Educational Visual Novels: An Experiential Learning Design Framework for Teaching Financial Literacy

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Abstract. Widespread diffusion of digital technologies has brought considerable attention to the adoption of video games in education. Many experts and scholars researching this topic advocate for their use, while more and more tech-companies are turning their interest towards the development of educational video games. Although research on educational video games has become quite common, some strands appear under researched. It is the case of "*Visual Novels"* or VN, which are narratively driven games with an emphasis on player choices. Differently from other game genres, VN are characterized by their minimal gameplay, mainly constituted by text and static or sprite-based visual. Despite its educational value, this particular genre has been somewhat overlooked. The present paper will aim to partially fill the gap by illustrating VN's educational potential. It is contended that their features make VN an ideal mean for the delivery of teaching practices based on *Experiential Learning*. Taking this into account, it will be illustrated a framework for the design of an educational VN aiming to teach Financial Literacy (FinLit). The proposed framework will be adopted within the Erasmus+ project **Promotion of FINancial literacy in primary and secondary EDUcation through gamification and DIGItal storytelling (DigiFinEdu)**, which, among its results, will develop a VN for teaching FinLit to 3rd – 6th grade pupils.

Key words: *Visual Novels, Experiential Learning, Gamification, Financial Literacy*

1. Introduction

With the advent of the multibillion-euro video game industry, more and more people are devoting part of their days to video games. Statistical data collected by Europe's Video Games Industry (ISFE) and European Games Developer Federation (EGDF) shows that around 50% of EU population aged between 6 to 64 years old play video games, spending an average of 9.5 hours per week by playing them. Video games have gained popularity among all age and gender groups. In Europe, the average age of a player is 31.3 years old and 47% percent of players are women (ISFE & EGDF, 2021). These facts demonstrate how video games have now become part of our daily lives. So much that in the past 20 years research on their use in education has grown and changed dramatically (Nadolny et al., 2019). As the engaging power and efficacy of gamification (i.e., "*the design approach of utilizing gameful designs in various contexts* […]") (Majuri et al., 2018) in education has been widely acknowledged (Boyle et al, 2016; Manzano-León et al., 2021), researchers have now moved their attention towards detailed experimental research measuring evidence-based outcomes of video games and gamification elements in teaching different subjects.

Among the various subjects covered by these studies, one that is gaining particular attention through almost all education levels (from primary to higher and adult education) is **Financial Literacy (FinLit)** education. Recently, European financial education policies have been significantly strengthened due to a variety of interrelated factors, such as the population ageing and the consequent pension reforms, the increasing debt burden and vulnerability to over indebtedness (OECD, 2016). Finding themselves tangled in the complexities of modern economics and finance, young adults often show a lack of adequate financial skills (Arrondel et al., 2021). When lacking FinLit, people are more prone to risky behaviours, such as poor saving and spending, excessive credit card use, and bad investment decisions (Lusardi, 2019). It is to counteract this issue that the EU and its Member States have devised policies and national strategies of FinLit education.

Within this context, several studies have been carried out to analyse and measure the effectiveness of FinLit education programs (Hung et al., 2009; Lusardi, 2019; Amagir et al. 2018; Batty et al., 2020), as well as the advantage of educational video games in imparting financial skills to students of all ages (Cheng, 2013; Maynard et al., 2012, Nadolny, 2019). The present research situates itself within this scenario, but from a different perspective, as it does not aim to empirically analyse the effectiveness of video games in FinLit education. The goal of this study, on the basis of previous research already conducted in this area (Kiili, 2005; Øygardslia et al., 2019, Camingue et al., 2020), is to propose a new framework for the design of educational video games, more specifically **Visual Novels** (VN), for teaching FinLit. VN are video games characterized by their minimal gameplay, mainly constituted by text and static or sprite-based visual. Despite today's great interest in educational video games, VN are largely ignored by research., although they show great potential for teaching practices based on **Experiential Learning**, which have proven particularly effective for delivering FinLit education (Batty et al., 2020; Kaczko & Razen, 2021; Amagir et al., 2018).

The design framework proposed in this research has been specifically outlined for the Erasmus+ project **Promotion of FINancial literacy in primary and secondary EDUcation through gamification and DIGItal storytelling (DigiFinEdu)**. Within this project, which started in February 2022 and it will end in January 2024, this design framework will be put at test for the creation of a VN aiming to teach FinLit to students aged from 9 to 12 years old. The project sees the involvement of an international team with varied skills. It comprises 6 organizations from 5 different countries (Lithuania, Bulgaria, Spain, Portugal and the Netherlands) and it involves teachers, project managers, storytellers, game developers and pedagogical experts. The design framework of this paper has been created to support the establishment of an effective collaboration between the staff members involved.

In order to thoroughly illustrate the rationale and theories supporting the design framework proposed, this paper will be structured in the following paragraphs:

- Paragraph 2 will provide an overview of FinLit definitions in order to clarify its content and objectives.
- Paragraph 3 will aim to make explicit the connection between FinLit and Experiential Learning, explaining why FinLit is better imparted through this teaching methodology.
- Paragraph 4 will move the focus towards educational video games, presenting Killi's (2005) "Experiential Gaming Model" (EMG), a game design modelling created to analyse and create experiential educational video games. It represents the starting point of the design framework proposed in this article and it will be used to analyse an example of FinLit educational video game.
- Paragraph 5 will be concerned only with Visual Novels (VN), showing the teaching strategies within their design.

- Finally, Paragraph 6 will present the design framework that will be adopted in the Erasmus+ project DigiFinEdu.

The authors hope this article will help enrich financial education practices and support teachers and technical staff alike in making new, high-quality educational video games.

2. What is Financial Literacy (FinLit)?

As for many other concepts, there is no single definition of Financial Literacy (FinLit). According to Remund (2010), the "*most basic*" definition should be *"financial literacy relates to a person's competency for managing money*". As simple as it may sound, this definition leaves many considerations aside. What kind of competency is referring to? What is meant by "*managing money"*?

Other institutions and researchers elaborated on this general idea, providing more detailed definitions. Below, Table 1, expanded from the results provided by Hung et al. (2009), summarizes the breadth of the conceptual definitions developed over the last 20 years.

Table 1. Conceptual definitions of financial literacy

SOURCE	CONCEPTUAL DEFINITION
Vitt et al. (2000)	"The ability to read, analyse, manage and communicate about personal financial conditions that affect material wellbeing"
Hilgert, Hogarth, & Beverly (2003)	Financial *knowledge*
FINRA (2003)	"The *understanding* ordinary investors have of market principles, instruments, organizations and regulations" (p.2)
Moore (2003)	"Individuals are considered financially literate if they are competent and can demonstrate they *have used knowledge* they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical *experience* and active *integration of knowledge*. As people become more literate, they become increasingly more financially sophisticated and it is conjectured that this may also mean that an individual may be more competent" (p.29)."
National Council on Economic Education (NCEE) (2005)	"*Familiarity* with basic economic principles, knowledge about the U.S. economy, and *understanding* of some key economic terms" (p.3)
Emmons (2005)	[The] "ability to keep track of a case resources and payment obligations, knowledge of how to open an account for saving and how to apply for a loan, basic understanding of health and life insurance,

	ability to compare competing offers, and plan for future financial needs"
Balatti (2007)	"Exercising in real life situations the ability to make informed judgements and to take effective decisions regarding the use and management of money" (p.7)
Mandell (2007)	"The *ability* to evaluate the new and complex financial instruments and *make informed judgments* in both choice of instruments and extent of use that would be in their own best long-run interests" (pp.163-164)
Lusardi and Mitchell (2007c)	[*Familiarity*] with "the most basic economic concepts needed to make sensible saving and investment decisions" (p.36)
Lusardi and Tufano (2008)	Focus on debt literacy, a component of financial literacy, defining it as "the *ability to make simple decisions* regarding debt contracts, in particular how one *applies basic knowledge* about interest compounding, measured in the context of everyday financial choices" (p.1)
The Presidents' Advisory Council on Financial Literacy (PACFL, 2008)	"The ability to use *knowledge* and *skills* to manage financial resources effectively for a lifetime of financial well-being"
ANZ Bank (2008), drawn from Schagen (2007)	"The *ability* to *make informed judgements* and to take effective decisions regarding the use and management of money" (p.1)
Lusardi (2008a, 2008b)	"*Knowledge* of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification" (p.2)
OECD/INFE (2013)	"A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing"
World Bank (2014)	"Financial literacy represents the level of aptitude in understanding personal finance."

What emerges from a quick overview of the definitions shown in the table above is that the various conceptual interpretations of FinLit fall into at least one (if not all) of the following three categories:

1. Knowledge, awareness and understanding of financial concepts.
2. Financial skills and behaviour.
3. Confidence, motivation and positive attitudes towards financial decisions.

It is on the basis of these three categories that the European Union and the OECD have jointly developed a financial skills assessment framework for adults (European Union/OECD, 2022). At the operational level, this means that FinLit is measured through these categories, looking at learners' knowledge, abilities and confidence. This fact represents a good starting point for explaining why Experiential Learning favours the attainment of FinLit competencies.

3. Experiential Learning and FinLit

There are several terms to describe Experiential Learning. John Dewey described it as "learning by doing", while Wolfe and Byrne used the term "experience-based learning" (Gentry, 1990). Beyond these slight differences, Experiential Learning can be considered a branch of constructivism theory, which posits particular emphasis on the concrete experience to construct knowledge (Cheng, 2013). Experiential Learning requires the introduction of active and participatory learning opportunities, inviting students to subvert their traditional role of passive listeners to create meaningful learning experiences (Beard & Wilson, 2006).

Kolb (Bergsteiner et al., 2010) argued that learning occurs within a cycle divided in 4 stages: (i) Concrete Experience, (ii) Reflective Observation, (iii) Abstract Conceptualisation, (iv) Active Experimentation.

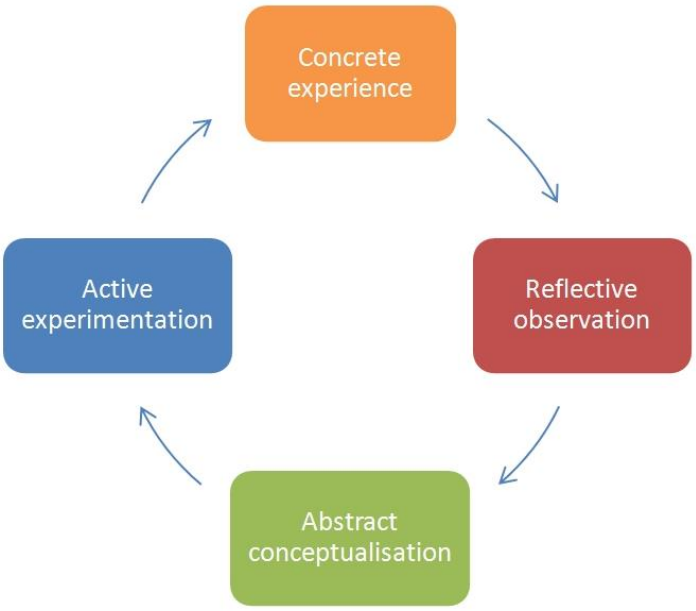

Figure 1. Kolb's cycle.

Within this model, students are invited to experience learning according to their preferences, as they may start the cycle at any point. Where some might prefer to think and then take action (from *Abstract Conceptualisation* to *Active Experimentation*), others might prefer to take action and then think about the outcomes (from *Active experimentation, Concrete Experience* and to *Reflective Observation*) (Endsley, 2020).

With regard to FinLit, the potential benefits of Experiential Learning appear evident when the objective of financial education is made explicit, i.e., the acquisition of sustainable financial behaviours and the achievement of a positive attitude towards financial decisions. Given the applied nature of financial decision making, Experiential Learning appears particularly suited for this task. In fact, it is not surprising to see that policy makers and scholars have

recommended to provide young people opportunities to practice and participate in financial decisions, be that at home or in schools (Whitebread & Bingham, 2013). On a similar note, Drever et al. (2015) argue that opportunities to reflect on the experience and to learn from good and bad choices are critical to promote feelings of self-efficacy and confidence, which are drivers of financial well-being and among the FinLit competencies comprised in the EU/OECD "Financial Competence Framework".

Theoretical considerations aside, there are several empirical studies that verified the effectiveness of Experiential Learning in teaching FinLit. For instance, Batty et al. (2020) conducted a field study to assess the impact of a simulated classroom economy on the financial knowledge of primary education students. The authors analysed the efficacy of "My Classroom Economy" (MyCE), an Experiential Learning approach where students actively participate in a simulated micro-economy. Through this program, students experience the impact of their decisions without the direct imparting of knowledge by teachers. MyCE produced statistically significant results, impacting positively on the financial knowledge and skills of students (Batty et al., 2020). Within this study, test results of students participating to MyCE were compared with the results of a more "traditional" teaching program of FinLit, "Financial Fitness for Life" (FFFL). The comparison revealed that both programs are equally effective, with the advantage that MyCE does not require formal instruction and focus on specific content. Another study evaluating MyCE found that students who participated in that program had 6% higher scores in financial knowledge than those who did not participate (Collins et al., 2016).

Other researchers examined the results of a school-based financial education and saving program, called "I Can Save" (ICS), on primary school students (Sherraden et al., 2009). Some students received a savings account with incentive, while also receiving in-class financial education. The results from this study show that the ICS helped students score significantly higher on financial fitness tests, regardless of parent education and income.

Another effective form of Experiential Learning is the "Stock Market Game" (SMG), wherein students manage real-time virtual investments. This initiative, which uses research and program-provided news updates to invest a hypothetical sum of 100,000 dollars in stocks, has been adopted in secondary schools, where students competed in teams to increase the value of their portfolio (Hinojosa et al., 2010). Harter and Harter (2010) assessed the efficacy of this game and found out that a combination of the SMG and content lessons yielded great results in deepening students' financial knowledge, skills and attitude.

As proved by these studies, Experiential Learning can make students aware of basic financial planning concepts and illustrate how these concepts apply to everyday life. As pupils and students are more interested in learning about the consumer and financial issues more relevant to their life, through Experiential Learning it is possible to add "real world experience" to the lessons. A good example of this is the teaching practice proposed by Bruhn et al. (2013), who used interactive classroom exercises dealing with present and future everyday matters of young people. Students also receive homework to do with their parents, such as creating a household budget. Parents of students participating in this program claimed that their children were more willing to discuss financial matters with them at home and they also volunteered to help organize household budgets. Test results showed a small and significant improvement of financial knowledge, with a significant increase of 1.4 percentage points in the intention to save money.

As these studies show, Experiential Learning is both effective in promoting the adoption of conscious financial behaviours, as well as increasing awareness, knowledge, and supporting a positive attitude towards financial decisions. For this reason, video games aiming to effectively teach FinLit education, need to take this methodological aspect into consideration.

4. Experiential Gaming Model (EGM)

There are so many video games teaching FinLit that is easy to get lost. Most of them are adopting, in one way or another, Experiential Learning in their design. But how are they designed? What makes them "experiential"? Killi's "Experiential Gaming Model" (EGM) (Kiili, 2005) can help us answer these questions. EGM has been created to design and analyse educational video games and it has already been tested in the analysis of FinLit educational video games (Cheng, 2013).

Kiili's EGM is based on three distinct elements: (i) **an ideation loop**, (ii) **an experience loop**, and a (iii) **challenge bank**. The challenge bank lies at the heart of the model, as it provides the player with the main problem to face and, therefore, the *motivation* to play. The goal of the challenge bank is to sustain players' motivation by confronting them with appropriate challenges. To overcome these challenges, players triy to come up with solutions by entering the *ideation loop*, which is further divided in 2 phases: (i) *preinvative idea generation*, and (ii) *idea generation.* The *preinvative idea generation* refers to a chaotic process of primary creativity, in which ideas are put in practice by trial and error. Through each attempt, the player accumulates experience entering a slightly modified Kolb's cycle (i.e., the *experience loop*) and returning to the ideation loop with enough knowledge to make more informed decisions (*idea generation*). To teach effectively, a video game must be able to provide an engaging story and enough stimulating challenges to facilitate players' **flow experience**. *Flow* can be defined as a psychological state where a person "*is so involved with the goal driven activity that nothing else seems to matter*" (Kiili, 2005). Research has proven that the *Flow state* has positive impact on learning. (Liao, 2006; Pavlas et al., 2010).

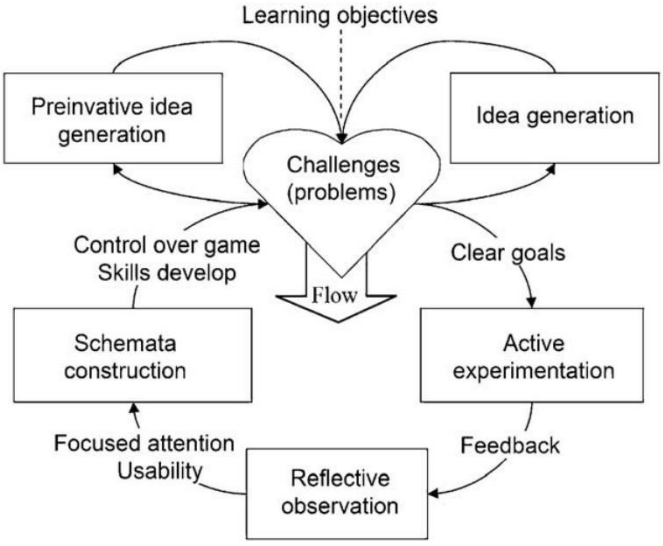

Figure 2. Kiili's experiential gaming model (EGM)

Let's see Killi's model applied in practice with the analysis of the online video game "Shady Sam: Loan Shark" (https://shadysam.com/). The goal of "Shady Sam" is to demonstrate how loan terms can hurt borrowers who do not pay attention. Players take on the role of a loan shark. The more the customer pay in interest and fees, the higher the score for the game player.

Figure 3. "Shady Sam: Loan Shark" game screen

The gameplay is quite simple. The player receives customers in an office and they come up with a loan request. At this point, the game presents three loan options, with attached monthly fee, interest rate and term length. The goal is to choose the most convenient option for the loaner and the most expensive for the debtor.

The story is minimal and it merely functions as a background to the tasks the game assigns to the player. However, it is essential to provide a *motivation* for the *challenge* proposed, i.e., choosing the right loan. At first, the player is left wondering which could be the best option and it enters the *Preinvative idea generation*, choosing without enough knowledge of the topic. However, after each attempt, the player's choices become more aware, based on the experience accumulated over the course of the game, which rewards or punishes the player when he or she chooses the correct option or not. As the game goes on, it becomes more difficult, presenting new challenges to the player, that learn about loans, mortgages, microloans and other forms of debt.

The game achieves its purpose by providing sufficient context for the players to immerse themselves in a plausible reality (*Flow state*) and learn through a safe experience the dangers and opportunities of loans. For these reasons, "Shady Sam" respects the principles outlined in Kiili's EGM. Concerning educational outcomes, the game contributes to all the three categories illustrated above:

- It increases players' *financial knowledge and awareness* by explaining through a compelling scenario how loans work.
- It improves *financial skills and behaviour* by teaching to players how to calculate loan interests and by inviting them to always read and ask information when not sure.
- It increases *confidence and attitudes* by rewarding right behaviour, helping players what to consider when they will take the same choices in real life.

Other examples of financial education video games that fit Kiili's model are:

- **Financial Football** (https://www.financialfootball.com/) puts the player in the shoes of the financial manager of an American football team.
- **Payback** (https://www.timeforpayback.com/) asks the player to imagine how to organize their university studies and future career, avoiding, at the same time, to accumulate too much debt.
- **Spent** (https://playspent.org/html/) challenges players to survive the struggle of low-income living, by asking them to manage the one-month budget of a minimum wage American worker with one child.
- **Money Magic** (https://playmoneymagic.com/) is designed to teach children basic budgeting principles, by making them manage the expenditures of a magician that need to save money to go to Las Vegas.

Although there are many FinLit educational games, there are no Visual Novels (VN) teaching FinLit. However, we find this to be a shortcoming given the actual educational potential of this genre, which can fit perfectly into the EGM.

5. The Case for Visual Novels (VN)

Visual Novels (VN) are a predominantly Japanese game genre, based on narratively driven mechanics putting an emphasis on player choices (Øygardslia et al., 2020). Compared to other types of video games, their gameplay is rather simple, as it relies on text and static (or semi-static) images to engage players in an interactive story. Within the Erasmus+ project **Promotion of FINancial literacy in primary and secondary EDUcation through gamification and DIGItal storytelling** (**DigiFinEdu)**, three reasons, already established by Øygardslia et al. (2020), provided the main motivation for the development of an educational VN to teach FinLit:

1. The narratively driven nature of VN makes them a suitable means to provide students motivation to learn and promote their access to the *Flow State*.
2. Since VN are not widely adopted in education, they deserve more study.
3. As these games do not involve complex game mechanics, also teachers and indie game designers may develop one without extensive programming expertise.

Figure 4. Visual Novel's game screen

Lately, researchers have been starting to notice the educational potential of VN. There are some studies (Øygardslia et al., 2020, Camingue et al., 2020) defining design principles and teaching strategies in VN.

According to Camingue et al. (2020), there are 5 main teaching strategies that may be used in combination or as standalone techniques. These strategies have been extrapolated from the careful analysis of over 30 VN, and they are:

1. **Choice**

In this strategy, learning goes hand in hand with the story progression, which changes according to the player's choices. This technique is based on notions of choice-based learning and self-determination theory, which have positive impact on autonomy, engagement and learning (Eseryel et al., 2014; Sierens et al., 2009). Through "*Choice*" players learn by experiencing the direct outcomes of their decisions, which are reflected on the story. Usually, video games designed with this mechanism include multiple endings, either "good", "bad", "neutral" or even more if the story is particularly complex. Regarding the teaching of FinLit, choice represents a perfect learning strategy. Financial decisions have a direct impact on people's life and by having the opportunity to make choices (e.g., saving or spending, borrowing money or not, etc.), students may increase their knowledge about financial concepts, learn to adopt financially responsible behaviours and improve their confidence. Although minimally, some FinLit educational video games already adopts this strategy. This is the case of **Money Magic** (https://playmoneymagic.com/), a game where you manage the budget of a magician that needs to save money to put on a show in Las Vegas. Players can decide how to allocate the resources. If they save enough, the magician is happy and he has his show in Las Vegas. If they do not save enough money, the magician ends his career.

2. **Scripted Sequences**

Like "*Choice*", "*Scripted Sequences*" (or "*scenarios*") are closely related to the game's story. However, the main difference is that they do not allow them to make decisions, as they require players to perform the designer's exact intended actions, before allowing them to progress. They are a form of "*guided experiential learning*" (Clark, 2005), as they ask players to apply their knowledge to real problems. Within VN, *"scripted sequences*" usually take the form of interactive cut scenes or in-game quizzes. Generally, *"Scripted Sequences"* are preceded by instructional dialogues, providing them the knowledge that needs to be applied later in the game.

3. **Minigames**

Minigames are short video games embedded in another video game. They have been proven to be an effective educational tool for serious games. As such, minigames can employ standard educational design concepts such as assessment and learning mechanics. For what concerns VN, minigames represent nodes in the game's narrative progression, which resumes only if the player achieved an adequate performance. Ideally, from an educational point of view, minigames should convey educational messages and ask players to complete tasks to assess their knowledge and/or skills. From the perspective of game designing, minigames are a perfect opportunity to give players unexpected and more engaging challenges to keep them engaged.

4. **Exploration**

"*Exploration*" invites players to investigate the game's world to find some hidden objects or artifacts providing fragments of knowledge that make the story progress. In VN, this methodology is seldom used alone. On the contrary, it is almost always paired with

another strategy. A probable explanation is that *"Exploration*" by itself does not provide any direct application of knowledge. For this reason, it has a limited impact on skills' development.

5. **Non-interactive elements**

Unlike the other strategies, "*Non-interactive elements*" does not require any input from the player which passively absorb knowledge through characters' dialogues or other text windows representing books, diaries, letters, etc. According to the ICAP model (Chi et al., 2014), this teaching strategy is less effective than the more active one.

The teaching strategies outlined above provide multiple means by which to convey any educational content. In the next paragraph, it will be explicated how the design framework proposed in this paper integrates them within Kiili's EGM to design an educational VN for teaching FinLit.

6. VN Design Framework for DigiFinEdu project

The results presented above provide the background of our design framework, which takes into account:

- The three types of competences promoted by FinLit, (financial knowledge, skills and, confidence), which set the educational goals of the video game.
- The Experiential Learning theory, which constitutes the educational methodology that will be applied to reach the objectives.
- Kiili's Experiential Gaming Model (EGM), which provides the theoretical approach to apply Experiential Learning in video games.
- Finally, the Visual Novels' (VN) learning strategies, that translate FinLit educational goals and the Experiential Learning methodology into the logic of VN's gameplay.

DigiFinEdu Visual Novel (VN) will include a compelling story with decision making elements. The central idea of this game is that players will learn FinLit in an experiential way, through the decisions they will make within the game. Each decision made will bring with it consequences that will affect the development of the plot. In this way, students will learn through experience in a safe environment and by reflecting on their own choices. As demonstrated by previous examples, this practice is expected to have positive effects on students' achievement of financial knowledge, skills and confidence.

As far as the game design is concerned, two phases were distinguished in its conception:

1. Story conceptualization & writing
2. Game design

The first phase concerns the creation of the game's story, which is conceptualized starting from the educational goals. After having identified the educational goals of the game, it will be defined the overarching theme of the story. The theme represents the educational content that the story will address. As the game is about FinLit, it could be, for instance, savings, banking, loans, etc. After having identified the theme, it is essential to define the challenge of the game, the problem that players will have to solve. This represents the core structure, as exemplified by Kiili's EGM. Finally, once the game's challenge has been defined, this will have to be transposed into a story and completed with the activities and challenges that will be launched to players.

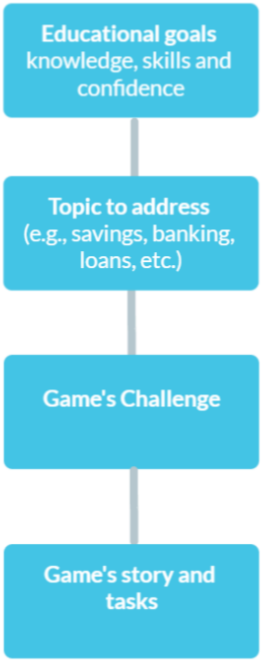

Figure 5. Story conceptualization and writing process

Once all these steps have been completed, we move on to the actual transposition of the story into the game mechanisms, i.e., the *game design* phase. Within this phase, writers and designers will collaborate to define the structure of each story's section. In this part, it is essential to keep in mind players' engagement, by balancing the VN's learning strategies presented above, so that they will enter the *Flow State* and, at the same time, will obtain the expected knowledge and skills.

There is no single solution for game design and the VN learning strategies could be adopted in anyway the designers wish. As DigiFinEdu VN will be divided in at least 8 different chapters (or story sections), for the purpose of achieving the expected educational outcomes, it has been devised a structure that will be repeated within each chapter. The game's learning strategies has been arranged as to mimic a sort of interactive lecture, in which the players/students are initially introduced to the topic and then are challenged to adopt the content learned.

Within DigiFinEdu VN, each chapter will be composed of:

- A **"non-interactive sequence"**, which will introduce the story and the topic addressed by it. This part carries out the task of introducing players to the contents of the subject, helping them to develop the expected knowledge.
- Following this, there will be a **"a scriptured sequence"**, which could be a quiz or some simple tasks based on the information provided in the previous stage. This part of the chapter will aim to verify whether players/students have comprehended the topics' presented.
- The next part will include a **"minigame**". The best option would be to have a different minigame for each game's chapter, so that the game will vary enough to keep players engaged. The minigame section will aim to test students' skills, helping them put in practice the content learned.

- Finally, at the end of each chapter, players will have to take a **"choice"**, which will affect the game's story. This part is the final test to help students develop their skills and acquire their confidence on financial decisions. Moreover, after seeing the outcomes of their choices, students will have the opportunity to reflect on them, making their educational journey even more valuable.

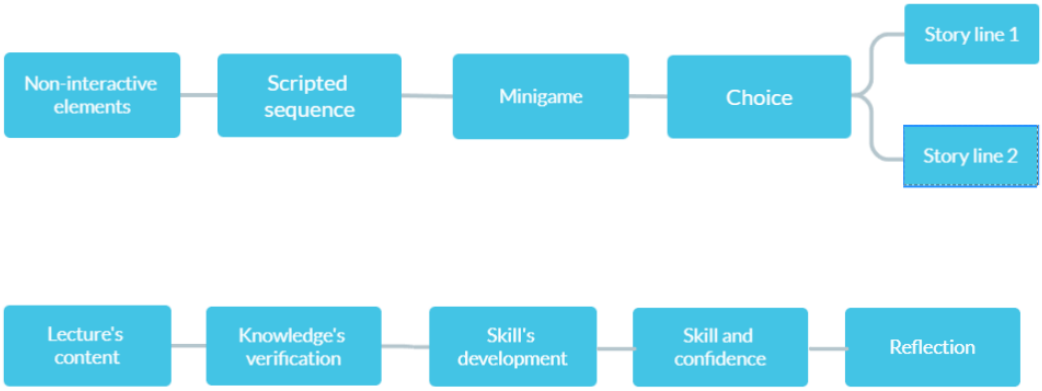

Figure 6. Game design

As previously explained, the DigiFinEdu project involves an international team with multiple skills, having among its members teachers, project managers, storytellers, game developers and education experts. The newly presented design framework was developed in order to enable all these members to use their skills to the fullest and contribute equally to the development of a VN.

7. Conclusions

This paper presented a design framework proposal for the development of an educational VN for teaching FinLit. This was done, first, by introducing different definitions of FinLit to determine its educational goals. Then, it has been explained the educational methodology (i.e., Experiential Learning) usually adopted for teaching FinLit and why it is effective. In the subsequent paragraph, Kiili's EGM was shown to illustrate how to infuse the Experiential Learning theory into educational video games. The educational value of VN was then explained, together with the 5 teaching strategies that are usually adopted in their design. Finally, all these elements were connected to explain the DigiFinEdu design framework.

We argue that the framework proposed here can represent a good starting point for the development of new educational video games. Requiring a lot of technical skills, educational video games are often the prerogative of developers alone. The aim of this article was to present a working structure that allows all the actors necessary in the development of an educational video game to participate equally. We believe that to this end, VN are a perfect genre, as they require less technical knowledge and have a high educational potential.

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