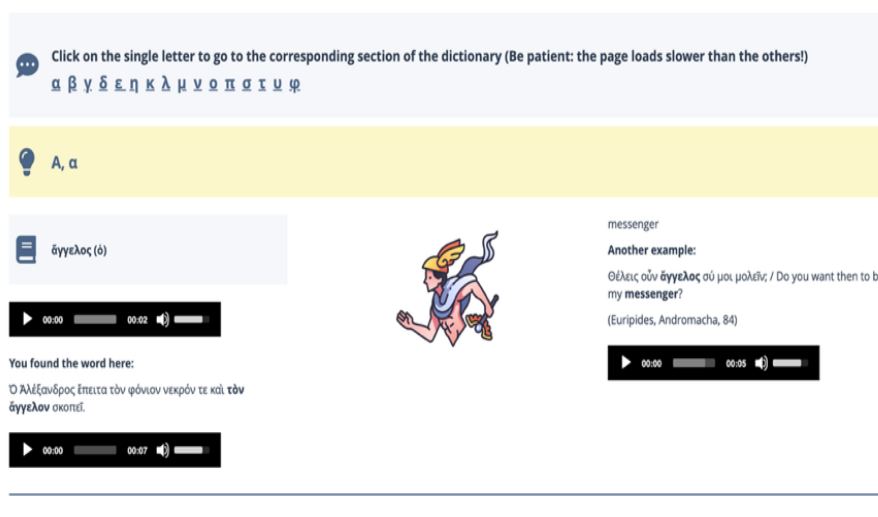


Figure 3.21. Example of the “controller” (blue section with the Greek letters) and the experimental version of the dictionary section.²³²

Moreover, according to results, it seems sensible to maintain the combination of audio, image and written text for each dictionary entry. However, as a participant suggested, it would be more didactically effective to add several different kinds of images to describe each entry. This way the comprehension and remembering processes would be aided, given that the association of image-word is personal and individual, and thus not all learners can benefit from the same standard association.

Lastly, for increasing accessibility for SEN students, T3 suggested some “micro-adjustments” to take into consideration: 1) slowing down the Greek text even more; 2) auto-pausing; and 3) segmenting the text on the screen.²³³ Interestingly, some of these adjustments resonate with a comment by E10.²³⁴

²³² For a comparison with the pre-experimental version of the dictionary, see Figure 4.

²³³ T3: [...] **I think there are some adjustments that might have to be made if you want to specifically check for access, such as slowing down the text, slowing down the Greek, auto-pausing on things so that they’ve got more time to read.** You know, there’s, **but I don’t see, there doesn’t strike me anything in here that is inherently exclusionary. Sometimes, I would say the only bit that perhaps - - is there’s a lot of text on the screen at some points, and there’s a lot of lines of it that go full width that is a bit difficult to chunk up if you’re, you know - - if you have any reading needs.** And um, perhaps that might be something to consider as the accessibility of the text. The sections where you had to put the English or complete the grammar note kind of thing? Assumes a learn- a reading age and a way that sentences unfold and sometimes you need to, for example, read *beyond the blank* to be able to fill in the blank? And I think that might be a *problem* for some students *in parsing out that sentence* and trying to get to what *the blank* was because it’s not following an *order*, that kind of processing order, those kind of things. **But I don’t think in the general set of, I think these are very, these are micro adjustments, right? These are adjustments to specific things within - - not within the overall.** And yeah, **at first thought, anyway, I’m not seeing anything that’s inherently exclusionary,** or in my opinion on it.

²³⁴ E10: I think it could be helpful to have (or to have the option) to pause after each sentence [sic] to give a moment to process and translate it, as I found that I needed to pause it a lot but changing the overall speed was mildly frustrating, another option to make the speed feel nicer could be to increase the space in between words when slowing it down rather than making the words themselves take longer to say.

6.4. Development team

The non-professional development of an adventure to learn ancient Greek requires a considerable amount of time, especially if the developing team is comprised of a single person. However, two strategies to reduce the workload are possible.

First, one possibility would be to work with generative AI. As mentioned in the previous section (§ 5), generative AI could help in the creation of didactical material such as sketching (or even writing) the narrative and the dialogues, creating tasks, images and videos. It is likely that for the amount of material required to create the video game, a subscription to an AI would be required, as most “free” AIs have a limit to the amount of material that can be created without a subscription. The costs of a subscription, however, represent a tradeoff in the form of a substantially reduced workload for the single developer.

A second possibility would be to create the adventure as a class or group project with Greek learners using project-based learning (PBL),²³⁵ which is a didactical approach that sees a group of learners actively and collaboratively working on an authentic project that usually produces an “end product.”²³⁶ With the learning content progression already decided by the teacher, a good strategy to develop the adventure with PBL would be to brainstorm the narrative with the entire class and afterwards assign each group a task. The teacher could assign each group a specific part of the development (e.g., the images, the videos, the writing, etc.) or assign each group an entire level to develop, so that each team would work on all aspects of the development. The end goal of the project could be to test the adventure with learners of another class, letting them play it and collecting opinions about it, similar to a scientific experiment. Although this strategy would require good coordination of the class’s workflow from the teacher’s side, the benefits would likely exceed the obvious time and resource savings, likely also increasing student motivation, as learners would themselves be the protagonists of the learning-making process.

²³⁵ For an example of the application of PBL in Classics, see Kyle Alexander Jazwa, “Hands-on Learning for Classics: Building an Effective, Long-Term Project,” *Journal of Classics Teaching* 18, no. 36 (2017): 1–7, <https://doi.org/10.1017/S2058631017000137>; Alice König, “Teaching Classics as an Applied Subject,” *Journal of Classics Teaching* 25, no. 49 (2024): 8–16, <https://doi.org/10.1017/S2058631023000727>.

²³⁶ Joseph S. Krajcik and Namsoo Shin, “Project-Based Learning,” in *The Cambridge Handbook of the Learning Sciences*, 3rd ed., ed. R. Keith Sawyer (Cambridge University Press, 2022).

6.5. Possible uses in the classroom

Regarding the possible uses of a similar adventure in the classroom, some interesting options may be able to be implemented.

Experimental participants were asked how they would envision this adventure being used. The majority of learners (6) would use the adventure during class to learn new things, while fewer would use it to practice things they have already learnt (3). Moreover, participants would use it at home to revise (5) or if assigned it as homework (4).²³⁷ Lastly, others would use it in their spare time to have fun (4) or to learn new things (3).

Regarding the possibility of using the adventure during class, using the game as a tool to learn new things seems to be the most appreciated option, at least in the eyes of the learners.

On this topic, T3 expressed herself as follows:

T3: Hm! So *I think* if - - if I had access to this and I was teaching my normal classes, *I think* what I would do is I would use it as 50% of a lesson. So, I like the fact that **students can go through it at their own pace** and can do that and I would *really* want to retain that because I think that was a very important aspect of it. **But I think I would want to prep them for it beforehand and provide some initial support before going into it and make sure that they had some ideas before they got there. And I would want to do a learning check at the end and make sure that they had um achieved *specific learning goals*.** So *I don't think* I would just let them loose with it. I think it would be, I would want to keep an eye on them from a more *holistic* - - even if I had ability to *check* their scores and *track* how they were doing, I think I would want more about *how* they got those answers and to check the *holistic progress* towards different things. But yeah, I - - **I think if it was available, we would - - we would be using it.** Yeah.

It is important to mention that T3 is referring to the current version of the experiment that therefore still does not provide the improvements discussed in the previous sections (e.g., reading and vocabulary checks at the end of each level, more embedded grammar, etc.). Nevertheless, both from teachers' and learners' perspectives, there seems to be room for the adventure to be used as a tool to let learners discover new topics at their own pace during class. According to T3's suggestion, the adventure could therefore be a systematic part of each lesson to introduce new content and let learners practice their competences, even while remaining under the supervision of teachers.

²³⁷ Participants were asked to select one or more options between six possibilities: [I can imagine using this tool in the following scenarios:] "At home, to revise," "During class, to learn new things," "In my spare time, to have fun," "At home, as homework," "In my spare time, to learn new things," "During class, to practice things I've already learnt."

Regarding playing the adventure at home on their own to learn new things, the current version of the adventure seems to still be too complicated, likely because the feedback and support system is not yet efficient. With an improved version (and also with the actual one), however, teachers could assign levels to play at home as a revision or as homework, or maybe even assign a level with a specific overarching task²³⁸ that would introduce a content re-explained by the teacher in the following class (in a sort of flipped classroom dynamic).

Lastly, given that the social component of DGBL in the current (but also in the improved) version of the game was largely nonexistent, as players could not interact with each other, a way to counter this could be to let learners play the adventure in pairs or small groups.

²³⁸ For example, if the teacher wants to introduce nominative and accusative, an overarching task could be: “play this level and note down in how many ways the word “girl” can be written.” This way, players would be guided to actively notice that words in Greek do not “stay the same” as in English, but rather change. The reason why this happens, namely that Greek has cases, would be introduced in the following class.

7. Conclusions

This case study provided a first qualitative investigation of DGBL, built upon a framework for inclusivity (UDL), for the ancient Greek language. In particular, the research focused on young British learners' perceptions of the effectiveness of an inclusive DGBL approach both for intrinsic motivation and for vocabulary learning. In light of previous sections, some interesting conclusions can be drawn.

Regarding RQ1, focusing on the possible effects of inclusive DGBL on intrinsic motivation to learn ancient Greek, data show that most participants, who were already mainly motivated before the experiment, remained intrinsically motivated during the adventure or became even more motivated after the adventure. This observation seems corroborated by the sample's average score of 5.8/7 on the IMI subscale measuring intrinsic motivation: this average remained constant after both levels. Moreover, the researcher noticed three main patterns in player-learners' motivational behaviors that have been analyzed through the notion of learning resilience. According to this analysis parameter, players can be divided into "resilient adventurers" and "non-resilient insecure players." Moreover, a third category, not strictly influenced by the notion of learning resilience, is represented by the "easily bored yearners." The first category includes most participants and represents a player that, in spite of minor or major encountered learning difficulties, kept playing and discovering the adventure, motivated by the compelling narrative or the desire to reach the goal of solving the mystery. Otherwise, the second category describes players that likely have low self-esteem and are generally more insecure and who, although they may be intrigued or recognize positive aspects in the experience, are immediately paralyzed by the encountered learning difficulties and subsequently give up the challenge. Lastly, the third category describes players that desire more inputs and that lose interest in the experience as soon as they notice that there is little variety in the types of tasks. For keeping the second and third categories motivated in future development of the tool, some suggestions have been made throughout the analysis. To summarize, DGBL built upon an inclusive approach (UDL) seems to be potentially positive to maintain and even increase intrinsic motivation in ancient Greek learners.

Regarding RQ2, focusing on the perception of usefulness of these didactical approaches to learn ancient Greek, findings show a quite high experimental sample average of 5.6/7. Words such as "helpful," "useful" and "it helped with..." were used by participants during the interviews or in the free comments to describe the experience. Moreover, a relevant observation

is that the usefulness of the adventure was mentioned by participants especially in relation to learning and remembering meanings of new vocabulary, which positively correlates with RQ4.

Regarding RQ3, which focused on investigating the motivating component of DGBL and UDL features, all analyzed features (1-5) were perceived as motivating by most participants. In particular, feature 1 (“having fun”) was positively rated by participants and also mentioned by teachers in their interviews. Thus, the idea of having fun through playing seems to be a valid method for fostering engagement and perseverance in the study of ancient Greek.

Feature 2, focusing on the process of autonomously discovering how some language processes work, seem to be potentially motivating, however, in order to maximize the motivating effects of this feature, structural adjustments are required, namely a more systematic scaffolding throughout the entire experience.

Features 3 and 4, focusing on the process of making choices (narrative or learning content), were perceived as extremely motivating. “Making narrative choices” (feature 3) was mentioned unprompted five times by participants, which resonates with data from the initial survey (Survey A). In comparison, feature 4 was mentioned unprompted only once by participants, showing perhaps a weaker motivating influence than feature 3. Thus, this seems to suggest that being involved in first person and able to interact with the narrative may be more motivating and important to learners than being able to choose the learning content.

Lastly, feature 5 (i.e., the cultural insights) was defined as more interesting than motivating. Nevertheless, given that interest is a component of intrinsic motivation, it can be hypothesized that by fostering this interest-component could benefit intrinsic motivation. Moreover, T3 described cultural insight as resources that foster a “higher order thinking,” which could therefore function almost as a “pre-workout” for the understanding of ideas and notions underlying original Greek texts. However, some modifications are required to maximize these positive effects, namely offering a richer interactivity in the interactive videos and adjusting the length of the resources according to a *Fundamentum-Additum* differentiation.

Regarding RQ4 and RQ5, focusing on the usefulness of DGBL and UDL features to remember or deduce meanings of Greek words, feature 6 (i.e., the English translations) was considered useful for remembering meanings, however, data showed that this specific feature is likely to be perceived as most useful when presented in combination with other media such as audio and especially visuals. This finding echoes literature on vocabulary learning.²³⁹ Feature

²³⁹ Aguilar García, “Vocabulary Acquisition in the Language Classroom,” 119-20; Kuhlmann, *Fachdidaktik Latein kompakt*, 61.

7 (“learning vocabulary by roots”) was already perceived as useful by the participants before the experiment: the intervention did not increase this perception, but it rather confirmed it and thus corroborates previous literature.²⁴⁰

Lastly, data showed that, although some features were separately investigated either for their motivating potential or their usefulness, they were mentioned by participants as both motivating and useful. This observation refers to features 8-12. Feature 8, namely having an external goal such as solving a mystery, was mentioned as a motivating factor, but also as being helpful to learn vocabulary due to the context it offered. Feature 10 (narrative) was also mentioned for the same reasons. Moreover, this specific feature seems to have three main effects, namely maintaining short-term motivation, fostering long-term motivation, and facilitating incidental learning. The collected data on this feature seem to confirm the hypothesis that a narrative, although fictional and not showing original Greek but a fictive and “propaedeutic” version of the language, represents a “gym for the language,” or a meaningful context in which to practice learning ancient Greek. Further, the linguistic immersion into the language offered by the omnipresent narrative seems to be part of the “pretty good toolkit,” mentioned by T3: being surrounded by a narrative from the beginning of the learning process appears to be a strategy to practice dealing with the unknown.

Feature 9 (i.e., the variety of inputs) was also one of the most appreciated aspects of the project. The combination of audio, visuals, and text was considered useful for different types of learners, as it allowed players to visualize Greek and “*play the Greek in their head as a film*” (T3). Once again, images and icons were particularly appreciated by participants, highlighting the necessity of the visual component (and in general of multi-inputs) as a general good and inclusive practice in Greek didactics.

Lastly, features 11 (i.e., difficulty customization) and 12 (i.e., external resources) were also considered useful and motivating. Feature 11 was particularly appreciated by participants as it allowed them to learn at their own pace without being overwhelmed. However, findings also show the necessity for improvement in both categories, namely even more customization for the difficulty options and modifications to the external resources: help and support should be even more direct, immediately accessible, and “in players’ face[s].”

Furthermore, although this study initially aimed at also investigating SEN students’ perceptions, the presence of a single certified SEN student in both samples prevented the

²⁴⁰ Rongoni and Grisendi, “Chioma o radici?” 65–74; Kuhlmann, *Fachdidaktik Latein kompakt*, 61–3.

researcher from being able to observe the phenomenon. Thus, it is recommended that further research samples include a more significant number of SEN students.

To conclude, this exploratory case study offers interesting perspectives on the potential of an inclusive DGBL approach for ancient Greek language instruction. Findings seem to suggest the positive didactical potential of this novel approach both for ancient Greek pedagogical research and school instruction: this dissertation offered a first introduction to this research field, which in relation to ancient Greek didactics is still vastly unexplored, highlighting many aspects, relevant topics and research questions still in need of further investigation. Thus, further research could use this study as starting point to investigate and offer more detailed understanding of DGBL for ancient Greek instruction e.g., by investigating other groups of people (i.e., other nationalities, other age groups, etc.) and bigger samples for an extended period of time. This would highlight whether the positive effects observed in this research find correspondence also from a quantitative perspective, with different respondents and whether this potential is long-term and/or short-term.

This study suggests that learning video games that offer multiple ways of interaction and involvement with the learning material could represent a positive didactical strategy to further motivate and help learners in the study of ancient Greek at a school level. Thus, it corroborates Plato's quote used to open this study, namely that a preferable strategy to keep children to their studies is not by compulsion, but rather *by play*. Moreover, it shows that, in spite of costs and time, it is still possible to develop an "at-home" version of a potentially motivating and didactically effective version of an inclusive DGBL environment to learn the ancient Greek language. Hence, it shows that a similar approach could also be implemented in schools by teachers themselves.

This case-study hopes to open the door to a new rich field of research in didactics of ancient languages, a still vastly under-researched field, especially in relation to ancient Greek.

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Appendix

A. Experiment content progression

The following table summarizes the grammar, vocabulary, and cultural content of the experimental tool:

- **Bold:** anticipated topics in comparison to Greek to GCSE 1;
- Underlined: target of the vocabulary tasks;
- Not underlined: words present in the narrative and explained to aid comprehension but not the focus of the didactical intervention;
- **Red:** words that experiment participants had never seen before during class.

Level	Grammar content	Vocabulary content	Cultural content
1 (tested)	<ul style="list-style-type: none"> • 1st declension (nominative -η, accusative -ην) • present tense (verbs in -ω) • female article nom. acc. sing. • common connecting words • Direct questions (pronouns and adverbs) • ἐν + dative • ἐστί 	<ul style="list-style-type: none"> • <u>ἀδελφή</u> • <u>ἀκούω</u> • Γλαύκη, ης • <u>δούλη</u> • <u>ἐν</u> • <u>ἐστί</u> • <u>ἔχω</u> • <u>κόρη</u> • <u>λέγω</u> • Μακεδονία • <u>οἰκέω</u> • Πέλλα, ης • <u>φέρω</u> • <u>φιλέω</u> • <u>φυλάσσω</u> 	<ul style="list-style-type: none"> • the Greek language and standards languages.
2 (narrative bridge, not tested)	<ul style="list-style-type: none"> • 2nd declension (nominative -ος, accusative -ον) • male article sing nom. acc. • expressing motion towards (εἰς + acc., πρὸς + acc.) • 2nd pers. sing. and plur. imperative present 	<ul style="list-style-type: none"> • <u>ἄγγελος</u> • <u>ἄγω</u> • βασιλεύς • βοή • <u>δούλος</u> • εἰς • <u>ἐξαίφνης</u> • θεός • <u>ἵππος</u> • <u>λόγος</u> • <u>νεκρός</u> • <u>ποταμός</u> • πρὸς • <u>στρατηγός</u> • <u>στρατός</u> • <u>συλλαμβάνω</u> • <u>τρέχω</u> 	-

3 (tested)	<ul style="list-style-type: none"> • 1st declension plur. (nominative -αι, accusative -ας) • female article nom. acc plur • 2nd declension plur (nom. -οι, acc -ους) • male article nom. acc. plur • verb to be • expressing time (accusative) 	<ul style="list-style-type: none"> • αγορά • ἄρα • αὐλητής • βαίνω • γράφω • δέκα • ἐκκλησία • ἐνταῦθα • ἔπειτα • ἐπιστολή • ἔτη • κλαίω • μένω • ὀβολός • <u>οἰκία</u> • πέμπω • σκοπέω • <u>στολή</u> • τέλος • φονεύς • φόνιος 	<ul style="list-style-type: none"> • Nationality? I'm ancient Greek! • Alexander the Great, Hellenism and globalization.
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The following summarizes which grammar content experiment participants had already learnt before the experiment:

- 1) regular verbs in -ω in the present, future, imperfect and aorist active tenses (all persons, singular and plural);
- 2) present active infinitive;
- 3) the forms of the definite article; nouns of the following types in all cases (minimal on dative): τιμή, χώρα, νεανίας, λόγος, δῶρον;
- 4) the declensions of the pronouns ἐγώ, σύ;
- 5) numerals to ten;
- 6) all genders and cases, singular and plural, of adjectives of the types: σοφός, μικρός;
- 7) standard uses of the cases;
- 8) standard patterns of word order (including sandwich construction);
- 9) direct statements;
- 10) direct questions;
- 11) some expressions of time;
- 12) a range of simple clauses without subordination.

B. Game and learning mechanics: LM-GM model

B.1. Alphabetic competence

The following are examples of tables to sort LMs out according to the LM-GM adaptation for ancient Greek (discussed in Chapter 2 ¶ 3.3.1). The LM and GM columns are left blank to be completed as needed.

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
Transliterate from ancient Greek to Latin letters and vice versa	Transliterate: <i>ἰδέα</i> <i>κίνημα</i> <i>κομμα</i> <i>χαος</i>	<i>Greek to GCSE</i>		
Transform words written in lowercase letters to uppercase letters and vice versa. Pay attention to the right accent	<i>ΣΩΜΑΤΩΝ</i> <i>σωμάτων</i> <i>ΜΕΡΟΣ</i> <i>μέρος</i> <i>ΛΟΓΟΥΣ</i> <i>λόγους</i>	<i>Méthodos, Kantharos</i>		
Put words in alphabetical order	-	<i>Méthodos</i>		
Write in ancient Greek transliterated words. Pay attention to the right accent	<i>meden</i> <i>μηδέν</i> <i>philosophon</i> <i>φιλοσόφων</i> <i>me</i> <i>μή</i>	<i>Méthodos, Kantharos</i>		
Write grammar denomination according to the accent (e.g., paroxytone, oxytone etc.)	<i>τίς</i> = oxytone <i>ῶρος</i> = paroxytone <i>ἄνθρωπος</i> = proparoxyton <i>e</i>	<i>Méthodos</i>		
Puzzle: words in ancient Greek must be connected with the translation. In the middle there are letters that will be “touched” while connecting the two words. The touched letters will give the name of a goddess	-	<i>Kantharos</i>		

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
Fill in the famous quotes by transforming the uppercase letters to lowercase	ΓΝΩΘΙ ΣΑΥΤΟΝ _ _ _ ὦ _ _ _ _ _ ὀ _ _ Know yourself	<i>Kantharos</i>		
Find the right written phrase according to enclitics rules (4 examples given, just one is correct)	<i>Κῶμαι τινές</i> <i>Κῶμαί τιναι</i> <i>Κῶμαί τινες</i> <i>Κῶμαι τίνες</i>	<i>Meletémata</i>		

B.2. Vocabulary competence

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
Highlight the common stems of modern words	Find the common stem: beauty, beautiful, beau etc.	<i>Méthodos</i>		
Understand suffixes/prefixes derivative mechanism	if eu- means “good” and <i>εὐσέβεια</i> means compassion, then <i>ἀσέβεια</i> could mean...	<i>Méthodos</i>		
Find words in your language that are composed of Greek suffixoids	Suffixoid: helio- derives from <i>ἥλιος</i> , sun A derived word: heliocentrism	<i>Méthodos</i> , <i>Kantharos</i> , <i>Greek to GCSE</i>		
Given a compound word in your native language, try to guess the meaning	Guess the meaning of the following compound word Lithography	<i>Athènaze</i>		
Given the basic form of a verb, hypothesize what a compound form could mean. Check the right answer in the dictionary afterwards	<i>βλέπω</i> , to look at <i>ἀναβλέπω</i> ?	<i>Méthodos</i> , <i>Athènaze</i>		
Translate a given word and find another grammar element that derives from the same stem	<i>ὁ δικαστής</i> , the judge → <i>δικάζω</i> , to judge	<i>Kantharos</i> , <i>Athènaze</i>		
Write the correct verb to describe the image	in the picture there is a man walking,	<i>Méthodos</i> , <i>Kantharos</i>		

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
	one has to write ἔρχομαι			
Fill in the blank with given words according to the meaning of the phrase	<p>Ζεὺς ἄνθρωπος ἵππος Ποσειδών</p> <p>Ὁ ___ θεὸς τῆς θαλάσσης ἐστίν</p>	<i>Kantharos, Suburani, Meletémata</i>		
Order the words into the correct categories	<p>ἄνθρωπος θύω σελήνη ἥλιος</p> <p>Categories: 1) sky and earth, 2) men and gods, 3) fair and unfair</p>	<i>Kantharos</i>		
Connect the antonyms	ἀεὶ – οὔποτε (always – never)	<i>Kantharos, Meletémata</i>		
Connect the synonyms	ὁ βίβλος - τὸ βιβλίον	<i>Meletémata</i>		
Explain the words writing in ancient Greek	σωφρονίζω = βελτίων γίγνομαι	<i>EULALIA, Athènaze</i>		
Find the odd one out	<p>σπεῖρε, δοῦλε, πῖπτε, φέρε</p> <p>the incorrect word is δοῦλε (a vocative between imperatives)</p>	<i>Meletémata</i>		

B.3. Grammar competence

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
Underline with three different colors stems, desinence, and prefixes/suffixes	<i>νόμοις</i>	<i>Méthodos</i>		
Grammar analysis	Find verb, subject and object: <i>Ὁ Ἀλέξανδρος τὸν Φίλιππον φιλεῖ</i>	<i>Méthodos, Kantharos</i>		
Verbal analysis (tempus, modus etc.)	<i>Εἶμι</i> = 1st person singular, indicative present	<i>Meletémata</i>		
Translate phrases or texts from ancient Greek in your language	<i>Ὁ Διονύσιος, ὁ τύραννος, τὴν ἀρχὴν ἔχει</i>	<i>Méthodos, Kantharos, Suburani, Greek to GCSE, Meletémata, Athènaze</i>		
Translate phrases or texts from your language in ancient Greek	The tyrant Dionisus has the power	<i>Greek to GCSE, Meletémata, Kantharos, Athènaze</i>		
Fill in the blank (with different linguistic elements)	<i>Οἱ ἑταῖροι οὐκ ἐθέλουσι _____ (= σώφρονες εἶναι): τὰς γὰρ τοῦ Ἥλιου βοῦς καὶ</i>	<i>Kantharos, Suburani, EULALIA, Athènaze, Meletémata</i>		
Fill in the blank in a translation which is missing a single missing element (e.g., how to express time) and vice versa (from a phrase in your language fill in the blank in ancient Greek)	<i>Ἐνταῦθα ἔμεινε Κῦρος ἡμέρας τριάκοντα</i> There Kyros stayed _____	<i>Méthodos, Kantharos, Meletémata, Athènaze</i>		

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
Complete the conjugation/declension of a verb/noun in ancient Greek	-	<i>Méthodos, Kantharos, Meletémata</i>		
Translate in your language a decontextualized verb form	ἦν = I was ἦσθα = you were etc.	<i>Méthodos, Kantharos, Suburani, Greek to GCSE</i>		
Translate a phrase and rewrite it changing verb <i>tempora</i>	Ἐνταῦθα ἔμεινε Κῦρος ἡμέρας τριάκοντα Ἐνταῦθα μένει Κῦρος ἡμέρας τριάκοντα	<i>Méthodos</i>		
Transform an element	Transform the highlighted parts with an equivalent expression: <u>Ὁ δοῦλος</u> <u>ἐξέρχεται ἐκ τῆς</u> <u>αὐλῆς, ὁ δὲ</u> <u>δεσπότης αὐτὸν</u> <u>ὄρᾳ = Ὁ</u> <u>δεσπότης ὄρᾳ τὸν</u> <u>δοῦλον</u> <u>ἐξερχόμενον ἐκ</u> <u>τῆς αὐλῆς</u>	<i>Meletémata</i>		
Transform an element from singular to plural (e.g., nominative to genitive etc.) and <i>vice versa</i>	ὁ ἄνθρωπος = οἱ ἄνθρωποι	<i>Greek to GCSE, EULALIA, Meletémata, Athènaze</i>		
Fill in the blank of ancient Greek phrases with the corrected declined case of a given word	Ὁ ἄνθρωπος ἔρχεται σὺν ... (given word: ὁ φίλος) right answer: σὺν φίλοις	<i>Méthodos, Suburani, EULALIA, Meletémata</i>		
Multiple choice (grammar questions)	The second person singular of indicative present active of τίθημι is:	<i>Méthodos, EULALIA</i>		

Type of exercise	Example of exercise	Found in	Corresponding LM	Corresponding GM
	<i>τίθης τίθησι τίθετε</i>			
Text comprehension questions (multiple choice or T/F) written in ancient Greek	<i>ὁ Φίλιππος βούλεται θύειν</i> True False	<i>Kantharos, EULALIA</i>		
Answer in ancient Greek	Question: <i>Τίς θεὸς αὐτοῖς ἐχθρὸς γίγνεται; Διὰ τί;</i> Answer: <i>Ὁ θεὸς αὐτοῖς ἐχθρὸς Ποσειδῶν ἐστὶ ὅτι ...</i>	<i>Meletémata, Athénaze</i>		
The main text is written in your language. Fill in the blank in ancient Greek and <i>vice versa</i>	Er braucht drei <i>θανμάσια</i> _____ Gegenstände: geflügelte Schuhe, <i>οἷς</i> <i>μακρὰς ὁδοὺς</i> <i>ἔρχεσθαι δύναται</i> ...	<i>Kantharos</i>		
Connect the basic form of the verb to the conjugated form and translate	<i>εἰμί</i> - ἦσαν - they were	<i>Kantharos</i>		
Multiple choice to fill in a blank	<i>Αἱ κόραι</i> _____ <i>ἐν</i> <i>τῇ ἀγορᾷ</i> a) <i>βοῶσιν</i> b) <i>βοοῦσιν</i> c) <i>βοᾶται</i>	<i>Suburani, EULALIA, Meletémata</i>		

C. Filters to adapt the LM-GM for ancient Greek

1) Available resources

- 1.1. Developing tools: what are the difference between the development environments I am considering? What are the financial and time costs, and required starting competences to use each environment I am considering?
- 1.2. Ancient Greek: which textbooks and other instructional examples can I consider to find Learning Mechanics to train the ancient Greek competences I want to train? How can I decide which textbooks and examples to take into consideration?

2) Target group

- 2.1. Am I planning the game for a real class (e.g., the class I am teaching) or a generic hypothetical class (e.g., generic beginners)?
- 2.2. Is the game developed to be played alone or in the classroom with the teacher?

3) Type of gameplay

- 3.1. Do I want a linear play or an emergent play?

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