

Gamifying economics teaching in secondary school: a case study of a class of 34 students

THIERRY KARSENTI

University of Montreal
Canada
thierry.karsenti@umontreal.ca

ABSTRACT

The objective of this case study was to grasp the inherent benefits of using the educational app FinEcoLab. The results underscore the many benefits for learning: the teacher reported 29 benefits and the students reported 23. This study highlights the potential of FinEcoLab for teaching students a wide range of economic and financial concepts in a playful, stimulating, meaningful, and practical context.

KEYWORDS

Education, economics, applications, game, teacher

RÉSUMÉ

Cette étude de cas visait à comprendre les avantages inhérents à l'utilisation de l'application éducative FinÉcoLab. Les résultats mettent en relief les nombreux avantages pour l'apprentissage : l'enseignant a fait état de 29 avantages et les élèves en ont mentionné 23. Cette étude souligne le potentiel de FinÉcoLab pour enseigner aux élèves un large éventail de concepts économiques et financiers de manière amusante, stimulante, pertinente et pratique.

MOTS-CLÉS

Éducation, économie, application, jeu, enseignant

INTRODUCTION

The astonishingly swift developments in social and financial systems have made it more urgent than ever to provide students with a solid grounding in economics and finance. Henceforth, all citizens will need to be financially literate in order to make sound economic and financial decisions. However, according to a study by the Organization for Economic Co-operation and Development (OECD) as part of its Financial Education Project¹, financial education and financial literacy standards need to be improved in many countries worldwide, and especially in teenagers. Worse still is the finding that although teenagers appear to be struggling to understand money matters², they are under the illusion that they are on top of the situation.

¹ <http://www.oecd.org/daf/fin/financial-education/oecdfinancialeducationprojectbackgroundandimplementation.htm>

² <http://www.oecd.org/finance/many-teenagers-struggle-to-understand-money-matters.htm>

In 2019, as we all grapple with increasingly complex financial decisions, the fear is that teenagers will think they know what they're doing, and being mistaken, suffer dire consequences. Faced with this and other concerns, governments around the world have called attention to the issue of financial literacy. In the same spirit, in fall 2017³, financial courses were reinstated in secondary five classes in the province of Québec (Canada). The stated goal was to better equip students for adulthood and entry into the workforce. The education community generally agrees on the wisdom of this decision, as it will give young adults a better idea of basic economic and financial notions as they embark on their careers. Furthermore, the benefits would be greater if hands-on learning is included in the courses. This initiative will certainly go a long way to help young adults navigate the increasingly challenging financial labyrinths that lie ahead. That is, as long as they can actually assimilate what they are taught.

Against this background, we conducted a study of classroom use of the educational game FinEcoLab (<http://www.finecolab.com>). The game is designed to help students learn diverse economic and financial concepts, but in a fun way, with simulation exercises and interactive learning environments. Students in secondary five and CEGEP (equivalent to college) classes played the game on computers or tablets.

The main study objective was to identify the inherent benefits of using the educational app FinEcoLab.

THE IMPORTANCE OF FINANCIAL LITERACY

What is the point of teaching financial literacy in secondary school? The overall objective of financial education is to provide students with the knowledge and know-how they need to make sound financial decisions. The OECD (2015) describes financial literacy as *“knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply [it] in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life”*⁴. Financial literacy has multiple benefits for everyone: not just secondary school students, but the citizens of tomorrow's global society. At the same time, as worldwide developments in technology and deregulation increasingly shape societies and impact economic, social, and education systems, financial literacy is gaining in importance. Notably, the massive invasion of digital technologies has spawned new and sophisticated digital financial methods that make financial literacy more critical than ever.

Many organizations strongly recommend that financial literacy be instituted as a mandatory secondary school subject. For example, in 2009, a study of teenagers in the United States by the Youthography organization (2009) revealed that:

- Only 28% of students felt that they knew something about financial issues and made good financial decisions
- 57% of students felt that money management and personal finances should be taught at school
- Only 38% of high school graduates felt confident that they could manage their money.

³ <http://www.education.gouv.qc.ca/salle-de-presse/communiqués-de-presse/detail/article/retour-du-cours-deduction-financiere-obligatoire-en-cinquieme-secondaire/>

⁴ <https://www.oecd-ilibrary.org/docserver/9789264281820-6-en.pdf?expires=1567691844&id=id&accname=guest&checksum=5C94D71AD658A69E7EF99B3068025242>

These results underscore a problem that seems to be growing worse with time: once they complete their secondary schooling, students must assume more—and more complex—financial responsibility. In a broader sense, their financial security and well-being will depend largely on their ability to survive in a restless financial universe.

In 2015, the OECD reminded us all that financial literacy is essential to help consumers make informed decisions about money and avoid falling victim to fraud. Since 2005, the OECD has called for the urgent need to teach financial literacy in secondary school, arguing that this form of education is *“increasingly necessary for individuals, not only to ensure their own financial well-being but also to ensure the smooth functioning of financial markets and the economy”*⁵ (OCDE, 2005, p. 180). The OECD adds that: *“Financial education can benefit consumers of all ages and income levels. For young adults just beginning their working lives, it can provide basic tools for budgeting and saving so that expenses and debt can be kept under control. Financial education can help families acquire the discipline to save for a home of their own and/or for their children’s education. It can help older workers ensure that they have enough savings for a comfortable retirement by providing them with the information and skills to make wise investment choices with both their pension plans and any individual savings plans”* (OCDE, 2005, p. 35).

The OECD’s Financial Education Project⁶ was guided by these policies. The final program objective is *“to provide alternates or ways to improve financial education and literacy standards through the development of common financial literacy principles”*⁷. With a similar goal, the American advocacy organization Partnership for 21st Century Learning (P21)⁸ calls for the “purposeful integration” of experiences that promote diverse skills, mindsets, and literacies in the 21st century compulsory school curriculum. Like the OECD, P21 believes that a range of literacies—financial, economic, commercial, and business—, deserve a legitimate place in today’s basic and cross-disciplinary competencies.

LEARNING THROUGH PLAY

The argument that play is essential for learning has been consistently backed by the research (Dewey, 1983; Piaget, 1959; Winnicott, 1975). The most recent reincarnation of play, the video game, happens to be the planet’s top cultural industry. In Canada alone, it contributed an estimated 3.7 billion dollars to the national GDP in 2017 (Entertainment Software Association of Canada, 2018). And now a new and rapidly growing category has entered the arena: the *serious game*. This latest contender in the gaming and learning field is not to be confused with regular video games. According to Alvarez (2007), regular and serious video games are positioned at opposite ends of a continuum of educational import: the more educational the game, the more serious it is. In contrast to regular games, serious games are purposefully designed to integrate educational concepts and notions (Berry, 2011). Being games, or forms of play, they are also motivating: *“The use of these gaming technologies requires that users manipulate virtual objects using electronic tools and develop an understanding of the complex systems being modeled. Generally speaking, these educational games seem to be effective in enhancing motivation and increasing student interest in subject matter”* (Annetta, 2008, p. 231).

⁵ <https://www.oecd.org/daf/fin/financial-education/improvingfinancialliteracyanalysisofissuesandpolicies.htm>

⁶ <http://www.oecd.org/finance/financial-education/oecdfinancialeducationprojectbackgroundandimplementation.htm>

⁷ Ibid.

⁸ <http://www.p21.org/>

A systematic review of empirical studies by Boyle and colleagues (2016) praises the positive impacts of serious games. The most frequently reported outcome was knowledge acquisition, and the most frequent uses of serious games were in the STEM subjects (science, technology, engineering, and math) and health courses. Squire (2003) calls them *edutainment* video games, and describes six ways in which they can serve as powerful learning tools. We retained three of these here for their coherence with the principles of FinEcoLab: 1) “*enable students to view phenomena from new perspectives,*” 2) “*observe systems behavior over time,*” and 3) “*pose hypothetical questions to a system.*” Respectively, this would enable students to 1) experience simulated situations and assume various roles in them, 2) manipulate time in order to observe vast systems (such as the solar system) in motion within a short space of time, and 3) experience “what if” situations to see what might happen.

There is abundant research evidence that gaming can provide favorable conditions for learning (Baranowski et al., 2003) and that it can have positive effects on cognitive, affective, and psychomotor skills (Shaftel, Pass, & Schnabel, 2005). An extensive literature review on the educational impacts of gaming showed that video games can increase student learning and improve skills in hand-eye coordination, problem-solving, and memory, among others (Clark, Tanner-Smith, & Killingsworth, 2016). Notably, surgeons who regularly played video games made fewer surgical errors and performed both faster and better than their counterparts (Rosser et al., 2007). In short, it has been established that video games have direct impacts on performance, both academic and professional. But it’s not quite that simple. There is still a ways to go before serious gaming is granted full educational status in the province of Québec, where, according to Boutonnet (2013), traditional transmissive and teacher-centered practices remain stubbornly persistent.

FINECOLAB

The Center for Interuniversity Research and Analysis of Organizations (CIRANO) developed the educational game FinEcoLab to give both teachers and students a fun way to work with life-like economic and financial situations, but without the real-life consequences. The game presents a comprehensive range of simulated scenarios in which the participants have to make various economic decisions (buy, sell, cooperate, save, etc.). Based on their individual choices and the consequences that ensue, the players then explore related economic and financial notions. This provides an experiential approach to the discovery of economics and finance. Instead of passively receiving information, the students are actively engaged in a computer- or tablet-assisted simulation. In other words, they get a hands-on interactive learning experience. The activities were planned to be fun yet meaningful. For example, the teacher can turn the classroom into a financial education lab in which the students assume different roles. The overall aim is to help them manage their money in real life.

The game is designed to get the students genuinely engaged so that they can grasp the basic notions of economic and financial literacy. In the province of Québec, the secondary school education system (Government of Québec, 2018) prescribes a competency called “Takes a position on a financial issue.” This competency is made up of four key features. First, “assesses the situation” refers to identifying one’s needs and constraints, examining one’s budget, and considering the socioeconomic context. Second, the student “considers the related costs, determines the risks, advantages, and disadvantages, and chooses an option.” Third, he/she “considers the legal aspects of each option,” with an emphasis on rights and responsibilities.

Finally, the student “puts his/her position in perspective” by comparing with the choices of others and recognizing the influential factors in their choices.

FinEcoLab deals with deceptively simple financial decisions that have serious repercussions down the road. It covers critical decisions such as when to buy, sell, or save. This knowledge would be invaluable one day. One highly motivating feature is that the students can see their results immediately. Another useful feature is that the teacher can use real-time simulation data to enrich classroom discussions.

When do you decide to sell stock? What’s your investment profile? What does economic altruism mean, and how does it work? FinEcoLab presents these questions and more, and gets the students to “experience” the answers. The hope is that it will help them think more carefully about day-to-day money matters. A total of 18 simulated games are provided, each dealing with essential concepts of economic and financial literacy (Table 1). The games are grouped under four main themes: the market, collective choices, individual choices, and institutions.

Table 1
The 18 FinEcoLab games

CATEGORY: THE MARKET and PRICING



Double Auction

Learn how equilibrium prices are determined in a competitive market.

Targeted competencies (economic and financial literacy): Supply – Demand – Market – Equilibrium price

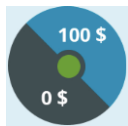


Speculative Bubble

Find out how speculative bubbles form and spike in stock markets.

Targeted competencies (economic and financial literacy): Speculative bubbles – Coordination failure and bad equilibrium – Pricing basics – Speculation

CATEGORY: INDIVIDUAL CHOICES



Lottery

Determine your risk profile.

Targeted competencies (economic and financial literacy): Risk – Risk attitude



Loss aversion

Are you risk-averse or loss-averse?

Targeted competencies (economic and financial literacy): Risk aversion – Loss aversion



Ambiguity

What’s your attitude toward uncertainty?

Targeted competencies (economic and financial literacy): Risk – Uncertainty – Uncertainty attitude



Discounts

All about consumer impatience

Targeted competencies (economic and financial literacy): Consumer impatience – Time preference

CATEGORY: INDIVIDUAL CHOICES



Insurance

How does insurance work?

Targeted competencies (economic and financial literacy): Insurance – Risk attitude



Saving

What happens when you save (or don't)?

Targeted competencies (economic and financial literacy): Precautionary saving – Disposable income – Savings – Savings rates



The World of Debt

Debt and saving decisions and their consequences

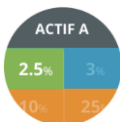
Targeted competencies (economic and financial literacy): Precautionary saving – Credit – Interest – Debt rates



Retirement

Saving for your retirement

Targeted competencies (economic and financial literacy): Retirement savings – Precautionary saving



Portfolio management

Discover the relationship between investment risk and return, and determine your investor profile.

Targeted competencies (economic and financial literacy): Return – Risk – Diversification

CATEGORY: COLLECTIVE CHOICES



Ultimatum

How your decisions affect other people

Targeted competencies (economic and financial literacy): Altruism – Conditional altruism – Inequality aversion



Dictator

Use strategic action to promote equity

Targeted competencies (economic and financial literacy): Altruism – Conditional altruism – Inequality aversion



Ultimatum with double payoffs

What are your preferences about relative income?

Targeted competencies (economic and financial literacy): Altruism – Conditional altruism – Inequality aversion



Public goods

Why public goods are funded with voluntary contributions

Targeted competencies (economic and financial literacy): Public goods – Cooperation – Stowaway – Free rider – Taxes – Taxation



Taxes

What happens when you fill out your tax returns (or do not)

Targeted competencies (economic and financial literacy): Taxes and taxation – The Canadian tax system – Tax fraud



Pollution

What happens when you meet (or ignore) the negative external cost accounting standards for production activities

Targeted competencies (economic and financial literacy): Externalities – Government regulation – The role of incentives

CATEGORY: INSTITUTIONS



Shared resources

Determine how far you'll go to exploit a resource that belongs to everyone

Targeted competencies (economic and financial literacy): The tragedy of common goods – Private ownership – Governance of shared resources

METHODOLOGY

The case study

The case study allows selecting specific cases in which the phenomena of interest are likely to manifest. We therefore used a case study design to spotlight a classroom that used the educational game FinEcoLab.

According to Eisenhardt (1989), the researcher should be less concerned about the “representativeness” of the case and primarily concerned about its quality. This frees one up to observe phenomena with a minimum of bias, as we have tried to do in this study. The case study follows a particular process: data collection, data formatting, and data analysis. The aim is to capture the complex and ever-changing nature of the phenomenological characteristics and dynamics of a particular social system (Mucchielli, 1996, p. 77). Long considered as a mere adjunct to other research designs, the case study has come into its own right. Useful in both quantitative and qualitative research, the case study allows an in-depth analysis of a specific setting according to the research aims and objectives. Despite their different epistemological positions, methods, and approaches, the main advocates of the case study (Merriam, 1988; Stake, 1995a, 1995b; Yin, 1994) agree strongly on its outstanding flexibility and scope compared to other study designs. Notably, the case study has made significant contributions to the fields of developmental psychology and education. Piaget (1936) used case studies to develop his theory of cognitive development in children, largely based on observations of his own three children, and the theory remains prominent today.

Participants

The participants comprised 34 students (18 girls, 16 boys) and their teacher in a secondary school in the Greater Montreal Area. The students were aged from 15 to 17 years (average age = 16.2 years). All students were enrolled in an optional financial literacy course. The teacher had over 25 years of experience teaching this subject. All participants were voluntary.

Data collection instruments

The following complementary data collection methods were used:

1. Videotaped observations (two 75-minute sessions)
2. Short individual interviews with students during FinEcoLab play
3. Group interviews in class
4. Analysis of computer and tablet activity during FinEcoLab sessions
5. Analysis of the FinEcoLab game.

Data treatment and analysis

Data collected from the observations, individual and group interviews, and the FinEcoLab game were subjected to qualitative content analysis (L'Écuyer, 1990; Miles & Huberman, 2003) using QDA Miner.⁹ Semi-open coding was used, based on participant responses in relation to the main research objectives. The analysis method was inspired by the approaches developed by L'Écuyer (1990) and Miles and Huberman (2003).

Methodological strengths and limitations

⁹ <http://provalisresearch.com/fr/produits/logiciel-d-analyse-qualitative/>

One of the main strengths of this study lies in the research methodology: qualitative analysis is eminently suitable for case studies. Moreover, the assessment tools, particularly videotaped observations, allow saving all the gaming traces. That said, the methods include certain limitations. First, data were gathered based on participant perceptions. We attempted to offset this limitation by using a variety of data collection instruments. To reduce the methodological bias, the analyses systematically compared responses from different types of respondents to identify divergences when applicable.

Another limitation concerns the sampling method, which was not random. Our sole objective was to represent a subsample of the target population. Why? Because in this educational context, it would have been difficult, if not impossible, to perform a random sampling of participants, especially for purposes of a case study. We opted instead for a convenience sample, or a non-probabilistic sample not intended to be representative. The aim was to work with respondents who were available, willing (voluntary), and readily interviewed.

MAIN RESULTS

This section presents the main results in relation to the research objective, which was to better understand the educational benefits of the video game FinEcoLab. We begin with the benefits as perceived by the teacher (6.1), followed by the benefits as perceived by the students (6.2).

The benefits as perceived by the teacher

The analysis results of the interviews with the teacher revealed 29 inherent benefits of the use of FinEcoLab in class. Each benefit is followed by a representative extract from the interviews.

1. **Outstanding learning support:** *“Another benefit of FinEcoLab is that it supports learning. [...] It’s designed for teachers who don’t necessarily know the program.”*
2. **Variety of activities:** *“There’s lots of activities [and] variety. That’s great for secondary school teaching.”*
3. **Allows re-using knowledge:** *“FinEcoLab lets you re-use the knowledge that they pick up during the game and apply it to new learning.”*
4. **Active learning:** *The students can move around and talk when they’re playing the games or doing simulations. [...] They’re learning actively, and they like that.”*
5. **Grasping difficult concepts:** *“The students can understand sophisticated concepts when they’ve worked with them in the game beforehand.”*
6. **A fun approach that students enjoy:** *“The students love playing it. [...] They get a kick out of FinEcoLab, because it’s fun.”*
7. **The appeal factor:** *“There’s no doubt in my mind that the students enjoy working with the technology [computer or tablet]. [...] It’s something they love to do.”*
8. **Greater autonomy:** *“The students feel freer when they’re playing the game. [...] They can make their own choices. [...] It helps them develop their autonomy, too.”*
9. **Valid content (financial literacy):** *The game is well designed. [...] The content is perfect.”*
10. **Flexible content:** *“Because there are plenty of games and simulations, it’s easy to use them for different types of lessons. [...] That’s an advantage. It means I can use the game any way I want, for whatever I’m planning. [...] It’s sort of like different learning modules for the students.”*
11. **Meaningful learning situations:** *“We can re-use the activities in meaningful situations.”*

12. **Development of social skills:** *“Although it’s not the main goal of the games, [...] they teach my students some social skills. [...] They have to learn how to listen, respect others, and work together.”*
13. **Inspires an interest in financial matters:** *“FinEcoLab [...] gets the students really curious about money matters.”*
14. **Development of critical thinking:** *“The games help the students develop critical thinking.”*
15. **Development of career-choice perspective:** *“After playing the games, many students asked me questions about their career choices. [...] The games gave them ideas about what to do when they grow up, and that’s important.”*
16. **Development of full citizenship (one day):** *“FinEcoLab helps build more well-rounded citizens [...] who know something about economics, and that’s an important skill.”*
17. **Student engagement:** *“The students get completely caught up in the simulations.”*
18. **Easy and interesting:** *“Sometimes financial games can be really complicated, so the students lose interest. [...]. But these games are easy. Anyone can play them easily. [...] It lets me concentrate on the content.”*
19. **Easier teaching:** *“Generally speaking, FinEcoLab really makes teaching easier.”*
20. **Free of charge:** *The fact that it’s free for schools and school boards [...] that’s truly awesome.”*
21. **Integration of knowledge into hands-on activities:** *“The games let you integrate knowledge into real-life situations [...] that the students will have to deal with some day.”*
22. **Increased student interaction:** *“There’s a lot, really a lot, of interaction between the students when they’re playing.”*
23. **Both girls and boys are interested:** *“I noticed that the girls like playing as much as the boys. [...] They both enjoy it [...] about the same.”*
24. **An educational game that is adaptable to course content:** *“For me, one of the main benefits of FinEcoLab is that I can adapt the content for my course.”*
25. **Greater motivation to learn:** *“For sure, one of the main benefits [...] is the students’ motivation to learn the basics of financial literacy.”*
26. **Fun to learn:** *“The students enjoy learning about money management. [...] That’s a new one for me, and I’ve been teaching a long time.”*
27. **Preparing students to manager their money:** *“The main thing is that, [...] FinEcoLab helps me prepare my students to manage their money once they grow up.”*
28. **Problem solving:** *“This educational game [...] helps the students improve their problem-solving skills.”*
29. **Students’ confidence about financial and economics notions:** *“After they complete the activities [...] the students feel more confident about their ability to understand economics and finance.”*

The benefits as perceived by the students

The analysis results also revealed 23 benefits as perceived by the students themselves. They are presented below, followed by a representative extract from the student interviews.

1. **Classroom atmosphere:** *“It’s a super positive classroom atmosphere. [...] the game, it puts us in a better mood.”*
2. **Learning from errors:** *“It lets me learn from my mistakes, [...] but also from other students’ mistakes.”*

3. **Learning theoretical concepts through the game is stimulating:** *“It’s not always very easy to understand things about economics, [...] the game makes me pay attention.”*
4. **More learning:** *“With the app, you learn a lot more.”*
5. **Active learning:** *“This way, your learning is less [...] passive, [...] this way, you’re not just listening, [...] you have to do it yourself.”*
6. **Facilitates learning:** *“When you use gaming [...] it’s easier to learn [...] and you don’t even notice it.”*
7. **Visual aspect:** *“The game has really great visuals [...] it helps me learn.”*
8. **Autonomy:** *“Me, I like the fact that you can make your own choices in this game. [...] It’s you who decides [...] You’re kind of on your own.”*
9. **More communication:** *“We talk a lot when we’re playing [...] and giving your opinion helps you learn.”*
10. **Competition that incites learning:** *“It’s a little like a contest [...] that makes you want to try and learn.”*
11. **Humor:** *“We laugh a lot when we’re playing in class. [...] It’s more fun.”*
12. **More interaction:** *“Sometimes we have debates about the results. [...] I get the feeling that everybody has something to say. [...] It’s interesting.”*
13. **Interest in financial literacy:** *“Before, I wasn’t into finance, [...] and I didn’t know much about it. [...] Now, I’ve gotten a taste for it.”*
14. **Greater motivation:** *“I’m sure that this system really motivates us to learn.”*
15. **Increased knowledge:** *“I’ve learned more about myself. [...] I had no idea that I was like that.”*
16. **Potential benefits for adult life:** *“It’s a game that helps you get by in real life, [...] not just a school game.” “I find that it’s really useful for real life. [...] We learn about things that we can use some day.”*
17. **More enjoyment at school:** *“When we have economics class, [...] I feel more like coming to school. [...] When it’s more fun, you learn better than when it’s just using the workbooks.”*
18. **Practical:** *“It’s like you’re learning “practical” things for your life. [...] It’s real.”*
19. **Decision making:** *“It forces you to make decisions. [...] It’s not always easy, [...] but I’m learning something.”*
20. **Awareness of progress:** *“I can see my progress compared to the other students. [...] I’m aware of my progress.”*
21. **Reassurance:** *“It gives you some idea of what real life is all about. It’s reassuring.”*
22. **Greater retention:** *“With the game, you remember what you’ve learned [...] a lot better.”*
23. **Simulation facilitates learning:** *“The gaming scenarios [...] they’re life-like, [...] It helps you learn.”*

CONCLUSION

The results of this case study show that educational gaming is beneficial for learning in many ways: the teacher reported 29 benefits and the students reported 23. The students also pointed out that the game improved their self-understanding, which is one of the aims of the Québec education system. The most compelling finding is that the students and their teacher felt that the game helped them learn a wide range of financial literacy concepts by presenting them in a context that was fun,

stimulating, meaningful, and practical. FinEcoLab is an active learning experience that puts abstract ideas into concrete form. Consequently, the students found it easier to grasp sophisticated economic and financial concepts. The observations of the FinEcoLab gaming sessions bore witness to the students' keen interest in the learning experience. It is worth reminding educators that the game is free of charge. This is an undeniable asset, given the reality of 21st century school budgets. In conclusion, the game is free, stimulating, and engaging for both teachers and students. In short, simulate to stimulate!

REFERENCES

- Alvarez, J. (2007). *Du jeu vidéo au serious game. Approches culturelle, pragmatique et formelle*. Thèse de doctorat, Toulouse, France: Universités Toulouse 2 & 3.
- Annetta, L. A. (2008). Video Games in Education: Why they should be used and how they are being used. *Theory into Practice*, 47(3), 229-239.
- Baranowski, T., Baranowski, J., Cullen, K. W., Marsh, T., Islam, N., Zakeri, I., & Demoor, C. (2003). Squire's Quest!: Dietary outcome evaluation of a multimedia game. *American Journal of Preventive Medicine*, 24(1), 52-61.
- Berry, V. (2011). Jouer pour apprendre: est-ce bien sérieux? Réflexions théoriques sur les relations entre jeu (vidéo) et apprentissage. *La Revue Canadienne de l'Apprentissage et de la Technologie*, 37(2). Retrieved from <https://www.learntechlib.org/j/CJLT/v/37/n/2/>.
- Boutonnet, V. (2013). *Les ressources didactiques : Typologie d'usages en lien avec la méthode historique et l'intervention éducative d'enseignants d'histoire au secondaire*. Montréal, Canada: Université de Montréal. Retrieved from <https://papyrus.bib.umontreal.ca/xmlui/handle/1866/10105>.
- Boyle, E. A., Hainey, T., Connolly, T. M., Gray, G., Earp, J., Ott, M.,..... & Pereira, J. (2016). An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games. *Computers & Education*, 94, 178-192.
- Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2016). Digital games, design, and learning: A systematic review and meta-analysis. *Review of Educational Research*, 86(1), 79-122.
- Dewey, J. (1983). *Démocratie et éducation: Introduction à la philosophie de l'éducation*. Lausanne: L'Age d'homme.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Entertainment Software Association of Canada. (2018). *Faits essentiels sur le secteur canadien du jeu vidéo*. Canada: Association canadienne du logiciel de divertissement.
- Government of Québec (2018). *Programme de formation de l'école québécoise (enseignement secondaire): Éducation financière, cinquième secondaire*. Québec, Canada: Gouvernement du Québec. Retrieved from http://www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_education-financiere_2018.PDF.
- L'Écuyer, R. (1990). *Méthodologie de l'analyse développementale de contenu: Méthode GPS et concept de soi*. Québec, Canada: Presses de l'Université du Québec.
- Merriam, S. B. (1988). *Case study in education: A qualitative approach*. San Francisco, CA: Jossey-Bass.

- Miles, M. B., & Huberman, A. M. (2003). *Analyse des données qualitatives*. Paris: De Boeck Supérieur.
- Mucchielli, R. (1996). *L'observation psychologique et psychosociologique*. Paris: Esf Éditeur.
- OCDE. (2005). *Pour de meilleures compétences financières: principes, programmes et bonnes pratiques*. Paris: OCDE.
- OECD. (2015). *National strategies for financial education: OECD/INFE Policy Handbook*. Paris: OCDE.
- Piaget, J. (1936). *The origins of intelligence in children*. New York: Internat. Univer. Press.
- Piaget, J. (1959). *La formation du symbole chez l'enfant - imitation, jeu et rêve - image et représentation*. (2^e éd.). Suisse: Delachaux et Niestlé.
- Rosser, J. C., Lynch, P. J., Cuddihy, L., Gentile, D. A., Klonsky, J., & Merrell, R. (2007). The Impact of Video Games on Training Surgeons in the 21st Century. *Archives of Surgery*, 142(2), 181-186.
- Shaftel, J., Pass, L., & Schnabel, S. (2005). Math Games for adolescents. *TEACHING Exceptional Children*, 37(3), 25-30.
- Squire, K. (2003). Video Games in Education. *Computers in Entertainment*, 2(1), 49-62.
- Stake, R. E. (1995a). Case study: Composition and performance. *Bulletin of the Council for Research in Music Education*, 122, 31-44.
- Stake, R. E. (1995b). *The art of case study research*. Californie, États-Unis: Sage Publications.
- Winnicott, D. W. (1975). *Jeu et réalité : L'espace potentiel*. Paris, France: Gallimard.
- Yin, R. K. (1994). Discovering the future of the case study. Method in evaluation research. *Evaluation Practice*, 15(3), 283-290.
- Youthography. (2009). *Youth Financial Literacy Landscape*. Retrieved from <http://www.getsmarteraboutmoney.ca/Investor-research/Documents/ief-youthfinancial-literacy-landscape.pdf>.