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A QUALITATIVE STUDY ON ENGAGEMENT IN GAMIFIED FOREIGN LANGUAGE ACTIVITIES

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SUMMARY

1. Introduction

In recent years, there has been a growing interest in gamification in the educational field, fueled by technological advancements and changes in students' needs. This qualitative research thus aims to contribute to the understanding of the level of engagement developed by students in this ever-evolving context. Moreover, it seeks to address the increasing difficulty students face in feeling involved in and committed to the educational process. Indeed, the current challenge for today's educators is to engage students during learning activities (Rahman et al., 2019). Despite the increasing attention to innovative teaching methods, there is still a gap in the literature concerning the engagement generated by gamification in language teaching, especially regarding the activities conducted in the workshops that we examined, namely escape rooms, CodyRoby, and Rospino. In fact, as we will see, there is not much research on the dynamics of these types of games applied to foreign language learning. Therefore, this study aims to fill this gap by investigating the level of engagement of a class of university students in northern Italy who were exposed to these linguistic activities implemented with game-like features.

In an attempt to address this need, we will indirectly contribute to recognizing the value that games can play both in the life journey and the learning path of students, drawing inspiration from what Jane McGonigal (2011) asserted: “Games don’t distract us from our real lives. They *fill* our real lives: with positive emotions, positive activity, positive experiences, and positive strengths”. Keeping this in mind, we will directly contribute by demonstrating what our research has confirmed regarding this assertion, which aligns with the reality narrated by the data we have collected. Considering the timeframe and context, we sought an already existing opportunity that would enable us to thoroughly examine our focus of interest in the broadest yet most detailed manner possible.

The primary objective of our research is to determine the degree of engagement experienced during this type of activities, aiming to understand its overall appreciation and feelings raised. Another ambition is to compare these workshops with students' favourite games to assess the difference in engagement levels, observing whether game dynamics effectively convey educational content similarly to how students feel during the games they like the most. Lastly, we aim to investigate whether participants' educational backgrounds influence engagement, evaluating whether different academic inclinations also shape the way they experience such activities. It is crucial to underline that this is meant to be an

observational study and does not aim to conclusively explain the reasons behind possible differences and variations.

To achieve these objectives, we developed an initial survey to understand the profile of the students and their gaming habits, and a second questionnaire to measure the level of engagement. The latter was initially applied to their favourite game and subsequently at the end of each workshop organised by the instructor. Administering four identical questionnaires to assess experiences with both games and activities allowed us to identify the variations between the data and derive differences in engagement across various components. The data from the first questionnaire will then be useful for establishing possible inferential connections between the results obtained through the other surveys.

This study proves to be significant as it contributes to the existing body of knowledge by providing new insights and perspectives on the application of gamification for fostering engagement in educational settings. Since it offers additional information on the impact of gamified activities to support the innovation of teaching methods, its findings may also have valuable implications for the implementation of this practice. However, it is important to clarify that our research specifically focuses on participants' emotions and sense of engagement, excluding investigations into their understanding or learning of the content. Indeed, the main purpose of implementing gamification strategies is to increase engagement (Subhash & Cudney, 2018), which is in turn expected to generate achievements, positive behaviours, and a sense of class belonging (Taylor & Parsons, 2011).

This thesis will be developed in five chapters. Chapter 2 provides a comprehensive review of the literature in both the gamification and engagement domains, exploring their effects and limitations. Chapter 3 outlines the motivations behind this research, subsequently describing the context of our study and the activities conducted during these workshops. In Chapter 4, we present the research design, starting with the research questions and then explaining the methods used for the selection and development of questionnaires. We will also illustrate the tools we employed and the research procedures. Chapter 5 aims to present the data from a general perspective, providing a broad picture of students' profiles, gaming habits, and level of engagement during the three educational games. In Chapter 6, we delve into these results in more detail, comparing them with students' favourite games and applying the variable of educational background, followed by a discussion of the obtained results. The final chapter will present the conclusions and limitations of our study.

2. Literature review

In modern education, many problems that teachers face are related to the lack of engagement and motivation of students, who struggle to participate actively in the learning process (Kiryakova et al, 2014, Rahman et al., 2019). In fact, current learners whom Beck and Wade (2004) identify as the *Gamer Generation*, and whom Prensky (2006) calls *Digital Natives* inherently seek involvement and can rapidly become frustrated when they do not perceive it (Chatterjee, 2012). It is curious, then, to try to answer the question addressed by Coonradt (1984): *why can't we get the same devotion to school lessons as people naturally apply to the things that interest them?* (Prensky, 2002). Teachers need new techniques, approaches, and strategies to prove that this idea is actually possible.

The phenomenon of gamification is gaining more and more attention from researchers trying to deal with this problem; in fact, it is a relatively recent notion: the term was not widely adopted until the second half of 2010 (Deterding et al., 2011). Moreover, its potential makes it applicable to various contexts and its influence nowadays ranges across numerous fields, such as business, health and wellness, productivity, and media (Bunchball, 2010). That's why interest in gamification has exponentially increased. In this research, however, we will focus on the field of education, where this phenomenon has earned growing interest since it provides an alternative to involve and motivate students during the learning process (De Sousa Borges et al., 2014). We will particularly focus on the concept of engagement, which will be the subject of our research study. To do so, it will be necessary to bring in some concepts from psychology, sociology, computer science, human-computer interaction (HCI), and game studies, so this literature review can help us figure out to what extent and in which way this multidisciplinary subject is impacting our present and future way of thinking about education.

2.1 Gamification

The most shared definition of gamification in literature is the one given by Deterding et al. (2011), namely: *the use of game design elements in non-game contexts*. It has been challenging to find a proper definition for a concept that originates from the gaming world since there are a lot of parallel or overlapping notions, but as they pointed out, this concept stands out from another existing group of phenomena. We considered the framework developed by Martens and Muller (2017) to be an excellent representation of how these concepts intersect with each other; therefore, we have decided to present it below (Figure 1).

To clarify these differences further, we will summarise the definitions from the study of Al Fatta H. et al. of some of the concepts that can be potentially competing:

- *Serious games* are full-fledged games that combine the playful characteristics of gameplay with utilitarian functions and have a primary and sometimes hidden purpose other than entertainment, but without excluding it from the user experience.
- *Game-based learning* entails creating comprehensive games designed to provide engaging and immersive educational experiences, incorporating content from school curricula or essential life skills to enhance understanding and achieve specific learning goals.
- *Educational games* are part of game-based learning (as you can see in Figure 1 below) since they involve the use of games to deliver attractive learning experiences; in fact, the term is sometimes used in place of *game-based learning*.
- *Edutainment*, as the name suggests, is a combination of educational and entertainment purposes that involves incorporating drill and practice-style educational elements into gameplay to deliver learning content.

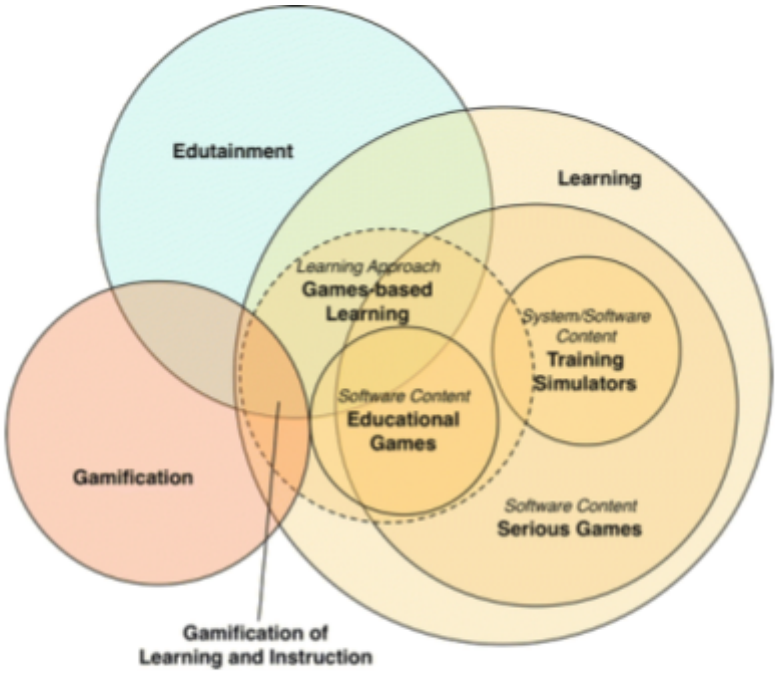

Figure 1. Relation between game-based-learning, gamification, edutainment, educational games, and serious games (taken from Martens and Müller, 2017).

Another type of approach that deserves to be highlighted is *adaptation*. As Camilla Zamboni explained in a recent webinar called *GAMIFICATION 101: come implementare giochi e*

principi ludici nella classe di italiano L2 e LS[1] (2023), adaptation consists in finding an existing game that best suits the teacher objectives based on educational criteria and implementing them into the game in order to meet the didactic needs. However, as she also explains, these approaches belong to a spectrum: every strategy is valid, and many have a lot of characteristics in common; what differentiates them is the level of depth in the game and the different purposes they meet.

Keeping these definitions in mind, we can now better understand what sets gamification apart from other gaming experiences. Fundamentally, while the main aim of games is to entertain the user, the purpose of gamification is to change or encourage the attitude and behaviour of the individual. According to Kapp, in his well-known book *The Gamification of Learning and Instruction*, gamification is "using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kiryakova et al., 2014), whether in formal and informal conditions. One last definition we ultimately want to highlight is the one by Yu-kai Chou (2015), who defines gamification as "the craft of deriving all the fun and addictive elements found in games and applying them to real-world or productive activities".

Game elements

So which are the game elements characterising gamification, then? A commonly used strategy is to use a set composed of points, badges and leaderboards (as known as PBL approach) (Silpasuwanchai et al., 2016). However, we cannot take it as the only valid example for such a broad practice, both because the chosen elements should also be based on our target, and because it is a limited, although effective, choice. In fact, there are a lot of features that can be implemented: challenges or tasks, trophies or medals (or rewards in general), levels, progressbars, avatars, time limits, hints or tips, skill trees, items to unlock, gifts, and most importantly a storyline (Silpasuwanchai at al., 2016, Da Rocha Seixas et al., 2016, Nah et al., 2014).

A storyline gives the learner an active role as a co-constructor of narrative, playing an important role in memory, effectiveness and motivation, which is enhanced by the narrative's almost unique ability to transport us to other worlds; in fact, narrative-based education finds its roots in Constructivism and organises a structure for new experiences and knowledge, as Mandler (1984) suggested (Mort et al., 1999). According to Bruner, humans organise their

[1] Translation: *GAMIFICATION 101: how to implement games and ludic principles in the Italian L2 and FL class*. Link to the video of the webinar: https://youtu.be/IhqVqXatJi8?si=bRkrFKNwg-zinwWV

experience and memory of events primarily in the form of narratives (Chatterjee, 2012): they serve as a powerful tool for making sense of information and constructing meaning; through storytelling and narrative frameworks, individuals can better retain and retrieve information, as they provide context, coherence, and a relational structure that enhances memory retention and comprehension. Moreover, in a study by Parker and Lepper (1992) students given instructional materials in fantasy conditions showed significantly more learning and motivation than those in the no-fantasy condition.

Game mechanics and game dynamics

These components are commonly referred to as game mechanics, that is, the features that make gameplay challenging, fun, satisfying, or any other emotion the game designers aim to elicit; these emotions, in turn, are "the result of desires and motivations we call game dynamics" (Bunchaball, 2010). In other words, "dynamics are the interactions of the player with the mechanics" (Da Rocha Seixas et al., 2016). In the context of gamification, it implies that people find motivation in engaging with certain aspects of game design, such as challenges, rewards, or competition, because they create dynamic and compelling experiences that encourage participation and interaction, which are part of the responses that teachers find difficult to trigger in the classroom.

A white paper published by Bunchball (2010) explains why some of these game features impact users (as you can see in Figure 2 below). What makes them efficient is that they satisfy basic human desires and needs: reward, status, achievement, self-expression, competition and altruism. Each of these finds its realisation in one or more game mechanics.

Figure 2. The interaction of basic human desires and game play. The green dots signify the primary desire a particular game mechanic fulfills, and the blue dots show the other areas that it affects (Bunchball, 2010).

Huang and Soman (2013) provide an alternative perspective on understanding these mechanics. They made a distinction between *self-elements*, which direct students towards self-competition and acknowledgement of personal accomplishments (e.g., points, badges, levels, and time restrictions), and *social-elements*, which involve interactive elements of competition or cooperation that place students with their peers, making their progress and goals publicly visible (e.g., the storyline and leaderboards). It is then up to the instructors to assess which of these elements best suit the teaching content and the needs of their students: what works for one class may not work for another.

How to implement gamification

As you may have already deduced, there is no single way to implement gamification in teaching, but we can underline the steps to guide teachers in designing a gamified approach that better suits their particular cases. Searching through the literature, two models of structure caught our attention: the one proposed by Kiryakova et al. (2014) and the one by Huang et al. (2013). Since they are very similar to each other, we will merge the two methods into one. The application of gamification in an educational context develops as follows:

1) Understanding the target learners, their characteristics, and the context;
2) Defining the learning objectives;
3) Structuring the educational content and activities of the experience;
4) Identifying the available resources;
5) Adding game elements and mechanisms.

Only at the end of the process, then, can the instructor ultimately add the chosen gamification elements. This also supports the idea that gamification is not just a mere addition of game elements that magically transform our educational environment and the mood of our students: each element corresponds to an emotional response on the part of the user, as we have already seen above; consequently, we must carefully and systematically choose the mechanisms to implement, it is not enough to make our lesson look like a game. As Chou (2015) suggested: “learn from the design, don’t copy the shell”.

Because of this focus on the user perspective, gamification has been described by many researchers, including Karl Kapp, as a learner-centred approach (Reigeluth et al., 2016), or as Chou (2015) prefers to call it, a “human-focused design”: the foundation of its design is based on human feelings, emotions, and engagement. More specifically, the gamification of content aims to create intrinsic motivation and cultivate a sense of autonomy, competence and

relatedness, while the gamification of the course structure is designed to provide external reinforcement and motivation for a protracted duration. Furthermore, it effectively aligns with personalised instruction by envisioning courses with multiple content paths that students can navigate at their own pace (Reigeluth et al., 2016).

To give you an example of successful gamification in the field of education, we can turn our attention to Khan Academy, founded by Sal Khan in 2006, which is mentioned in some of the most influential websites in the field of gamification, namely eLearning Industry[2], Yu-kai Chou's website[3] and Gamification.co[4]. Khan Academy is a non-profit online educational platform that offers a vast collection of self-paced exercises, lessons, and videos covering subjects from basic arithmetic to complex topics like physics, organic chemistry, historical events, and current affairs. It introduces gamification elements, utilising game mechanics to make learning engaging and compelling: the subjects are organised visually on a Google map, resembling an RPG (role-playing game) skill tree, creating a network where lessons build upon one another. Doing so, it motivates learners by visualising knowledge as a map, transforming learning into a rewarding and progressive experience. Challenges reward quick problem-solving and correct answer streaks, promoting an interactive learning environment. Another important aspect is that the platform tracks and quantifies learners' progress, converting stats into infographics and offering achievements within a galactically themed system (Gamification.co, 2011). In our opinion, this is a great example of how game mechanics should be implemented in a learning path because each element finds its utility, there are no unnecessary embellishments or features, and an optimal balance between the chosen ones.

2.2 Engagement

As we already mentioned, student engagement is at the centre of many teachers' concerns, especially because it is a key factor in the prevention of early school dropout (Taylor & Parsons, 2011; Huang & Soman, 2013): students who eventually drop out do less homework, exert less effort in school, participate less in school activities or extracurricular activities, and have more discipline problems at school; and lack of engagement is a precursor of these behaviours (Fredricks et al., 2004). Moreover, student engagement is a complex construct, which can be affected by many factors in the school environment, for instance, individual

[2] Link: https://elearningindustry.com/gamification-for-learning-strategies-and-examples
[3] Link to Chou's site: https://elearningindustry.com/gamification-for-learning-strategies-and-examples
[4] Link: https://www.gamification.co/2011/05/26/quests-skill-trees-for-learning-with-khan-academy/

motivation, teachers, and external influences (Zepke et al., 2010). However, our aim is to investigate the influence of engagement in the specific case of teaching and learning, yet without neglecting the existence of a broader structure. But what is engagement exactly?

The literature tends to analyse this construct by dividing it into three areas of influence: *behavioural engagement* relies on the idea of participation and involves the time spent on the task, the attempt rate and the effort level, and is considered crucial to achieving positive academic results; *emotional engagement* involves the relationships with others, the excitement and endurance of this state, and influence commitment to do the work; finally, *cognitive engagement* draws on the idea of investment, i.e., attention and deep reflection to try to understand complex ideas (Fredricks et al., 2004; Silpasuwanchai et al., 2016). This breakdown fits very well with Chapman's (2003) definition of engagement, namely: *students' cognitive investment in, active participation in, and emotional commitment to their learning* (Zepke et al. 2010).

Another question we should approach is how engagement can be enhanced. To do so, we will sum up what Taylor & Parsons (2011) elaborated in their research, where they recorded common strategies found in the literature to stimulate engagement based on students' needs:

- *Interaction* - collaborating not only with teachers and classmates but also with the extended community and people beyond the classroom walls.
- *Exploration* - encouraging a "hands-on" approach to let students search for solutions and answers by themselves both in the real and the digital world.
- *Relevancy* - contextualising and giving authentic tasks to stimulate deep reasoning on problems and situations students are concerned with.
- *Multimedia and technology* - widening of the boundaries of learning globally and ensuring access to a huge variety of materials, in and beyond the classroom.
- *Challenging instruction* - providing a constructivist pedagogy, discussing ideas, setting high expectations and helping to "learn how to learn".
- *Authentic assessment* - monitoring success, acknowledging improvements and understanding how to develop one's learning.

Does something ring a bell? While reading these guidelines now, it might be somehow transparent that they align with many principles of gamification or games in general. In fact, the reason games are so engaging is that the primary objective of the game designer is to keep

the user engaged (Prensky, 2002), so they have to come up with clever solutions and arrangements to achieve this goal, which is by no means simple.

Engagement and games

In recent times, there has been a growing interest in studying gamification as a means and a *tactic* of enriching the educational experience for students to develop their learning efforts (Rahman et al., 2019; Huang & Soman, 2013). It is interesting to have a look at a study by Jang (2008) who examined two different theoretical models of motivation, the Identified Regulation Model and the Interest Regulation Model, to explain how an externally rationale given by the instructor can support students' motivation, engagement, and learning during uninteresting learning activities. What we found particularly curious about these experiments is that, in these circumstances, people attempted to regulate their interest by self-generating strategies to raise their interest in order to cope with the boring task. The most used of the so-called *interest-enhancing strategies* include setting a goal, modifying the procedure to do the same task in different ways, working together with stimulating people and trying to turn the task into a game (Jang, 2008). Once again, we can find strong similarities between the gamification dynamics and these students' self-developed strategies, for example levels and achievements, challenges and self-expression, interaction, and gameplay. If we ultimately take into account the variable of depth and immersion, which bring engagement to its highest state, another dimension that needs to be addressed is that of flow.

Flow

The name of Mihaly Csikszentmihalyi prevails in the literature on this subject. He describes flow as an *optimal experience*, a state where you are totally focused and engaged in an activity and perform at the maximum of your skills (1975, 1990). The flow experience can be strongly related to the students' performance in an educational context since it has a direct impact on students' motivation and engagement (Oliveira et al., 2020). Csikszentmihalyi also elaborated nine dimensions characterising the experience of flow and, as Hamari and Koivisto (2014) suggested, we will report these dimensions by dividing them between the *conditions* for reaching this state and the following *outcomes*. As we can understand, the ability to test one's skills in an environment with well-defined objectives, the presence of feedback and recognition, and in which one has a sense of control over the activity allows for the generation of desired outcomes.

Conditions:

1. balance between the challenge of the task and skills of the individual;
2. clearly defined goals;
3. sense of control of the activity;
4. unambiguous feedback;
5. an *autotelic*, intrinsically rewarding experience.

Outcomes:

6. loss of self-consciousness or awareness of self;
7. distortion of perceived sense of time;
8. total concentration on the task;
9. merging action and awareness so that the activity is carried out almost automatically;

Oliveira et al. (2020) suggest that the key to understanding the flow state is the *autotelic experience* which is the result of an activity or situation that is in itself motivating, fulfilling, and incentivising, even without external goals or rewards. The feeling of inability to interact with the external environment is also present, while there are no feelings of concern or worry about fulfilling the task (Özhan & Kocadere, 2020). McGonigal (2011) also mentions Csíkszentmihályi when she reports that a depressing lack of flow is found in everyday life, but that there is an overwhelming prosperity of it in games and gamefull activities.

Deriving their foundations from the structural factors of games, gamified learning approaches are effective in inducing the feeling of flow (Özhan & Kocadere, 2020). In fact, Özhan and Kocadere (2020) reported that many researchers who focused their work in gamified learning contexts found that "learners are motivated (Su & Cheng, 2015), engaged (Denny, 2013; Hew et al., 2016; Ibanez et al., 2014; Simo˜es et al., 2013), and feel a sense of flow (Sillaots, 2014) in these environments", and in their study, too, flow was a particularly strong predictor of motivation. Furthermore, it was observed that the sensation of flow, engagement, and motivation in the gamified learning environment positively affected the learners' success. As we can observe, flow seems to be of extreme importance in how people live the learning experiences, how they enjoy the learning journey, which consequently affects their thinking of it.

However, it is difficult to achieve learners' flow in school or any educational environment. What is more, Csíkszentmihályi raises a serious issue: one of humanity's most pressing problems is precisely the inability of schools, offices, factories and other everyday environments to provide a flow. Considering that flow is not only related to the attention paid to a particular activity, but also to entertainment (Özhan & Kocadere, 2020), it becomes clear how much this construct can positively impact the outcome of how we structure our teaching. Thus, McGonigal (2011), along the same lines as Coonradt (1984) that we mentioned before,

questions: *why should we needlessly spend the majority of our lives in boredom and anxiety, when games point to a clear and better alternative?*

Fun

Chatterjee (2012) affirms that there is a significant connection between entertainment and engagement, and the most prominent common factor is the "retention of learning". He found that the degree of engagement is primarily driven by the level of retention, learner involvement and satisfaction with the activity: all of these factors are also the reasons why entertainment is required for "people of all age groups", not just for young people as one can easily think from general assumptions. It is no coincidence if learning and fun have mostly been kept separate in the practice of most post-secondary educators (Prensky, 2002). Moreover, according to Keller's ARCS model of motivation (1987), one of the four conditions that should be provided in order to engage learners is that the learning setting should be "entertaining and valuable" for them (Oliveira et al., 2020). Gamification proves to be a suitable strategy for this purpose. In fact, a study by Denny (2013) examining the impact of a gamified e-learning setting on the perception and engagement of learners, indicated that the gamified environment had a positive impact and 65% of learners found gamification entertaining (Özhan & Kocadere, 2020). Reporting a study by Kumar and Khurana (2012), Nah et al. (2014) explained that the goal of gamifying a learning scenario is not fulfilled unless the objective of "learning with fun" is added into the activity. Therefore, to get students involved in learning we have to "inject fun into the process", which makes it not only more pleasant and exciting, but more efficient as well (Prensky, 2002).

Another concept that caught our interest is that of "fun failure" by McGonigal (2011), a major finding in video game research history. It contributed to identifying the specific mechanisms through which a well-structured game fosters the development of remarkable mental resilience. This concept is instrumental in extending both the gaming experience and the learning process. Simultaneously, deriving enjoyment from our own failures allows us to linger in a state of "urgent optimism", a moment of hope preceding tangible success, inspiring us to exert our utmost effort and perform at our best. This dynamic emerges as a crucial emotional strength that can be cultivated through gaming and subsequently applied in real-life scenarios (McGonigal, 2011). Essentially, what causes discouragement and discontent in a traditional school environment is cause for fun and engagement in a gamified setting. All things considered, many concepts and approaches that are second nature to game designers can teach us how ro create more fun, engaging and effective education (Prensky, 2002).

Clearly, the use of games should not only be about fun, or rather it is not the ultimate goal; it is useful to direct learning towards the development of skills useful for solving real-life problems (McGonigal, 2011).

2.3 Effects and limitations

Although there is still much room for implementation, gamification applications are becoming increasingly popular and the areas of use are spreading from kindergarten/primary school level up to the university/adult stages in various disciplines (Çeker & Özdamlı, 2017). As we have already outlined, the urge to increase motivation and involvement during learning tasks is the main reason for the adoption of gamification techniques (Caponetto et al., 2014). More specifically, gamification modifies the neural pathways associated with the brain's reward and pleasure centre, thereby improving learning. It is widely acknowledged that games, whereby an individual achieves victory or receives positive feedback, trigger the release of the neurotransmitter dopamine, activating the brain's pleasure circuits. This neurological response is suggested to be also applicable to educational games, given their incorporation of elements such as overcoming challenges or successfully attaining goals. Consequently, the pleasure derived from gamified education fosters a sustained affinity for the academic subject or the resolution of intricate problems (Lynch, 2018). To summarise, we propose here a list of the main benefits of gamification (*Examples of Gamification in Higher Education in 2024*. Scavify):

- Reward-seeking behaviour related to learning;
- Fun and engaging learning;
- The acquisition of positive and committed education habits;
- The creation of progressive motivation to persevere through difficult subject matter;
- Opportunities for collaborative teamwork and mutual support;
- Engagement of dopamine responses enhancing mood and performance during learning;
- Consistent connection between learners and the material;
- Cultivation of a sense of autonomy making learning feel personal and relevant;
- Enhancement of feelings of proficiency and accomplishment.

Nevertheless, these results must not be taken as granted for all cases; unfavourable results are also present in literature. For instance, Çeker and Özdamlı (2017) report a study by Hans and Fox (2015) evaluating the effects of gamification on students in a classroom, where they

found that students who used gamification elements were less motivated, showed less improvement and collected fewer exam points compared with the classes that did not use them. Alaso Barata et al. (2016) concluded that although the gamified approach they proposed in their research had a positive influence on lecture attendance, gamification did not significantly improve student grades (Nah et al., 2014).

In fact, while gamification can boost engagement, it doesn't ensure learning success: simply adding game elements without a practical instructional design, a thoughtful strategy and a meaningful content may lead to limited engagement and scarce learning outcomes. Thus, “achieving a high score in a gamified quiz doesn't necessarily mean a learner fully grasped the learning material. The learner may still need time to learn and apply new knowledge or skills in a real-world scenario” (Niraj, 2023). For example, adding a leaderboard could be useless if the class is not an overtly competitive group; turning the lesson into a challenge can be perceived as hindering for students who have immediate learning needs to fill and are already motivated; and using points to reward students must then pay off in real recognition for their hard work in order to encourage future positive behaviour (*Gamification Alone Won’t Solve Your Learning and Development Woes*, 2022). On the other hand, gamification without careful measures to increase collaboration can result in excessive competition among students (Subhash & Cudney, 2018). It is also essential to acknowledge that gamification may not be suitable to enhance all types of content (Niraj, 2023): gamification works best when the learning programme consists of pure content and/or when the relevance of the information is not immediately evident to learners (Huang & Soman, 2013).

Toda et al. (2018) identified the most recurring negative effects in literature and the gamification elements related to these outcomes. The four detected negative effects were: *indifference* (finding gamification neither fun nor boring and not being interested or motivated by it), *loss of performance* (gamification damages or hinders students’ learning process and demotivation occurs), *undesired behaviour* (opposite or different results than expected) and *declining effects* (loss of interest and motivation over time). The gamification design that has proven to have the main impact on these issues is the PBL approach. In fact, researchers clarify, it may not be suitable for certain situations and contexts, especially if individual profiles, instructional and engagement design theories have not been considered. Therefore, these problems occurred not so much because of the game mechanics themselves, but for the lack of proper methods and/or frameworks for planning and implementing gamification. As Toda et al. (2018) affirm, the lack of instructional theories to support the implantation of

gamification to be a major issue influencing negative responses. So specific instructional design theories are needed to produce well-thought and meaningful strategies that will have positive impacts on the students.

Extrinsic motivation

Another important aspect that educators should pay attention to is not to rely solely on "extrinsic motivators" within the gamified environment to influence student behaviour, because the habits developed through gamification may not last long once the external rewards are removed (Huang & Soman, 2013). Positive psychologists call them "extrinsic rewards" because they make people reach happiness outside themselves (e.g., money, material goods, and status). This type of pleasure is followed by tolerance which consequently makes people crave more and more of them; so adding points, levels, and achievements has its risks, especially if it is an already enjoyable activity: this actually lowers the feelings of motivation and recognition (McGonigal, 2011). While intrinsic motivation is the drive to engage in a behaviour or activity because it is personally rewarding or engaging, extrinsic motivation is a means to an end. There are three forms of extrinsic motivation, which differentiate according to the level of autonomy of the individual:

1. *External regulation* refers to behaviours performed to fulfil an external demand, conform to an externally established standard or avoid an externally given penalty.
2. *Introjected autonomy* spurs the individual to pursue activities to achieve ego enhancement and self-esteem or avoid guilt; so the regulation is internal to the person, but the stimulus is still external.
3. *Regulation through identification* means that the individual's identity is connected with an externally prescribed behaviour and he/she acts to instantiate that identity (Buckley & Doyle, 2014).

Buckley and Doyle (2014) discovered that gamification impacts students with different types of motivation differently. Intrinsically motivated individuals are accustomed to deriving satisfaction from gamified learning and assessments, which have a greater impact on them, whereas the effect on extrinsically motivated students seems to be limited to students who are motivated by *identification*, the most closely aligned with intrinsic motivation. Aware of the fact that not all types of extrinsic motivation are harmful, we still have to pay attention to students' learning types and how they interact with new contexts, so we can detect their locus

of autonomy. Once again, careful planning and design of learning interventions is essential, especially with such an innovative teaching approach as gamification (Caponetto et al., 2014).

Influential factors

One of the several influences on the outcomes of a gamified educational environment is the relationship between students and teachers, which plays an important role in students' engagement; plus, educators can fulfil their expectations for students to be involved in the classroom when educators themselves demonstrate these expectations towards their students (Ab. Rahman et al., 2018). With this account, we want to highlight how gamification, like any other didactic approach, needs first and foremost a figure capable not only of elaborating a meaningful learning path but also of playing the game. An instructor who clarifies the unfolding dynamics and goals of the learners and is engaging at the same time makes this strategy even more effective. On the other hand, not everyone can immediately know what will work for their class, especially if they have never tried this approach. That is why it is important to talk to students and ask them questions: investigate what interests them, what activates them, and what excites them; the idea of testing a gamification experience on a small scale to receive feedback is also worth being considered (*Gamification Alone Won't Solve Your Learning and Development Woes*, 2022).

Summing up, as we have learned from the literature, gamification directly affects engagement and motivation and it indirectly leads to acquiring more knowledge and skills (Huang & Soman, 2013). Certainly, implementing gamification strategies into educational curricula may often do a better job of teaching. Nonetheless, this approach should not be understood as a substitute for a thorough curriculum or traditional face-to-face teaching methods: it can rather prove essential in complementing conventional approaches (Niraj, 2023). Only by grounding the organisation of gamified activities in proper educational, social and emotional reflections involving the students can we truly maximise the benefits of this practice.

3. Introduction to and explanation of the case study

Considering everything that influences and implies the use of gamification and its versatility, it was important for us to narrow our field of investigation to be as precise as possible. On the other hand, as it is a relatively recent phenomenon, there is a lot of freedom for experimentation where research is necessary. It was important for us to be able to manage

both the didactic part and the study part, provided that this was a truly feasible challenge in terms of possibilities and timing and without the risk of it becoming ineffective or inconclusive. Given these circumstances, we chose to focus our research study on the workshops of a university course which were designed precisely to make the students understand what gamification means and let them experience it first-hand. More precisely, this course is dedicated to the didactics of games in the field of language learning, designed by the lecturer in such a way that each workshop was closely linked to a specific learning theory. Indeed, its organisation aims at integrating four key learning theories, namely behaviourism, cognitivism, constructivism, and enactivism, with practical examples from educational technologies and games, encompassing both analogue and digital formats. Thus, the learning lessons were followed by play sessions, in other words: for each theory encountered, the lecturer has developed a specific workshop, allowing students to experiment and observe the processes previously explained in class.

Therefore, unlike a lot of research in the literature, the students were aware and conscious of what this type of approach entails and were then given the opportunity to try it out through these activities. Hence, we consider it to be a rich opportunity to investigate gameful design in an hypothetical language class from an unexplored although restricted point of view, both because the research is based on a well-structured path from a didactic point of view and because the study provides a comparison between different activities. This enables us to assess any preferences of the participants, their shifts in perception and their varied responses, with the ultimate goal of understanding whether there are differences in beliefs about games between pre- and post-workshops.

3.1 Needs for the research

As Caporarello et al. (2017) learnt from their screening of the literature on gamification, “until now researchers have mostly focused especially on the definition and evaluation of two aspects of gamification for education: its design and its educational effectiveness”. Given the circumstances of our research and the new perspective and considerations that it aims to bring, we decided to focus instead on the level of engagement and on the impact gamification had in regard to the students’ background. This means that particular gameful design features were not taken to exam and that there were no tests assessing the learning or the retention of the content.

The reasons behind the limited extension of our study reside in the willingness to increase gamification research in a territory where it is not yet widely affirmed or even known. In fact, in Italy, gamification is not given the importance it deserves (Malvasi et al., 2022). A recent study by Malvasi et al. (2022) demonstrates that many Italian teachers do not know what gamification is or have received training on it; nevertheless, they declared proposing tasks that help or facilitate learning such as group competitions, prize contests, riddles, logic games, and the use of prizes or rewards: teachers tend to apply an "unconscious gamification". This means that they are conscious of the benefits of this practice, but at the same time, they're not aware of its functioning, structure, or development.

On the other hand, Cinganotto (2019) illustrates a European project called GUINEVERE (Games Used IN Engaging Virtual Environments for Real-time Language Education) focused on the potential of game-based learning in 3D immersive environments for foreign language teaching. One of the intellectual outputs of the project is the analysis of students' needs, which highlighted the perception of the added value of gamification within the curriculum, although "this dimension is still not very widespread in Italian schools". Cagnotto reports the results of the survey, whereby we learn that the use of gamification in curricular teaching appears to be very limited: 71.2% of respondents affirm that teachers never use games at school and 22.7% say this is rarely the case. Yet 48.1% of the respondents think that games play a key role in supporting learning.

The poor uptake of gamification does not seem then to be attributable to a lack of effectiveness or appreciation of this strategy on the part of students, but rather to the still limited knowledge and diffusion of the approach, which might cause it to seem difficult to implement or too complicated to plan. This is why we want to provide further insight and food for thought on this innovative practice, giving students a word on what motivates them most to pursue not only the language activities themselves but the whole learning journey. Furthermore, this research aims to encourage the development of innovative practices, raise awareness and give teachers the confidence to adopt new ways of transmitting knowledge.

3.2 Context

The research study was conducted in a course at a university in Northern Italy that involved three one-and-a-half hour laboratory activities during the semester, in which the students got to know other language teaching realities: they were able to see the world of games embrace education and thus experience alternative and innovative ways of learning and teaching

foreign languages. The class consisted of approximately 30 participants. Nevertheless, since the activities were elective, not all students were always present and not all maintained constant attendance. Therefore, our research primarily seeks to provide a general perspective on the influence of gamification on student engagement. Subsequently, we aim to delve deeper into specific variations in responses based on educational backgrounds and conduct a detailed analysis of those individuals who actively participated most in the surveys.

In addition, before addressing the learning theories previously mentioned, the students had a lesson on the current conceptions of games in the context of second language (L2) learning. Special attention was paid to the key elements of digital games, as well as to the classification of different genres of games that have been studied in Computer Assisted Language Learning (CALL) research, drawn from the work of language pedagogue Mark Peterson. CALL is a field of study that deals with the use of computer technology in the language learning process, which offers multiple opportunities to support learners; it also includes the study of digital games in language learning, which offer an interactive and engaging approach that can foster language practice, comprehension, memorisation and consolidation of language skills.

3.3 Lab activities description

First of all, it is important for us to provide a theoretical background that presents what the literature says about the activities that the university course has chosen as the focus of the workshops, namely, the gamification through escape rooms, an educational game called CodyRoby, and the construction of the Rospino robot.

Within contemporary educational paradigms, López-Belmonte et al. (2020) describe the ER (escape room) as an emerging "innovative teaching approach" that combines the principles of gamification with a foundational emphasis on problem-solving pedagogy. In this methodology, they illustrate, students autonomously engage with challenges, either real or simulated, proposed by educators. This collaborative endeavour promotes active participation, thereby cultivating a conducive environment for skill acquisition and learning outcomes. Structurally, the escape room pedagogical model mirrors game-based scenarios where participants navigate a series of challenges within a confined setting, requiring collaborative problem-solving within a specific timeframe. As the researchers explain, this multifaceted approach encapsulates elements from three distinct active learning methodologies: it takes advantage of the motivational dynamics intrinsic to gamification, underscored by structured

rewards and game-like incentives; it integrates *flipped learning* components, using preparatory resources to facilitate self-directed learning; and it also embodies some principles of problem-based learning, since they have to solve authentic challenges necessitating the application of acquired knowledge. They also propose empirical evidence confirming the promising interest in integrating ERs within academic settings, showing positive educational outcomes. In particular, such gamified instructional strategies engender motivation, group cohesion, student commitment and high engagement levels.

A recent study by Llumiquinga (2023) highlights the significance of educational escape rooms in both the educational and English as a Foreign Language (EFL) sectors. In this experiment, escape rooms not only enhanced linguistic skills but also fostered essential social competencies like problem-solving and effective communication. The research emphasises the need to explore how varied gaming environments can boost students' oral proficiency, a vital aspect for EFL learners. By integrating escape rooms into educational settings, educators can create a more engaging and effective learning environment. Furthermore, specific game-based strategies within these rooms scaffold learning, encouraging students to refine their communicative abilities through interactive challenges.

On the other hand, CodyRoby belongs to the unplugged learning resources that are intended to teach Computational Thinking (CT). It is a game for children aged 5+ based on programming and the interpretation of simple sequences of elementary instructions: Cody is a programmer who gives directions and Roby is a robot who executes them. More specifically, the instructions are playing cards, the programmers (Cody) are the players, and the robots (Roby) are represented by pawns moved by the players on a chessboard. CodyRoby also stimulates problem solving, which remains a significant area of weakness among students. Araújo et al. (2019) explain that the reason behind this difficulty resides in some crucial skills that students struggle to obtain: interpreting the problem, finding a relationship with prior knowledge, reactive response, and weak persistence or motivation. To develop this ability, training computational thinking can be considered as a valuable solution. Acquiring logical reasoning, abstract, and critical thinking skills from an early age not only facilitates overcoming challenges in programming courses but also serves as a foundational skill applicable across various domains.

From Prieto's article (2019) on how CT can boost the motivation of students in foreign language learning, we understand that the integration of programming offers a compelling avenue to enhance foreign language acquisition. The article underscores CT as a

problem-solving methodology, suggesting that educational contexts emphasising this approach facilitate natural language acquisition. Within this framework, the *communicative approach*, centred on language functions like instruction-giving and asking questions, akin to programming, is pivotal. Drawing on Krashen's *Natural Approach*, in particular the *Affective Filter Hypothesis*, Prieto elucidates how coding aids second language learning by potentially reducing barriers like anxiety; in other words, lower anxiety fosters improved language acquisition. By providing authentic input, high quality feedback, and individualised content, technologies can thus diminish the affective filter in classrooms. Prieto's article emphasises not just leveraging human-computer interaction but also fostering genuine communicative contexts, facilitating bidirectional interactions: teacher-student, student-student, and student-software. This can be accomplished utilising platforms like Scratch, an engaging coding environment which indirectly exposes learners to foreign languages, promoting subconscious exposure to the target language. Importantly, maintaining Scratch's consistent programming language features across different foreign languages ensures a symbiotic relationship between programming and language learning. This approach, named the "camouflage hypothesis", posits that learning programming via platforms like Scratch in English can expedite foreign language acquisition by minimising cognitive demands and lowering affective filters.

Moreover, Stevens and Verschoor (2017) explore the integration of coding within English language teaching. The emphasis is on intertwining English instruction with coding activities to enrich the educational experience. Again, Scratch emerges as a favoured platform for educators keen on merging coding with language learning. Its user-friendly interface, web-based accessibility, and drag-and-drop functionality eliminate the need for students to master intricate syntax, aligning with Earls W. Stevick's notion of *incidental learning*, which happens when we are focused on doing something else. Omid (2014), they explain, further advocates for a dual-learning approach, asserting that coupling English with disciplines like programming enhances the language acquisition process. Consequently, integrating coding with language education not only augments critical thinking skills but also unlocks future prospects for students in both domains.

Strictly linked to CT, educational robotics have a positive effect on students' critical thinking and problem solving skills as recent studies confirm. In this scenario, Rospino is an educational activity for primary schools belonging to the field of handmade robotics, which is considered one of the most successful approaches for learning and teaching technology. Based

on the Arduino platform, Rospino can be built with a recycled materials kit and a freely downloadable software; crafting with everyday objects also allows greater freedom in creative exploration (Tosato & Banzato, 2018). Researchers Tosato and Banzato (2018) explain that all design decisions are based on research and feedback from students, teachers, developmental psychologists, and pedagogists; it has also been tested both in schools and in the laboratory.

Although numerous studies explore the integration of robots to support learning experiences, limited research delves into their efficacy in second language acquisition (Chang et al., 2010). In their research, for example, Nic Réamoinn and Devitt (2019) integrate the teaching of the Irish language with the application of programmable floor robots. In other words, children developed their language skills by making significant connections through play and robotics. The introduction of robotics offers children a dual benefit: they delve into foundational engineering principles while also weaving narratives around their projects, fostering creativity. Specifically, the study utilises Bee-Bot, a programmable robot designed to move on a customised floor map showcasing images and vocabulary pertinent to the children's Irish language instruction. Preliminary findings suggest that robotics, within a playful setting, enhances both motivation and practical application of the Irish language, offering an innovative avenue for linguistic development.

Schina et al. (2021) also built their research using Bee-Bot as an educational tool. More specifically, their study reports the point of view of educators and evaluates their capacity to incorporate the Bee-Bot robotic toy into English as a foreign language instruction. After a training session for teachers, a year later a subsequent session at the same venue aimed to reassess teachers' perspectives and their adeptness at integrating the robot in their teaching methods. From their investigation, we learn that educators exhibit confidence and enthusiasm towards integrating robotic toys into their pedagogy, recognizing its several benefits in language instruction. Despite encountering some implementation challenges, their enthusiasm persisted after hands-on experience and they effectively incorporated Bee-Bot into their English as a foreign language teaching practices.

In order to better understand what the students learned and experienced, we now provide a more detailed description of the three workshop activities, focusing on the explanations of the respective theoretical frameworks introduced, the didactic technologies and game examples they learned about, and what took place in the laboratory.

Escape room

Prior to this first workshop activity, students explored behaviourist theory in class. Behaviourism seeks to provide a scientific framework for understanding behaviour and its intricate ties to environmental stimuli. Central to this approach is the methodology of scientific observation rather than introspection, a perspective that views the human mind as an opaque entity, often referred to as a "black box". Within this paradigm, concepts like consciousness, emotions, and internal mental processes are considered beyond the realm of direct observation and thus not the primary focus of study. Subsequently, stimulus-response mechanisms were explained. At the core of behaviourist thought, in fact, is the stimulus-response (S-R) theory: behaviours are acquired through associations between specific stimuli and corresponding responses. Ivan Pavlov's experiments with *classical conditioning* exemplified this concept; through experiments with dogs, he demonstrated that neutral stimuli (i.e., a bell) could elicit responses (i.e., salivation) when consistently paired with unconditioned stimuli (i.e., food).

John B. Watson expanded on these principles, emphasising the significance of *frequency* and *recency* in conditioning. Watson's insights underscored that repeated exposures to stimuli at brief intervals could reinforce learned responses. Moreover, he elucidated that conditioned associations could be generalised across various contexts. Edward Thorndike's *connectionism* further enriched behaviourist perspectives with his exploration of trial-and-error learning. Through his famous "puzzle box" experiments, Thorndike observed that organisms would exhibit various responses until identifying a solution that yielded a desired outcome. This learning was solidified through reinforcement, highlighting the adaptive nature of behaviour in response to environmental cues.

In addition, B.F. Skinner's contributions to behaviourism are monumental, particularly with his theory of *operant conditioning*. In contrast to Pavlov's *classical conditioning*, which primarily focuses on reflexive behaviours, Skinner emphasised voluntary behaviours influenced by consequences. In his well-known "Skinner Box", rats learned to associate specific behaviours with outcomes, either reinforcing or inhibiting future repetitions of those behaviours. This operant behaviour dichotomy, respondent (involuntary) and operant (voluntary), provided a nuanced understanding of how individuals interact with and adapt to their environments.

Later, the class was explained how behaviourist principles translated into practical educational technologies through the illustration of three examples: Linear Programmed Instruction (IPL), which segments information into bite-sized chunks followed by targeted questions, facilitating a linear progression of learning; Linear Programmed Branching (IPR),

which offers a branching structure where student responses guide them through different content pathways, tailoring the educational experience to individual needs; and Computer-Assisted Instruction (CAI), taking advantage of computing capabilities to deliver personalised learning experiences. CAI platforms dynamically adjust content based on student responses, integrating behaviourist principles into modern educational technologies, and fostering adaptive learning environments.

To conclude, some examples of games based on behaviourist theory were provided. One was the *Mingoville* platform, specifically targeting primary school students (aged 9 and 10). Although not strictly a game, *Mingoville* integrates elements of gamification, incorporating various activities and mini-games reminiscent of activities children do outside school. For instance, missions combine exercises and tasks with vocabulary training, spelling, and word recognition exercises. The platform's avatars engage students in a series of discrete tasks that don't necessarily build upon a singular storyline. Another example is the *Super Speed Boat Challenge* to teach English vocabulary: players navigate a boat around the island, interacting with floating images and corresponding text fragments; the challenge lies in pairing the correct image with its corresponding text label. Successfully identifying these pairs rewards players with points and time and lap counters motivate engagement by introducing an element of challenge and competition. This reinforcement-based design, establishing spatial contiguity between stimuli, responses, and outcomes, echoes behaviourist principles, facilitating effective and engaging language learning experiences.

Once these underlying theoretical concepts had been explained, the students were introduced to the escape room activity. The workshop lesson was divided into a brief theory part, where students learnt about the underlying mechanisms and design of an ER, and a practical part, where they gained experience with the invention and the testing of it. They were shown an example of ER from a YouTube video[5] to take as a reference for the activity. We also designed another example of ER, which can be found in the appendix of this thesis, to provide further inspiration for students (Appendix A). Initially, the primary objective of creating this escape room was to assess the feasibility of the activity in terms of time and resources, in order to gain a better understanding of how to structure the game during the laboratory session with students. In conclusion, this first workshop aimed to simultaneously place students in the roles of designers and users of a language lesson created using this method. The guidelines were as follows:

[5] Link to the video: https://youtu.be/vQF43Qb2YF4?si=il_TPSHjlEl2PE6b

- Divide into small groups of 4 students;
- Target the ER at 8-year-old children with an A2 English proficiency level;
- Select a theme and a storyline, introducing two main characters;
- Choose the setting for the story, that is, the room where the game will take place;
- Design slides using PowerPoint;
- Develop at least 3 different types of riddles in English (e.g., guessing the character names, from syllables to numbers, identifying the missing character based on given descriptions, colour sequences, correct sequence based on clues, safe combination etc.) and provide the answer to each riddle on the subsequent slide so players can immediately check their answers.
- The final slide should be dedicated to the final score: +1 point for each correct answer, +1 point for guessing within the time limit, +2 points for no errors (bonus point);
- Complete the ER of another group.

We gave them 50 minutes to finish the design activity. Afterwards, in the remaining 10 minutes, the students exchanged their work with others and tested the creations of their peers by playing another group's ER.

CodyRoby

The theory that the students explored in preparation for the activity with CodyRoby is that of cognitivism. The emergence of cognitivism marked a pivotal shift in the realm of psychology, presenting a counterpoint to the predominant behaviourist perspective. This shift was influenced by several key discoveries and developments, including Gestalt psychology's insights into perception, advancements in human factors research, computer simulations of cognitive processes (Human Information Processing), developments in medical neuroscience, Noam Chomsky's linguistic theories, and Shannon–Weaver communication model. Distinct from behaviourism's focus on observable stimulus-response-reinforcement chains, cognitivism delves into the "black box" of internal mental processes. While behaviourism investigates "how" individuals respond to stimuli, cognitivism probes the "why" behind these responses. Central to the cognitivist paradigm is the idea that learning involves information *processing*, involving various hierarchical cognitive processes from initial *perception* to *encoding*, *storage*, information *management* strategies, and *retrieval*.

Key pedagogical implications of the cognitivist approach include the recognition of the hierarchical *organisation* of cognitive processes in learning: the role of prior knowledge,

conceptual frameworks, or *anticipators*, facilitates understanding by activating students' existing knowledge. *Metacognition*, that is, the awareness and understanding of one's cognitive processes, emerged as a pivotal concept, promoting autonomous learning. Additionally, learning *taxonomies* were introduced to categorise learning objectives based on increasing complexity, aiding educators in structuring lessons effectively. Cognitivism also acknowledges individual differences, and the learning process, from this perspective, involves active information processing rather than mere response to external stimuli. Motivation within this framework is multifaceted, influenced by factors like goals, self-determination, attributions, emotions, and self-regulation.

The role of education becomes orchestrating stages and levels through which learners achieve deep-seated content and strategy memorization, facilitating application in diverse contexts. In this regard, students were shown some educational technologies developed within the framework of the cognitivist theory. A pioneering educational development is Computer-supported Collaborative Learning (CSCL), which focuses on collaborative knowledge sharing and construction among participants using technology as their primary means of communication or a shared resource; key attributes include an emphasis on both collaborative and individual learning aspects, recognizing social interactions as crucial components of knowledge construction, prioritising students and their activities, and leveraging mediated communication environments to foster group learning. Another technology introduced to the class was simulations and virtual environments. These enable individuals to engage with simulations of real-world situations or virtual environments that necessitate the application of cognitive knowledge and strategies. Virtual learning environments for language acquisition provide students with opportunities to interact with virtual characters, explore simulated linguistic settings, and practice language skills in an authentic context. One last technology is represented by concept mapping tools to construct visual representations illustrating relationships between concepts and ideas. These conceptual maps enhance comprehension, facilitate knowledge connections, and stimulate the generation of new meanings.

On the other hand, the cognitivist theory significantly informed the design and development of digital games, emphasising cognitive learning, attention, memory, critical thinking, and personalised learning. Consequently, educational games grounded in cognitivist principles aim to enhance cognitive development and foster meaningful learning experiences. Some examples of language learning games were mentioned, namely, *Mission Skill Builder*, an interactive lesson module designed for fostering cultural and linguistic skills, where

students use a microphone to speak and subsequently receive feedback regarding their response choices and pronunciation. *Mission Practice Environment* immerses students in a 3D role-playing game setting, and through their avatars, students navigate and interact with NPCs within a simulated social environment. Students communicate through gestures via their avatars and respond verbally using a microphone; a simulated tutor offers specific foreign phrases or hints, allowing students to determine their expression method. Finally, *Arcade Game*: a 3D mini-game that facilitates students' listening and conversational skills in a first-person interaction mode. The game features a listening mode and a conversation mode: students hear a vocal command and must navigate their character to the correct location on the map to retrieve a reward and earn points; by correctly pronouncing commands that lead them to the right place and reward, they accumulate points.

Before presenting CodyRoby to the class, students were explained the main characteristics of Computational Thinking and the difference between CT and coding, which is the use of visual block programming tools and methods to foster the development of computational thinking. Following this, some examples of coding apps for children were presented. The first was Scratch Jr, a programming language and free downloadable platform designed specifically for younger children aged 5 to 7+. It is a simplified version of the popular Scratch programming language developed at the MIT Media Lab. Researchers redesigned all the features to suit childrens' cognitive, personal, social and emotional development level; indeed, the platform introduces basic coding concepts in a playful and accessible manner, enabling children to express their creativity while developing foundational skills in computational thinking. With this application, children can program their own interactive stories, games and animations by snapping together graphical programming blocks. At the same time, they learn to solve problems, create projects and express their creativity using the computer (Scratchjr.org, 2023).

Another example was *Daisy the Dinosaur*, available for free on iPad for children aged 5 to 7. Created by Jocelyn Leavitt and Samantha John, the inventors of Hopscotch, *Daisy* introduces kids to the basics of programming with an easy drag-and-drop interface that they can use to animate the dinosaur and make her dance on their screen. Children will intuitively grasp the basics of objects, sequencing, loops and events by solving this app's challenges (Apps.apple.com, 2023).

The third example was *Tynker*, a creative computing platform for 5-18 years olds created to teach programming; it provides individualised learning with built-in tutorials and

hands-on projects so kids and teens can learn to code easily at their own pace while having fun. By providing them with story-based lessons and powerful creativity tools, Tynker unlocks life-long skills that young people can use today and into the future (Tynker.com, 2023). Also created by Jocelyn Leavitt and Samantha John, Hopscotch is another successful example of coding apps for children (aged 8 to 16) to make games, stories, and art. It is available for free on iPad and offers an easy drag & drop interface; it is a great starter tool to help students with no coding experience learn the basics of programming, logical thinking and problem solving (Gethopscotch.com, 2023).

After these short examples, CodyRoby was introduced and the game materials were shown to the class:

- 14 cards with a "FORWARD" arrow;
- 8 cards with a "RIGHT" arrow;
- 8 cards with a "LEFT" arrow;
- A 5x5 grid board with a button (a green triangle);
- 4 little robots;
- Grey squares for the path.

To better understand the value of the game, the specific learning objectives were also explained, namely: cognitive competence, that is, being able to recognise directions and sequence of symbols and to order them on the board; linguistic competence, including the use of specific terminology in English, the pronounce and words recognition; methodological and operational competence, which involves being able to associate movements with graphic symbols and knowing how to use structured material to carry out known and new sequences; and relational competence, concerning mutual respect, being able to follow turns and established rules and trying to communicate solution hypotheses to peers in the foreign language.

Afterwards, we explained the rules of some of the possible gameplays that can be performed with CodyRoby with the aid of photos and videos. The *race*, for example, is designed for two players standing facing a path with cards in hand and must quickly formulate a solution using the cards and then press the "GO" button; the player pressing the button first tests the solution by moving their robot along the path, while the opposing player checks the correctness of the solution and the minimal card usage: if the solution is incorrect or the opponent finds a more efficient one, the opposing player wins, otherwise, the player who pressed "GO" first wins. Another game is the *duel*; this time, the deck of cards is shuffled

and placed beside the board, while the players (or the two teams) stand on opposite sides, and the robots are placed in their starting positions. Each player arbitrarily places two grey blocks (not directly in front of the opponent robot), representing forbidden squares. Then, five cards are drawn each (not revealed) and, in turns, players decide how many cards to play: the objective of the duel is to get above the opponent. A third possibility is the *snake*, which begins with a deck of shuffled cards and two robots placed at opposite ends of the board; each player draws 3 cards and plays one at a time and, at each move involving the robot's movement, puts a grey block in the vacated square, making it off-limits: the pawn leaves a trace, it is like a long snake that cannot eat its own tail. As players progress, they continue drawing and playing cards strategically to obstruct the opponent's path: the player who forms the longest path wins, while the one who gets trapped loses.

While the game dynamics changed, the objective of each type of match, however, was the same, namely to get the students to use the foreign language during the activity.

Rospino

Constructivism and enactivism characterised this third part of the course. Constructivism was introduced as a paradigm within the cognitive approach, shifting the focus from the internal processes and external behaviours of an individual. Instead, it emphasises learning as an ongoing, constructive, and interactive dialogue between the mind and its contextual, social, and cultural environment. This perspective challenges the traditional separation between the mind and its surroundings. In this case, we shall speak of CSSC learning, an acronym that summarises the key attributes of constructivism:

- *Constructive*: individuals build upon existing knowledge, which is relational, formed through a dynamic interaction between the learner and the subject matter.
- *Self-regulated*: learners have an active role in managing their knowledge construction process in relation to contextual needs.
- *Situated*: learning is anchored within specific contexts and activities, emphasising the significance of action and language in developing complex skills.
- *Collaborative*: emphasis on interpersonal and intrapersonal processes; contributions from scholars like Vygotsky underscored the importance of social interaction and cultural patterns in learning.

Jonassen further distilled this into three pivotal aspects of the knowledge process: collaboration, facilitation, and reflective negotiation. Consequently, the constructivist theory

envisions educators as facilitators guiding students in their skill development; they focus on creating active learning environments that foster student interaction and participation. Moreover, meaningful tasks are central in constructivist pedagogy, as they resonate with students' experiences, making learning more engaging and relevant. Such tasks, whether authentic (simulating real-world scenarios) or real (operating in real-life contexts), differ for each student, emphasising open-ended and unpredictable activities. Lastly, constructivist teaching transitions from assessing learning to assessing *for* learning: evaluation becomes a tool to enhance ongoing learning by monitoring student progress, identifying learning needs, and adjusting instructional strategies accordingly.

Constructivist educational technologies have significantly influenced modern learning paradigms. A notable contribution introduced in the lesson is Seymour Papert's Logo, which embodies not just a technology but a philosophy of learning. Collaborating with colleagues and students, Papert developed this programming language and environment for children. While rooted in Piaget's pedagogical paradigm, Papert coined his approach as "constructionist". Unlike behaviourist applications, Papert emphasised that technology within constructivism should empower students to manipulate, extend, and apply knowledge, fostering a deeper understanding of the world and self-awareness. Another pivotal constructivist technology is Etienne Wenger's *communities of practice*. These are viewed as technologies because they facilitate shared learning and meaning-making through active member interaction. A community of practice involves individuals collaboratively engaging in learning, characterised by significant social interaction, knowledge sharing, and mutual support towards common learning objectives.

Furthermore, in the realm of constructivist educational technologies, there's a strong inclination towards constructionism, as evident in Papert's work. Central to this are *microworlds*: simplified simulated environments facilitating hands-on exploration and language learning. For instance, the game *My Make Believe Castle* focuses on fostering creativity, problem-solving, critical thinking, sequential planning, and memory rather than specific content. Another example is *Quest Atlantis*, a 3D game where players interact via avatars, engaging with objects, characters, and peers, all in the foreign language. This game promotes identity exploration, encouraging students to assume roles like investigators or scientists, addressing "real-world" challenges. However, the effectiveness of *Quest Atlantis* in fostering community-based learning largely hinges on individual mission designs.

Afterwards, enactivism was also introduced. Coined by Francisco Varela, Eleanor Rosch, and Evan Thompson in the field of philosophy of mind and cognitive sciences, enactivism revolves around the pivotal concept that cognition arises from the interactions between an organism and its environment. As delineated by Mark Rowlands, this theory is based on four foundational pillars, as known as *the four Es*:

1. *Embodied*: body and physical actions have a critical role in understanding and learning about the world.
2. *Embedded*: cognition isn't confined solely to the brain but is dispersed throughout the body and its surrounding environment.
3. *Enacted*: learning and cognition emerge from the dynamic interaction between the organism and its environment.
4. *Extended*: cognition extends beyond the boundaries of the brain, encompassing the environment in which an organism operates.

Thus, enactivism emphasises the interconnection of the mind, body, and environment in mental processes. Distinctively differentiating itself from constructivism, enactivism focuses on knowledge construction through individual experiences and information processing from the environment. Moreover, Jerome Bruner initially introduced the term “enaction” as *learning by doing*. In this view, individuals actively shape their experiences through actions, challenging the notion of passive reception from the environment. A salient concept within enactivism is *autopoiesis*, denoting systems capable of self-reproduction and maintenance: in enactivist thought, the body isn't just a vessel but an integral component of cognition. Perception, in this perspective, is not about transmitting information, as proposed by cognitive theories, but rather about exploring the world through various means.

Within educational theory, enactivism perceives every learning scenario as a multifaceted system involving teachers, learners, and contexts, all co-creating the learning environment. This approach aligns closely with situated cognition, asserting that knowledge is context-bound, emerging from activity, context, and culture. In linguistic education, however, enactivism remains a burgeoning field. Rather than rigidly directing students, educators act as facilitators, fostering interactive and meaningful learning experiences. Enactivist educational goals are *proactive*, aiming to engage students deeply and interactively within their learning contexts.

Although a nascent theory, it was explained that enactivism has garnered attention from robotics and human-machine interface specialists. Robots, for instance, can be designed

to interact and learn from their environments as well as humans. Furthermore, human interactions with computer-aided design tools or databases can be enriched by creating enactive environments, leveraging users' tactile, auditory, and visual capabilities for more immersive experiences, which are crucial in language learning. In recent times, enactivist scholars have begun exploring digital gaming realms, emphasising bodily experiences, experiential learning, meaning construction, exploration, discovery, and social interaction.

As for the other teaching theories, the practical part of the lesson also took place, involving the assembly of a robotic device called *Rospino* and the interaction with a specific software. Students were tasked with mastering this software to navigate a virtual environment and dictate the robot's movements, granting them the autonomy to engage in explorative experimentation (Tosato & Banzato, 2018). In order to start with the crafting of the robot, materials were shown:

- *Axes and wheels*: 4 wheels, a stick, a wooden board;
- *Control unit*: an Arduino board, a breadboard, 7 cables;
- *Power supply*: a 9V battery, 4 x 1.5V batteries and a battery holder, a USB cable;
- *Chassis*: a board and rubber bands;
- *Activators*: two servo motors.

After understanding the procedure, the students were ready for the assembly. In line with the guidelines described by Tosato and Banzato (2018), the laboratory activity was then organised as follows:

1. Students were asked to split into groups of three members each. Every group received Lego WeDo kits provided by the teachers and was asked to build a fox with a maximum of 10 pieces. The common thread of the activity is Aesop's fable "The Fox and the Crow", which is often told to children at the beginning of the activity to introduce the characters and to capture their attention.
2. The Scratch program, pre-installed in laptop computers, was introduced. The task was visual storytelling: after explaining how the software interface works, the students were asked to create a background ("stage") for the fable and to draw the protagonists ("sprites") of the story, that is, the fox, the crow, and the cheese. Students were given the freedom to showcase their creativity through the selection of backgrounds and sprite colours. The development of sprites offered an initial introduction to Scratch controls,

allowing students to build confidence by getting accustomed to the controls and independently exploring the outcomes they could produce.

3. Subsequently, we guided the students in structuring their story using Scratch, starting from educational goals and then posing the right questions to develop their reasoning. We report here a slightly modified version of the table from Tosato and Banzato (2018):

Educational goals	**Questions asked students**	**Activities with Scratch**
Define the essential elements of a problem	What are the main actors of the story?	The main entities are the *sprites*, the secondary elements, not necessary to animate, are placed on the *stage*.
Identify the actions to be associated with each entities and when it is necessary to activate them.	What do the main actors have to do? Which of these move first? When does the cheese move? What does the fox have to do while it falls?	Control block (when [] key pressed, broadcast [], when I receive [])
Describe the termination condition of a loop (iteration)	When does the cheese have to stop? How far does it come down?	Control block (repeat until []), sensor suite (touching []?)
Use the variables	How does the cheese move down? What is the value of variable y? How to bring the cheese to the starting position each time?	Motion commands (x position, y position, change x by [], change y by [], set x to [], set y to [])
Describe the condition to select a block of code to be executed (selection)	When to move the fox right or left? Which of the sensors value "get up"?	Control block (if []), sensor suite ([tilt] sensor value), operators commands ([] = [])
Distinguish between the input and output of a program	How to make a crow sound? How to clear the cheese eaten by the fox? How to move the cheese from the raven to the fox? How to show that the fox is happy to have taken the cheese? How to move the fox according to the movement of "tilt"?	Looks block (think [] for [] secs, hide, show), motion commands (change x by [], change y by []), sensor suite ("tilt" sensor value)

4. After the realisation of the program associated with each character in the story, the robots built by each group were connected to gyroscopes which, in turn, were connected to their computers; as a result, the groups were able to guide their fox by handling the gyroscope. Thanks to the instructions they realised in Scratch, the students successfully controlled the movement of their Lego-built fox and observed its movements on the screen.

The utilisation of these activities by the university lecturer served as a pedagogical gaming environment for language learning. Thus, explicitly asking students to employ

English as the vehicular language for completing the tasks enabled them to immerse themselves in the role of the learner. Furthermore, the games were straightforward and accessible to all, obviating the need for foundational computer literacy. Ultimately, these activities allowed university students to become acquainted with innovative methods to be used in a language classroom, reconnecting them with what they had progressively learnt in class. As a result, not only did the students experience these approaches first-hand, but they did so with full awareness of the underlying teaching processes.

4. Research design

Our research was designed to analyse the level of engagement developed by the participants concerning the above-described workshop activities, all while taking into consideration their personal background. In other words, our objective was to assess whether the proposed activities can be enjoyable and thus functional within an educational context. In the existing literature, several case studies can be found that examine the engagement component of students during a particular language learning activity based on game features.

To provide a few examples of researches addressing the activities covered by our study individually, we mention the work of Koeltzsch and Stadler-Heer (2021), who trained pre-service teachers in designing skill-specific digital escape room scenarios for foreign language classrooms and tested the educational escape games developed in the seminar; the survey results reported an overall positive experience of the learners, concluding that implementing educational escape games in the language classroom may also lead to a change in attitude towards making mistakes.

Along the same line as the activity with Cody Roby, Tinedo Rodríguez (2022) provided teachers with instruction on how to develop their own video games according to the needs of their students by making use of the software Scratch; they were then able to share their games with their students so that they will have out-of-class opportunities of immersion. Parents were also involved in the process as active agents along the learning journey and provided teachers with feedback on how students engaged at home. This proposal is supposed to foster the use of ICT and computational thinking as a language immersion environment outside the classroom, resulting in improved linguistic competence, involvement, technological skills and the family-school relationship.

While there are still few existing studies on robotics integration into language curriculum and instruction, we found the work of Awada (2022) to be an interesting example

in this scenario. This research investigated the efficacy of robotics and weblog models in enhancing English as a Foreign Language (EFL) proficiency among middle and secondary school students. Students initially identified a problem, conducted research to devise a solution, and subsequently communicated their innovative ideas to both Robotics and EFL educators. Specifically, the robotics project centred on the creation of a "Gas Detector", requiring components such as a gas sensor, microprocessor (utilising Arduino Uno), buzzer, connecting wires, and a battery. Following instructions from their teachers, students incorporated the identified components into their design, culminating in the coding phase. Subsequently, students were tasked with crafting weblog posts and producing videos enriched with visuals and music, fostering engagement with computer-mediated content resources. Ultimately, findings underscored the pronounced benefits of integrating blogging and robotics initiatives in significantly elevating EFL proficiency scores.

Although these are very good examples of the successful evaluation of an educational experience, their research method did not fit our study, either because some methods were not within our possibilities (i.e., observations and interviews) due to time and organisational constraints and because they do not compare several types of activities. Given the absence of existing literature addressing all three language learning activities observed in our workshops, we decided to design our research project in such a way as to emphasise precisely the differences in engagement between the different types of educational games, consequently enriching the body of research in the field of gamification in education through our work.

In the absence of a predefined example suitable for our specific context, we designed our research based on two already validated models to gather the relevant data for our study, namely the *Leisure Activity Questionnaire* and the *Game Experience Questionnaire*, one of the most popular gaming experience questionnaires (Sabet et al., 2019). While the former belongs essentially to explanatory research and therefore does not incur any validity or reliability problems, the latter model can be questioned. Johnsona et al. (2018), for example, found that a number of the items link to more than one construct and that the constructs of *negative affect*, *tension/annoyance* and *challenge* can be replaced more appropriately by a combined construct of *negativity*. To address this potential limitation, our approach entails considering these constructs collectively during the analysis of our findings. Effie et al. (2018) also found that *challenge* and *negative affect* are problematic components. As shown in their literature review and validation study of the GEQ, since its psychometric properties are not fully established, a refinement of this tool or the development of a new one are needed.

Moreover, as Sabet et al. (2019) remark, this questionnaire is based on the experiences that participants remember, which does not necessarily correspond to the actual experience that they have while playing. Therefore, GEQ should not be used for long-duration tests, although this is not relevant to our case.

On the other hand, these researchers (Johnsona et al., 2018; Effie et al., 2018) also affirm the reliability and validity of other constructs, namely *flow*, *immersion*, *competence*, and *positive affect*. Johnsona et al. (2018) also explain that GEQ's structure is not supported within a gaming context where people are playing a game they presumably find highly enjoyable; nevertheless, we had no certainty that the workshop activities could meet the tastes of students in our study, as we could also ascertain from the results of the students' profile questionnaire. Lastly, Sabet et al. (2019) did not find any evidence for the existence of primacy and peak effects in the GEQ.

Overall, we believe that there is a need for the development of more contemporary, systematically structured, and accessible questionnaires. However, considering the scope and objectives of our research, the employment of these instruments remains appropriate. We therefore adapted the structure of the research to our context and our possibilities, exploiting the data collected from multiple perspectives.

4.1 Research questions

In order to pursue the above-mentioned objective, it was necessary to focus our attention on three fundamental aspects: engagement, playing habits and educational background. These guidelines also help us to direct our research more specifically, so as not to provide too general a view of the results. Moreover, in conducting our research, we examined a class composed of a large majority of females, leading us to question their level of engagement and appreciation concerning the gaming activities proposed in the laboratory setting. Indeed, Manero et al. (2016), in their examination of educational video games, reference several studies highlighting gender disparities in gaming habits, preferences, and behaviours/interactions with video games. Although affirming certain gender-specific differences, their findings curiously indicate that gender does not serve as a determining factor in influencing motivation and interest levels towards the presented game. Our research does not aspire to confirm or refute these distinctions; hence, this acknowledgment is solely pertinent to mitigate concerns associated with the predominant gender composition of our

sample. Consequently, we approach the analysis not from a gender-specific perspective but rather holistically. These considerations led us to develop the following research questions:

RQ1: What is the engagement level experienced during the workshop activities?
RQ2: How was the engagement level experienced during the lab activities compared to the level of engagement during participants' favourite game?
RQ3: Is there a relation between the level of engagement of students and their educational background?

The first RQ is functional to understand whether the performed activities have a capacity for engagement and to what extent. As we have shown in the literature review, engagement is the key to engender active participation and interest in students, as well as our focus of interest in this study. The first question is therefore essential to test the effectiveness of the workshops on this aspect. RQ2 is designed to understand whether these game activities meet the preferences and standards of the participants. Indeed, comparing the levels of involvement allows us to better understand whether the activities proposed by the teacher succeed in making the students have a learning experience that engages them as their favourite game does. In addition, it provides interesting insights into how students respond to different game dynamics. The third question seeks to identify potential correlations and patterns between students' levels of involvement and their educational background, exploring whether this variable significantly influences the effects of various activities on individuals. Consequently, such insights could be instrumental when considering the design implications of gamification.

4.2 Methods

To investigate the subjective experience of each participant, we designed a qualitative research study. Given the limited sample size, we focused more on individual experiences and perceptions, trying to understand the quality and nature of their engagement. In total, the participants had to complete five questionnaires: the student profile questionnaire, a pre-test on their favourite game, and three post-tests following each laboratory activity.

First, it was necessary to delineate the students' preferences and backgrounds. To do so, we relied on the questionnaire developed by Salmon et al. (2017) which can be found in their research paper *A survey of video game preferences in adults: Building better games for older adults*. Their survey explores many aspects of leisure activity preferences in adults, which can be grouped into four large-scale themes: the features that they look for in a video

game, which help to understand the useful game mechanics to implement; the types of games that they play, to identify the game genres that most attract them; who they play games with, to design engaging environments from a social point of view; and the devices and hardware they use, which allows for the development of activities that most meet their comforts. Since we do not have the certainty that the participants in our study are regular players (rather the opposite), the questionnaire had to be as broad as possible and differentiated at the same time, therefore, the *Leisure Activity Questionnaire* was perfect for our purpose. Furthermore, the participants in our study are university students whose age range fits well with the purpose for which their questionnaire was developed.

What we did was to slightly reshape and adapt this model so that it best met our needs, as well as translate the questionnaire into Italian to ensure that the students clearly understood the questions. The result was a 6-minute questionnaire divided into the following areas of interest:

1. *Anagraphic*: age, gender, educational background and highest level of education.
2. *Leisure activities*: different types of leisure activities to rate on a five-point Likert scale values ranging from “I don’t like it at all”, “I don’t like it”, “Indifferent”, “I like it” and “I like it a lot”, and a multiple response question on who they engage in leisure activities with.
3. *Entertainment preferences*: several entertainment categories to rate on a five-point Likert scale with values ranging from “I don’t like it at all”, “I don’t like it”, “Indifferent”, “I like it” and “I like it a lot”.
4. *Electronic devices*: frequency of use of different electronic devices (alone or with others) to rate from “less than once a year to never”, “more than once a year to yearly”, “more than once a month to monthly”, “more than once a week to weekly”, “more than once a day to daily”.
5. *Computer use*: frequency of computer use for different types of tasks to rate from “less than once a year to never”, “more than once a year to yearly”, “more than once a month to monthly”, “more than once a week to weekly” and “more than once a day to daily”.
6. *Computer or video games*: video game qualities/features (e.g, themes, aesthetics and characters) to rate based on their personal opinion on a five-point Likert scale with values ranging from ‘‘not at all important”, ‘‘minimally important”, ‘‘moderately important”, ‘‘quite important” and ‘‘very important”; play frequency for different game genres to rate from “less than once a year to never”, “more than once a year to yearly”, “more than once a month to monthly”, “more than once a week to weekly” and “more

than once a day to daily"; and a multiple response question on who they play those games with.

The adaptation of the questionnaire by Salmon et al. (2017) proved efficacious in diminishing the completion duration and removing certain questions that did not pertain directly to our principal research focus. At the end of the questionnaire, we also added a question asking them to list at least three of their favourite games. The entire revised questionnaire, transcribed in both Italian and English, can be found in the appendix (Appendix B).

To design the second part of the research on student involvement, instead, we relied on the *Game Experience Questionnaire* (GEQ) by IJsselsteijn et al. (2013). Its structure consists of three modules:

1. The *Core Module* assesses game experience as scores on seven components: Immersion, Flow, Competence, Positive and Negative Affect, Tension, and Challenge.
2. The *Social Presence Module* examines psychological and behavioural interaction with other social entities, be they virtual (e.g., in-game characters), mediated (e.g., other online players), or co-located.
3. The *Post-game Module* evaluates how players feel after they stop playing.

Thus, while the first two parts probe the players' feelings and thoughts during the game, the last part focuses on their sensations at the end of the gaming experience. Nevertheless, we decided not to consider the in-game version of the GEQ since its components and items are the same as those of the core questionnaire and we did not have enough time for assessing game experience at multiple intervals during workshop sessions as is suggested. For the purpose of our research, we used the GEQ questionnaire both to detect the level of involvement during their favourite game and to examine each laboratory experience, ensuring consistency and comparability of the survey. This model is based on a five-point Likert scale with values ranging from "not at all", "slightly", "moderately", "fairly" and "extremely".

As we did with the students' profile questionnaire, we translated the GEQ questionnaire into Italian as well: we used the present tense for the translation of the pre-test on their favourite game, while for the three post-tests we used the past tense as the compilation occurred after each workshop. We present here the English transcript of the survey that was administered after each lab activity as it is reported in IJsselsteijn et al. (2013); it may be useful to understand how the data were then interpreted. We also provide the corresponding components, which we will discuss later on.

Core Module		
N°	**Item**	**Component**
1	I felt content	*Positive affect*
2	I felt skilful	*Competence*
3	I was interested in the game's story	*Sensory and imaginative immersion*
4	I thought it was fun	*Positive affect*
5	I was fully occupied with the game	*Flow*
6	I felt happy	*Positive affect*
7	It gave me a bad mood	*Negative affect*
8	I thought about other things	*Negative affect*
9	I found it tiresome	*Negative affect*
10	I felt competent	*Competence*
11	I thought it was hard	*Challenge*
12	It was aesthetically pleasing	*Sensory and imaginative immersion*
13	I forgot everything around me	*Flow*
14	I felt good	*Positive affect*
15	I was good at it	*Competence*
16	I felt bored	*Negative affect*
17	I felt successful	*Competence*
18	I felt imaginative	*Sensory and imaginative immersion*
19	I felt that I could explore things	*Sensory and imaginative immersion*
20	I enjoyed it	*Positive affect*
21	I was fast at reaching the game's targets	*Competence*
22	I felt annoyed	*Tension/Annoyance*
23	I felt pressured	*Challenge*
24	I felt irritable	*Tension/Annoyance*
25	I lost track of time	*Flow*
26	I felt challenged	*Challenge*

27	I found it impressive	*Sensory and imaginative immersion*
28	I was deeply concentrated in the game	*Flow*
29	I felt frustrated	*Tension/Annoyance*
30	It felt like a rich experience	*Sensory and imaginative immersion*
31	I lost connection with the outside world	*Flow*
32	I felt time pressure	*Challenge*
33	I had to put a lot of effort into it	*Challenge*
Social Presence Module		
N°	**Item**	**Component**
1	I empathized with the other(s)	*Psychol. involvement – Empathy*
2	My actions depended on the other(s) actions	*Behavioural involvement*
3	The other's actions were dependent on my actions	*Behavioural involvement*
4	I felt connected to the other(s)	*Psychol. involvement – Empathy*
5	The other(s) paid close attention to me	*Behavioural involvement*
6	I paid close attention to the other(s)	*Behavioural involvement*
7	I felt jealous about the other(s)	*Psychol. inv. – Negative feelings*
8	I found it enjoyable to be with the other(s)	*Psychol. inv. – Empathy*
9	When I was happy, the other(s) was(were) happy	*Psychol. inv. – Empathy*
10	When the other(s) was(were) happy, I was happy	*Psychol. inv. – Empathy*
11	I influenced the mood of the other(s)	*Psychol. inv. – Negative feelings*
12	I was influenced by the other(s) moods	*Psychol. inv. – Negative feelings*
13	I admired the other(s)	*Psychol. involvement – Empathy*
14	What the other(s) did affected what I did	*Behavioural involvement*
15	What I did affected what the other(s) did	*Behavioural involvement*
16	I felt revengeful	*Psychol. inv. – Negative feelings*
17	I felt schadenfreude (malicious delight)	*Psychol. inv. – Negative feelings*

Post-game Module		
N°	**Item**	**Component**
1	I felt revived	*Positive experience*
2	I felt bad	*Negative experience*
3	I found it hard to get back to reality	*Returning to reality*
4	I felt guilty	*Negative experience*
5	It felt like a victory	*Positive experience*
6	I found it a waste of time	*Negative experience*
7	I felt energised	*Positive experience*
8	I felt satisfied	*Positive experience*
9	I felt disoriented	*Returning to reality*
10	I felt exhausted	*Tiredness*
11	I felt that I could have done more useful things	*Negative experience*
12	I felt powerful	*Positive experience*
13	I felt weary	*Tiredness*
14	I felt regret	*Negative experience*
15	I felt ashamed	*Negative experience*
16	I felt proud	*Positive experience*
17	I had a sense that I had returned from a journey	*Returning to reality*

In order to analyse the gathered data, we followed the scoring guidelines delineated by the developers of the GEQ, encompassing the computation of the average value of each item and the average of all items in each component:

Core Module

Competence: items 2, 10, 15, 17, and 21.

Sensory and imaginative immersion: items 3, 12, 18, 19, 27, and 30.

Flow: items 5, 13, 25, 28, and 31.

Tension/Annoyance: items 22, 24, and 29.

Challenge: items 11, 23, 26, 32, and 33.

Negative affect: items 7, 8, 9, and 16.

Positive affect: items 1, 4, 6, 14, and 20.

Social Presence Module

Psychological involvement – Empathy: items 1, 4, 8, 9, 10, and 13.

Psychological involvement – Negative feelings: items 7, 11, 12, 16, and 17.

Behavioural involvement: items 2, 3, 5, 6, 14, and 15.

Post-game Module

Positive experience: items 1, 5, 7, 8, 12, 16.

Negative experience: items 2, 4, 6, 11, 14, 15.

Tiredness: items 10, 13.

Returning to reality: items 3, 9, and 17.

We applied this procedure to each of the four questionnaires based on the GEQ model. The ease of use and completeness of this questionnaire were the attributes that led us to select it as the method for our research; it examines all the facets of our interest and provides a comprehensive and clear picture of the student's experience from all angles, addressing all types of engagement: behavioural (e.g., items in the Social Presence Module), emotional (e.g., items in the Post-game Module), and cognitive (e.g., items in Core Module) engagement. Furthermore, it incorporates the component of flow, the importance of which we highlighted in the literature review.

To better understand the rationale and design of these components, we should draw our attention to the work of Poels et al. (2007) in which they describe the development of the GEQ. First of all, empirical data collection involved focus group interviews with different types of gamers. These interviews not only served to contrast scientific conceptualisations with ordinary descriptions but also provided valuable insights for the formulation of questionnaire items. Drawing from the outcomes of these focus groups and subsequent expert consultations, the research commenced with the generation of items, prioritising specificity to avoid “underfactoring” in the model. One significant observation was the combination of sensory and imaginative immersion into a single scale. Interestingly, no distinct subscale was identified to explore experienced *control*, although some elements earmarked for this concept intertwined with the construct of *competence*. Another unexpected dimension, i.e. *tension*, emerged as a separate entity from other negative affect indicators. The research findings are

promising in the sense that they have yielded reliable and comprehensible scales, aligning with both theoretical constructs and qualitative empirical observations.

Exploring the sensitivity of the scales, distinct patterns of game enjoyment surfaced: *male* players generally exhibited higher levels of game enjoyment than their *female* counterparts, as evidenced by elevated scores across positive affect, competence, flow, immersion, and challenge metrics. *Frequency of gameplay* also emerged as a determinant, with frequent players manifesting heightened enjoyment levels compared to occasional gamers. Furthermore, *game type* distinctions became apparent upon detailed categorisation: social dynamics within the gaming environment also significantly influenced player experience. Post-game experiences were predominantly shaped by rich involvement and perceived competence; notably, transitioning back to reality posed greater challenges for those who experienced profound immersion and flow during gameplay.

An important aspect of their study concerned the psychological involvement scales that measured the influence of positive (empathy) and negative feelings. These scales exhibited positive correlations, underscoring the role of social presence: both positive and negative feelings towards co-players distinctly influenced various aspects of the gaming experience. In summary, the GEQ demonstrated robust sensitivity in capturing nuances related to gamers, game genres, gameplay attributes, and social contexts. Although further investigation is warranted, as researchers underline, the distinctiveness of each subscale was validated through varied response patterns concerning these contextual variables, solidifying the questionnaire's efficacy and applicability in assessing the multifaceted psychological impacts of gaming.

4.3 Tools

Once the study was structured and the models were selected, we proceeded to create the questionnaires using Google Forms, which were then shared with the students via email. The charts generated in the Google Forms responses section are highly beneficial for visualising the collected data and interpreting the percentages. Each survey was also linked to its respective spreadsheet on Google Sheets, where data were progressively gathered; this tool allowed us to easily calculate the averages of each component of the pre and post-tests and to filter the data according to the established variables. It was also helpful in creating graphs. In addition, students could find the teaching materials shown in class on the Moodle page of the university course (e.g., the ER template).

4.4 Procedure

Before administering the questionnaires, we wanted to ensure anonymity in the answers to the questionnaires, making the students feel free to express their personal opinions. To do so, we assigned a unique identifier code to each participant, which had to be added at the beginning of each questionnaire. Thus, we maintained the possibility of tracking individual answers for each questionnaire in order to cross-reference the data, while at the same time preserving anonymity. Furthermore, participants were explicitly illustrated the academic use of the data and the need for a code for the follow-up questionnaire. For each survey, they agreed to the security and privacy consent regarding the collection of this personal information, which guaranteed that e-mail addresses would be stored and not shared with third parties.

As we have already anticipated, we first investigated the students' playing habits through a survey that outlined their profile and a pre-test regarding their favourite game, which we sent the students a few days before the first workshop to give them enough time to complete them accurately; we then administered the other three post-test questionnaires on the lab activities. The pre-test and the post-test questionnaires are identical (apart from differences in verbal agreement), precisely to see how the participants felt during these experiences in contrast with their favourite game, which we adopted as a standard of comparison. The three workshops were conducted two weeks apart from each other, and the questionnaires were sent via email to the students after each session. Due to time constraints, we were unable to administer the surveys immediately after the end of the activities, as recommended by IJsselsteijn et al. (2013). However, by adopting this approach, we allowed students more time to complete the forms in the subsequent days.

Additionally, between the first laboratory activity and the second, we provided the students with feedback regarding the process of data collection and approximate interpretation. We summarised the answers from the initial three questionnaires (namely the student profile, the favourite game questionnaire, and the ER activity questionnaire) in a PowerPoint presentation showing them our findings based on the data collected up to that point. Although this marked just the beginning of our analysis, it served to prompt students to reflect upon their own responses and to recognise the positive outcomes of the laboratory activity, as will be discussed in subsequent chapters. Given that their contribution was fundamental to us, we believed it would be equally interesting for them to understand the developments and the outcomes of their educational journey.

4.5 Data collection

The collection of survey data, automatically undertaken by computational systems, was subsequently organised to align with our following interpretative framework. Utilising the identification codes, we further selected the subjects that would allow us to conduct a more specific analysis according to the established variables. Indeed, our aim was to provide an analytical perspective transitioning from the general to the specific.

In order to understand how our research structure meets the ambitions of this study, we can turn our attention back to the research questions. The three post-test questionnaires provided us with an overarching understanding of the extent and manner in which students engaged during the workshops, consequently addressing our first RQ (i.e., what is the engagement level experienced during the workshop activities?). Thus, we were also able to see the different impact of the activities on the participants' involvement. Drawing upon the findings from the pre-test and post-tests together, we then answered the second RQ (i.e., how was the engagement level experienced during the lab activities compared to the level of engagement during participants' favourite game?), paying particular attention to the differences in engagement between their favourite game and the educational games they played in class.

Given that the students' presence was not consistently uniform throughout the lessons, as we previously prefaced, we also gathered and analysed the answers of the individuals that participated in at least 4 surveys in order to give a presentation of the results that was as linear as possible. After this skimming, the number of participants per questionnaire, from the first to the last, was 17 for the first two, 15 for the first two post-tests, and 14 for the last, respectively. Although the number of students is reduced at this stage, it facilitates a more consistent and continuous analysis of the instructional impact.

The third research question (i.e., is there a relation between the level of engagement of students and their educational background?) entailed the selection of other types of participants. To address this query, we essentially categorised students into two groups based on their educational background: those who attended high school[6] and those who attended a technical institute[7]. Only one person attended a different school (a vocational school); given the marginal significance of this particular datum, we shall omit it from this categorisation. Italian high schools, which encompass various types such as classical, artistic, linguistic, scientific, humanistic, and musical, focus primarily on providing students with a robust

[6] *Liceo* in Italian.
[7] *Istituto tecnico* in Italian.

foundational education. They emphasise cultivating logical reasoning and analytical skills, and preparing students for university studies, making them a preferred choice for those proficient in theoretical subjects. In contrast, technical institutes offer a blend of theoretical knowledge and hands-on practical skills, leading to a professional "technician" qualification. Responding to the demands of the economic and productive sectors, technical institutes provide a diverse range of specialisations, from administration and electronics to fashion and tourism. Unlike high schools, they place a significant emphasis on practical training through extensive laboratory work, enabling students to seamlessly transition into specific professional roles upon completing their studies (*LE CARATTERISTICHE DELLE SCUOLE*, n.d.; Elia, 2022). This approach enabled us to identify potential similarities within the same categories of students and distinctions between the two.

To sum up, our objective was to examine potential disparities in habits, play styles, or lab activity appreciation by taking into consideration what the different types of schools entail in terms of mentality, practical competencies and interests. Considering the predominantly female composition of the sample, the variable of gender held limited significance, as well as the variable of age since the majority of students were within a comparable age bracket, apart from a few cases. From a research perspective, this data could provide valuable insights into the efficacy and applicability of educational games within the school context.

In this section, our aim is also to elucidate the extent of participation in the questionnaires, offering a comprehensive understanding of both the volume and reliability of the data collected. Accordingly, we categorised students based on their participation levels across the workshops, which have been consistently declining over time: from the first to the last survey, the number of participants was respectively 34, 29, 20, 18 and 16. In the following graphic (Table 1), we categorised students based on their participation frequency. As we can see from Table 1, the number of students who completed all five questionnaires (in blue) remains constant; in contrast, the number of individuals who answered four surveys (in red) decreased over time, although not as much as the number of those who answered only 3 (in yellow). Presumably, the five students who only answered the first two questionnaires (in green) were not able to come to class and thus participate in the workshops (they might be non-attending students); however, their answers may be useful information in the general reading of the data for understanding playing habits also based on school background.

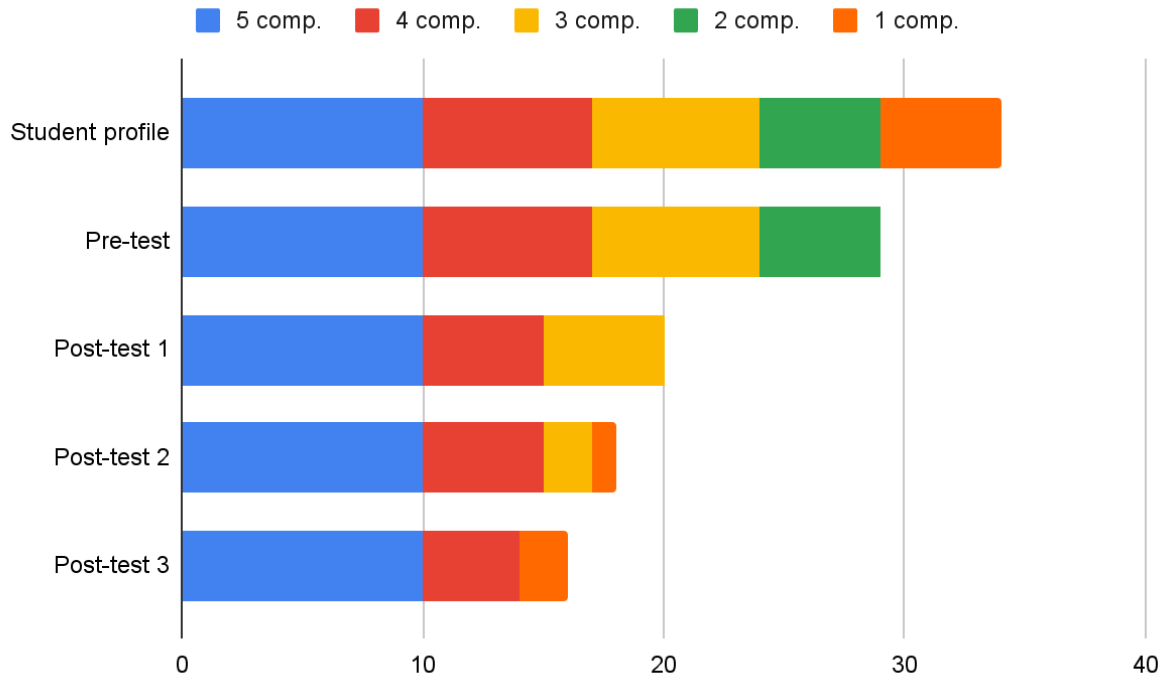

Table 1. Frequency of student participation in the questionnaires (comp. = compilations).

On the other hand, data from people who only completed one questionnaire (in orange) will only be taken into account for the general reading of the students' profiles and general level of appreciation of the activities since it is necessary to know their background and their favourite game to provide a measure of comparison with based on established variables.

Ultimately, we designed this study to gather, from multiple perspectives, the opinions of university students regarding the laboratory activities undertaken, aiming to comprehend their feelings and level of engagement. While we may draw certain inferences regarding motivations and connections between the collected data, our research does not seek to answer the “why” behind the results obtained. Instead, it aims to provide an account of individuals' experiences and serve as a basis for potential future adjustments and development of the educational workshops.

5. Data analysis of students' profiles and engagement level

In this chapter, we aim to provide a comprehensive overview of the insights derived from our surveys, beginning with an analysis of the profiles of our student sample, followed by their overall feedback regarding their favourite game and the laboratory activities. We will report the information in the most comprehensive manner possible, allowing for a faithful

understanding of the peculiarities of our sample and enabling a thoughtful interpretation of the results.

We will begin by describing the characteristics of the participants in our study, aiming to understand their gaming habits and preferences. We will also highlight any inconsistencies that may arise in the questionnaire responses. Through the pre-test, we will subsequently assess their level of engagement during their favourite game, already presenting data from the most participative students. These results will then determine the appreciation of the proposed laboratory activities in terms of expectations. Finally, we will examine the feedback received for the three gamified language activities, focusing on both the overall response and the outcome differences among the various components of the questionnaire.

5.1 Students' profile

The demographic questions facilitated a more nuanced understanding of the profile of the participants in our study. The cohort predominantly comprises females (91.2%) aged between 20 and 25 years, with a few exceptions exceeding this age bracket, notably a 27-year-old, a 35-year-old, two individuals in their 40s, and a 60-year-old. Excluding three outliers, all students were of Italian nationality. A salient distinction pertains to the type of secondary education they pursued, prompting us to subsequently incorporate this variable into our study. Specifically, 61.8% attended a high school, whereas 35.3% enrolled in a technical institute; the remaining fraction consists of a sole individual who attended a vocational institute. Furthermore, the vast majority of the cohort attained a high school diploma as their highest educational qualification, while 14.7% already hold an undergraduate degree.

The second section of the questionnaire, on the other hand, investigated the leisure activities preferred by the students, encompassing any activity they do for entertainment, pastime, or hobby, whether done individually or with others. In order to calculate the mean of the responses, we substituted the Likert scale indicators as follows: 1 = "I don't like it at all", 2 = "I don't like it", 3 = "Indifferent", 4 = "I like it", and 5 = "I like it a lot". As we can see in Table 2, by considering all activities that received a score of 4 or higher, we discovered that students, in descending order, enjoy *travelling*, *listening to music*, engaging in *physical activities*, playing *board or card games* and going *shopping*. Conversely, by taking into account scores equal to or lower than 3, we discerned that students do not appreciate *gardening* and *casino* or *lottery* pursuits. An immediate result that catches our attention is the presence of *board and card games* in the top 5, which could serve as a reliable indicator of the

appreciation for similar gaming activities, such as our CodyRoby, for instance. Another item within the realm of games is word and number puzzles, which, despite having a lower score, still occupy the eighth position along with other activities that may not be favourites but are generally appreciated by the participants.

Ranking	Leisure activity	Mean
1	Vacationing / travelling	4.79
2	Listening to music	4.74
3	Fitness activities (walking, gym, hiking etc.)	4.24
4	Board games / cards games	4.09
5	Shopping	4.03
6	Watching movies	3.97
7	Individual sports (tennis, swimming, etc.)	3.82
8	Crosswords and sudoku Reading or writing Manual activities and DIY Musical activities	3.74
9	Artistic activities (painting, drawing, etc.)	3.5
10	Team sports (volleyball, basket, etc.)	3.38
11	Theater	3.03
12	Gardening	2.91
13	Casino / lottery tickets	1.53

Table 2. Ranking of students' leisure activities based on preferences.

Originating from the realm of games are the casino and lottery activities, which can be described as games of chance played by wagering money or anything of monetary value, thus becoming part of the world of gambling[8]. In contrast to skill-based games, therefore, this type of games relies on chance, and it is noteworthy to observe that they are widely disliked by students. Furthermore, we can deduce from this table that students prefer individual sports over team sports, and this is a significant aspect to consider when discussing habits and sense of challenge stemming from everything associated with having a team mentality rather than an individual one. We can also observe that students find interest in hands-on activities, but

[8] Link Wikipedia, *Game of chance*: https://en.wikipedia.org/wiki/Game_of_chance

they do not particularly enjoy those involving interaction with nature; utilising manual skills for plant care is not perceived as genuinely engaging by them. Surprisingly, theatre elicits a general lack of interest on average, making it the most divisive item within the class.

Relevant to this section was also the question concerning preferred entertainment categories in terms of films, books and TV series, for example. As depicted in Table 3, we opted to represent the 34 categories listed in the questionnaire in preference intervals to facilitate the interpretation of this widely varying data: each column presents the items in order of score from highest to lowest within each interval and dashes represent different scores.

Mean			
≥ 4	**< 4 and ≥ 3.5**	**< 3.5 > 2.5**	**≤ 2.5**
– *Action and adventure* – *Travel* – *Foreign*	– *Arts and humanities* *Psychology* *Romance* – *Comedies* *Documentary* *Family movies* – *Sci-fi and fantasy* – *Quiz shows* *Suspense* – *Cooking* *Spy shows* – *Mystery*	– *Sport* – *Home improvement* *Philosophy* *Thrillers and espionage* – *News* – *Sciences* *Dramas* – *Medical* – *Health* – *Poetry* – *Reality shows* – *Computer and technology*	– *Daytime talk shows* – *Soap operas* – *Business and economy* – *War* – *Westerns* – *Horror*

Table 3. Intervals of students' favourite entertainment categories.

Considering the first column, we can assert that students appreciate the idea of escapism, involving both real and imaginary travel, which exposes them to diverse and new realities. This initial observation aligns well with their choice of academic discipline, focusing on humanities and languages. Another factor reflecting this characteristic is the preference for artistic, psychological, and fun themes over scientific, economic, or technological themes.

Viewing the data from another perspective, we can draw additional interesting conclusions; if, instead of relying on the mean, we base the interpretation on the entries that earned the majority of "Indifferent" votes, our ranking undergoes a curious change: we find *Computer and technology* and *Medicine* with 17 votes and *Sciences* with 16 votes out of 34

participants. These items particularly stand out in terms of the neutrality of their impact on students, which denotes a lack of both negative and positive stimuli. It's worth noting that the item related to technology, crucial in our research context, falls within this category, therefore, this could be crucial in gaining a better understanding of students' responses regarding their computer usage. At the very bottom of the list, instead, we find themes of *War*, *Westerns*, and *Horror*, which received a majority of "I don't like it at all" votes.

In addition to serving as an indicator and guide during the interpretation of the data collected on laboratory experiences, this information is valuable to consider when planning a gameful activity in the classroom, especially to understand what appeals to our target audience. It can be highly useful, in fact, for creating a stimulating and engaging context for students and for developing compelling materials that capture their attention, thereby catalysing the use of the foreign language in the classroom.

To calculate the frequency of use of electronic devices and computer use, we replaced the Likert scale indicators with numbers as follows: 1 = "less than once a year to never", 2 = "more than once a year to yearly", 3 = "more than once a month to monthly", 4 = "more than once a week to weekly", 5 = "more than once a day to daily". It did not surprise us to discover that, on average, only smartphones (μ=5), laptops (μ=4.53), and televisions (3.79) are used daily or weekly, but rather that gaming consoles (μ=1.59), and e-readers (μ=1.35) do not even surpass a score of 2, just as desktop computers (μ=1.79); in other words, their usage remains sporadic at best, if not rare or nonexistent. However, not regularly using a gaming console does not necessarily imply not engaging in regular gaming; thus, we approach this data as a functional perspective to interpret the results related to games involving the use of a console. Devices used with moderate frequency are portable music devices (3.03) and tablets (2.76), which have generated divisive data among students between those who never use them and those who use them every day, suggesting that their usage might depend strictly on device ownership. Overall, these data can be useful for reflecting on the assignment or recommendation of multimedia gaming activities to students, who, depending on their social and generational context, exhibit variable habits and possibilities.

The subsequent question also allows us to understand the students' computer usage and frequency. Among the most common activities are browsing for content (μ=4.76), sending emails (μ=4.53), and social networking (μ=3.94). In addition to these actions, aligned with a student lifestyle, less frequent are activities related to creating music collections (μ=3.65), working (μ=3.56), watching movies (μ=3.38), shopping (μ=3.15), and photo

collection (μ=3), presumably associated with leisure time. Much less frequently, on average, participants engage in word processing (μ=2.91), video watching/editing (μ=2.53), and using spreadsheets (μ=2.03). It is interesting to note that the least performed activities on the computer involve online (μ=1.88) and offline (μ=1.79) gaming. Exploring this data, we observe that the difference between the online-offline variable is not as influential:

Online	*Offline*
1 = **17** votes	1 = **18** votes
2 = **8** votes	2 = **7** votes
3 = **6** votes	3 = **7** votes
4 = **2** votes	4 = **2** votes
5 = **1** vote	5 = **0** votes

Consequently, we can affirm that the students in our study are not regular computer gamers, as, on average, they engage in this activity either a few times a year or never.

Delving into the theme of digital games, the questionnaire subsequently asks students: "If you were asked to play a computer or video game, how important would the following aspects be to you?". Participants had to rate the proposed features on a five-point Likert scale which we then translated into numbers as follows: 1 = “not at all important to me”, 2 = “minimally important to me”, 3 = “moderately important to me”, 4 = “quite important to me”, 5 = “very important to me”. Furthermore, in addition to the characteristics listed in Salmon et al.'s (2017) questionnaire model, we added two more items: "structured game" and "unstructured game." We believe that this additional distinction is crucial to understanding whether students prefer the presence of rules, indicating a more guided experience, or a freer game where inventiveness and creativity prevail.

By calculating the averages and ranking these qualities in order of importance, as we have done in Table 4, we can derive the prototype of the game that students in our study would appreciate the most and, consequently, would make them feel more engaged. Considering the four most significant characteristics, we can clearly state that they prefer a game that is highly varied, practical to start and stop, and has polished graphics; the narrative component also proves to be very influential. Contrary to visual aesthetics, music is less essential. The preference for a challenging game aligns well with the aspect immediately following in the ranking, namely, achieving larger rewards after overcoming more demanding levels.

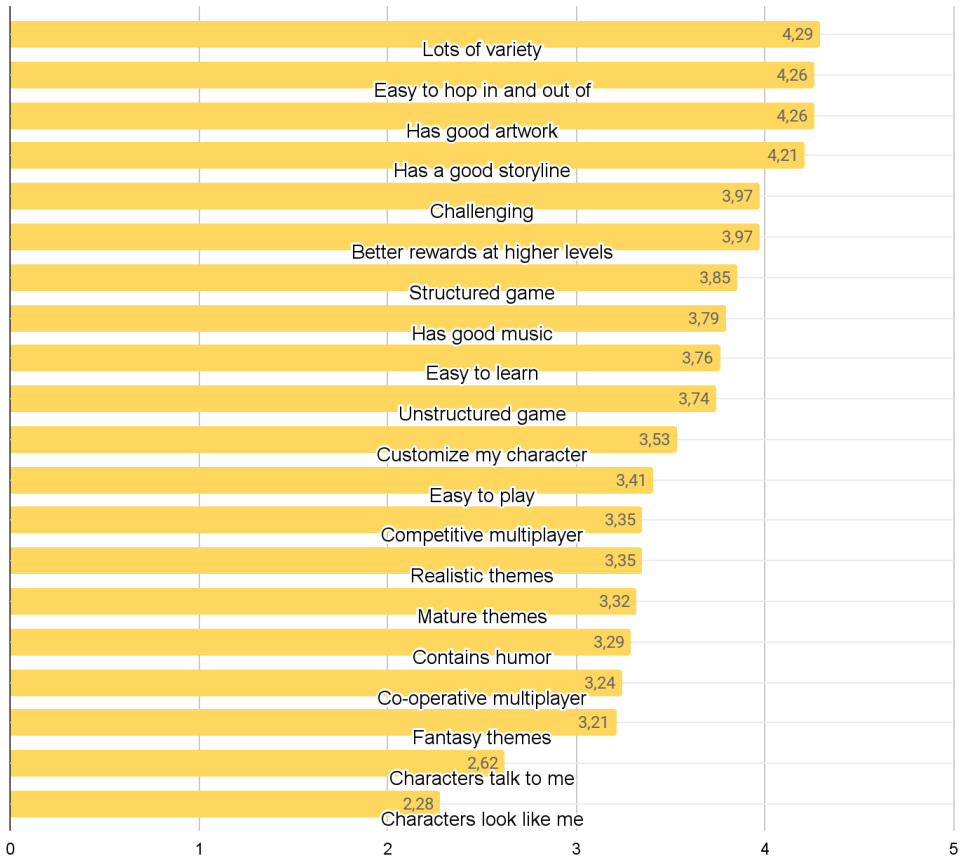

Table 4. Importance of computer or video game aspects.

It is also noted that the presence of rules is favoured over unstructured play, which is positioned a few positions lower in Table 4. This information can also be read in relation to the significant aspect of challenge for students, as in a more free and exploratory game, the difficulty component is not central: the students therefore seem to welcome the possibility that a game can be demanding.

The ability to customise the character is relatively important, but it does not seem to involve making it resemble oneself; the option to create a character that looks like oneself is, in fact, ranked last so is not considered necessary. Additionally, although no theme appears significantly more important than others, we can observe that realistic and mature themes are almost equally important, while it is surprising that fantasy themes are less important, considering the sci-fi and fantasy entertainment category was in a good position, as seen in Table 3. Another aspect we thought might be more requested on average, namely the presence of humour, is not actually necessary for participants, although just over half of them state it is quite important (13 votes) or very important (5 votes).

Furthermore, we understood that they prefer a competitive multiplayer mode rather than a cooperative one, which received 11 votes as “minimally important to me”. We also

want to highlight how many of these aspects mirror the gaming mechanics utilised in the gamification process (explained in Chapter 2), such as the variety in material delivery, rewards, the narrative, and a structured pathway. An interesting final observation is that the possibility of interaction with characters is one of the least significant; this somewhat contradicts the hypothetical language learning game scenario in which, as seen in the above-mentioned examples, this aspect seems to be quite central.

Employing the usual frequency indicators, students then indicated how often they play 10 different types of games. From the results, we can conclude that students are definitely not regular gamers: the highest average is 2.56 for puzzle and strategy games, followed by educational games (μ=2.26). Despite the low frequency, these game genres are surprisingly in line with the games proposed in the university laboratory; it is therefore a noteworthy data point to consider in evaluating their appreciation. Below, we list the other types of games and their respective average play frequencies:

- *Music, fitness & lifestyle* 2.21
- *Simulation* 1.97
- *Sports and racing* 1.94
- *Role playing* 1.85
- *Action and adventure* 1.82
- *Party* 1.76
- *First person shooters* 1.32
- *Gambling or casino games* 1.26

Taking into account their preferred entertainment categories, we expected adventure games to be in a higher position. However, it's important to consider that frequency is not necessarily correlated with enjoyment.

We would now like to examine, by comparing them, the results regarding company during leisure activities and digital games. We have slightly modified the indicators proposed in Salmon et al.'s model (2017) by choosing to place "Family" and "Partner" in two separate categories, eliminating the other subgroups within the "Family" category. Before presenting the data, however, it is important to specify that unfortunately, we had to discard the data related to “Friends” due to an issue with the questionnaire wording. In the second question regarding company during video games, we incorrectly transcribed this item, causing confusion among the participants. Consequently, in Table 5 we have omitted this category of individuals, focusing on the remaining data. An immediate general observation is the lower

presence of individuals during video gaming. Although they primarily engage in these activities alone, students tend to involve people around them more during their leisure pursuits, especially family members.

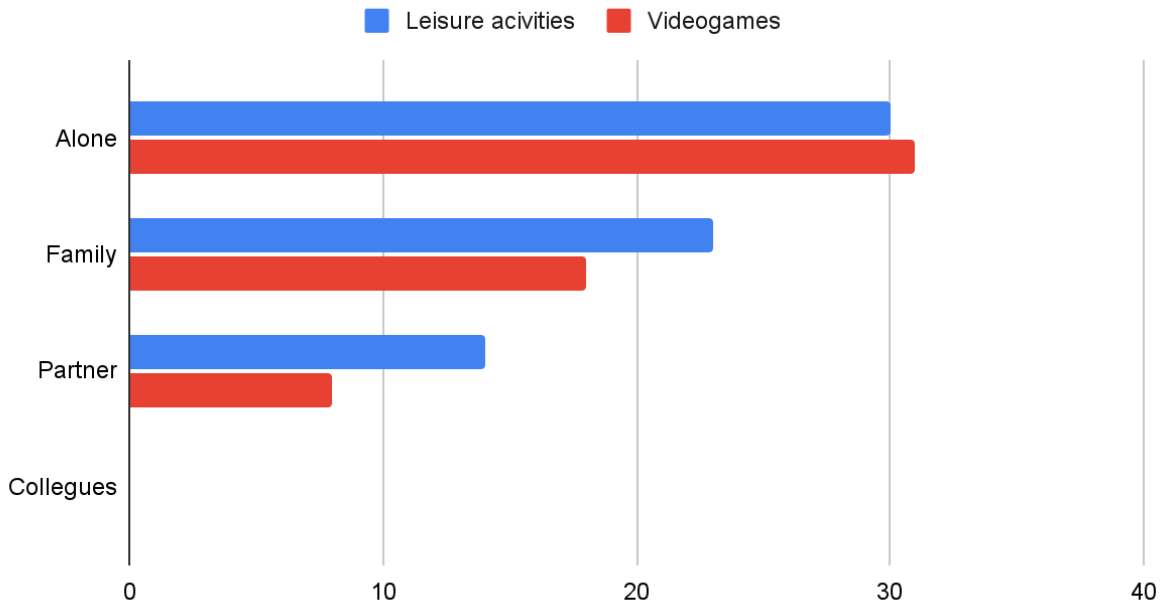

Table 5. Who they engage in leisure activities and digital games with.

Regarding partners, nearly half of those engaged in recreational activities are also involved during gaming. The presence of colleagues, on the other hand, is absent for any type of activity; this data might be partially explained by the fact that, being students, many of them do not yet have employment and, therefore, colleagues. In conclusion, we can infer that digital games tend to isolate the students in our study and thus do not appear to be strong social aggregators. We regret the absence of results regarding friends, which could have certainly provided additional information either in support or against this conclusion.

The last question, which we incorporated into Salmon et al.'s model (2017), asked the group to name at least three of their favourite games or video games. Noticing that several video games had multiple occurrences, we then selected the digital games mentioned more than once. Despite the infrequency with which they play, digital games are mentioned in the majority: another piece of evidence demonstrating that frequency does not necessarily determine a game's preference in our case. Below, we provide the list of games, categorised into digital and non-digital, specifying the number of appearances greater than 2 for digital games and greater than 1 for non-digital games.

Digital games	**Non-digital games**
Mario Kart - 10	*Uno* - 2
Just Dance - 7	*Patience* (*Solitario* in Italian) - 2
Gardenscapes - 3	*Sudoku* - 2
The Sims - 3	*Cluedo*
Candy Crush - 3	*Briscola* (trick-taking ace–ten card game)
Crash Bandicoot - 3	*Chess*
Assassin's Creed	*Uruguayan Truco*
Wii Sport	*Hide-and-seek*
Wii Party	*Monopoli*
Mario Bros/Galaxy/Party	*Rummikub*
Animal Crossing	
FIFA	
Pokémon	
Minecraft	
Geometry Dash	

This list, indeed, cannot be correlated with the previous question because, for instance, even though many participants mentioned Mario Kart, not all of them play it frequently. Here are the responses for “Sports and racing” from the preceding question (in numbers) of those who mentioned it: 3 - 1 - 1 - 2 - 2 - 2 - 1 - 4 - 3 - 4. Seven out of ten people play sporadically or rarely.

Nevertheless, we encounter an inconsistency: despite infrequent console gaming, many games frequently cited by them require the use of a console, such as Mario Kart, Just Dance, or Crash Bandicoot. These apparent inconsistencies may arise from the fact that, not being regular gamers, participants may lack a clear idea of the role of gaming in their leisure time and its value among their interests. Therefore, we feel inclined to interpret this information as a result of the students' limited awareness regarding what the world of games, both digital and non-digital, means to them.

On the other hand, it can be observed that, on the whole, the mentioned games align with the characteristics of a game that are important to them, for instance, *lots of variety* (e.g., Mario Bros, Galaxy, or Party), *easy to hop in and out of* (e.g., The Sims, Animal Crossing), *has good artwork* (e.g., Mario Kart, Assassin's Creed), *has a good storyline* (e.g., Gardenscapes), *challenging* (e.g., Crash Bandicoot), *better rewards at higher levels* (e.g., Candy Crush), *has good music* (e.g., Just Dance).

5.2 Pre-test results

The second questionnaire gathers data on participants' level of engagement with their favourite game using the GEQ model. As mentioned in the previous chapter, these data will serve as a benchmark to understand whether the laboratory activities were appreciated by the class. To achieve this, we intend to rely solely on the data from those who participated in at least 4 questionnaires. In this section, therefore, we will present both the collective data and those specifically related to this subset of the sample.

As evident from Table 6, during their preferred gaming activities, students experience, as expected, a high sense of competence and positive affect on average, with substantial scores also observed for sensory and imaginative immersion, as well as for flow. Conversely, feelings of tension, boredom, and negative affect exhibit lower scores. The games also elicit a mild sense of challenge; given their significance for students, as highlighted in the initial questionnaire, this data appears relatively low. Concerning social interaction, negative sentiments are notably low, while empathy and behavioural involvement are only moderately expressed. After the game, there are minimal indications of fatigue, return to reality, or negative experience; however, the overall experience does not seem particularly positive to be descriptive of their favourite game; in fact, the average tends to be moderate.

Core Module		**Social Presence Module**		**Post-game Module**	
Competence:	4	*Psyc. Inv. – Empathy*:	3.19	*Positive Experience*:	3.06
S. and I. Immersion:	3.48	*Psyc. Inv. – Neg. Feelings*:	1.99	*Negative Experience*:	1.36
Flow:	3.41	*Behavioural Involvement*:	3.05	*Tiredness*:	1.52
Tension/Annoyance:	1.48			*Returning to Reality*:	1.53
Challenge:	2.61				
Negative affect:	1.55				
Positive affect:	4.43				

Table 6. Favourite game GEQ overall results.

If we exclusively examine the data from those who responded to at least 4 questionnaires (17 individuals), we observe subtle changes; Table 7 presents the findings. To emphasise the differences, we have underlined increasing scores and coloured in red the decreasing scores, considering instances where the difference was at least 0.1 point. This group of participants experiences a heightened sense of flow but also more negative emotions, which nonetheless

remain consistently minimal. The most noticeable aspect is the decrease in components of the Social Presence Module: it has revealed moderate results regarding the influence of relational dynamics within the game, except for the minimal negative influence. Upon investigating the data, we found that the two indicators yielding the highest results were 3.35 for "I find it enjoyable to be with the other(s)" and 3 for "When the other(s) is(are) happy, I am happy"; however, the answers for the highest indicator are very polarised: ten people answered "fairly" or "extremely" (7 times), while seven people with "slightly" or "not at all" (4 times). However, these results closely depend on their favourite game type, and it is therefore conceivable that the data is so intermediate when considering that some students prefer a single-player mode or with no interaction within the game (e.g., Gardenscapes or Patience) while others opt for board games or multiplayer games (e.g., Mario Kart or UNO).

Core Module		**Social Presence Module**		**Post-game Module**	
Competence:	3.92	*Psyc. Inv. – Empathy*:	2.89	*Positive Experience*:	2.81
S. and I. Immersion:	3.45	*Psyc. Inv. – Neg. Feelings*:	1.73	*Negative Experience*:	1.39
Flow:	3.51	*Behavioural Involvement*:	2.60	*Tiredness*:	1.32
Tension/Annoyance:	1.57			*Returning to Reality*:	1.49
Challenge:	2.69				
Negative affect:	1.66				
Positive affect:	4.35				

Table 7. Favourite game GEQ results of people participating in at least 4 questionnaires.

Although it was already moderate, the "Positive Experience" component has further decreased, prompting us to investigate more in depth. Upon revisiting the indicators of this component, we can assert that participants feel quite satisfied (μ=3.71) and invigorated (μ=3.29), moderately victorious and energised, but not powerful (μ=1.65) or much proud (μ=2.12). Furthermore, they perceive a minor sense of fatigue. To follow Johnsona et al.'s (2018) observation regarding the GEQ, we shall consider the components of *negative affect*, *tension/annoyance*, and *challenge* taken together. If we follow this procedure and thus create a single average to measure negative emotions, we obtain 1.88 for the overall results and 1.97 for those of the high-participation group, so the result remains very low in both cases. Ultimately, these results will be valuable in the next chapter for comparing the level of engagement they have expressed regarding their favourite game with that experienced during the language activities conducted in the workshops.

5.3 General tendency of post-tests results

Before making comparisons and delving into specifics, let's now describe the impact that different educational activities have had on the students, aiming to address our first research question. In Table 8, we have presented the mean measurements for easy visualisation of the various results as a whole; for each component, we have also underlined the highest and lowest values. By applying this filter, it becomes evident that the first column is the most neutral: the polarisation of results mainly occurs between CodyRoby and Rospino, whose outcomes appear to be specular. In fact, where high values are often found on one side, we identify low values on the other (e.g., Competence, Sensory and Imaginative Immersion, Flow, Empathy, Positive Experience, and Returning to Reality) and vice versa (e.g., Negative affect, Negative Feelings, and Negative experience). However, *Tension/Annoyance*, *Challenge*, and *Tiredness* show maximum results for the escape rooms and minimum for Rospino.

ER		**CodyRoby**		**Rospino**	
Competence:	3.68	*Competence*:	3.47	*Competence*:	4.1
S. and I. Immersion:	3.92	*S. and I. Immersion*:.	3.29	*S. and I. Immersion*:	3.99
Flow:	3.41	*Flow*:	2.90	*Flow*:	3.75
Tension/Annoyance:	1.23	*Tension/Annoyance*:	1.22	*Tension/Annoyance*:	1.06
Challenge:	3.07	*Challenge*:	2.58	*Challenge*:	2.28
Negative affect:	1.21	*Negative affect*:	1.26	*Negative affect*:	1.19
Positive affect:	4.35	*Positive affect*:	4.06	*Positive affect*:	4.73
Psyc. Inv. – Empathy:	3.8	*Psyc. Inv. – Empathy*:	3.62	*Psyc. Inv. – Empathy*:	4.07
Psy. Inv. – Neg. Feel.:	1.89	*Psy. Inv. – Neg. Feel.*:	2.12	*Psy. Inv. – Neg. Feel.*:	1.71
Behav. Involvement:	3.49	*Behav. Involvement*:	3.67	*Behav. Involvement*:	3.57
Positive Experience:	3.71	*Positive Experience*:	3.08	*Positive Experience*:	4.05
Negative Experience:	1.15	*Negative Experience*:	1.16	*Negative Experience*:	1.09
Tiredness:	1.7	*Tiredness*:	1.33	*Tiredness*:	1.28
Returning to Reality:	1.52	*Returning to Reality*:	1.43	*Returning to Reality*:	1.88

Table 8. Lab activities GEQ overall results.

Let's first analyse the results of the Core Module. Considering that for many participants, this was their first time engaging in these activities, and moreover, in a foreign language, the sense of competence is relatively high, especially for the robotics activity in the foreign language.

The high sense of immersion experienced would also explain the excellent results concerning flow, with the exception of CodyRoby, which seems to have triggered this sensation to a lesser extent. Students felt moderately challenged during the escape room activity, but much less so for the others. Furthermore, we can assert that tension, annoyance, and negative affect were not exhibited, which is a good indicator of the appreciation for the activities, especially for Rospino. Overall, then, all gamified activities have generated a very positive affect among the participants.

What pleasantly surprised us were the results of the Social Presence Module. In this section, indeed, very positive results can be observed for psychological involvement, especially for Rospino, and behavioural involvement, particularly for CodyRoby. It's also noteworthy that negative social influence is generally very low. Finally, we note that in the Post-game Module, students found the experiences with the escape rooms and Raspino to be fairly positive, while for CodyRoby, only moderately so. Upon investigating the individual measurements of the indicators for this component in the coding game, we observe that the lowest results were obtained for "I felt powerful" (2) and "I felt proud" (2.72), significantly lowering the overall average. Keeping in mind that even for their favourite game these indicators do not show high results, we do not interpret this data as necessarily negative. Regarding the other components of the module, very low values were recorded: the most tiring activity was the one with ERs, even though the score remains at a minimum, and it appears that, in general, the games were not alienating; ultimately, they were not negative experiences for them.

To better analyse the indicators most associated with engagement, we selected the most significant ones based on the concept of engagement described in the literature review. We thus identified those elements (10 from the Core Module and 1 from the Post-game Module) that fall within the descriptions of notions such as absorption, flow, presence, and immersion. Subsequently, we recorded the data for individual items for each questionnaire and calculated the mean of the three scores for each item. This will provide us with more specific information regarding the focus of our research. The data is presented in Table 9 below. With this additional visualisation of data, we can address our first research question (i.e., “What is the engagement level experienced during the workshop activities?”). Considering the overall average initially, we can assert that the language workshops have been highly effective in engaging students in terms of focus during gameplay, concentration, immersion, and the balance between challenge and sense of ability (items number 2, 3.1, 5,

26, and 28). The activities have, to a lesser extent, encouraged the ingenuity and commitment of students, making them lose track of time (items number 18, 25, and 33).

Indicators	**ER**	**CodyRoby**	**Rospino**	**Average**
2. *I felt skilful*	4	3.67	4.31	**4.13**
3.1 *I was interested in the game's story*	4.6	3.78	4.44	**4.41**
5. *I was fully occupied with the game*	4.4	4.17	4.69	**4.55**
13. *I forgot everything around me*	3.2	2.39	3.25	**2.95**
18. *I felt imaginative*	3.65	3	3.31	**3.45**
25. *I lost track of time*	2.85	2.56	3.5	**3.10**
26. *I felt challenged*	3.75	3.56	4.5	**4.07**
28. *I was deeply concentrated in the game*	3.95	3.22	4.38	**3.98**
31. *I lost connection with the outside world*	2.65	2.17	2.94	**2.85**
33. *I had to put a lot of effort into it*	3.45	3.22	2.69	**3.25**
3.2 *I found it hard to get back to reality*	1.25	1.33	1.5	**1.36**

Table 9. Specific engagement-related items.

However, they were not engaging to the extent of alienating students from reality (items number 13, 31, and 3.2). In comparison with the other two activities, the data related to CodyRoby is generally lower, making it the less engaging activity. The activity involving ER has been the most engaging in terms of brilliance, effort exerted, and immersion in the story, which is coherent given that it is a key aspect of the activity. The level of engagement achieved through Rospino appears to prevail over all other aspects, making it the generally most engaging game.

In summary, from these measurements, we have understood that the language activities proposed during the workshops were generally well-received. However, their impact on students occurred to varying extents: robotics in a foreign language was the most engaging for students across multiple facets, whereas the coding activity recorded the lowest results, although without being deemed negative. The escape room challenge received generally positive feedback, thus falling in between the other two. All activities influenced the feelings arising from social presence, proving to be effective facilitators of interaction and to stimulate various aspects of participant involvement. Ultimately, these data show that these gamified activities elicited participants' cognitive, emotional, and behavioural engagement.

6. Data analysis and discussion through established variables

In this chapter, we will undertake a more in-depth analysis considering the variables explained earlier (see Chapter 4) in relation to the collected data. We will provide a dual examination of the data regarding the pre-test and post-tests to understand what distinguishes the engagement experienced by highly participating students during their favourite game from that experienced during the workshops, thereby addressing the second research question. Subsequently, we will investigate any differences in participant feedback based on their educational background, aiming to comprehend potential inclinations among various student types and thus address the third research question. The final section will be dedicated to the discussion of the main findings of the analysis in this chapter; additionally, we will propose hypothetical explanations for some inconsistencies or curiosities emerging from the data.

6.1 Comparison with their favourite game

We will now rely on the data from Table 7, analysed in the previous chapter, to highlight the differences found in the results concerning their favourite game and the three activities tested during the workshops, taking into account the high-frequency participation group. We deemed it interesting to identify both the difference between the data and the percentage of variance to respectively understand the increase or decrease in the scores and the weight of such changes.

In Table 10, we have presented the averages of the group's results for the three activities. Since the standard deviation calculated based on all the results from the four questionnaires (1.20) is too high to allow us to identify any differences, we have decided to consider a significant difference of 0.3 points, both for values increased compared to the pre-test (underlying them) and for values that have decreased (colouring them in red). Furthermore, we have marked in bold the results that have risen or fallen by 0.5. The Core Module exhibits significant variations. Let's clarify starting from the first workshop. Compared to their favourite game, participants experienced a much stronger sense of challenge and sensory and imaginative immersion. In fact, by looking at the indicators, we learn that they highly appreciated the aesthetics and found the activity exciting and enriching; they had to put in a lot of effort and felt time pressure, thus feeling stimulated. While remaining relatively high, the sense of competence has decreased, giving students a lesser feeling of success; although it was already low in their favourite game, the sense of tension and negative affection has decreased.

Escape room		CodyRoby		Rospino	
Competence:	3.61	*Competence*:	3.35	*Competence*:	4.09
S. and I. Immersion:	**3.99**	*S. and I. Immersion*:	3.40	*S. and I. Immersion*:	3.94
Flow:	3.63	*Flow*:	3.07	*Flow*:	3.71
Tension/Annoyance:	1.27	*Tension/Annoyance*:	1.24	*Tension/Annoyance*:	**1.07**
Challenge:	**3.28**	*Challenge*:	2.59	*Challenge*:	2.23
Negative affect:	1.20	*Negative affect*:	1.27	*Negative affect*:	1.21
Positive affect:	4.43	*Positive affect*:	4.08	*Positive affect*:	4.70
Psyc. Inv. – Empathy:	**3.93**	*Psyc. Inv. – Empathy*:	**3.72**	*Psyc. Inv. – Empathy*:	**4.04**
Psy. Inv. – Neg. Feeling:	1.88	*Psy. Inv. – Neg. Feeling*:	2.13	*Psy. Inv. – Neg. Feeling*:	1.77
Behav. Involvement:	**3.62**	*Behav. Involvement*:	**3.72**	*Behav. Involvement*:	**3.56**
Positive Experience:	**3.89**	*Positive Experience*:	3.13	*Positive Experience*:	**3.96**
Negative Experience:	1.16	*Negative Experience*:	1.18	*Negative Experience*:	1.1
Tiredness:	**1.83**	*Tiredness*:	1.40	*Tiredness*:	1.29
Returning to Reality:	1.67	*Returning to Reality*:	1.49	*Returning to Reality*:	1.79

Table 10. Lab activities GEQ results of students participating in at least 4 questionnaires.

In the second workshop, on the other hand, there were no score increases but a particular decrease in the sense of competence and the flow state, caused by a lack of effectiveness in extracting students from reality and the passing of time. The third workshop managed to further minimise the sense of annoyance, increasing positive affection and, like the escape room activity, the sense of immersion as well.

The Social-presence Module has generated several noteworthy increases according to our significance criterion: all three workshops have raised psychological and behavioural involvement, as we have already noticed in the previous chapter; from the descriptors, we understand that, in other words, participants found it enjoyable to be with others, and a sense of happiness was widespread; additionally, there was interdependence and mutual attention among students. Contrarily, the result concerning CodyRoby on the involvement in negative feelings has risen, given the high sense of influence individuals have on each other's mood.

What particularly stands out when observing the Post-game Module is the greater sense of fatigue experienced during the activity with ERs, in addition to considering the activities as positive experiences. Therefore, we want to investigate this latter aspect more thoroughly. We have already noted in the previous chapter how the "Positive Experience"

component yielded highly varied results when examining individual indicators. To better understand how the students felt, we want to delve deeper into this aspect for this part of the sample. By transcribing the data into a table, we can compare the feelings experienced by the participants after the games more distinctly (Table 11).

Items	**ER**	**CodyRoby**	**Rospino**	**Fav. game**
1. *I felt revived*	4.07	3.47	4.5	3.29
5. *It felt like a victory*	4.07	3.4	4.14	3.06
7. *I felt energised*	4.07	3.4	4.21	3.06
8. *I felt satisfied*	4.47	3.6	4.64	3.71
12. *I felt powerful*	3.2	2.13	2.86	1.65
16. *I felt proud*	3.47	2.8	3.43	2.12

Table 11. Items for *Positive Experience*.

As we can clearly observe, students felt more revitalised, victorious, recharged, and with a higher sense of satisfaction, except for the second workshop (which, however, did not decrease profoundly), which reached its peak after the activity with Rospino. It is interesting to observe how students perceived the completion of the workshop on Rospino as a victory, considering that, among the three, it is the only one not structured as a real challenge. This implies that the sense of victory was conferred by the mere accomplishment of the activity. The sense of strength has also increased, albeit remaining at a moderate level. Additionally, these experiences made them feel significantly more proud than when playing their favourite game.

In an effort to analyse the data from a different perspective, we presented the percentage results of the variance between the questionnaire outcomes of the laboratory activities and those of the favourite game in Table 12. These percentages were obtained by calculating the statistical variance on a spreadsheet and subsequently converting the values into percentages. We find it to be a useful way for assessing the extent to which experiences with gamification have impacted the expectations and engagement of the participants and for better evaluating the considerations made thus far. We have highlighted variances of over 10% in green, over 30% in yellow, over 50% in blue, and over 60% in red. As we have already observed, the aspect of the experience that has been most influenced is the social presence, which indeed exhibits the majority of the highest percentages: the linguistic escape

room activity has increased empathetic and behavioural engagement by over 50%; concerning CodyRoby and Rospino, we see that their results are reversed: the former enhances empathy by over 30% and behavioural engagement by over 60%, while the latter shows the opposite pattern.

Components	**Escape room**	**CodyRoby**	**Rospino**
Competence	- 4,8%	**- 16,2%**	+ 1,4%
S. and I. Immersion	**+ 14,6%**	- 0,1%	**+ 12,0%**
Flow	+ 0,7%	- 9,7%	+ 2,0%
Tension/Annoyance	- 4,5%	- 5,4%	**- 12,5%**
Challenge	**+ 17,4%**	- 0,5%	**- 10,6%**
Negative affect	**- 10,6%**	- 7,6%	**- 10,1%**
Positive affect	+ 0,3%	- 3,6%	+ 6,1%
Psyc. Inv. – Empathy	**+ 54,1%**	**+ 34,4%**	**+ 66,1%**
Psyc. Inv. – Neg. Feelings	+ 1,1%	+ 8,0%	+ 0,1%
Behavioural Involvement	**+ 52,0%**	**+ 62,7%**	**+ 46,1%**
Positive Experience	**+ 58,3%**	+ 5,1%	**+ 66,1%**
Negative experience	- 2,6%	- 2,2%	- 4,2%
Tiredness	**+ 13,0%**	0,3%	- 0,0%
Returning to Reality	+ 1,6%	0,0%	+ 4,5%

Table 12. Percentages of variants between pre-test and post-tests results.

Furthermore, unlike the first and third workshops, considered significantly more positive experiences by over 50% and 60% respectively, the second one shows a minimal percentage increase. Other moderately increasing percentages can be found in the sense of *immersion*, as we explained earlier, and in the feelings of *challenge* and *tiredness* for the initial activity. The negative percentages do not exceed 20% and are primarily found in the experience with Rospino in components such as *tension*, *challenge*, and *negative affect* (the latter also for the ERs) and in CodyRoby, only for the sense of *competence*.

To revisit the consideration of Johnsona et al. (2018), we analyse *negative affect*, *tension/annoyance*, and *challenge* as a unified component of "negativity". As we have seen in Chapter 5.2, this data for participants' favourite game was 1.97 (for high-participation students). Instead, for the escape room, coding, and robotics workshops, it is 1.92, 1.70, and

1.50 respectively: the indicators not only resist an increase but actually decrease further; this holds true for the ER as well, although the sense of *challenge* they evoke in participants is significantly higher compared to the others.

As we did in Table 9, we also want to provide for this part of the sample an analysis of the data regarding the indicators that, in our opinion, are closely tied to the concept of engagement, both for the pre-test and the post-tests. This additional analysis will also enable us to respond more comprehensively to our second research question (i.e., "How was the engagement level experienced during the lab activities compared to the level of engagement during participants' favourite game?"). Table 13 lists these results, also offering a total average for each game.

Indicators	**ER**	**CodyRoby**	**Rospino**	**Fav. game**
2. *I felt skilful*	3.93	3.6	4.36	4.41
3.1 *I was interested in the game's story*	4.6	4.07	4.43	3.53
5. *I was fully occupied with the game*	4.53	4.33	4.71	4.29
13. *I forgot everything around me*	3.33	2.53	3.14	3.29
18. *I felt imaginative*	3.67	3.13	3.43	3.06
25. *I lost track of time*	3.13	2.73	3.57	3.12
26. *I felt challenged*	3.93	3.47	4.43	3.12
28. *I was deeply concentrated in the game*	4.27	3.33	4.29	3.88
31. *I lost connection with the outside world*	2.87	2.4	2.86	2.94
33. *I had to put a lot of effort into it*	3.73	3.13	2.57	2.88
3.2 *I found it hard to get back to reality*	1.33	1.4	1.36	1.29
Average	**3.76**	**3.14**	**3.63**	**3.36**

Table 13. Specific engagement-related items in comparison.

The scores in blue show us that, overall, 22 out of 33 results surpass the scores achieved in the questionnaire about the favourite game: the first workshop is the one that exhibits the most improvements, while the second one has seen the least. This is also reflected in the overall average, with the first activity achieving the highest score, followed by Rospino, the favourite game, and finally CodyRoby. Additionally, the game with the ERs was the only one to slightly increase the item “I forgot everything around me”, managing to divert the students'

attention from their immediate surroundings. However, there were no increases for “I felt skilful” and “I lost connection with the outside world”. Ultimately, we understand that students felt immersed and absorbed, and their cognitive engagement, in addition to emotional and social engagement (Table 11), appears to have been more solicited compared to when they play games they like.

6.2 Variable: educational background

Before continuing the analysis, we would like to recall the main differences between the high school and technical institute, which are important for understanding the characteristics upon which our discussion will be based. In short, based on the choice of school, we can say that those who attended a high school will generally be more inclined towards theoretical study and traditional or classical subjects, with a flexible mindset accustomed to critical reasoning. On the other hand, those who attended a technical institute will have both cultural and technical or practical knowledge, a better understanding of the world of work, and a penchant for pragmatic reasoning. Of course, this premise is not universally applicable, and it is not our ambition to delve into all these highly subjective characteristics. Instead, it will serve as a potential starting point to justify or attempt to explain possible discordant results.

We then took the responses of all participants to the pre-test and post-tests and divided the results according to their educational background, choosing to display the results as we did in the previous subsection. Below, we present the data concerning their favourite game (Table 14), the escape room activity (Table 15), the coding activity (Table 16), and then the robotics activity (Table 17). Since we have already assessed the differences residing between the various workshops, we will now focus more specifically on the differences between the responses of the two groups of participants. We have coloured in blue the elements that differed by more than 0.3 points, additionally underlining those that deviated by more than 0.5 points, to further highlight the differences.

The first questionnaire we will analyse consists of 19 responses from students who attended high school and 9 from those coming from a technical institute. According to the collected data, several results differ significantly from each other (Table 14). For example, the results of students who attended high school are noticeably higher for the components of the flow state and challenge, as well as for all components of the Social Presence Module. They also exhibit a slightly lower increase in the positive evaluation of the gaming experience. However, we believe it might be useful to turn our attention to the mentioned games to try to

explain these differences. At the beginning of the questionnaire, participants were asked to enter the name of their preferred game to which they referred during completion. Upon analysing these names, we note that for students who attended high school, there are significantly more multiplayer or social games (e.g., Wii Party, Rummikub, UNO, Mario Kart, Taboo, Monopoly, Just Dance) compared to individual or socially non-interactive games (e.g., Minecraft, Gardenscapes, Piano Tiles). As for former technical institute students, however, the presence of both social games (e.g., Mario Kart, SimCity, Dixit, and an Italian rummy card game) and individual games (e.g., Need for Speed, Gardenscapes, Duolingo, Hay Day, Tomb Raider) is nearly equal.

High school		**Technical institute**	
Competence:	4.07	*Competence*:	3.82
S. and I. Immersion:	3.54	*S. and I. Immersion*:	3.35
Flow:	**3.66**	*Flow*:	2.89
Tension/Annoyance:	1.49	*Tension/Annoyance*:	1.37
Challenge:	**2.78**	*Challenge*:	2.24
Negative affect:	1.46	*Negative affect*:	1.67
Positive affect:	4.51	*Positive affect*:	4.29
Psyc. Inv. – Empathy:	**3.48**	*Psyc. Inv. – Empathy*:	2.76
Psy. Inv. – Neg. Feelings:	**2.23**	*Psy. Inv. – Neg. Feelings*:	1.58
Behav. Involvement:	**3.5**	*Behav. Involvement*:	2.28
Positive Experience:	3.18	*Positive Experience*:	2.74
Negative Experience:	1.32	*Negative Experience*:	1.43
Tiredness:	1.61	*Tiredness*:	1.33
Returning to Reality:	1.49	*Returning to Reality*:	1.44

Table 14. Favourite game GEQ results of students who attended high school and technical institute.

This observation could, therefore, explain why the results of the second module are significantly higher for former high school students. The scores of the first module, on the other hand, indicate that those coming from a technical institute seem not to experience a particular sense of challenge and do not enter a state of flow while playing. This may have also influenced the Positive Experience component, which, on average, does not even reach a moderate level.

Moving on to the post-tests, we know that in the first one, 14 individuals with a high school background and 5 with a technical institute background responded. Examining the results (Table 15), there is a prevalence of increasing outcomes for former technical institute students. They appear to have been significantly more immersed and focused in the game, experiencing higher positive affection and empathy towards others, leading to an elevation in the perception of the workshop as a positive experience. The feeling of being less competent compared to former high school students might explain the greater sense of tiredness after the game. In essence, this activity seems to have had a more pronounced impact, on average, on this group of students.

High school		**Technical institute**	
Competence:	3.79	*Competence*:	3.48
S. and I. Immersion:	3.82	*S. and I. Immersion*:	4.33
Flow:	3.19	*Flow*:	4
Tension/Annoyance:	1.12	*Tension/Annoyance*:	1.4
Challenge:	2.89	*Challenge*:	3.72
Negative affect:	1.21	*Negative affect*:	1.05
Positive affect:	4.26	*Positive affect*:	4.68
Psyc. Inv. – Empathy:	3.62	*Psyc. Inv. – Empathy*:	4.5
Psy. Inv. – Neg. Feelings:	1.91	*Psy. Inv. – Neg. Feelings*:	1.88
Behav. Involvement:	3.45	*Behav. Involvement*:	3.63
Positive Experience:	3.56	*Positive Experience*:	4.37
Negative Experience:	1.12	*Negative Experience*:	1.17
Tiredness:	1.57	*Tiredness*:	2.2
Returning to Reality:	1.38	*Returning to Reality*:	1.8

Table 15. Escape room GEQ results of students who attended high school and technical institute.

Continuing with CodyRoby, we notice that its impact on the participants seems to be opposite to the previous activity: some scores of the 10 students who attended high school are higher compared to those of the 7 participants who attended a technical institute (Table 16). In particular, what increases the most is the sense of ability and behavioural engagement, which certainly contributed to the enhanced positive perception of the experience of programming in the foreign language. Positive affect and sense of empathy towards others increase moderately. No component of the other group of students seems to surpass those of the first

group, and indeed, it maintains intermediary results that do not reach, at least on average, a score of 4 (i.e., “fairly”). We can therefore conclude that students with an educational background in high school have been more significantly influenced by the language activity on coding, albeit for a few components.

High school		**Technical institute**	
Competence:	3.7	*Competence*:	3.06
S. and I. Immersion:	3.3	*S. and I. Immersion*:	3.17
Flow:	2.9	*Flow*:	3
Tension/Annoyance:	1.23	*Tension/Annoyance*:	1.24
Challenge:	2.56	*Challenge*:	2.66
Negative affect:	1.28	*Negative affect*:	1.29
Positive affect:	4.24	*Positive affect*:	3.8
Psyc. Inv. – Empathy:	3.8	*Psyc. Inv. – Empathy*:	3.43
Psy. Inv. – Neg. Feelings:	2.22	*Psy. Inv. – Neg. Feelings*:	2.03
Behav. Involvement:	3.92	*Behav. Involvement*:	3.38
Positive Experience:	3.38	*Positive Experience*:	2.79
Negative Experience:	1.15	*Negative Experience*:	1.19
Tiredness:	1.3	*Tiredness*:	1.43
Returning to Reality:	1.4	*Returning to Reality*:	1.52

Table 16. CodyRoby GEQ results of students who attended high school and technical institute.

Finally, let's analyse the responses of the two groups for the third workshop, the one with fewer overall completions: 8 for former high school students and 5 for those from the technical institute. Despite the results being very similar, we still notice a meaningfully greater impact on participants who attended high school regarding empathic and behavioural engagement, and a slight increase in the consideration of the experience as positive (Table 17). In general, however, this activity seems to be the one that brings the two groups of participants closer from the perspective of appreciation and feelings experienced.

High school		**Technical institute**	
Competence:	4.18	*Competence*:	3.92
S. and I. Immersion:	3.98	*S. and I. Immersion*:	3.90
Flow:	3.7	*Flow*:	3.84

Tension/Annoyance:	1.13	*Tension/Annoyance*:	1
Challenge:	2.33	*Challenge*:	2.12
Negative affect:	1.22	*Negative affect*:	1.20
Positive affect:	4.63	*Positive affect*:	4.76
Psyc. Inv. – Empathy:	4.1	*Psyc. Inv. – Empathy*:	3.39
Psy. Inv. – Neg. Feelings:	1.85	*Psy. Inv. – Neg. Feelings*:	1.76
Behav. Involvement:	3.85	*Behav. Involvement*:	3.20
Positive Experience:	4.25	*Positive Experience*:	3.77
Negative experience:	1.06	*Negative experience*:	1.13
Tiredness:	1.25	*Tiredness*:	1.40
Returning to Reality:	1.79	*Returning to Reality*:	1.80

Table 17. Rospino GEQ results of students who attended high school and technical institute.

As we did in Table 9 and similarly in Table 13, we would now like to present an analysis of specific engagement-related items. In Table 18, we have decided to directly report the mean of the data for all three post-tests for each group, providing a comprehensive overview of how students from different educational backgrounds felt engaged during the workshops. We have also highlighted results exceeding the others by at least 0.2 points.

Indicators	**High school**	**Technical institute**
2. *I felt skilful*	**4.14**	3.83
3.1 *I was interested in the game's story*	4.22	4.35
5. *I was fully occupied with the game*	4.36	4.53
13. *I forgot everything around me*	2.88	**3.12**
18. *I felt imaginative*	**3.49**	3.06
25. *I lost track of time*	2.95	**3.22**
26. *I felt challenged*	3.95	3.92
28. *I was deeply concentrated in the game*	3.71	**4.16**
31. *I lost connection with the outside world*	2.41	**3.03**
33. *I had to put a lot of effort into it*	2.94	**3.52**
3.2 *I found it hard to get back to reality*	1.31	1.36

Table 18. Average of specific engagement-related items of students with different educational backgrounds.

In this way, we can understand that, overall, students who attended high school felt more capable and ingenious, while those coming from a technical institute felt more immersed and absorbed in the game, exerted more effort and were more focused on the game. Both groups were particularly engaged in the narrative and got caught up in the game, thus feeling challenged. These data reveal a particular cognitive and emotional engagement that leads participants to a state of presence and absorption.

To answer our third research question (i.e., "Is there a relation between the level of engagement of students and their educational background?"), we can conclude that the high sense of social involvement experienced during the favourite game by those who attended a high school is replicated during the activities with CodyRoby and Rospino. Furthermore, the sense of competence in this group of students is consistently higher than the group that attended a technical institute in each activity. The latter, with initially low scores on the favourite game, appears to have appreciated the escape room activity more than the other group, showing high levels of immersion and positive engagement in the activity. Overall, however, we can infer from specific engagement-related data that former students of the technical institute experienced a greater sense of spatiotemporal abstraction, indicating a profound feeling of immersion and presence, and a higher focus during the activities, which likely explains the greater effort exerted compared to the other group. On the other hand, former high school students were more engaged in finding brilliant solutions and expressing their skills. Regarding other factors, we did not find particular differences. In summary, the high school group seems to be more impacted by the second workshop, and the technical institute group by the first, while the activity on robotics in the foreign language appears to have reconciled the sensations and expectations of both groups, with a small exception for the explained components.

6.3 Discussion

In this section, we would like to discuss some key points of this chapter to further deliberate on the obtained results. Drawing upon the characteristics of the proposed games, for instance, we can observe how different dynamics led to distinct outcomes: the escape rooms, characterised by narrative and ingenuity, significantly influenced immersion and the sense of challenge; CodyRoby, where interaction and the significance of commands are essential, fostered pronounced behavioural engagement; the activity involving Rospino, marked by

creativity and collaboration, stimulated a heightened sense of empathy and psychological involvement (see Table 10).

Another crucial point is the significant increase in the scores of the Social Presence Module for all the workshops, crucial for fostering a more complete engagement of students. Furthermore, we observed that the behavioural and social engagement of the group of students who attended high school is generally higher, and we considered that it might be linked to their favourite games: they, indeed, expressed a preference for more social or multiplayer games compared to former technical institute students. This foundational preference may have contributed to the heightened appreciation of social dynamics within the gamified activities. On the basis of the indicators we selected to specifically assess engagement, excluding the social aspect, we then learned that, on average, the activities that surpassed the results of students' favourite games were the one with ERs in particular, and the one involving Rospino, while CodyRoby did not exceed this threshold.

An interesting aspect to investigate was the "Positive Experience" component, which revealed how students felt much more energised and satisfied after the language activities compared to how they feel after their favourite game, also showing greater results regarding the feelings of empowerment and pride. Consequently, these results lead us to believe that the games structured by the lecturer provided participants with a sense of self-efficacy that is lacking during the games they like: the feeling of success in performance, in fact, enhances the sense of self-efficacy (Schunk & Pajares, 2009). This could be attributed to the fact that all the proposed activities lowered the sense of competence and raised that of challenge, except for Rospino, making the completion of the activity appear as a more challenging and therefore more satisfying victory.

By creating a single component for negative feelings, as suggested by Johnsona et al. (2018), we did not detect significant differences, but we confirmed what we have learned, namely that all activities had a less negative impact than the favourite game, and that Rospino seems to be the activity originating the least negative influence. The activity with the ERs appeared more negative than the one with CodyRoby, which, however, we generally discovered to be the one that involved students the least; this occurred because the researchers' suggestion incorporates the *challenge* component into the negativity aspect, yet if our focus is on the notion of engagement, we cannot consider the component of *challenge* as inherently negative. On the contrary, it is crucial for understanding which activity required participants to exert more effort.

Discussing this, we then understood that students coming from technical institutes were more engaged in completing the educational games and experienced a greater sense of absorption (Table 18). Since the threshold for appreciation and engagement in the preferred game was already low for them, unlike former high school students (Table 14), we believe that they reacted so positively to the proposed activities both because they probably had never experienced similar games and were impressed by the novelty, or also because they might not have found the games that suit them yet. This discussion, even more broadly, applies to both groups of students: from what we have understood in Chapter 5, the games they like the most do not seem to engage them as much as expected; the pre-test results, in fact, were not so high, to the point that in many aspects, the activities proposed in the workshops seemed to stimulate them more (Table 10). Therefore, we can deduce that one does not need to be a regular gamer to appreciate a gamified activity.

Another result that we did not expect was the greater appreciation of the coding activity by former high school students. Their educational background, in fact, diverges more from this subject compared to the background of the other group (in some technical institutes, computer science is also studied), and, moreover, the majority considers the "computer and technology" entertainment category as indifferent (Table 3). We think that this apparent anomaly is due to the fact that the appreciation of such an activity is actually disconnected from what students are accustomed to; in other words, it is the gaming dynamics itself that engages students, more than the content or theme of the game. Another reason could also lie in the effect that the novelty of the game produced on the participants: in their research, Jeno et al. (2018) report some studies that suggest novelty stimulates cognitive processes, learning, positive behaviour, and motivation, which may decline with habituation.

6.4. Conclusions and limitations

This study revealed that, based on our sample of university students predominantly consisting of young women, the level of engagement during gamified language activities was very high, albeit with varying intensities across different components. It appeared that the diverse dynamics of the games introduced by the instructor consequently elicited different responses in the type of engagement from the participants. These findings contribute to the understanding of how gamification can impact the perception of an activity and induce positive feelings and engagement, although students were not habitual gamers or particularly interested in the gaming world, and generally do not exhibit high levels of engagement during

their favourite game. To sum up, the robotics activity with Rospino was the most engaging, followed by the educational escape room and the programming activity with CodyRoby. Thus, our first research objective has been achieved.

In addressing the second research question, it was found that, compared to students' favourite game, ERs led to a stronger sense of challenge, sensory and imaginative immersion, aesthetic appreciation, and excitement among participants, while Rospino minimised annoyance and increased positive affection and immersion. However, CodyRoby showed a decline in competence and flow state. The increase in psychological and behavioural engagement across all three workshops demonstrates that participants enjoyed being with others, experienced widespread happiness, and demonstrated interdependence. Involvement in negative feelings increased only for CodyRoby, indicating a notable influence of participants on each other's moods. After playing, participants reported a greater sense of fatigue after the ER activity; despite this, the workshops were generally considered positive experiences, surprisingly revealing increased feelings of revitalization, victory, recharge, and satisfaction, especially after the robotics activity. Moreover, negative components decreased across all workshops compared to participants' favourite game, improving participants' emotional experiences. Finally, the gamified language learning activities enhanced students' engagement across various dimensions; the ER workshop demonstrated the most significant influences, while the coding activity had the least impact. In summary, participants felt more immersed, absorbed, and cognitively engaged during the workshops than they do while playing their favourite game.

In response to the third research objective, we found that the ER activity significantly impacts former technical institute students, increasing immersion and positive engagement. In contrast, CodyRoby influences former high school students more, particularly in terms of ability and behavioural engagement. The robotics activity brings both groups closer in appreciation and feelings, with minor differences. Detailed analysis of specific engagement-related items indicates that people who attended a high school feel more capable and ingenious, thus finding an emphasis on cognitive aspects, while those who attended a technical institute exhibit higher levels of immersion, focus, and effort, with an emphasis on emotional and practical engagement. In summary, high school and technical institute groups display distinct engagement patterns in gamified language activities. Overall, this analysis provides valuable perspectives to the overarching objectives of the study.

The findings of this study are consistent with the information and notions presented in the literature review. Indeed, we can assert that the game elements implemented by the

instructor proved effective in engaging the participants in our study. Nevertheless, we cannot simultaneously infer that these same dynamics would be suitable for every student group. The implications drawn from our research certainly pertain to the applicability of this pedagogical approach in a classroom similar to our participant group and its effectiveness in fostering engagement. However, it primarily serves as an encouragement for ongoing experimentation and research to gather insights into the impact of a strategy with such high potential. The research is therefore of great importance in investigating an area that is still little explored, especially in Italy, and could be of great help to those who would like to approach this practice or seek to overcome the problem of lack of engagement on the part of students. Furthermore, it shed light on some activities that have not yet been exhaustively addressed in the literature (i.e., CodyRoby and Rospino), especially in terms of their capacity for engagement in the classroom.

While the study offers valuable insights, it is crucial to acknowledge its limitations. These encompass constraints in data collection, potentially affecting the generalizability of the findings. Applying this study to a more extensive sample of students would indeed yield more robust results. Another limitation arises from the use of questionnaires that were not tailor-made for the structure of our study. While valid, the surveys we utilised were not specifically designed for our investigative purposes, namely measuring engagement experienced during different activities compared to a standard. Consequently, there is potential for developing dedicated measurement tools tailored to these specific objectives. Additionally, administering the questionnaires immediately after the activities would enhance the fidelity of participants' responses, ensuring a more accurate reflection of the emotions experienced during the workshops.

To build on this research, future studies could explore a larger sample and investigate additional variables such as gender or age, which we were unable to apply to our group of participants. Furthermore, employing more sophisticated and precise measurement tools may enhance the methodological rigour of future investigations. In our work, we have offered various inferences and points for reflection on potential relationships between different outcomes; however, future research could delve deeper into the causality of the data. In conclusion, it is hoped that the findings of this study will inspire further research and advance our understanding of the impact of gamification on engagement in a language learning environment, also taking into consideration the presented activities.

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9. Appendix

Appendix A

1

In questa ER le fasi sono le seguenti:

- **A) Copertina: titolo, personaggi e informazioni sui punteggi (per le regole, mantenere le stesse e non cambiarle)**
- 1) Primo indovinello: personaggio
  2) Secondo rompicapo: dalle sillabe ai numeri
  3) Terzo indovinello: il personaggio mancante
  4) Quarto indovinello: La sequenza di colori.
  5) Quinto indovinello: La sequenza corretta.
  6) Sesto indizio: La combinazione della cassaforte

B) Finale: calcola il tuo punteggio

2

Scegli una stanza per la tua escape room

Vedi qui alcuni esempi:
https://www.google.com/search?q=disegno%20stanza%20per%20un%20escape%20room%20scuola%20primaria&tbm=isch&tbs=rimg:CdIZZbrW2e_1I7YQK1w653PptEsqIRCqIIABAAOgQIARAAVfRhxD7AAgDYAgDqAgA&rlz=1C1GCEU_itIT1010IT1010&hl=en&sa=X&ved=0CCQQuIlBahcKEwjA3_6m6IuCAxUAAAAAHQAAAAQBQ&biw=1615&bih=747

3

- **Nella stanza troverai diversi enigmi da risolvere! Fai attenzione, ti daremo preziosi indizi.**
- **Calcola il tuo punteggio così**
- **+ 1 punto per ogni risposta corretta**
- **+ 1 punto ogni volta che indovinate entro il tempo limite**
- **+ 2 punti se non avete commesso errori (Bonus fuga)**
- **Alla fine del percorso potrete scoprire il vostro ranking!**

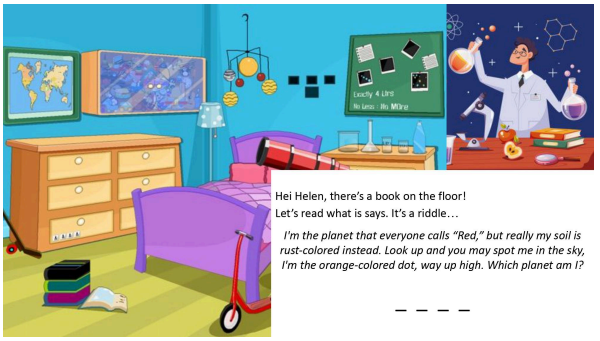
4

Astronomic
Escape

Help Helen and Tom, two aspiring astronomers, escape the room.

Do you have a fairly *brilliant* mind?

5

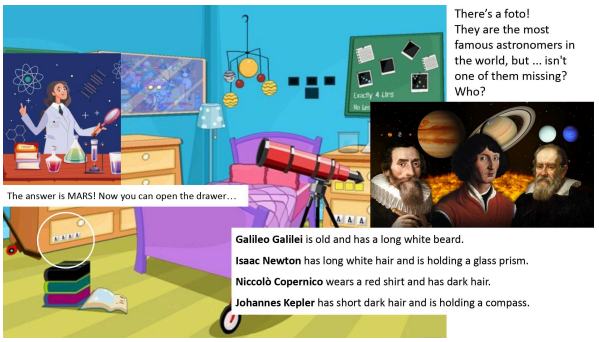


Hei Helen, there's a book on the floor!
Let's read what is says. It's a riddle…

I'm the planet that everyone calls "Red," but really my soil is rust-colored instead. Look up and you may spot me in the sky, I'm the orange-colored dot, way up high. Which planet am I?

– – – –

6



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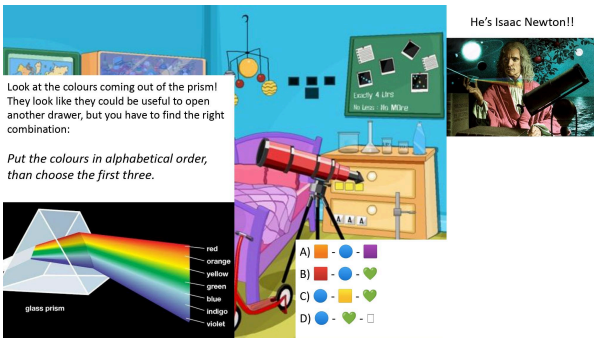

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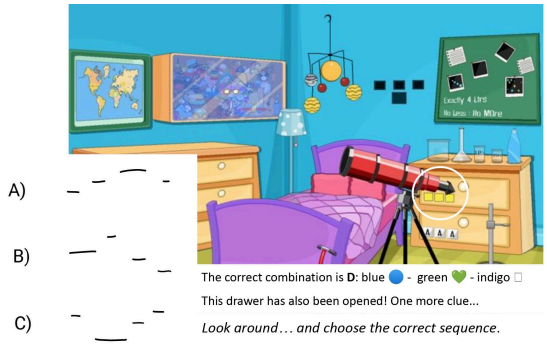
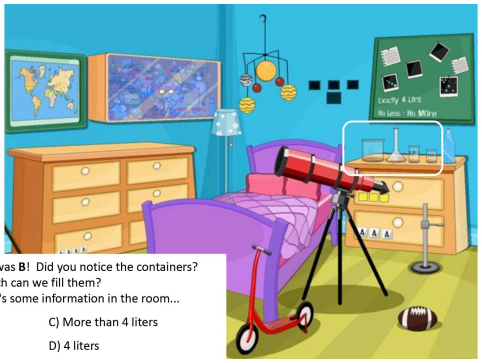


9



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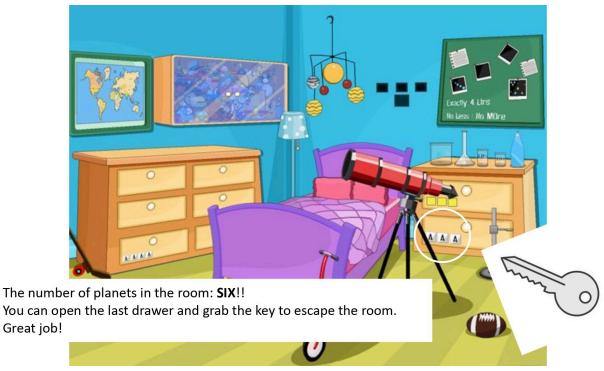

12

13

Appendix B

Profilo del partecipante *Participant's profile*

Di seguito troverai delle domande utili a delineare il tuo profilo in quanto partecipante al laboratorio e a comprendere le tue **abitudini di gioco**. Pensa alle attività che ti attraggono di più nel tuo tempo libero e aiutaci a capire al meglio **chi sei**: preferenze e attitudini in ambito di svago, di gioco e tecnologico.
Tempo di compilazione: 6 minuti.
Below you will find questions to help us outline your profile as a workshop participant and understand your gaming habits. Think about the activities that attract you most in your free time and give us a better understanding of who you are: preferences and attitudes in the areas of leisure, gaming and technology. Compilation time: 6 minutes.

Inserisci il tuo ID assegnato (ID_0XX): *Enter your assigned ID:*			
Genere *Gender*	Maschio *Male*	Femmina *Female*	Altro… *Other…*
Età *Age*			
Nazionalità *Nationality*			

Che tipo di scuola superiore hai frequentato? *Which type of school did you attend?*	☐ Liceo *High school* ☐ Istituto tecnico *Technical Institute* ☐ Istituto professionale *Vocational school*
Qual è il tuo livello di istruzione? *What is your highest level of education?*	☐ Scuola secondaria di secondo grado *Secondary school* ☐ Alta formazione artistica, musicale e coreutica *Higher education in art, music and dance* ☐ Laurea triennale *Bachelor's degree* ☐ Laurea magistrale *Master's degree* ☐ Dottorato di ricerca *PhD* ☐ Altro *Other…*

ATTIVITÀ DI SVAGO *LEISURE ACTIVITIES*
Valuta quanto ti piace partecipare alle seguenti attività, ora o in passato.
Le **attività di svago** includono qualsiasi attività che svolgi per divertimento, per passatempo o per hobby, sia da solo che con altri.
Please rate the extent to which you like engaging in the following leisure activities, now or in the past. Leisure activities include any activities you do for fun, recreation, as a hobby, alone, or with others.

	Non mi piace per niente *Dislike strongly*	Non mi piace *Dislike*	Indifferente *Neutral*	Mi piace *Like*	Mi piace molto *Like strongly*
Sport individuale *Individual sports*					
Sport di squadra *Team sports*					
Attività fisica *Fitness activities*					
Giardinaggio *Gardening*					
Guardare film *Watching movies*					

Casinò / biglietti della lotteria *Casino / lottery tickets*					
Giochi da tavolo/ carte *Board games/cards*					
Cruciverba e sudoku *Word or math puzzles*					
Vacanze/viaggi *Vacationing/travel*					
Lettura o scrittura *Reading or writing*					
Attività manuali/ DIY *Manual activities/ DIY*					
Attività musicali *Musical activities*					
Attività artistiche *Artistic activities*					
Teatro Theater					
Ascoltare musica *Listening to music*					
Shopping					

Con chi pratichi queste attività solitamente? (seleziona tutte le opzioni pertinenti) *With whom do you usually engage in leisure activities?* *(check all that apply)*	☐ Da solo *Alone* ☐ Amici *Friends* ☐ Colleghi di lavoro *Co-workers/colleagues* ☐ Famiglia *Family* ☐ Coniuge/Partner *Spouse / partner*

INTRATTENIMENTO *ENTERTAINMENT*
Quanto ti piacciono le seguenti categorie di intrattenimento (nel cinema, in TV o nei libri)?
Which of the following entertainment categories do you like or dislike (in Film, TV or Books)?

	Non mi piace per niente *Dislike strongly*	Non mi piace *Dislike*	Indifferente *Neutral*	Mi piace *Like*	Mi piace molto *Like strongly*
Azione e avventura *Action and adventure*					
Arte e umanità *Arts and humanities*					
Affari ed economia *Business and economy*					
Commedie *Comedy*					
Computer e tecnologia *Computer and technology*					
Cucina *Cooking*					
Talk show diurni *Daytime talk shows*					
Documentari *Documentaries*					

Drammi *Dramas*					
Film per famiglie *Family films*					
Stranieri *Foreign*					
Quiz televisivi *TV quiz*					
Salute *Health*					
Ristrutturazione domestica *Home improvement*					
Horror					
Medicina *Medicine*					
Mistero *Mystery*					
Notizie e attualità *News and current events*					
Filosofia *Philosophy*					
Poesia *Poetry*					
Polizieschi *Detective*					
Psicologia *Psychology*					
Reality show televisivi *Reality television*					
Romantici *Romantic*					
Scienze *Science*					
Fantascienza e fantasy *Sci-fi and fantasy*					
Soap opera					
Sport					
Suspense					
Thriller e spionaggio *Thrillers and espionage*					
Viaggi *Travel*					
Guerra *War*					
Western					

DISPOSITIVI ELETTRONICI *ELECTRONIC DEVICES*
Indica quanto spesso utilizzi ciascuno dei seguenti dispositivi elettronici, da solo o con altri.
Indicate how much you use each of the following electronic devices by yourself or with others.

	Meno di una volta all'anno o mai *Less than once a year to never*	Più di una volta all'anno o ogni anno *More than once a year to yearly*	Più di una volta al mese o mensilmente *More than once a month to monthly*	Più di una volta alla settimana o settimanalmente *More than once a week to weekly*	Più di una volta al giorno o giornalmente *More than once a day to daily*
Smartphone					
GPS					
Dispositivo musicale portatile *Portable music device*					
Tablet / iPad					
Lettore di e-book *E-reader*					
Computer portatile *Laptop computer*					
Computer fisso *Desktop computer*					
Televisione *Television*					
Macchina fotografica *Camera*					
Console da gioco *Gaming console*					

USO DEL COMPUTER *COMPUTER USE*
Indica quanto spesso utilizzi il computer per le seguenti attività:
Indicate how often you use computer for the following activities:

	Meno di una volta all'anno o mai *Less than once a year to never*	Più di una volta all'anno o ogni anno *More than once a year to yearly*	Più di una volta al mese o mensilmente *More than once a month to monthly*	Più di una volta alla settimana o settimanalmente *More than once a week to weekly*	Più di una volta al giorno o giornalmente *More than once a day to daily*
Email					
Social networking					
Ricerca di contenuti *Browsing for content*					
Lavoro *Work*					

Guardare film *Watching movies*					
Shopping (online)					
Giochi online *Online games*					
Editor di testo *Word processing*					
Fogli di calcolo/finanza *Spreadsheets*					
Album di foto *Photo collections*					
Playlist musicali *Music collections*					
Editor/visualizzatore di video *Video watching/editing*					
Giochi offline *Offline games*					

GIOCHI DIGITALI *DIGITAL GAMES*
Se ti fosse chiesto di giocare a un gioco per computer o un videogioco, quanto **importanti** sarebbero i seguenti aspetti per te?
If you were asked to play a computer or video game, how important would the following aspects be to you?

	Per nulla importante *Not at all important to me*	Poco importante *Minimally important to me*	Moderatamente importante *Moderately important to me*	Abbastanza importante *Quite important to me*	Molto importante *Very important to me*
Facile da imparare *Easy to learn*					
Facile da giocare *Easy to play*					
Sfidante *Challenging*					
Molta varietà di obiettivi, scenari e stili di gioco *Lots of variety*					
Multigiocatore (cooperativo) *Multiplayer (co-operative)*					
Multigiocatore (competitivo) *Multiplayer (competitive)*					
Bella trama *Good storyline*					

Bella musica *Good music*					
Bella grafica *Good artwork*					
Temi fantasy *Fantasy themes*					
Temi realistici *Realistic themes*					
Temi maturi *Mature themes*					
Ricompense maggiori ai livelli superiori *Better rewards at higher levels*					
Facilità di entrare e uscire dal gioco *Easy to hop in and out of*					
Personaggi che mi somigliano *Characters that look like me*					
Personaggi che parlano con me *Characters that talk to me*					
Possibilità di personalizzare l'aspetto del mio personaggio *Possibility to customize the look of my character*					
Contiene umorismo *Contains humor*					
Gioco con regole *Structured game*					
Gioco libero *Unstructured game*					

Con quale frequenza giochi ai seguenti tipi di gioco? How often do you play these following types of game?					
	Meno di una volta all'anno o mai *Less than once a year to never*	Più di una volta all'anno o ogni anno *More than once a year to yearly*	Più di una volta al mese o mensilmente *More than once a month to monthly*	Più di una volta alla settimana o settimanalmente *More than once a week to weekly*	Più di una volta al giorno o giornalmente *More than once a day to daily*
Azione e avventura *Action and adventure*					
Giochi educativi *Educational games*					
Sparatutto in prima persona *First person shooters*					

Giochi d'azzardo o casinò *Gambling or casino games*					
Musica, fitness e stile di vita *Music, fitness and lifestyle*					
Party					
Enigmi e strategia *Puzzle and strategy*					
Giochi di ruolo *Role playing*					
Simulazione *Simulation*					
Sport e corse *Sports and racing*					

Con chi pratichi questi giochi solitamente? (seleziona tutte le opzioni pertinenti) *With whom do you play video games? (check all that apply)*	☐ Da solo *Alone* ☐ Amici *Friends* ☐ Colleghi di lavoro *Co-workers/colleagues* ☐ Famiglia *Family* ☐ Coniuge/Partner *Spouse/partner*

Elenca fino a 3 dei tuoi giochi/videogiochi preferiti. *List up to 3 of your favorite games/video games.*	