Working Paper UNU-MERIT (submitted for review)

The Impact of Educational Gaming on Financial Education: A national Pilot Project Using the Mobility Era Game[1] in Luxembourg.

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This research was conducted as part of a project financed by the European Investment Bank Institute (EIBI)[3] and implemented by Researchista.

Cite this article: Burlacu-De Paoli I. (2026) "The Impact of Educational Gaming on Financial Education: A national Pilot Project Using the Mobility Era Game in Luxembourg", Working Paper UNU-Merit

Last edited: 23.10.2026

1 Mobility Era Game is a board game and app, a trademark of Researchista registered at the Benelux Office for Intellectual Property (BOIP) under the number 1395977, class 28.41. This study only investigates the board game adaptation, see Burlacu-De Paoli (2024) for the impact of the Mobility Era Game app.

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3 The EIB Institute (EIBI) is part of the European Investment Bank Group. It invests in people and ideas, fostering education, social resilience, foresight and partnerships with foundations to amplify the EIB Group's impact. By connecting with universities, innovators, foundations and communities, the Institute helps the Bank to anticipate future challenges and contribute to Europe's resilience, competitiveness and inclusive growth. This study is part of the project "*The National Pilot Project on Financial and Civic Education in Luxembourg, using the case of the Mobility Era Game*", SG/EIBI/2024- 16390/EC/dbm.

Foreword

A few decades ago, school curricula primarily focused on economics in class, that includes macro and micro-economic disciplines. However, with the rise of consumerism and youth's early access to financial services, educational policies evolved to a new dimension: *financial education*. Emerging in the 1990s and 2000's, financial education has become a cornerstone for the intention to increase the financial literacy rates around the world. By 2026, within the European Union, this concept is integrated under a single concept, called *financial competence framework,* developed by the European Comission and the Organisation for Economic Co-operation and Development (see European Union/OECD, 2023).

Similarly to other disciplines, financial education faces its challenges related to its effectiveness and practical application. Research indicates that not all pedagogical methods are equally effective in equipping youth with the skills needed to navigate the modern financial pressures, strong social media algorithms that significantly contribute increased youth consumerism, and rising labour market demands. Building on the work of Burlacu de Paoli (2024), which highlights the role of an EdTech tool (specifically, the Mobility Era Game app, tested with 70 high school managers) in financial and fiscal education, this study examines the impact of its board game adaptation (Mobility Era Game: the board game).

The study is structured in two parts. The first part consists of a desk review of financial education trends, policies, and initiatives in Europe and in Luxembourg, with a focus on the efforts undertaken by Luxembourgish authorities. It outlines the research methodology. The second part triangulates empirical findings from schools with the current EU policy framework, specifically the financial competence framework.

Following the completion of the pre- and post-assessment forms, a total of The data collected from 195 high school students across 10 schools across Luxembourg, including German and French speaking groups. Ten teachers received 100 board games (Mobility Era Game[4]), and implemented them in their classrooms during 2025, divided in 2 phases: January-June and September-December. Pre- and -post assessment questionnaires administered in 3 languages: English, French and German.

[4] *The financial and civic education game application and board game, the Mobility Era Game was recognized as the frontrunner at the Triple E Awards (Entrepreneurship and Engagement Excellence Awards in Higher Education) in the Category Community Engagement Initiative, and was awarded the European Prize for 2023. The app version passed stage two in the BAFTA Awards 2024 at the Game Beyond Entertainment section. Both, the game app and its board game adaptation were developed by Researchista, a venture specialized in certification of research-inspired educational tools.*

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1. Introduction

Financial education, once marginal or less discussed topic in the past, turned out to be of critical importance into the 21-st century school curricula. As a new discipline, it is transitioning from optional to compulsory topic in class. In the European Union for example, the *financial competence framework* developed by the European Commission and the OECD International Network on Financial Education (OECD/INFE) supports the EU's Member States in designing and integrating financial education strategies into school curricula, learning materials and educational tools.

Nonetheless, practical implementation of financial education in schools remains suboptimal across much of the European Union. While short-term improvements are often observed, their impact tends to diminish over time, without reinforcement argue Garcia and Perez-Oleaga (2025). While reviewing the global financial education practices, the authors found that constant engagement is crucial for long-term learning effectiveness. More precisely, they identified that experiential learning is one of the most effective for fostering and maintaining financial literacy skills overtime. Supporting this, Reisdorfer-da-Silva, Becker and Vieira (2025) investigate the role of board games as means to enhance financial literacy in schools. Their findings show that board games not only boost students' confidence in financial education, but also demonstrate high propensity score matching, leading to significant gains in financial knowledge and behaviour.

This study aims to contribute to the methodologies used in teaching financial education in schools by presenting a case study on the impact of *Mobility Era Game (board game, Edition1)* on the learning outcomes of 195 pupils in 10 schools of Luxembourg. The methodology relies on survey data collected over one year, measuring pupils' knowledge before and after playing gameplay. Teachers participating in this national pilot project integrated the board game into various disciplines and administered pre- and post-assessment questionnaires to their students.

To align with the *financial competencies framework* proposed by the EC/OECD (2023) framework- for both adults and youth - the results are analyzed across framework's 4 key dimensions, which the Mobility Era Game (since the board game Edition 1 was produced in 2019) happen to be addressed either partially or fully. These dimensions and their associated competences are:

1) **money and transactions**, related to (i) money and currencies; (ii) income; (iii) prices, purchases and payments, and (iv) financial records and contracts.

2) **planning and managing finances**, (i) budgeting/planning; (ii) managing and planning income and expenditure; (iii) saving and investing; (iv) retirement and pensions; and (v) credit.

3) **risks and reward**, namely: (i) the identification of risks and rewards; (ii) the relationship between financial risk and reward; and (iii) insurance and managing financial risk; and

4) **financial landscape**, covers knowledge, skills and attitudes related to (i) financial products, services and providers; (ii) consumer protection; (iii) rights and responsibilities; (iv) scams and fraud. (v) financial education, information and advice; (vi) tax and public spending; and (vii) external influences.

The results of the study are both positive and promising. Although some teachers in Luxembourg (and in Europe) initially expressed a preference for a digital application – fearing for their students' opinion about a board game as being outdated - the Mobility Era Game effectively introduced contemporary financial concepts and terminology already familiar to students. Furthermore, the study reveals that many students responded favourably to the use of an engaging, interactive tool in classroom, contrasting with more traditional or repetitive teaching methods.

1.1 Study Goals and Objectives

This study is delivered to the European Investment Bank Institute, the philanthropic arm of the EIB, as part of the project "T*he National Pilot Project on Financial and Civic Education in Luxembourg, using the case of the Mobility Era Game".* This project is implemented by Researchista.

All data collected during this study are securely stored and managed by the Ministry of Education, Childhood, and Youth in Luxembourg, in compliance with applicable data protection regulations, including the General Data Protection Regulation (GDPR), as well as institutional protocols governing research ethics and data security.

The study aims to achieve the following objectives:

O1. To assess the level of readiness and financial literacy of the high school pupils in Luxembourg.

O2. To evaluate students' openness to using a board game in class as an alternative to traditional methods of teaching finance and civics.

O3. To explore the values of young students of Luxembourg and identify key obstacles they face in preparing for adult life.

1.2 Study Key Features

This section outlines the particularities of this research that are essential for interpreting the data. Three major features are highlighted:

Target audience

A defining characteristic of this study is its focus on *teenage respondents*. In the words of Uktamovna (2025), adolescence is a significant developmental phase that marks the transition from childhood to adulthood, a period characterized by rapid physical, emotional, cognitive, and social

changes, occurring between the ages of 12 and 18, typically. The author reminds about the importance of the hormonal fluctuations that can cause intense mood swings and increased sensitivity. For example, adolescents may experience heightened feelings of excitement, frustration, or sadness, often without fully understanding why - a natural part of growing up and identity separation.

Two critical considerations arise from this:

Emotional prevalence – emotions have a crucial role and influences significantly the process of learning. The spectrum of human emotions is vast. For example, in their study on the impact of teenagers' emotions on thinking related to climate change, Oberaurer et al. (2022) found adolescents' emotions related to: *anger, sadness, helplessness, insecurity, worried and inspired to act* was associated with higher levels of complexity thinking competence (to questions about climate change), while those adolescents experience *apathy or were annoyed and even hopeful*, had a diminished the level of complexity thinking competence in their responses. We are particularly interested in those emotions that propel learning and have been triggered by the intervention we had in class – gameplay of a board game.

(b) Questionnaire design - due to the emotional and developmental stage of the respondents, the pre-play questionnaire was designed to be general, engaging and intentional. While the post-play questionnaire was influenced by the novelty of the game in the classroom, as well as the students' first-time exposure to it. This unfamiliarity shaped the structure and content of the post-play questions.

Implementation

Initially, the study aimed to include 300-500 pupils considering the number of participating schools involved and the scalable nature of the board game (which can be used easily across classes, semesters or occasions). However, the study hardly reached 200 pupils due to the nature of our private entity readiness to face administrative challenges related to the EU data protection laws created delays and reduced teacher participation during the second phase of the project. As Netherlands-based entity, Researchista completed Luxembourg's National Data Service training on GDPR before launching the second phase of the project, following the recommendation and support on behalf of the Ministry of Education.

This experience underscored the importance of private-public cooperation in the Educational Technology (EdTech) sector which originated in the United States and expanded significantly post-covid. Given the high costs of testing and implementing EdTech products, trust-based cooperation between public institutions and private entities is essential.

Analysis

The dual role of the researcher as both the author of the Mobility Era Game and the study analyst does not make the study biased. With over 15 years of pedagogical and research experience, the author

maintains professional integrity and is committed to delivering transparent results. The original data, stored on the servers of the Ministry of Education, can be independently validated, ensuring the reproducibility of the findings.

Rather than posing a conflict of interest[1], this dual role enriches the study by integrating diverse perspectives:

(1) The author's extensive experience – including participating in board game fairs across the EU as presenters showcasing Mobility Era Game to a wide range of players and demographic groups, collaboration with Dutch EdTech, and prior research on educational gaming – enables a comprehensive triangulation of data. This provides valuable insights into the role of educational gaming and its potential impact when combined with pedagogical expertise.

(2) This study is the second research and exploration of Mobility Era Game in a school setting, with a particular focus on *Learning Engineering*. As Herbert Simon (1969) posited, education should be approached with the same rigorous, mathematical precision as fields like physics or engineering.

1.3 Structure

This study emphasizes the significance of financial education and game-based learning in school curricula. The structure is as follows:

Introduction: outlines the Study goals and objectives.
Section 2: reviews the policy and legislative framework for financial education in the EU and Luxembourg.
Section 3: describes the applied methodology.
Section 4: presents the research, including a comparative analysis of the opinions of 195 students before and after playing the Mobility Era Game.
Section 5: focuses on the key conclusions and recommendations derived from the research.

2. The policy framework on financial education in the EU and Luxembourg.

Fan and Zeng (2025) argue that compulsory study of finance in schools plays a decisive role in shaping the future financial wellbeing of youth. In their study of mandatory financial education classes in American high schools, the authors found that these classes are crucial in preparing young adolescents for independent financial decision-making. They recommend implementing such classes not only in secondary education, but also adult learning programs for continuous education.

In Europe, there is a growing trend toward transitioning from optional to mandatory education in school curricula. This section will review key aspects of financial education and then examine the existent policies in the EU and Luxembourg.

[1] *Researchers interested in conducting independent analyses are welcome to request access to the anonymized raw data by contacting the corresponding author at researchista@outlook.com. All data-sharing requests will be reviewed in accordance with ethical guidelines and data protection regulations.*

2.1 Financial Education: Literature Review (Pedagogical dimensions).

The literature on financial education has expanded rapidly in the past decades. Keiser and Lusardi (2024) note that over 7,000 peer-reviewed publications financial literacy have been indexed in the Social Science Citation Index (Clarivate Analytics) over the last fifteen years. This surge in research is driven by: globalization, increasing number of financial products and technological advancements (e.g. fintech, cryptocurrencies) which have made financial literacy a priority for policy makers, educators, and researchers.

Financial education encompasses a broad spectrum of topics and dimensions, extending beyond formal setting and includes informal through parents, family, and peers. Considering the design of this research, financial education is further analyzed through pedagogical lenses, by asking how financial education in class setup works. The generic questions of most interest remain valid: what factors contribute to the improvement of financial literacy? Under what conditions is financial education most effective? The literature on financial education can be divided into more compartments, each addressing different aspects of financial knowledge and skills. In this section, the discussion focuses around 2 questions: (1) is it better to use online application on financial education or offline, like board games or other methods? (2) Why do obligatory classes in financial education when there are plenty of other courses, like economics or math to cover financial knowledge? Does it make a difference if the financial education class is compulsory or optional at school?

(1) *Online vs. offline educational tools:* Garcia and Perez-Oleaga (2025) analyzed 70 influential publications (2011 - 2023) and found that integration of digital and offline educational tools is essential for creating long-term behavioural change. Their work underscores the importance of interactive and experiential learning methods, such as simulations, games, and real-world applications, to enhance engagement and retention.

Reisdorfer-da-Silva, Becker and Vieira (2025) pilot-tested 159 financial board games across 53 schools in State of Rio Grande do Sul, Brazil using a control and a test group design and found a significant positive outcome on students' knowledge. Authors sustain that the results of this pilot demonstrated that incorporating board games into the educational process not only improves financial knowledge, but also positively influences financial behavior and attitude.

(2) Mandatory vs. optional classes: To optimize the findings, the framework of Fan and Zeng (2025) is proposed as a point of reflection on how obligatory financial education classes in schools could impact financial knowledge and access and as a result improve the financial wellbeing of youth. Expanding on the financial capability framework, the authors developed an enhanced model specifically for young adults, whose financial practices and independent decision-making can be shaped by increased financial knowledge and access through financial education classes with financial wellbeing as the

ultimate outcome.

A mandate refer to a legal or policy requirement that high school students must complete a financial literacy course to graduate. For example, Delaware high school students are required to complete a minimum one-half credit course on a broad range of financial concepts as a graduation requirement.[2]

The 1st Model hypothesizes positive links between Financial education obligatory classes at secondary level and the financial capability factors, including financial knowledge, access, healthy behaviors, and independent decision-making. These are proposed to be positively associated with financial wellbeing through direct paths. After further research, the authors suggest in Model 2 that financial knowledge and access to financial products alone are two direct factors that influence financial wellbeing, based on the previous literature that suggests direct relationships among these factors. Furthermore, they found a third potential causal relation that is represented by Model 3 and that shows a direct link from financial knowledge to access to the original framework because the literature demonstrated that financial knowledge could improve financial access.

Figure 1. Conceptual Model 1: Financial Education Classes and its relation to Financial Wellbeing.

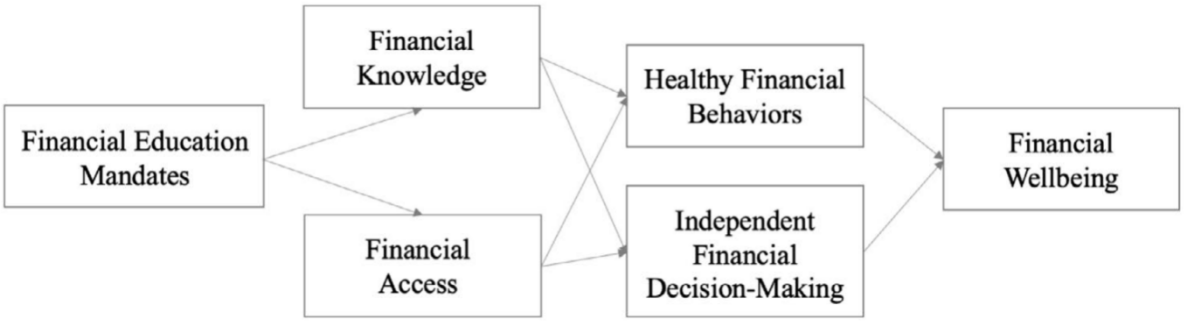
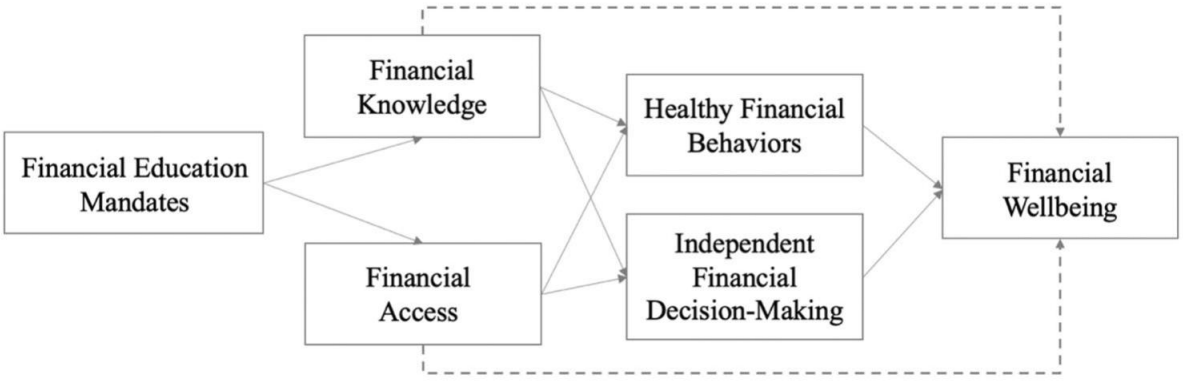
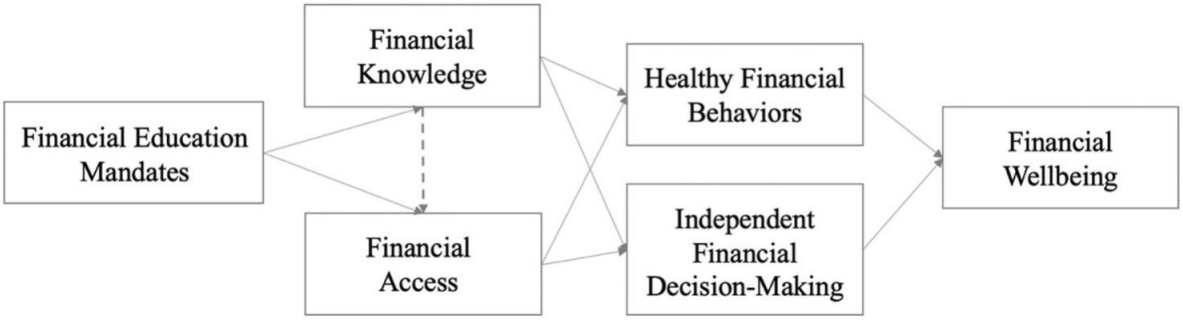


Figure 2. Alternative Conceptual Model 2: Financial Education Classes and its relation to Financial Wellbeing.



[2] Online source: https://housegop.delaware.gov/2025/10/11/delaware-financial-literacy-law/

Figure 3. Alternative Conceptual Model 3: Financial Education Classes and its relation to Financial Wellbeing.



Both online and offline educational tools play a critical and complementary role in financial education. While the implementation of mandatory financial education classes has seen significant growth in Europe, the United States remains ahead in terms of widespread adoption and institutionalization of such programs. Research by Fan and Zeng (2025) demonstrates that obligatory financial education classes have a positive impact on financial wellbeing, as evidenced by their three theoretical models:

1. Model 1: Mandatory classes directly enhance financial capability factors (e.g., knowledge, access, behaviors, decision-making), which in turn improve financial wellbeing.
2. Model 2: Financial knowledge and access are identified as direct predictors of financial wellbeing.
3. Model 3: Financial knowledge facilitates greater access to financial products, further contributing to financial wellbeing.

Given these findings, the European school curricula must undergo further reforms to align with the best practices in financial education. The efforts undertaken by the EU authorities to advance financial literacy are detailed in Section 2.2, while the specific initiatives of Luxembourgish authorities - and the place of the Mobility Era Game in the grand scheme - are examined in Section 2.3.

2.2 Financial Education Policy in the European Union and Luxembourg.

Some countries have introduced mandatory financial education disciplines, while others embed financial topics across mathematics, economics, civic education, or entrepreneurship. This fragmentation limits comparability of outcomes and creates uneven access to quality financial education across the European Union (hereafter, the EU).

The European Union's efforts and policy on financial education

The EU has increasingly recognized financial literacy as a core life skill necessary for citizens' economic resilience, social inclusion, and participation in modern financial systems. The EU's Financial Education Strategy (2025) of the European Commission frames financial literacy as a prerequisite for financial well-being, consumer protection, and long-term economic stability, particularly in the context of rising household debt, digitalization of financial services, and demographic ageing.

Evidence from Eurobarometer (2023) highlights persistent disparities in financial literacy across Member States and socio-demographic groups. While 64% of EU citizens demonstrate a medium level of financial knowledge, 18% display low financial literacy and only 18% reach a high level. These iinequalities are pronounced among *women, young people, individuals with lower income*, and *those with lower levels of formal education* – who consistently score below the EU average. These gaps suggest that financial knowledge is not only an educational issue but also a social equity concern.

Although aggregate literacy levels may appear moderate, behavioural indicators reveal deeper vulnerabilities. The Eurobarometers (2023) show that half (49%) of EU residents aged 18–65 lack emergency savings sufficient to cover three months of living expenses without borrowing or relocation, amounting to approximately 219 million individuals. Furthermore, 16% of the population report having no savings at all. Analysts such as Van den Bogart (2025) argue that these figures reflect limited financial preparedness, short-term decision-making, and comparatively lower household investment rates than those observed in the United States. These weaknesses expose citizens to economic shocks and increase dependence on social protection systems.

Education policy remains a national competence under EU treaties. Consequently, the European Commission does not impose binding requirements on financial education curricula. Instead, it operates through coordination mechanisms such as:

- policy recommendations and communications,
- funding instruments (e.g. Erasmus+, ESF+),
- expert groups and stakeholder platforms,
- comparative benchmarking and data collection.

While the Financial Education Strategy (2025) is crucial to propelling financial education in the EU forward, in this paper we are particularly interested in the Financial Competencies Framework (The EU/OECD, 2023) for Youth due to its applicability and relevance to the goal of the study.

The modality the framework was mapped and the list of verbs identified to be needed for an independent young adult to thrive. A practical application in class that could result in generating these actions could lead to creating a skill for a better financial education after class. Namely, these are centered around 3 key dimensions:

Table 1. Financial Competencies Framework Map (the list of Verbs used)

Knowledge, Awareness and Understanding Skills	Skills and Behaviours	Attitudes
• (Is) aware of • Grasps (a concept) • Knows • Realises • Recognises • Relates • Understands	• Accesses • Analyses • Appreciates • Calculates • Checks • Chooses • Compares • Completes • Considers • Describes • Develops • Differentiates • Distinguishes • Draws up • Evaluates • Exchanges • Exercises • Explains • Finds • Gives examples • Identifies • Inquires • Invests • Lists • Makes • Monitors • Names • Pays • Prioritises • Protects • Puts • Reduces • Requests • Resists • Saves • Seeks • Starts (to plan) • Takes into account • Thinks • Uses	• (Is) Confident to • (Is) Cautious • (Is) Motivated to • (Is) Willing to

Through these instruments, the EU promotes the integration of financial education from an early age, encourages lifelong learning approaches, and supports innovative pedagogical methods, including digital and experiential learning. However, the absence of binding obligations has resulted in substantial variation across Member States in terms of curriculum coverage, instructional hours, teacher training, and assessment frameworks.

Luxembourg: policy context and implementation

Similarly to other EU Member States, financial education in Luxembourg is not uniformly established as a compulsory subject across all levels of formal schooling, despite its high GDP per capita, advanced financial sector, and strong institutional capacity. The new national action plan of the Ministry of Education, Children and Youth's suggests significant efforts to align with the financial framework of the OECD and EC and including financial education skills needed from early age (see point 1) is one of its successes.

Table 2. The national action plan to strengthen financial education in Luxembourg schools (2025)

1. A national financial skills framework defines the skills to be developed from cycle 1 of basic education up to the first year of secondary education.
2. In cycle 1, *Finny,* a short puppet theatre play, introduces fundamental concepts such as recognizing exchange situations, understanding that resources are limited, differentiating needs and wants, and making initial choices.
3. In the curriculum for cycles 2 to 4, financial education is one of the priority cross-curricular thematic areas, which means that students do not follow a separate course, but address these concepts within the framework of activities linked to several subjects.
4. The new *Piwitsch-Finanzguide* magazine for middle school helps students better understand money in everyday life. It will be available from the start of the 2027/2028 school year in print and digital versions, enriched with mini-videos, quizzes, podcasts, and challenges to complete in class or at home.
5. The *EduStart-Up* initiative allows high schools to create a school business, managed by students with the support of their teachers.
6. The *Finanzfürerschäin* allows students in their final two years of secondary school to have their financial skills certified. For students in their final year, this certification will be available starting in the 2027/2028 academic year.
7. A national charter defines the rules of collaboration between the ministry and relevant actors in the financial sector.
8. High schools engaged in regular financial education activities (workshops, projects, mini enterprises, 'Finanzfürerschäin') can obtain the *Financial Literacy Label.*
9. For students interested in economics and finance, several specialized tracks are already offered in Luxembourgish high schools, allowing them to explore topics in depth within this field. High schools are encouraged to develop practical partnerships (portfolio management, stock market simulations, real-world projects) to provide students with comprehensive preparation for higher education or direct entry into the professional world.
10. A monitoring system is in place to continuously assess the implementation of the national action plan. Furthermore, Luxembourg will participate for the first time in 2029 in the *Financial Literacy* option of the OECD's PISA test.

The financial education initiatives in Luxembourg are often delivered through:

- optional modules or project-based learning,
- extracurricular programmes,
- partnerships with financial institutions, regulators, or NGOs,
- awareness campaigns targeting youth and vulnerable groups.

In this context, pilot initiatives and innovative educational tools play a critical role in addressing systemic gaps. They allow policymakers and educators to test scalable solutions, evaluate learning outcomes, and inform future curriculum reforms aligned with EU strategic objectives and Luxembourg's national priorities. At the same time, while these initiatives contribute valuable content, they tend to be unevenly distributed across educational tracks and institutions. Access frequently depends on school leadership, teacher expertise, or external partnerships rather than a standardized national framework. Moreover, similarly to other EU countries, teacher training in financial education remains limited, and assessment of financial competencies is not systematically embedded in national evaluation systems. Considering its socio-economic context characterized by:

- a highly international and multilingual population,
- a large cross-border workforce,
- early exposure of young people to digital payments, online banking, and complex financial products,
- increasing housing costs and financial pressure on households.

These factors increase the risk of financial exclusion and poor decision-making, particularly among young people transitioning to financial independence. At both EU and national levels, the policy discourse increasingly emphasizes the need to move beyond purely theoretical instruction toward applied, competency-based financial education. Experiential approaches—such as simulations, serious games, and problem-based learning—are highlighted as effective tools to translate abstract financial concepts into practical decision-making skills.

3. Research Methodology.

The results of this research are based on a **survey** conducted in 2025, supplemented with teacher feedback from 10 schools in Luxembourg, where 100 board games were donated for educational use. Following an introductory training session for teachers on the mechanics and pedagogical application of the Mobility Era Game, students in the classes of 10 trained teachers participated in gameplay completed pre- and -post play questionnaires.

Unlike the study by Reisdorfer-da-Silva, Becker and Vieira (2025) which pilot-tested 159 financial board games across 53 schools in State of Rio Grande do Sul, Brazil using a control and a test group design, this study adopted **a pre- and post-assessment approach** to measure the changes in students' financial knowledge and attitudes before and after the gameplay.

According to the official statistics, Luxembourg has approximately 225 primary and secondary education institutions (Ministry of Education, 2023[3]). This study focuses on a sample of 10 schools, that is about 4% from the total education institutions in Luxembourg, representing nearly cantons of the country. The participating schools include both private and public institutions, as well as national and international schools. To provide an initial overview of students' readiness to engage with a board game in the classroom and their perception of the Mobility Era Game, the following insights are presented.

Table 3. Distribution of Mobility Era Game in schools by area and disciplines.

Location	Canton	Region	Discipline
Clervaux	Clervaux	North	Economics, Fundamentals of the international trade
Rodange	Esch-sur-Alzette	South	Economics
Redange	Redange	West	Accounting, English, Administration
Junglister	Grevenmacher	East	School preparation hours
Luxembourg city	Luxembourg city	South	Civic Education, Geography, History and Social work
Luxembourg city	Luxembourg city	South	Economics (German + French groups)
Grevenmacher	Grevenmacher	East	Digital Balance Initiative and ACTPA
Kirchberg	Luxembourg city	South	Ethics, Politics, English
Lallange	Esch-sur-Alzette	South	Variety, Open to use at School Level

Both pre- and post-play questionnaires were disseminated and collected online during class. The questionnaires contain 10 questions before playing the game and 17 questions after playing the game. The header of both questionnaires is presented in Annex 1. Every question included in both questionnaires is interpreted and presented in detail in the Results section.

Used Empirical Tool A **board game** is used as a primary tool to assess the knowledge before and after gameplay, in this case the Mobility Era Game. Annex 3 contain the visuals of the game the students played. Figure 2 illustrates that the vast majority (92%) of the students of age 14 and older have prior experience playing board games and are familiar with their basic principles of it. Additionally, Figure 3 reveals that students predominantly view the Mobility Era Game positive (63%), while 28% remain neutral to it. While 9% of the respondents expressed a very negative attitude towards the Mobility Era Game, the board game. Given that this is an educational game incorporating complex public finance concepts, this proportion represents a relatively small number of respondents.

[3] This statistics includes private and international schools, online source: https://men.public.lu/en/systeme-educatif/fondamental/offre-scolaire-organisation/offre-scolaire.html?utm_source=chatgpt.com

Figure 4. Have you ever played a board game before?

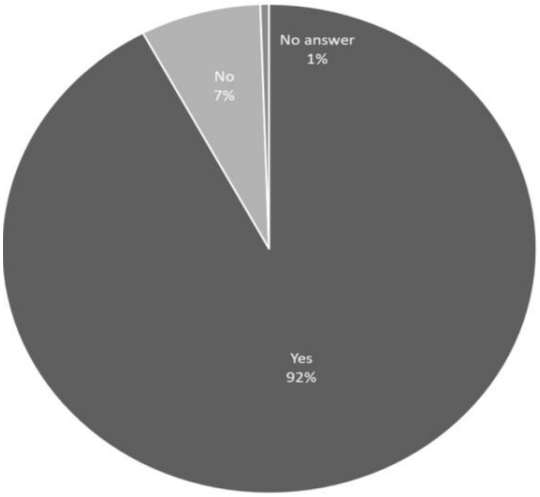
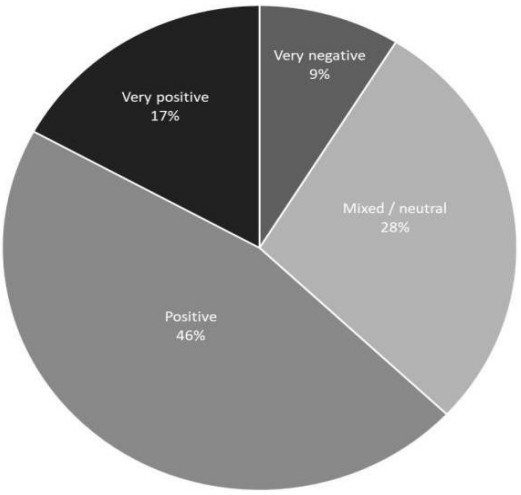


Figure 5. How would you characterize Mobility Era Game?



Both the societal board game and the application versions of the Mobility Era Game have been endorsed by staff members from prestigious organizations, such as the World Economic Forum, Forbes Council, STEM.org[4], National Research Fund of Luxembourg[5], TAXEDU of the European Commission[6]. We argue that game-based learning is necessary and effective approach, whether through physical instruments (such as board games) or accessible electronic applications (which convey the same educational message and game). This dual approach ensures alignment with modern EdTech practices and enhances engagement and learning outcomes.

Analytical framework consists in aligning the FCF with the components of the Mobility Era Game or vice versa, described in Table 4 (for visual representation of the game, see Annex 1). The Mobility Era Game directly addresses money and transactions through its mechanics, currency system, and real-world financial simulations. Moreover, the players get to see the price differences across Europe and must play in a context in which, without a work contract, it is difficult to move to another country. Moving across Europe is due to finding a new job, hence the players recognize the role of the employment contract.

The Mobility Era Game is designed to teach financial literacy through realistic, life-stage-based gameplay. It covers budgeting, income/expenditure management, saving/investing, retirement planning, and likely credit—all within an engaging, educational framework. Its use of real statistics and focus on happiness as a goal make it both practical and appealing for learning financial skills. Part II in Table 4 refers to Planning and Managing Finances, and a series of game's components are identified in this sense.

[4] "*The most engaging and well-thought-out screen-free STEM game we have seen to date*", STEM.org Educational Research & Credentialing. Read full endorsement here: https://www.prweb.com/releases/-mobility-era-play-your-taxes-game-earns-the-stem-org-authenticated-tm-educational-product-trustmark-841937207.html
[5] About the game: https://www.fnr.lu/research-with-impact-fnr-highlight/mobility-era-researcher-turns-phd-thesis-into-game/
[6] About our launch: https://taxedu.campaign.europa.eu/mt/node/3062

Table 4. Financial Capacity Framework (FCF) and Mobility Era Game (Edition 1)

Researched Dimensions	Financial Capacity Framework	Mobility Era Game
I. Money and transactions Understanding money, currencies, and payment methods. Managing income, expenses, and financial records. Recognizing the role of contracts and financial agreements.	(i) money and currencies; (ii) income; (iii) prices, purchases and payments, (iv) financial records and contracts;	A. Banknotes from 1 to 1.000 EKUs (the currency in the game, European Currency Units or else, the name of the former currency before Euros); B. Currencies; C. Gross and Netto Personal Income in 42 European countries (Country Card); D. Personal Income Tax (average) in 42 European countries (Country Card); E. Moves on the board related to financial records, *Tax Fraud, Tax Haven.* F. Work contract offered at every move to another country. G. Financial agreement between tax authorities and schools, hospitals, transportation (e.g. *Congratulations, you paid your taxes on time and now a new school is being built in your area. Your children are happy to go to school so close to their home!).*
II. Planning and managing finances Budgeting and financial planning. Managing income and expenditure. Saving, investing, and understanding retirement planning. Understanding credit and debt management.	(i) budgeting/planning; (ii) managing and planning income and expenditure; (iii) saving and investing; (iv) retirement and pensions; (v) credit.	(i) Budgeting/Planning Life Cycle Simulation: The game spans from age 11 to 99, requiring players to manage resources across different life stages. This mirrors real-life budgeting, where planning for both short-term needs and long-term goals is essential. Income and Expenses: Players earn money (European Currency Units) by working in different countries and must allocate funds for taxes, living expenses, and other costs, reinforcing the importance of budgeting and financial planning (ii) Managing and Planning Income and Expenditure • Monthly/Annual Cycles: Players receive income periodically and must decide how to spend or save it, like managing a pay check in real life. The game includes real-world expenses like taxes, which are deducted from earnings, teaching players to plan their spending and savings. • Real Statistics: The game uses official statistics on income and taxes in 41 European countries, making the financial decisions more realistic and educational (iii) Saving and Investing • Investment Choices: Players can invest in health, education, or other assets, which likely yield long-term benefits or happiness points. This teaches the value of saving and investing for future gains rather than immediate spending. • Happiness as a Goal: The game's objective is to be the "happiest player," which may involve balancing spending, saving, and investing to achieve long-term well-being—a core principle of financial literacy (iv) Retirement and Pensions • Life Span Gameplay: The game's structure, which spans from youth to old age, naturally incorporates retirement planning. Players must

		consider how their financial decisions (saving, investing, managing taxes) impact their quality of life in later stages, mirroring real-life retirement planning. (v) Credit • Debt and Loans: While not explicitly detailed, the game's focus on real-life financial scenarios suggests that players encounter situations involving credit or loans, such as borrowing for education or emergencies. This would teach responsible credit management, though more specific mechanics are not described in the available sources.
III. Risks and reward Identifying financial risks and rewards. Understanding the relationship between risk and return. Recognizing the role of insurance and risk management.	(i) the identification of risks and rewards; (ii) the relationship between financial risk and reward; (iii) insurance and managing financial risk;	Life Events and Decisions: As players progress through different life stages (ages 11–99) and work in various countries, they encounter real-life financial scenarios—such as job changes, health issues, or economic fluctuations—that carry risks (e.g., loss of income, unexpected expenses) and potential rewards (e.g., career advancement, investment returns). Trivia and Strategy: The game's trivia and decision-making mechanics likely present players with choices that have financial consequences, such as investing in education or health, which may yield long-term benefits or expose them to risks if not managed well. Investment Choices: Players are encouraged to invest in assets like health, education, or other opportunities. These investments may offer higher returns but also come with uncertainty—for example, investing in education could lead to better job opportunities (reward) but requires upfront costs and time (risk). Trade-offs: The game's structure likely requires players to weigh risks vs. rewards in their financial decisions, such as choosing between safe, low-yield options and riskier, high-reward opportunities. Recognizing the Role of Insurance and Risk Management • Health and Unforeseen Events: The game includes elements like investing in health and dealing with real-life situations, which may simulate the role of insurance in mitigating financial risks (e.g., health insurance protecting against medical expenses). • Taxes and Social Safety Nets: Since the game incorporates taxes and public finance, it may also introduce players to the concept of social insurance (e.g., pensions, unemployment benefits) as a form of risk management, helping them understand how these systems provide financial security in exchange for contributions
IV. Financial landscape	(i) financial products, services and	(i) Financial Products, Services, and Providers • Real-World Context: The game uses official statistics from 41 European countries,

Knowledge of financial products, services, and providers. Understanding consumer rights, responsibilities, and protection. Recognizing scams, fraud, and financial abuse. Accessing financial education, information, and advice. Understanding tax, public spending, and external influences on personal finance.	providers; (ii) consumer protection; (iii) rights and responsibilities; (iv) scams and fraud; (v) financial education, information and advice; (vi) tax and public spending. (vii) external influences.	exposing players to diverse financial systems, products (e.g., savings accounts, loans, pensions), and services (e.g., banking, insurance) • Life Simulation: As players work in different countries, they encounter varied financial products and providers, reflecting real-life choices like opening bank accounts, taking loans, or investing in public/private services (ii) Consumer Protection • Civic Education: The game integrates civic and financial education, which likely includes understanding consumer rights—such as protections against unfair practices, transparency in financial contracts, and recourse for disputes • Regulatory Awareness: By simulating real financial environments, players learn about the role of regulations and institutions in protecting consumers. (iii) Rights and Responsibilities • Taxation and Public Finance: Players pay taxes and interact with public systems, learning their rights (e.g., access to public services) and responsibilities (e.g., tax compliance, ethical financial behavior) Social Contract: The game's focus on happiness and public finance reinforces the idea that financial decisions impact both individuals and society, highlighting civic responsibilities (iv) Scams and Fraud • Critical Thinking: While not explicitly detailed, the game's use of real statistics and trivia includes scenarios where players must identify misleading information or avoid financial pitfalls, fostering awareness of scams and fraud. • Educational Objectives: The game's endorsement by institutions like the European Commission and World Economic Forum suggests it promotes financial awareness, including recognizing and avoiding fraud. (v) Financial Education, Information, and Advice • Research-Backed Design: Developed from a PhD thesis and supported by educational institutions, the game is a tool for accessing financial education, offering players information and advice through gameplay and official statistics. • Interactive Learning: The game and its companion app provide a platform for users to explore financial concepts and seek guidance, making it a resource for ongoing learning. (vi) Tax and Public Spending • Tax Simulation: Players earn income and pay taxes based on real data, learning how taxes fund public services and influence personal finance. This hands-on experience demystifies tax systems and public spending. • Policy Impact: The game illustrates how tax policies and public spending shape economic

		opportunities and social welfare, helping players understand external financial influences. (vii) External Influences • Global and Local Factors: While Edition 1 does not explicitly show how external influences like economic policies, inflation, exchange rates, and geopolitical events affect personal finance, the game exposes players by simulating life across multiple countries'. • Life Events: Players experience how external shocks (e.g., health crises, job market changes) impact financial stability, reinforcing the need for adaptability and informed decision-making.

The game's approach to risk and reward is grounded in real-world financial principles, making it a practical tool for teaching players how to:

- Assess the trade-offs in financial decisions.
- Understand the value of insurance and safety nets.
- Develop strategies for managing uncertainty in personal finance.

Lastly, the Mobility Era Game is uniquely positioned to address the financial landscape through its educational design, real-world data, and focus on civic and financial literacy.

4. Research Results

The results are divided by 4 dimensions that present the key competences in the *financial competences framework* of the European Commission and the OECD report (2023) but not excluded only by these dimensions since the survey questions also regards questions related to the wellbeing and health of the students, civic responsibilities and the European Union.

First, when it comes to knowledge about **money and transactions**, the Mobility Era Game is a particularly rich resource in learning about its subtopics. Namely, these are the following elements included and directly accessible to students when playing the game (for visuals, see Annex 5):

H. Over 300 bancnotes from 1 to 1.000 *EKU*s ;
H. Gross and Netto Personal Income in 42 European countries (Country Card);
I. Personal Income Tax (average) in 42 European countries (Country Card);
J. Currencies;
K. Daily life purchases and different types of taxes to it;
L. Payments.

The board (see Annex 2) contains a blind map without country names that the players must guess each turn. To win every time when throwing the dice, a player needs to guess 2 out of 3 components: a) the location of the country on the map b) the currency of the country and/or c) language spoken.

When a player moves to another country for work, they must collect and keep until the next Tax Inspectorate a Country Card that is indicative of the average salary that an individual would receive in

the country (official statistics for 2019), before and after tax.

One of the highlights of playing Mobility Era Game in Luxembourg is to make students aware that salary is not only one independent financial element, taxes are an important component of it. Figure 4 and 5 illustrate a broadening with about 10% more students who after playing the Mobility Era Game claim that a salary does not come on its own, and that taxes and other types of expenses. Considering the rules of the game, the students hear a lot about the expenses from the public budget (such as the social insurance contributions) rather than expenses in a classical sense of personal expenses an intrinsic part of it.

Figure 6. Complete the sentence about income, before

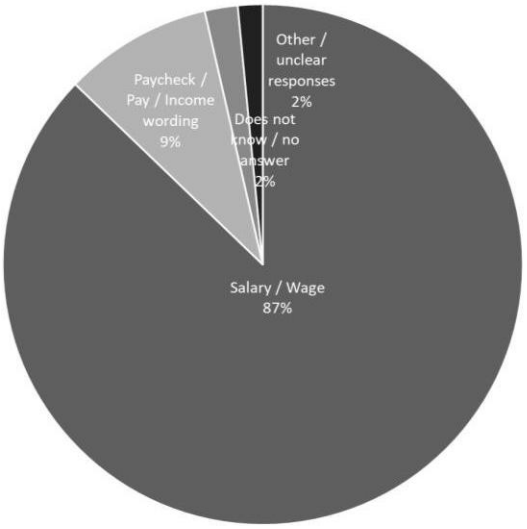
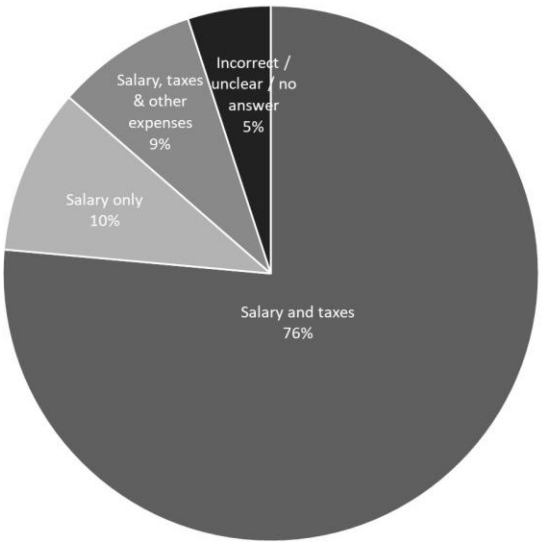


Figure 7. Complete the sentence about income, after playing the Mobility Era Game



This also explains why from 2% of no answer or do not know answer, and 2% of unclear or missing responses, turned into a 5% incorrect or missing answers. Thus, the game explains the difference between the net and gross salary.

Lastly, the European Commission and the OECD report (2023) include in this dimension the (iv) financial records and contracts. The Mobility Era Game only partially reminds about the importance of keeping the financial records clean, otherwise there is a paid sanction (G) and it goes inherently in the rules of the game that once the player is moving from one country to another it happens because they found a new work contract and have a job to move to.

II. According to the European Commission and the OECD report (2023), the **planning and managing finances** dimension includes: (i) budgeting/planning; (ii) managing and planning income and expenditure; (iii) saving and investing; (iv) retirement and pensions; and (v) credit.

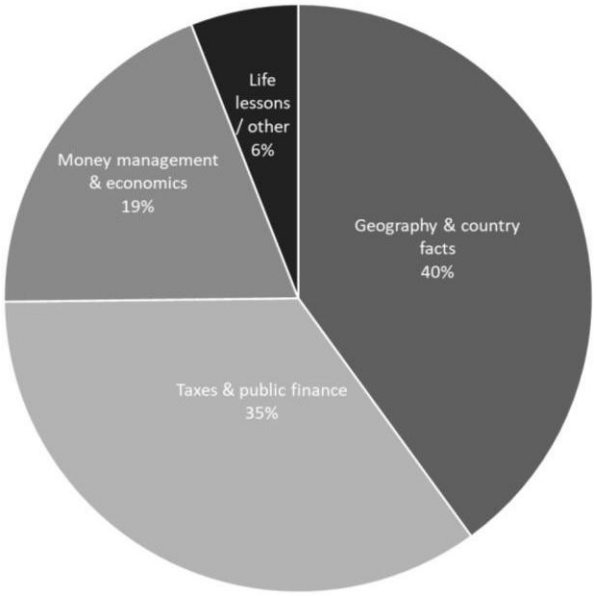
From a life-cycle perspective (a dimension Mobility Era Game addresses as part of its game design) the authors found that youth aged 18–24 usually have life goals to finish school and enter into careers, while older young adults' (ages 25–29) life goals may include marriage, establishing families, and getting their first homes, with more stable income. Moreover, as suggested by Arnett (2001, 2003),

those aged 18–24 do not subjectively feel they have entered adulthood, whereas those young adults aged 25–29 do feel they have reached adulthood.

In the context of a wide range of living conditions and standards of living levels across the Member States of the European Union, it is important to mention that planning and managing individual finances (including, different financial tools such as, budgeting - saving - investing - retirement - credit) is influenced by the levels of average income in the country. Hence, it is essential for the students to first get an overall view on the living conditions across the European countries to then later understand the particularity of one's own country and how to optimise their personal finance in the context. The full board of the game with all countries and their average personal income and taxes can be found in Annex 2.

The Figure 6 suggests that after playing the game the students learned the most about geography and country facts (40%), taxes and public finance (35%), money management and economics (19%) and lastly, how to navigate finances in different life situations (6%), such as unemployment or retirement, or child raising.

Figure 8. When playing the Mobility Era Game, the students learned the most about:



When referring to (iv) retirement and pensions, Reisdorfer (2025) argues that especially the younger generation will face greater financial responsibility worldwide due to an increase in pension and social security burden. Our respondents seem to be increasingly aware that managing own money is important to avoid debt and poverty and financial gaming helps them understand better (see Figure 8).

The risks and reward dimension includes: (i) the identification of risks and rewards; (ii) the relationship between financial risk and reward; and (iii) insurance and managing financial risk.

In personal finances management, almost half of the respondents (45% of the students) thought own

money was important to manage for financial security and emergencies as well as to avoid debt. However, after playing the financial education game the opinions split into 2 major groups, by which money management became rather a way to prevent emergencies and for the future (34%) and a distinct group rise with 22% of the students who would rather save money to avoid debt and poverty.

Figure 9. Personal finance - before

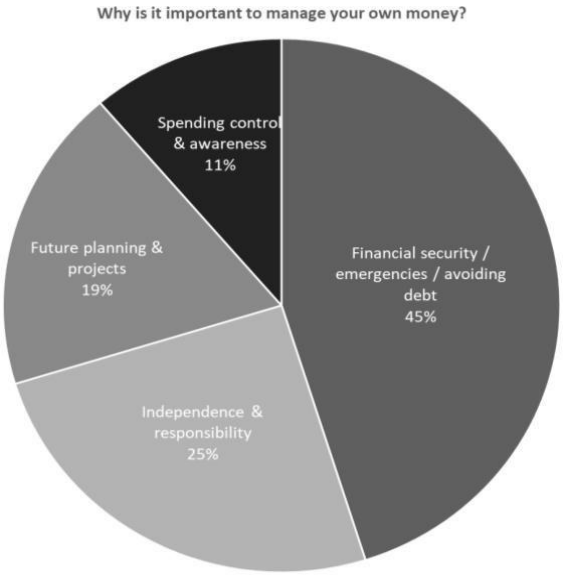
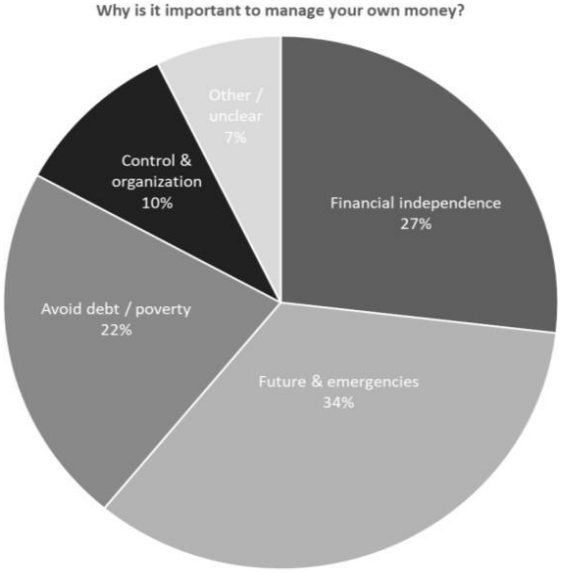


Figure 10. Personal finance - after playing Mobility Era Game



Probably, one of the strongest points of the Mobility Era Game is reflected in the last component of the financial competencies framework (2023) and that is the **financial landscape,** covering knowledge, skills and attitudes related to: (i) financial products, services and providers; (ii) consumer protection; (iii) rights and responsibilities; (iv) scams and fraud; (v) financial education, information and advice; (vi) tax and public spending; and (vii) external influences.

When it comes to (vi), if we draw a parallel to the well-known board game *Monopoly,* where the bank decides key financial transactions and steps, in the *Mobility Era Game* this is decided by the Public Budget. A separate player is in charge of all the actions related to budgeting, distributing salaries and collecting taxes, as well as paying pensions or bank credits. The tresory in this case is Public to remind the player about the key feature that makes the European welfare state valued and that is the principle of solidarity. This is why all the players are cashing in and cashing out of the Public Budget, make savings and investments based on this key component in the game. Public Budget is the totality of all the bancnotes available in the game and not in the player's pocket.

According to Figure 7 confidence level in the knowledge on what taxes and public budget is clearly increased after playing the Mobility Era Game. As such, 7% more students state that they heard of it and 1% more students are interested in learning more. The latter percentage is insignificant, yet considering that these are students that played this game in a variety of classes, not only in economics class, but some students played Mobility Era Game during geography class, or languages, we consider this a successful first starting point to get to know more about public finance.

Figure 11. Knowledge about the taxes and public budget - before

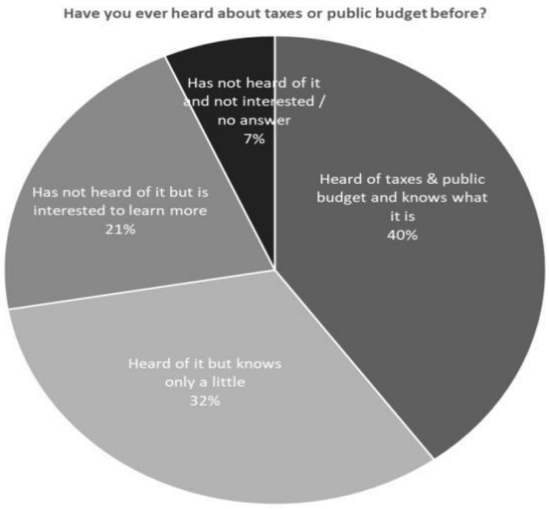
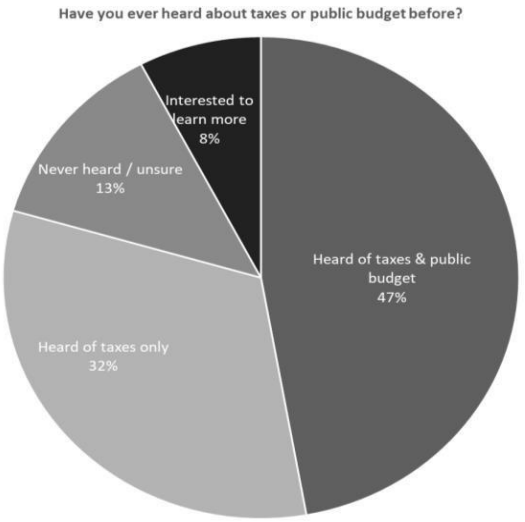


Figure 12. Knowledge - after playing Mobility Era



Even though there is already a high degree of knowledge on what the European Union is and that Luxembourg is an European Union member country (63%), this percentage increases with 10 degree more after playing the game. First results pinpoint that the students who have a basic knowledge in this question before playing the game (23%) have moved into the more confident group of students and after playing the game the students that has a basic knowledge (16%) are with 7% less.

Figure 13. Knowledge about the EU - before

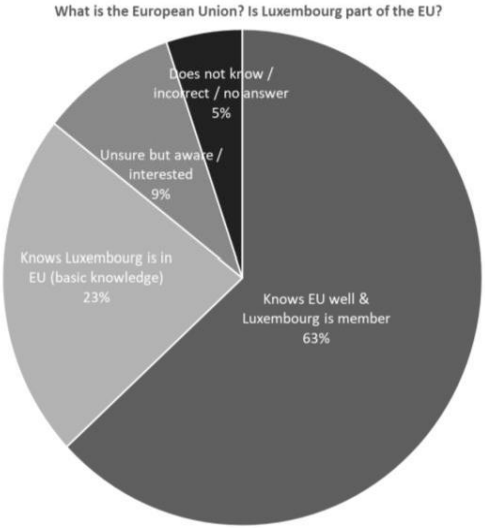
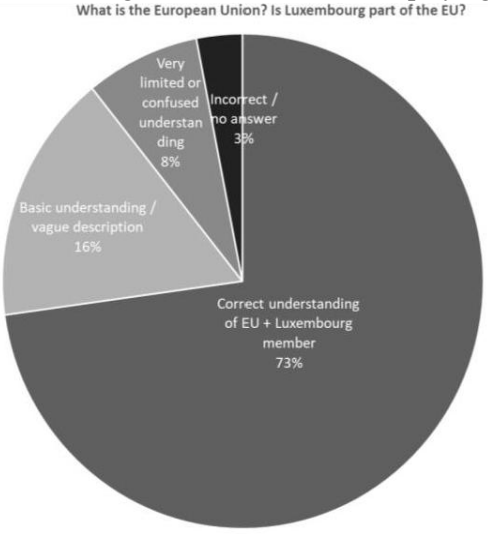


Figure 14. Knowledge about the EU - after playing



When it comes to civic responsibility and knowledge, our sample of students show a high degree of knowledge about what elections are, the importance of voting and what is the age that one is allowed to vote in Luxembourg. The interesting finding show that unlike the knowledge about salary that after the Mobility Era Game play when more students became aware that a salary is also composed out of taxes (see Figure below), in the case of the election question, 3% less students (195 students answered in both cases) become less confident or are confused about their knowledge on elections after playing the game. This could be due to the design of the game, or the fact that while playing the game, the students

understand that

Figure 15. Knowledge about elections - before

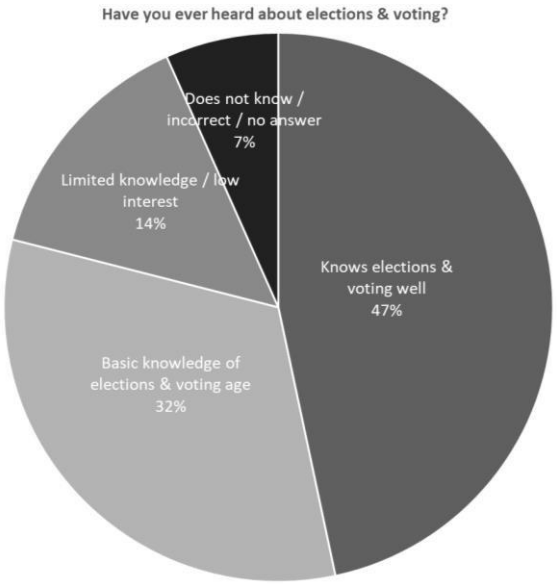
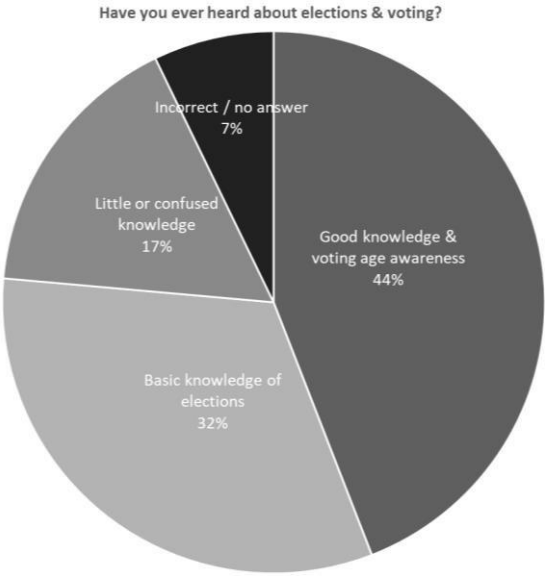


Figure 16. Knowledge about elections - after playing



When it comes to the values and state of emotions in the moment of the survey, most of the students have a healthy lifestyle and are happy.

Figure 17. How do you invest in your health?

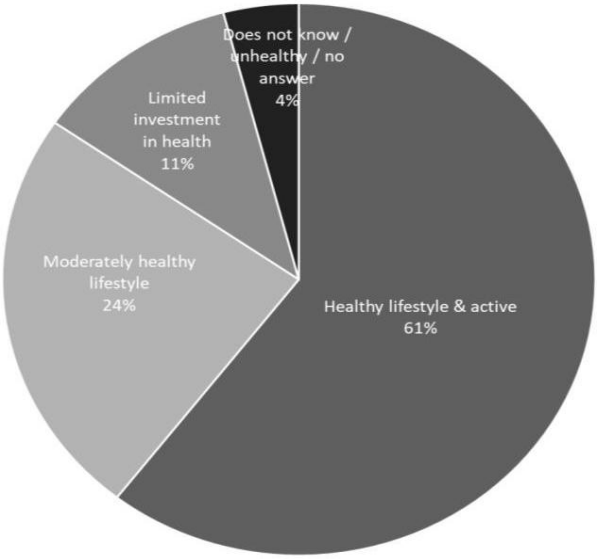
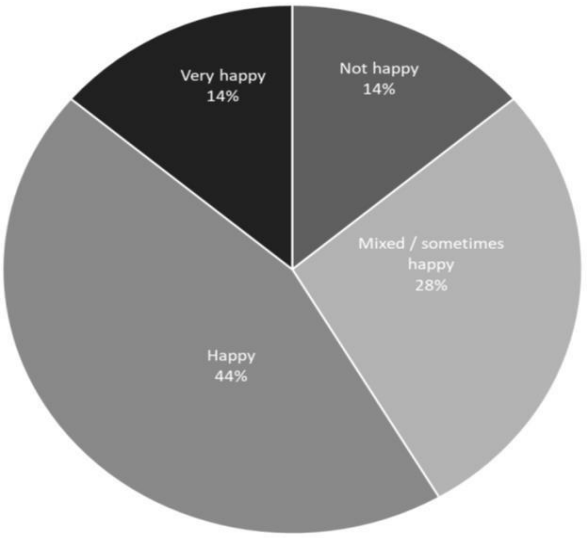


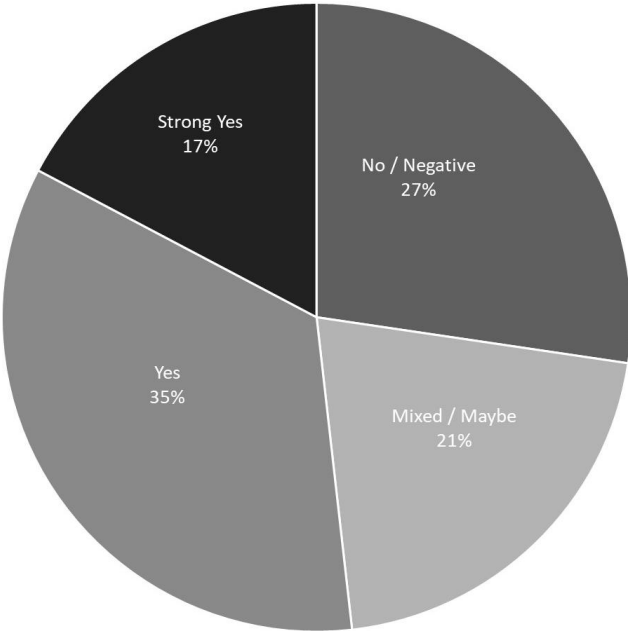
Figure 18. Are you a happy student?



To conclude the results, the students were asked if they would like to play the Mobility Era Game more often as part of their studies (Figure 19), 52% answered affirmatively, 21% were undecided and 27% declined. This is an important indicator for the overall indication of the game evaluation. Namely, that beyond the measurable knowledge gains indicated above, it shows that the students experienced the game as an engaging and acceptable learning tool rather than an obligation. Considering that gamified financial education is most effective when being repeated all over again, (rather than played as a one-off activity), this willingness to replay the game can be regarded as a seen as a favourable context that helps strengthen the learning process. Moreover, it also suggests a positive

attitude towards financial education itself, which the European Commission and OECD (2023) identify as an important component of the financial landscape.

Figure 19. Would you play this game more often as part of your studies?



Below, a summary of the extent to which the components of the Mobility Era Game correspond to the four dimensions of the Financial Capacity Framework of the European Commission and the OECD (2023 is depicted. The game achieves full coverage of the money and transactions dimension, with all four subtopics directly embedded in the mechanics of the game.

Table 5. Coverage of the Mobility Era Game components versus the Financial Capacity Framework.

Researched Dimensions	Financial Capacity Framework	Mobility Era Game	Coverage and Study Results
Money and transactions	money and currencies; (v) income; (vi) prices, purchases and payments, (vii) financial records and contracts;	M. Over 300 banknotes from 1 to 1.000 *EKU*s (the currency in the game, European Currency Units or else, the name of the former currency before Euros); N. Gross and Netto Personal Income in 42 European countries (Country Card); O. Personal Income Tax (average) in 42 European countries (Country Card); P. Currencies;	100%, fully covered (4 out of 4) - 95% learned about it

Planning and managing finances	• budgeting/planning; • managing and planning income and expenditure; • saving and investing; • retirement and pensions; • credit.		75% (3 out of 4 core mechanics: budgeting, income/expenditure management, saving; retirement pensions and credit only touched via the Public Budget) —
Risks and reward	(iv) the identification of risks and rewards; (v) the relationship between financial risk and reward; (vi) insurance and managing financial risk;		Partially covered (financial risk through game events and loss of income; insurance and formal risk management not represented)
Financial landscape (covers knowledge, skills and attitudes)	(i) financial products, services and providers; (ii) consumer protection; (iii) rights and responsibilities; (iv) scams and fraud; (v) financial education, information and advice; (vi) tax and public spending; and (vii) external influences.		Strongest dimension - the Public Budget mechanism covers tax and public spending, solidarity, rights and responsibilities

The planning and management of finances dimension is covered approximately three quarters. The risk and reward dimension is least covered. Specifically, the financial setbacks occur through game events (job loss, sanctions, moving costs), yet insurance and formal financial risk management are not part of the game design in Edition 1. Finally, the financial landscape is the strongest game's contribution in education. Through the Public Budget and the principle of solidarity, the game teaches about taxes and public spending, also about the rights of the citizens and the roles of financial institutions in an European welfare state. This aspect is rarely addressed in conventional financial education tools.

The pilot results fall in line with the declaration of the Ministre de l'Éducation nationale, de l'Enfance et de la Jeunesse in Luxembourg[6] that a new financial literacy strategy is needed and should be adopted in Luxembourg. *How would a compulsory financial education discipline at school look like?* Using the

Financial Competences Framework (2023), a financial education discipline would include a series of classes around personal budgeting, daily financial decision making, savings, trade-off and related topics. The topics in Table 6 are partially discussed in Economics and Business classes, yet the focus is often not on individual responsibility and personal finance management.

Table 6. Financial Education Discipline based on Financial Competences Framework (OECD and EC).

Financial Education	Economics / Business Studies
Personal budgeting and cash flow	Supply and demand models
Everyday financial decision-making	Market structures
Applied games/simulations on savings, interest, and inflation	Theoretical knowledge about the Monetary policy
Consumer contracts and rights	Corporate finance
Risk, uncertainty, and trade-offs	Economic growth theories
Simulations, games, and case studies	Textbook-based problem sets

Methodological context

The research results rely on a pre- and post-assessment survey addressed to a national sample of 195 high school students (14+) covering 10 schools in all parts of Luxembourg. The project kicked off with a soft launch of the Mobility Era Game at SCRIPT of the Ministry of Education together with all the teachers from the participating schools in December, 2024. The survey was conducted from January, 2025 – December 2025.

Key findings

One of the key conclusions of this research is that educational gaming can make a difference - if not a significant difference - in financial education and literacy. The statistics show improvements in the following key areas:

- *social security awareness,*
- *knowledge of public finance*
- *knowledge about the European Union*
- *knowledge in civics*

Interpretation considering prior research

While investigating personal finances and the role of financial education in Latin America, Alvarado-Cáceres et al. (2025) found that financial education must be approached as a **continuous, adaptive** process to effectively respond to evolving economic challenges. In a related field, Oberaurer et al. (2022) studied the impact of teenagers' emotions on thinking about climate change; using exploratory factor analyses they clustered the sample into two groups.

[6] https://gouvernement.lu/fr/gouvernement/claude-meisch/actualites.gouvernement2024%2Bfr%2Bactualites%2Btoutes_actualites%2Bcommuniques%2B2025%2B12-decembre%2B02-meisch-plan-action-education.html

The first group - emotions of anger, sadness, helplessness, insecurity, worried, and being inspired to act - was associated with *higher* levels of complex thinking in participants' answers and was therefore

designated “stimulation”. The second group - apathy or annoyance - *diminished* the level of complexity thinking, designated “attenuation”. Applied to financial education realm, this suggests that game-based learning works not only to transfer knowledge, but it can also amplify financial reasoning by emotionally engaging students via a stimulation type of engagement in learning. While disengaged or apathic students may benefit from this less. These findings are consistent with the observed improvements in the pilot.

Policy implications

As a result, Luxembourg faces a policy gap between its advanced financial environment and the level of financial education fostered through formal education. One of the recommendations would rely on the OECD’s Financial Competences Framework (2023) and that would mean the existence of a compulsory financial education module structured around personal financing (complementing the macroeconomics dimension), from secondary education. For easier implementation, embedded game-based and simulation-based learning (e.g. Mobility Era Game) is highlighted as a standard pedagogical tool given the measured gains it has on knowledge in social security, public finance, the EU and civics (as well as basic math, topography amongst other knowledge).

The study shows knowledge in EU education and civics is related to financial literacy across discipline, hence integrating financial education across such disciplines can help to reinforce accumulated knowledge.

When using the approach of Alvarado-Cáceres et al., (2025) it is recommended to treat financial education as a continuous process and at various disciplines, rather than an isolated topic or a one-time off course. Lastly, it is recommended to extend the survey beyond the 195-student sample to measure long-term behavioural change. This would require to monitor and evaluate the programme longitudinally.

Limitations and future research

In the light of the recommendations, it is important to highlight the limitations of this pilot that covers a sample of 195 students across 10 schools; while nationally distributed, it remains a pilot-scale study. Future research should test the intervention with a larger and more diverse sample, include control groups where feasible, and measure longer-term effects on actual financial behaviour (e.g., saving habits, budgeting practices) rather than knowledge alone.

5. Acknowledgments.

Special thanks to the EIBI and the key team, without you, this project would not have been possible. Furthermore, we would like to express my sincere gratitude to SCRIPT and the National Ministry of Education, Childhood and Youth of Luxembourg for facilitating the live meeting with teachers to kick off the project (December, 2024); for safely preserving the collected data and help us follow all the GDPR guidelines, for providing us with the necessary links to distribute the online questionnaire that teachers could use in class.

Lastly, we appreciate the support of the school administrations listed below. Some teachers have been keen promoters of the project and got involved in going the extra mile, so we would like to conclude by thanking in the first place Mrs. Dearbhla Farrell from the European School I and her colleagues, Mrs. Aina Joanna Pesonen, Mrs. Marine Jeannniard Du Dot as well as, Mr. Marc Welter, Mrs. Anne-Marie Bernard, Mr. Jody Kalmes, Mr. Kevin Lopes, Mrs. Cathia Lahure, Mrs. Alexandra Hirsch, Mr. Pobez, Mr. Yann Mannon and Mrs. Barbel Gobel-Stolz. Your participation was essential in making this project possible.

Participating Schools
Edward Steichen European School
Lycée Michel Rodange
Atert Lycée Redange
Lënster Lycée International School (LLIS)
Ecole Privée Fieldgen
Ecole Internationale Gaston Thorn
Lycée Maacher
European School Luxembourg I
Lycee Technique de Lallange

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Annex 1. Pre-Playing Mobility Era Game Form (10 questions), header.



PRE-GAME FORM: 1

Dear Student,

Researchista is reaching out to you today.

We are all about research. We believe you also have so many reasons to love Research! Can you think of one? Do you know anything developed out of **Research?**

Probably none of the technologies we use everyday (tea maker or telephones, laptops) could have been developed without Research ;-)

But what does it mean to be a Researcher? Put on your Detective hat and let's try on this role! Just like a **Detective, a Researcher** collects evidence for a problem.

So, if you see this questionnaire that means you are l in thousands of students in Luxembourg selected to provide **Researchista** with evidence, how amazing is that :-D

This is a special survey in which we measure the knowledge before and after playing a board game, called the **Mobility Era Game.** Your evidence and experience will tell us how useful this game is and how much it helps you and your teacher to advance at school and hopefully, in life!

So, if you want to play **Sherlock Holmes** or be as intelligent as **Mrs. Marple** today, complete this form and remember that Researchista has your best interests at heart. We made this game inspired from a PhD thesis on Luxembourg and I would love to share with you the complex knowledge we gained from Research all zipped in l colourful game for you to play.

With love for Research(ers), Researchista

**This project* is *a donation of the Institute of the European Investment Bank.*

Just as for the survey you completed before playing the game, your participation in this survey is voluntary and you can stop anytime you like, without any negative consequences. No personal data is collected, so your participation is completely anonymous (no one will know what you answered). Please use the code your teacher provided you with for the first survey, so your answers in both survey parts can be linked without knowing who you are.

Dies ist eine anonyme Umfrage.

In den Umfrageantworten werden keine persönlichen Informationen über Sie gespeichert, es sei denn, in einer Frage wird explizit danach gefragt.

Wenn Sie für diese Umfrage einen Zugangscode benutzt haben, so können Sie sicher sein, dass der Zugangsschlüssel nicht zusammen mit den Daten abgespeichert wurde. Er wird in einer getrennten Tabelle aufbewahrt und nur aktualisiert, um zu speichern, ob Sie diese Umfrage abgeschlossen haben oder nicht. Es gibt keinen Weg, die Zugangscodes mit den Umfrageergebnissen zusammenzuführen.



Pre-Playing Mobility Era Game Form (17 questions), header.



POST-GAME FORM:2

Dear Player, How did it go?

I hope your **Detective** and **Researcher** hat helped you observe your own answers and reaction while playing the Mobility Era Game and also the reactions and insights of your team members!

How new or different was what you experienced in the game? **The more specific, exact and sincere you are the better it is for our Research. Thank you!**

With love for Research(ers),

Researchista

Just as for the survey you completed before playing the game, your participation in this survey is voluntary and you can stop anytime you like, without any negative consequences. No personal data is collected, so your participation is completely anonymous (no one will know what you answered).
Please use the code your teacher provided you with for the first survey, so your answers in both survey parts can be linked without knowing who you

are.

Il y a 17 questions dans ce questionnaire.

Ce questionnaire est anonyme.

L'enregistrement de vos réponses à ce questionnaire ne contient aucune information permettant de vous identifier, à moins que l'une des questions ne vous le demande explicitement.

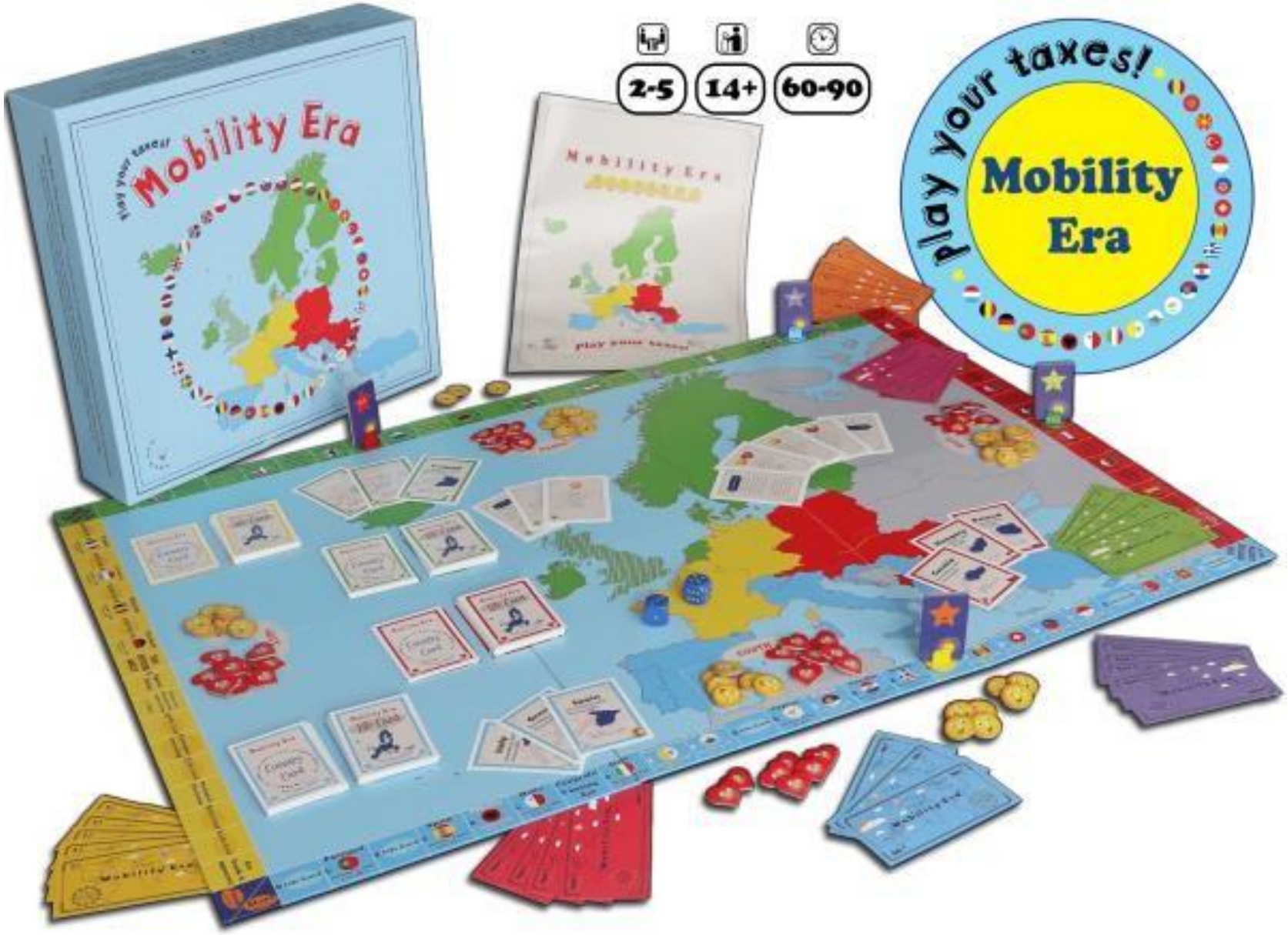
Si vous avez utilisé un code pour accéder à ce questionnaire, soyez assuré qu'aucune information concernant ce code ne peut être enregistrée avec vos réponses. Il est géré sur une base séparée où il sera uniquement indiqué que vous avez (ou non) finalisé ce questionnaire. Il n'existe pas de moyen pour faire correspondre votre code d'accès avec vos réponses à ce questionnaire.

*Si vous avez lu et compris les informations ci-dessus et que vous souhaitez participer à cette enquête, veuillez sélectionner « J'accepte ». Dans le cas contraire, veuillez sélectionner « Je ne suis pas d'accord ».

Veuillez sélectionner une réponse ci-dessous.

- ○ J'accepte.
- ○ Je ne suis pas d'accord.

Annex 2. Mobility Era Game (Edition 1).



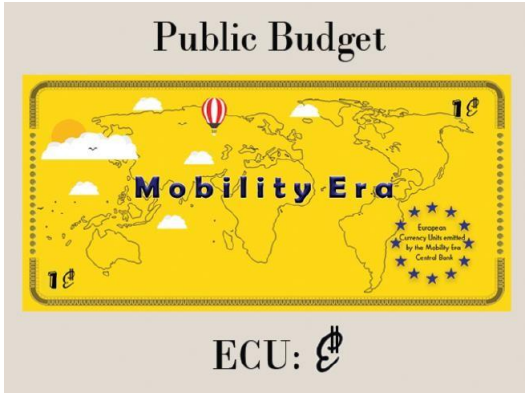
Annex 3. The elements of the[7] of the Mobility Era Game (Edition 1): board, tokens,



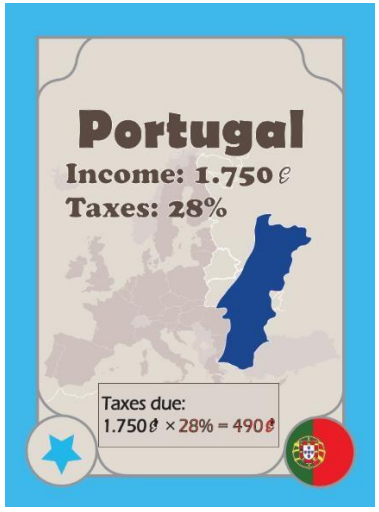
[7] The board contains a blind map without country names that the players have to guess each turn. To win everytime when throwing the dice, a player needs to guess 2 out of 3 components: a) the location of the country on the map b) the currency of the country and/or c) language spoken.

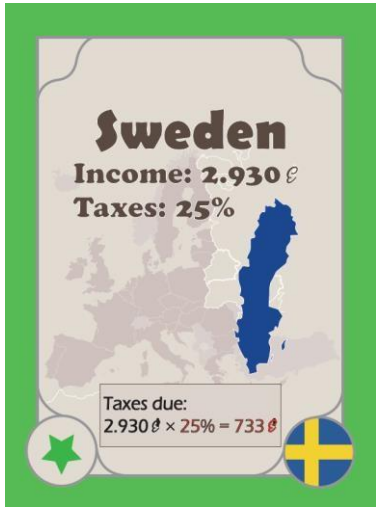
Start
Life Card
Portugal
Life Card
Spain
Albania
Malta
Congrats! Voting Age
Italy
Vatican City
San Marino
Life Card
Cyprus
Serbia
Croatia
Greece
Life Card
Andorra
Switzerland
Liechtenstein
Monaco
Life Card
Turkey
N. Macedonia
Entrepreneurship
TAX OFFICE SOUTH
Montenegro
Life Card
Romania
Life Card
Bulgaria
Life Card
Referendum
Austria
Tax Fraud
Slovakia
Go to Tax Fraud
Slovenia
Hungary
Entrepreneurship
Croatia
Poland
Life Card
TAX OFFICE EAST
Britery Case
Norway
Tax Haven
Iceland
Life Card
Ireland
Life Card
U.K.
National Elections
Netherlands
Life Card
Latvia
Life Card
Lithuania
Entrepreneurship
Estonia
Tax Fraud
Finland
Go to Tax Office East
Denmark
Life Card
EU Elections
Sweden
Life Card
TAX OFFICE NORTH
Go back 2 squares
Life Card
Life Card
Life Card
Entrepreneurship
National Elections
Life Card
Speculation
Return on Chance tile, name them 2 Hap
TAX OFFICE WEST
Germany
Life Card
Belgium
Life Card
Luxembourg
Life Card
France
Life Card
Finish
NORTH
Hap
Hep
WEST
Hap
Hep
EAST
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Hep
SOUTH
Hap
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Mobility Era
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Country Card

Bancnotes from 1 to 1.000 EKUs

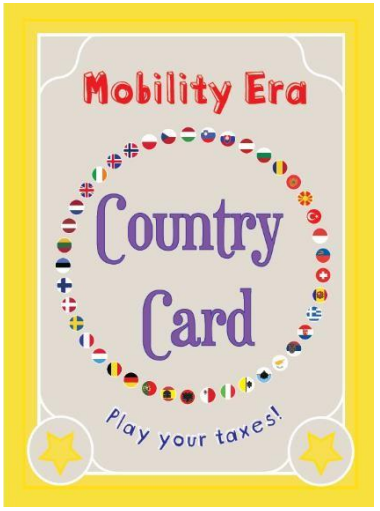


A. Gross and netto personal income
B. Personal Income Tax










TAX REFUND
Your employer deducted too much withholding tax from your wage and you receive a refund from the Public Budget.
+700€


TAX ALLOWANCE
You isolated the roof of your house and in addition to enjoying the healthier atmosphere, you receive a tax allowance.
+1HeP
+300€


Sorry!
Due to the recent crisis in your company you are made redundant with a golden handshake.
-1HeP
-1HaP
+3.000€


CARBON TAX
You drove more than 40.000 km in the past year. Pay your Carbon Tax please.
-350€


CHILD BENEFIT
You have twins and you receive a higher child benefit.
+450€


Sorry!
Due to the recent crisis in your company you are made redundant with a golden handshake.
-1HeP
-1HaP
+3.000€



VAT TAX

You bought a new washing machine and have to pay value added tax (VAT) on it.

-45₿



TAX CREDIT

You have 3 children and you **will** receive a tax credit of 600₿ **when** you pass through TAX OFFICE EAST.

Keep this card till then.

INVESTORS' FAIR

Today is D-day for investors. Move your token (back or forth) to the investment square of the colour you are on (red side of the board).

All players have the opportunity to invest in their business at the same conditions corresponding to this colour.



Congratulations!

Due to a surplus accumulated in the Public Budget, the government launched a new policy for health care that will bring elderly advantages in the long term.

+1HeP



Congratulations!

Collect one more salary of the last country where you worked. This is your 13th month!

+1HaP



Congratulations!

One of your investments was very successful and you earn a capital gain of:

+2.500₿

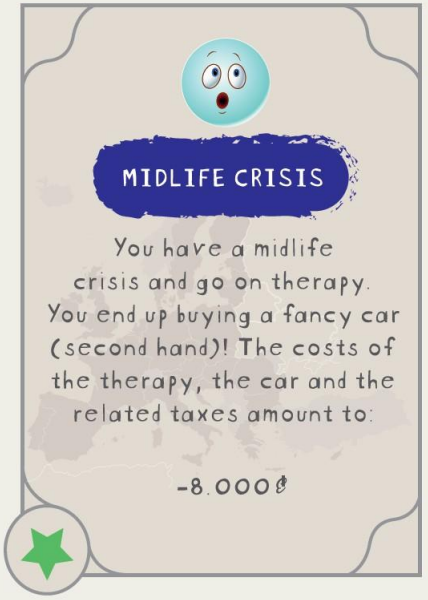


Congratulations!*

After your retirement (at 65), your former employer needs your help and guidance. You get paid for your consultancy.

+1.000€

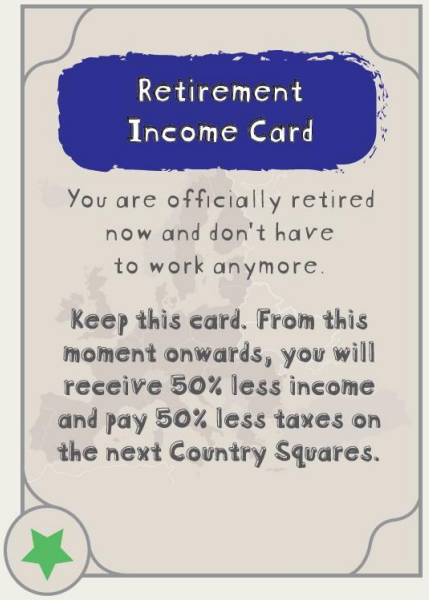
*First, check your age on the board. If you are younger than 65, move to the next square.



MIDLIFE CRISIS

You have a midlife crisis and go on therapy. You end up buying a fancy car (second hand)! The costs of the therapy, the car and the related taxes amount to:

-8.000€



Retirement Income Card

You are officially retired now and don't have to work anymore.

Keep this card. From this moment onwards, you will receive 50% less income and pay 50% less taxes on the next Country Squares.



Sorry!

You stopped doing sports for a while and your body feels aging, weakening and stiff.

-1HeP



WEALTH TAX

You have been accumulating savings and you are charged wealth tax.

Count all the ECU banknotes in your possession and pay 5% of the total to the Public Budget.



CARBON TAX

You drove more than 40.000 km in the past year, pay your Carbon Tax please.

-900€



Big pay day!

You are paid out once again the wages and salaries for all the Country Cards that you own!

Fiscal notification:
This will not affect your taxes due, because taxes are only levied on one round of income at a time.



Well...

Your daughter broke up with her boyfriend and comes back to live at home with you. Does this make you sad or happy?

Roll one die. If you roll an even number, get 1Hap. If you roll an odd number, give 1HaP back.



Sorry!

You need a tooth implant and your health insurance does not cover the cost.

-1.500€



Sorry!

You have a hip operation at the hospital and have to pay extra money on your insurance.

Speedy recovery!

-1HeP
-750€

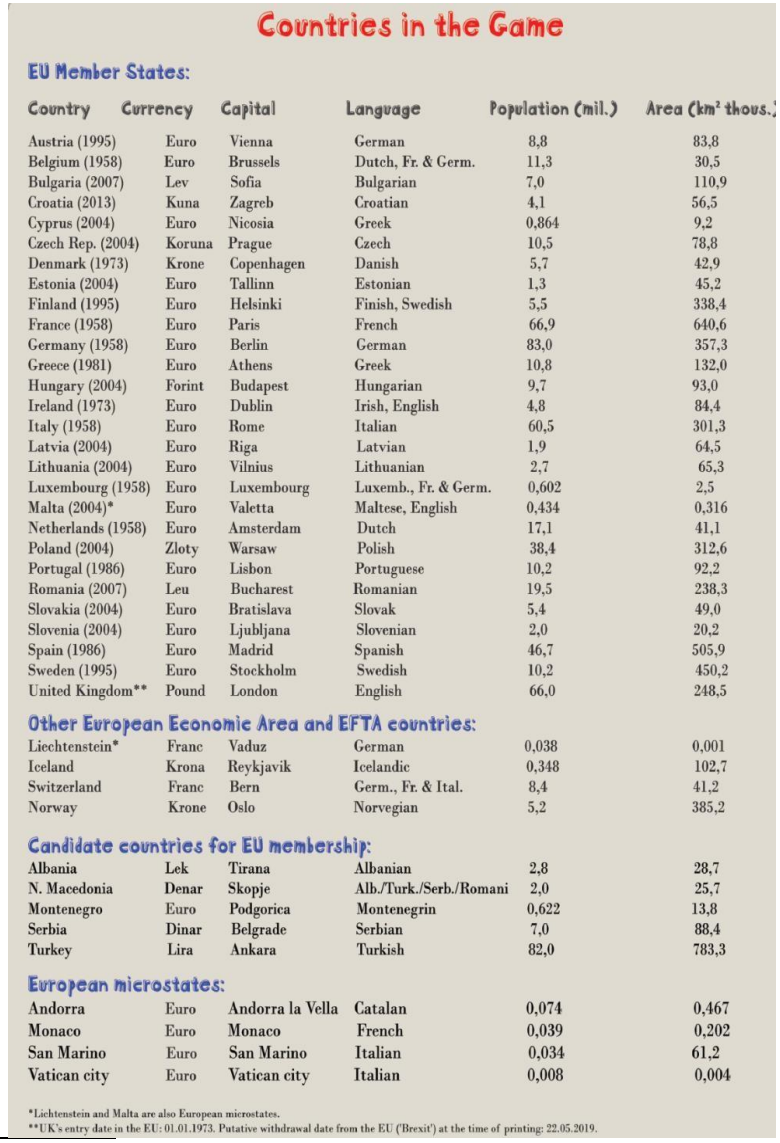


PENSION ALLOWANCE

Collect your pension allowance:

+900€

List of countries in the game



Countries in the Game

EU Member States:

Country	Currency	Capital	Language	Population (mil.)	Area (km² thous.)
Austria (1995)	Euro	Vienna	German	8,8	83,8
Belgium (1958)	Euro	Brussels	Dutch, Fr. & Germ.	11,3	30,5
Bulgaria (2007)	Lev	Sofia	Bulgarian	7,0	110,9
Croatia (2013)	Kuna	Zagreb	Croatian	4,1	56,5
Cyprus (2004)	Euro	Nicosia	Greek	0,864	9,2
Czech Rep. (2004)	Koruna	Prague	Czech	10,5	78,8
Denmark (1973)	Krone	Copenhagen	Danish	5,7	42,9
Estonia (2004)	Euro	Tallinn	Estonian	1,3	45,2
Finland (1995)	Euro	Helsinki	Finish, Swedish	5,5	338,4
France (1958)	Euro	Paris	French	66,9	640,6
Germany (1958)	Euro	Berlin	German	83,0	357,3
Greece (1981)	Euro	Athens	Greek	10,8	132,0
Hungary (2004)	Forint	Budapest	Hungarian	9,7	93,0
Ireland (1973)	Euro	Dublin	Irish, English	4,8	84,4
Italy (1958)	Euro	Rome	Italian	60,5	301,3
Latvia (2004)	Euro	Riga	Latvian	1,9	64,5
Lithuania (2004)	Euro	Vilnius	Lithuanian	2,7	65,3
Luxembourg (1958)	Euro	Luxembourg	Luxemb., Fr. & Germ.	0,602	2,5
Malta (2004)*	Euro	Valetta	Maltese, English	0,434	0,316
Netherlands (1958)	Euro	Amsterdam	Dutch	17,1	41,1
Poland (2004)	Zloty	Warsaw	Polish	38,4	312,6
Portugal (1986)	Euro	Lisbon	Portuguese	10,2	92,2
Romania (2007)	Leu	Bucharest	Romanian	19,5	238,3
Slovakia (2004)	Euro	Bratislava	Slovak	5,4	49,0
Slovenia (2004)	Euro	Ljubljana	Slovenian	2,0	20,2
Spain (1986)	Euro	Madrid	Spanish	46,7	505,9
Sweden (1995)	Euro	Stockholm	Swedish	10,2	450,2
United Kingdom**	Pound	London	English	66,0	248,5

Other European Economic Area and EFTA countries:

Liechtenstein*	Franc	Vaduz	German	0,038	0,001
Iceland	Krona	Reykjavik	Icelandic	0,348	102,7
Switzerland	Franc	Bern	Germ., Fr. & Ital.	8,4	41,2
Norway	Krone	Oslo	Norvegian	5,2	385,2

Candidate countries for EU membership:

Albania	Lek	Tirana	Albanian	2,8	28,7
N. Macedonia	Denar	Skopje	Alb./Turk./Serb./Romani	2,0	25,7
Montenegro	Euro	Podgorica	Montenegrin	0,622	13,8
Serbia	Dinar	Belgrade	Serbian	7,0	88,4
Turkey	Lira	Ankara	Turkish	82,0	783,3

European microstates:

Andorra	Euro	Andorra la Vella	Catalan	0,074	0,467
Monaco	Euro	Monaco	French	0,039	0,202
San Marino	Euro	San Marino	Italian	0,034	61,2
Vatican city	Euro	Vatican city	Italian	0,008	0,004

*Lichtenstein and Malta are also European microstates.
**UK's entry date in the EU: 01.01.1973. Putative withdrawal date from the EU ('Brexit') at the time of printing: 22.05.2019.

needs to guess 2 out of 3 components: a) the location of the country on the map b) the currency of the country and/or c) language spoken.

Annex 4. Types of Games that are used for Educational Purposes.

TYPES OF GAMES

There are numerous types of games, each falling into various categories based on their rules, objectives, and gameplay styles. Here are some of the main types of games:

1. **Board Games:** Played on a physical board or surface, these games often involve moving pieces, strategy, and competition. Examples include Chess, Monopoly, and Scrabble.
2. **Card Games:** Played with a standard deck of cards or specialized card sets. Popular card games include Poker, Bridge, Solitaire, and Uno.
3. **Video Games:** Electronic games played on gaming consoles, computers, or mobile devices. They can be further categorized into various genres, such as action, adventure, puzzle, and role-playing games.
4. **Puzzle Games:** Focus on problem-solving and mental challenges. Examples include Sudoku, crosswords, jigsaw puzzles, and video games like Tetris.
5. **Educational Games:** Designed to teach or reinforce specific knowledge or skills. Educational games can cover a wide range of subjects, from mathematics to language learning.
6. **Role-Playing Games (RPGs):** Players assume the roles of characters in fictional settings and engage in adventures. Tabletop RPGs like Dungeons & Dragons and video game RPGs like Final Fantasy fall into this category.
7. **Sports:** Physical games involving physical exertion or skill. Common sports include soccer, basketball, tennis, and swimming.
8. **Strategy Games:** Emphasize decision-making and planning. Strategy games can be board games like Risk or video games like Civilization.
9. **Card Collecting Games (CCGs):** Players collect and build decks of cards and compete against each other. Magic: The Gathering and Pokémon Trading Card Game are examples.
10. **Simulation Games:** Simulate real-world activities, experiences, or systems. This category includes flight simulators, city-building games like SimCity, and life simulation games like The Sims.
11. **Adventure Games:** Focus on storytelling and exploration, often with puzzles to solve. Classic examples include the point-and-click adventure games of the '90s.
12. **Platform Games:** Require players to navigate a character through platforms and obstacles. Iconic platformers include Super Mario and Sonic the Hedgehog.
13. **Shooter Games:** Centered on combat and aiming. Shooter games can be first-person (e.g., Call of Duty) or third-person (e.g., Gears of War).
14. **Racing Games:** Revolve around racing vehicles, either on land, water, or in the air. Examples include Mario Kart and Need for Speed.
15. **Music and Rhythm Games:** Players interact with music by hitting specific cues in time with the beat. Games like Guitar Hero and Dance Dance Revolution are in this category.
16. **Party Games:** Designed for social gatherings and often encourage multiplayer participation. Games like charades, Pictionary, and Mario Party fit this category.
17. **Arcade Games:** Originally found in arcades, these games are often simple and designed for quick, high-score gameplay. Examples include Pac-Man and Space Invaders.
18. **Word Games:** Challenge players with language and vocabulary tasks. Popular word games include Scrabble, crossword puzzles, and Boggle.
19. **Boardless or Pen-and-Paper Games:** These are played with minimal or no equipment. They include games like 20 Questions, Hangman, and Tic-Tac-Toe.
20. **Party Role-Playing Games:** Games like Mafia and Werewolf involve social deduction, where players take on secret roles and work to achieve their objectives.

Webinar by Mobility Era Game

Source: Chat.openai.com

ONLINE GAMES

There are various types of online and offline games, each offering unique experiences and entertainment. Here's a broad overview of the different categories of games:

1. **Multiplayer Online Games (MOGs):** These games are played over the internet with other players from around the world. Examples include massively multiplayer online role-playing games (MMORPGs) like World of Warcraft, online shooters like Call of Duty, and multiplayer online battle arena (MOBA) games like League of Legends.
2. **Online Social Games:** Social games are typically casual games played on social networking platforms or mobile devices. They often involve interactions with friends and include games like FarmVille, Candy Crush Saga, and Words with Friends.
3. **E-Sports:** Competitive video gaming, where professional players and teams compete in various games. Popular e-sports titles include League of Legends, Dota 2, and Counter-Strike: Global Offensive.
4. **Browser Games:** These are games that can be played directly in web browsers, usually without the need to download or install anything. Examples include browser-based strategy games and idle games.
5. **Massively Multiplayer Online Games (MMOGs):** These games can support thousands of players simultaneously and are often virtual worlds where players can interact and create their own experiences. Second Life and EVE Online are examples of MMOGs.

Source: Chat.openai.com

ONLINE GAMES (2)

6. Online Card and Board Games: Digital versions of classic card and board games are available online. Examples include online poker, chess, and card games like Hearthstone.

7. Battle Royale Games: These are online multiplayer games where players compete in a last-person-standing battle. Popular examples include Fortnite, PlayerUnknown's Battlegrounds (PUBG), and Apex Legends.

8. Cooperative Online Games: These games require players to collaborate and work together to achieve objectives. Games like Among Us and Left 4 Dead fall into this category.

Webinar by Mobility Era Game

Source: Chat.openai.com

OFFLINE GAMES

1. **Tabletop Games:** Traditional board games and card games that are played in person. Examples include chess, Monopoly, Scrabble, and poker.
2. **Video Games:** Offline video games are those that are played on gaming consoles or personal computers without requiring an internet connection. This category includes single-player games, local multiplayer games, and games that can be played offline, such as The Legend of Zelda: Breath of the Wild, The Witcher 3, and Super Mario.
3. **Physical Sports:** Sports like soccer, basketball, and tennis are played offline, in physical environments, either casually or competitively.
4. **Role-Playing Games (RPGs):** These are games where players take on the roles of characters in a fictional world and embark on adventures. Offline RPGs include titles like The Elder Scrolls series, Final Fantasy, and Fallout.
5. **Card Games:** Traditional card games like poker, bridge, and solitaire can also be played offline with physical cards.
6. **Puzzle Games:** These games involve solving puzzles, challenges, and brain teasers, both in digital and physical forms. Examples include Sudoku, jigsaw puzzles, and mobile puzzle games like Monument Valley.
7. **Party Games:** These are games designed for social gatherings and typically involve a group of people playing together in person. Examples include charades, Pictionary, and board games like Apples to Apples.
8. **Educational Games:** Educational games can be played both online and offline and are designed to teach or reinforce specific knowledge or skills. Examples include math board games and language learning apps.

These categories encompass a wide range of games, catering to different interests and preferences, whether you enjoy playing online with a global community or prefer traditional offline gaming experiences.

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TYPES OF INTERVENTIONS

Incorporating elements of games into the learning process can take various forms, and educators and instructional designers have developed several approaches to enhance engagement and learning outcomes. One of the most common approaches of incorporating gamification into education are:

1. **Game-Based Learning:** This approach involves using educational games as a core part of the learning experience. These games are designed with specific learning objectives in mind and are meant to teach content or skills directly. Examples include:
   - **Educational Video Games:** Interactive digital games designed to teach specific subjects, such as math, science, or history.
   - **Simulations:** Realistic, scenario-based simulations that mimic real-world situations and require learners to make decisions and solve problems.
   - **Board Games:** Analog games designed for educational purposes, like math board games or word puzzles.
2. **Gamified Learning:** Gamification involves adding game-like elements to non-game contexts to boost motivation and engagement. Some common gamification elements include:
   - **Points and Rewards:** Awarding points or virtual currency for completing tasks or achieving milestones. Learners can then use these points to unlock rewards or receive recognition.
   - **Badges and Achievements:** Issuing digital badges or achievements for completing specific challenges or demonstrating skills. These badges can serve as symbols of accomplishment.
   - **Leaderboards:** Creating leaderboards to showcase the performance of participants, fostering competition and motivation to reach the top of the rankings.
   - **Quests and Challenges:** Presenting learners with quests or challenges to complete, which can be related to coursework or extracurricular activities.

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TYPES OF INTERVENTIONS (2)

3. Escape Room Learning: Inspired by escape room games, this approach involves setting up scenarios where learners must work together to solve puzzles and challenges related to the subject matter. It promotes teamwork, critical thinking, and problem-solving.

4. Role-Playing Games (RPGs): Using RPG elements, students take on roles and characters within a narrative. They make decisions, solve problems, and advance the story as they learn. RPGs can be used in language learning, history, and other subjects.

5. Digital Storytelling: Encouraging students to create and engage with interactive, digital stories. This approach combines narrative elements with gameplay and decision-making, making learning more immersive and creative.

6. Game-Based Assessments: Using game formats to evaluate students' knowledge and skills. This can include quiz-style games, educational trivia, or simulation-based assessments.

7. Augmented Reality (AR) and Virtual Reality (VR): Leveraging AR and VR technologies to create immersive educational experiences. Students can explore historical sites, conduct virtual experiments, or engage in immersive simulations.

8. Minecraft in Education: Using the popular game Minecraft as an educational tool, which can be adapted for subjects like geography, architecture, and problem-solving.

9. Serious Games: These are games designed specifically for educational, training, or professional development purposes. They are often used in fields like healthcare, military training, and corporate learning.

10. Competitions and Game-Style Challenges: Organizing contests or competitive activities that motivate students to apply their knowledge or skills to solve real-world problems.

Each of these approaches can be tailored to the specific educational context and subject matter, and the choice of approach should align with the learning objectives and the preferences of the learners.

Source: Chat.openai.com