

# Building the bridge between kids and financial literacy: The Gamification of Learning

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## Introduction

Financial literacy is the knowledge, skillset, and attitude an individual has that allows him to adopt good money-management practices useful for earning, spending, saving, borrowing, and investing. It is the ability to understand the basic principles of business and finance. Therefore, there is a need for people to understand how the financial system works and how it can be beneficial for them. Studies conducted by Sandra J. Huston and her research team at Texas University looked at seventy-one individual studies drawn from 52 data sets with the majority of sample size being students, with findings showing that the majority of the participants, including entrepreneurs and investors, do not understand what financial literacy means. The study also shows that people have made significant financial decisions without having all the required information to justify it. They rarely set time aside to actively seek knowledge of finance management beyond what they already possess. Research has also found that the majority of the educated people lack the most crucial financial information, including management of their money, efficient management of their bank accounts, and the ability to shape a secure future like their retirement plans<sup>1</sup>.

## Literature review

The authors of the "International Journal of Educational Technology in Higher Education" have identified a growing number of studies reporting empirical evidence for the effectiveness of gamification in an educational context. "Gamification has been used in educational environments and instructional practices by individual instructors to enhance student engagement and motivation through the employment of game design elements outside of a fully-fledged game." Gamification tries to infuse the excitement and fun of

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<sup>1</sup>. Huston, Sandra J. "Measuring financial literacy." *Journal of Consumer Affairs* 44, no. 2 (2010): 296-316.

games to non-game activities. According to the world government summit report by WGS which is a worldwide stage committed to molding the future of governments around the world, none of the schools have officially rolled out a class solely based on gamification, whereas some of these schools are incorporating game-based concepts in the form of activities and courses. Hence, the approach of having a gamified learning experience can be an exciting way for learners to get engaged in the education system and be motivated to learn<sup>2</sup>. Gamification is a method of using game design principles to encourage engagement in different tasks. Many games like Nike + Run Club promote cooperation, communication, competition, and incentives to drive action towards winning rewards. In most cases, rewards are in the form of badges, payments, virtual money, discount coupons, and gift cards. Also, there is a status indicating elements such as friend count, profile retweets, achievement satisfaction, leader boards, progress bars, and level-up abilities. Gamification also significantly enhances the experience children have in doing basic tasks at a very early age<sup>3</sup>. Kevin Akeroyd, senior vice president of field operations for Badgeville, a silicon valley based pioneer in gamification technology, said that “it is the use of the mechanics and dynamics of psychology, which makes games very engaging, sticky, and addictive.”

Since the term gamification was coined back in 2002, games have been used to promote purchasing ability by introducing in-game elements that can be purchased by real money to either customize the character or to unlock new in-game features. The term researchers use for this is 'Behavior management.' The elements like the reward system and level-up abilities are what make games very compelling and addictive. Sometimes, gamification is used on online platforms, increasingly due to its immersiveness as it can generate immediate feedback. The competitiveness within various players and the rewards followed later makes the activity even more exciting. Multiple companies such as Starbucks, Nike, and The US Army have started using these elements as part of their marketing strategies. “Business spending on gamification will increase from an estimated \$242 million this year to \$2.8 billion in 2016” (Snider 2012). These strategies reflect how

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<sup>2</sup>.Squire, Kurt. "Video games and learning." *Teaching and participatory culture in the digital age* (2011).

<sup>3</sup>. Broer, Jan, and Jens Poepplbuss. "Gamification-a new phenomenon in information systems research?." In *24th Australasian Conference on Information Systems (ACIS)*, pp. 1-13. RMIT University, 2013.

gamification is being used to not only enhance the user experience but also to create a sense of engagement. A recent study published by the MIS Quarterly mentions that digital games can be integrated “within organizational activities as components, with the anticipation that they can improve employees’ motivation and performance.”

Substantial evidence on the benefits of gamification in education has been collected through gamification workshops conducted by Lisa-Maria Putz and Horst Treiblmaier with 384 student participants. These workshops have shown that the aspect of game-based learning helps learners to retain what they have been taught in the short term, but not necessarily in the long term. Yet the majority of the schools have not incorporated it into their educational system. This is due to the financial constraints and the compulsion of schools to follow a certain curriculum. Hence, schools haven't taken gamified education development as a priority. Some instructors have come up with ideas that can help in the implementation of a game-based learning approach, such as creating a partnership between the public and the private sectors. This is because the concept is set to benefit both the sectors<sup>4</sup>.

Gamification has been considered to benefit the gaining of knowledge about financial literacy. It can help people to achieve their financial goals as well as become self-sufficient. This can be done in various ways, like saving money, managing the expenditure under a budget, understanding the difference between the needs and the wants, paying for college, or even saving money to buy a house<sup>5</sup>. Financial literacy is critical for kids to have a realistic approach to successfully navigate their daily lives as they make significant financial decisions. Financial literacy, through the aspect of gamification, empowers people. It is always a disadvantage for people who lack financial literacy when they encounter situations that have anything to do with credits, investments, or interest rates; they get too intimidated<sup>6</sup>.

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<sup>4</sup>. Perrotta, Carlo, Gill Featherstone, Helen Aston, and Emily Houghton. "Game-based learning: Latest evidence and future directions." *NFER Research Programme: Innovation in Education*. Slough: NFER (2013).

<sup>5</sup>. Ethel, Séverine, and Eric Jamet. "Digital game-based learning: Impact of instructions and feedback on motivation and learning effectiveness." *Computers & Education* 67 (2013): 156-167.

<sup>6</sup>. Hastings, Justine S., Brigitte C. Madrian, and William L. Skimmyhorn. "Financial literacy, financial education, and economic outcomes." *Annu. Rev. Econ.* 5, no. 1 (2013): 347-373.

Using a gamified approach in financial literacy may help students remember what they have learned, which may drive them to make positive financial decisions. A 2014 report from the Federal Reserve found that students that were exposed to personal finance education had credit scores that were 7 to 29 points higher than those of students who did not have such classes.<sup>7</sup> According to the “Survey of the States “, researchers have claimed that by the age of 12, most of the learners develop an economic understanding that the researchers have described as "essentially adult."<sup>8</sup> By using the game-based approach to teach them financial literacy before they become adults, we can encourage young people to engage in activities such as fostering family conversations about finances or saving money. Apart from this, it can also empower the children to be stewards in their financial future.

There are some organizations such as The MassMutual foundation which focuses on equipping the youth with financial skills where they are able to achieve those outcomes through a game-based learning approach. These companies look for what in the current generation is more appealing to its residents and its relationship to the financial capabilities of these states. For the current generation, commonly referred to as Gen-Z, many opportunities can be utilized to ensure that they learn about financial literacy to their utmost capabilities<sup>9</sup>. A game-based approach is an approach that involves videos, animations, avatars, and digital gaming. These concepts are being used in bringing the aspect of financial concepts of life for the younger generation.

Gamification is being used to make the most out of all financial literacy opportunities. As mentioned in “Parenting and its Effects on Children” by Eleanor E. Maccoby, Parents largely influence the behavior and the attitude of their children towards handling finance. It is crucial to expose children to money and smart financial decisions from a young age. Finding time for

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<sup>7</sup>. Nova, Annie. "Financial Education Stalls, Threatening Kids' Future Economic Health." CNBC. Last modified February 8, 2018. <https://www.cnbc.com/2018/02/08/financial-education-stalls-threatening-kids-future-economic-health.html>.

<sup>8</sup>. Nova, Annie. "Financial Education Stalls, Threatening Kids' Future Economic Health." CNBC. Last modified February 8, 2018. <https://www.cnbc.com/2018/02/08/financial-education-stalls-threatening-kids-future-economic-health.html>.

<sup>9</sup>. "Gen Z Takeover: How Colleges Are Using Gamification to Engage Students." Education Dive. Last modified March 5, 2019. <https://www.educationdive.com/news/gen-z-takeover-how-colleges-are-using-gamification-to-engage-students/549722/>.

financial education can be challenging for parents in some cases<sup>10</sup>. However, children find time to play digital games. Hence, one of the best ways of ensuring that children are exposed to money and making financial decisions at an early age is by using the game-based approach to teach them. This might help them understand the concepts better since the aspect of financial literacy could be infused in something they can easily relate to.

### Analysis

#### America's growing Financial illiteracy problem.

Statistics according to the "Standard & Poor's Global Financial Literacy Survey" have shown that the majority of Americans do not have the financial expertise that is required for them to make monetary judgments in both short and long runs<sup>11</sup>. These statistics have shown a worrisome trend, which is a wakeup call for policymakers to change the education system and ensure that the people become financially literate. Results of the 2015 Standard & Poor's Global Financial Literacy Survey showed that the majority of Americans are financially illiterate. Even though the United States has one of the largest economies in the world, the country still comes 14<sup>th</sup> for its financial literacy awareness programs. After the survey of adults who were considered financially literate, it was found that only around 57 percent of the entire population have knowledge of financial concepts<sup>12</sup>. The United States had a tie with Botswana and was above it by just a small margin even though Botswana has an economy that is 1,127 percent smaller than the economy of the United States.

A time when Americans are conscious about their financial situation, studies conducted reveal that only 37 percent of Americans above the age of 50 years can answer questions about risk diversification, compound

<sup>10</sup> Caponetto, Ilaria, Jeffrey Earp, and Michela Ott. "Gamification and education: A literature review." In *European Conference on Games Based Learning*, vol. 1, p. 50. Academic Conferences International Limited, 2014.

<sup>11</sup> "Americans Fall Short in Financial Literacy." *The Tennessean*. Last modified April 15, 2019. <https://www.tennessean.com/story/money/2019/04/15/americans-fall-short-financial-literacy/3456766002/>.

interest, and inflation<sup>12</sup>. The financial literacy survey was then extended to high school students, and their results were consistent with those of the adults. The young generation of Americans is not equipped with the required financial information to aid them in making effective financial choices. Approximately 45 percent were categorized as being just barely financially literate. Also, 65 percent of all those who have graduate degrees have rudimentary financial skills as compared to high school graduates and add up to only 19 percent of the entire population. The study also showed that approximately 47 percent of Americans are not aware of their lack of knowledge of financial literacy<sup>13</sup>. This was consistent with the fact that 47 percent of Americans do not have any savings. This only concludes with the major financial concerns that are faced by the majority of Americans such as loans and debts with higher interest rates.<sup>14</sup>

Financial advisors have stated that this trend is unsettling because this percentage was a drop from 42 percent back in 2009. According to a survey conducted by InvestmentNews, approximately 78 percent of the financial advisors within the country say that the burden of financial illiteracy is a growing concern and should be addressed before it becomes too late to reverse the effects of it. However, the research also showed that very few people are making efforts to address the lack of financial knowledge in the country. It is seen that only four out of every ten financial advisors are making efforts to address the problem.<sup>15</sup>

Another study conducted showed that there are many Americans who fall prey to high-interest rates and predatory subprime mortgage fraud, which could potentially lead to huge debts, bad credit ratings and even foreclosures on properties. An excellent price reduction in housing caused the subprime mortgage crisis in the United States. This then led to the devaluation as well as the foreclosure of financial securities that were housing-related. This was the cause of the United States financial recession, which occurred from 2008

<sup>12</sup>. "How Gen Z Thinks About Finances and How You Can Help." CUInsight. Last modified August 17, 2018. <https://www.cuinsight.com/how-gen-z-thinks-about-finances-and-how-you-can-help.html>.

<sup>13</sup>. Pascarella, Dani. "4 Stats That Reveal How Badly America Is Failing At Financial Literacy." Forbes. Last modified April 9, 2018.

<sup>14</sup>. Lusardi, Annamaria. *Numeracy, financial literacy, and financial decision-making*. No. w17821. National Bureau of Economic Research, 2012.

<sup>15</sup>. "Financial Literacy and Education Commission." Front Page | U.S. Department of the Treasury. Accessed November 28, 2019. <https://home.treasury.gov/policy-issues/consumer-policy/financial-literacy-and-education-commission>.

to mid-2009<sup>16</sup>. The massive decline in the pricing of houses and the ever-increasing household debt led to a reduction in household spending as well as investments. The housing impacted the average as well as the low-income earning households due to the massive debts they were left with due to the housing bubble which was primarily financed by securities whose collateral was mortgaged<sup>17</sup>.

Despite the challenges that Americans face in their financial lives, the government has noticed this problem and has implemented several measures to rectify the situation. Some of the solutions to the financial illiteracy problem include the creation of institutions like the Financial Literacy and Education Commission, whose task is to come up with national strategies aimed to help millions and millions of Americans who desperately need financial education<sup>18</sup>. Financial institutions, those owned by the government as well as those which are privately owned, should launch financial literacy programs. Such financial institutions should encourage their customers to open savings accounts where they can save some money for future purposes<sup>19</sup>. The government should come up with strict laws and regulations which prevent easy manipulation of unsuspecting Americans. The citizens of the United States must be protected from conmen and other fraudsters who aim to exploit the financial illiteracy for most Americans. The financial market should also try to create a better market that is highly diversified and competitive<sup>20</sup>. This ensures that the participants in such markets are well informed, and as a result, are not easy targets for fraudsters. The financial sector should also try to be as transparent as possible for people to understand how the financial industry can help them increase their financial literacy levels. The language used should be simple and easy to understand without

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<sup>16</sup>. Buckley, Patrick, and Elaine Doyle. "Individualizing gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market." *Computers & Education* 106 (2017): 43-55.

<sup>17</sup>. Whistle, Wesley. "A Look At Millennial Student Debt." *Forbes*. Last modified October 4, 2019. <https://www.forbes.com/sites/wesleywhistle/2019/10/03/a-look-at-millennial-student-debt/#394ca01c2437>.

<sup>18</sup>. "Predatory Lending: Laws & Unfair Credit Practices." *Debt.org*. Last modified November 7, 2012. <https://www.debt.org/credit/predatory-lending/>.

<sup>19</sup>. Katmada, Aikaterini, Anna Satsiou, and Ioannis Kompatsiaris. "A reputation-based incentive mechanism for a crowdsourcing platform for financial awareness." In *Collective Online Platforms for Financial and Environmental Awareness*, pp. 57-80. Springer, Cham, 2016.

<sup>20</sup>. Koh, Noi Keng. "Approaches to teaching financial literacy: Evidence-based practices in Singapore schools." In *International Handbook of Financial Literacy*, pp. 499-513. Springer, Singapore, 2016.

hidden meanings, which act as a deterrent to many Americans who find themselves tied up in contracts which they do not know entering and hence, eventually end up paying money for something unknown or undesired.

### The Millennial debt

In the United States, Millennials are the ones hit the hardest due to the financial crisis. This is primarily attributed to the fact that they were born during the 2007-2008 great recession. The economy has been changing drastically ever since the millennials were born and it hasn't helped their situation. The cost of higher education was rising fast in an era where most of the millennials were enrolling in high school and higher learning institutions. Some of those enrolling in the higher learning institution sought to enhance their skills or even acquire new training after they lost their jobs in the economic recession<sup>21</sup>. Due to the significant number of students in colleges and other higher learning institutions, the education institutions were seeking to increase the tuition fees. The solution was to offer loans so that students could pay their tuition fees. This is how millennials started their lives with a student debt on their heads. A study, which defined millennials as those aged between 18 and 37 years, showed that approximately 60 percent of this group was not sure if they will ever be able to pay their student debt<sup>38</sup>. In another study conducted, 57 percent of the millennials did not believe that student debt composed the largest share of the millennial debt<sup>22</sup>.

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<sup>21</sup>. Xiao, Jing Jian, and Nilton Porto. "Financial education and financial satisfaction: Financial literacy, behavior, and capability as mediators." *International Journal of Bank Marketing* 35, no. 5 (2017): 805-817.

<sup>22</sup>. "Most Americans Think They Know More About Money Than They Do." [www.kiplinger.com](https://www.kiplinger.com/article/retirement/T047-C032-S014-most-think-they-know-more-about-money-than-they-do.html). Last modified October 28, 2019. <https://www.kiplinger.com/article/retirement/T047-C032-S014-most-think-they-know-more-about-money-than-they-do.html>.

<sup>38</sup>. "15 Economic facts about millennials" The council of economic advisors. October 2014. [https://obamawhitehouse.archives.gov/sites/default/files/docs/millennials\\_report.pdf](https://obamawhitehouse.archives.gov/sites/default/files/docs/millennials_report.pdf)

<sup>39</sup>. Lusardi, Annamaria, and Nan J. Morrison. "Financial Literacy Transforms Students' Lives. Here's Where to Start." *Education Week*, 18 Nov. 2019, [www.edweek.org/ew/articles/2019/07/26/financial-literacy-transforms-students-lives-heres-where.html](http://www.edweek.org/ew/articles/2019/07/26/financial-literacy-transforms-students-lives-heres-where.html).

<sup>40</sup>. Erprose. "How Each US State Is Shaping the Personal Finance IQ of Its Students." CNBC. CNBC, February 5, 2020. <https://www.cnbc.com/2020/02/05/how-each-us-state-is-shaping-the-personal-finance-iq-of-students.html>.



## Define the Need

### The importance of financial education

Students must be educated in the importance of financial literacy because such knowledge is critical in managing both personal and professional budgets, making smart money decisions and reducing the risk of becoming or starting a poverty cycle. . Eventually students will be adults with jobs, and they will also be the drivers of the economy However, the majority of the states in the United States do not require schools, especially high schools, to mandate at least one economics course. Such courses are essential because they teach crucial skills to students who need to be financially stable in both the short run as well as the long run. Many schools have stopped offering financial education because they believed that science was a more critical subject than financial literacy<sup>39</sup>. However, if the problem of financial illiteracy is not solved from the grass-root level, In 2018, a survey was conducted throughout all the states in the country, and it was found that only a mere 17 states mandated that high school students take a class in personal finance<sup>40</sup>.

Students need to understand the importance of managing their finances effectively. The key reason why students need to be informed about financial literacy is that the student debt burden continues to rise without any possibility of diminishing in the near future. It is also in the best interest of the Government to create a high-scale personal finance class. The current student debt in the country is \$ 1.48 trillion, which is the highest the country has ever seen. States such as Ohio have already introduced programs that will ensure the financial literacy of students. One such program is the ‘Smart Ohio’ program, which aims at training economics teachers who will, in turn, teach the students in their respective high schools. It projected that by the year 2021, more than 75, 000 students would be beneficiaries of the Smart Ohio program<sup>41</sup>. The Federal Reserve conducted a study in 2014, which proved that those students who had prior training in personal finance had higher credit scores than those who had no exposure to either personal finance or economics programs. Such programs also require the input of parents, and hence they are also needed to talk to their

children about money handling. Parents should be able to slowly teach their children the importance of effectively managing their personal finances from a young age<sup>23</sup>.

### **Digital items and loot.**

In a world where technology is fast-paced and ever-changing, it is crucial that people try to understand any technology they are introduced to before they begin using it. A trend is seen in the world of gaming where players “win” prizes for completing various challenges in the game. A loot box refers to any virtual consumable item that can be redeemed in a bid to receive a selection of materials ranging from individual characters to equipment randomly. Despite the loot box being completely virtual, gamers are required to pay real money for them to acquire the loot boxes and thus the concept of exchanging real money for virtual money<sup>24</sup>. The majority of the gamers are the youth, the same people who are facing high student debts, and therefore should be protected from this form of exploitation by the game developers<sup>25</sup>. Gamers have designed their games in such a manner that the loot boxes are manipulative and in the end, making the player pay vast sums of money in exchange for "nothing." The virtual gains which the players make have no real financial benefits to them, and as a result, Earlier in 2019, a United States Senator proposed loot boxes should be banned. The argument for the ban was that spending real money when playing video games enhances gamer addiction and also increases the loss of money, which could have instead been put to good economic use<sup>26</sup>. The Senator claimed that the monetization of today’s video games is enabling the gambling addiction in very young children who believe they will get lucky whenever they pay money to unlock the loot boxes for the hidden virtual treasure.

<sup>23</sup>. Jorgensen, Bryce L., and Jyoti Savla. "Financial literacy of young adults: The importance of parental socialization." *Family relations* 59, no. 4 (2010): 465-478.

<sup>41</sup>."Ohio Government Making Smart Choices by CEE." Council for Economic Education. SENATOR LOU TERHAR, February 9, 2018. <https://www.councilforeconed.org/2018/02/14/ohio-government-making-smart-choices/>.

<sup>24</sup>. Hamari, Juho, Jonna Koivisto, and Harri Sarsa. "Does Gamification Work?-A Literature Review of Empirical Studies on Gamification." In *HICSS*, vol. 14, no. 2014, pp. 3025-3034. 2014.

<sup>25</sup>. Zendle, David. "Is real-money mobile gaming a form of gambling or video gaming?." (2019).

<sup>26</sup>. Deterding, Sebastian. "Gamification: designing for motivation." *interactions* 19, no. 4 (2012): 14-17.

## Excessive Borrowing

A survey conducted by Personal Survey showed that approximately 54 percent of American citizens would not hire a financial advisor because they believe they will take advantage of their lack of financial knowledge and steal from them. This is one of the main reasons why the majority of the average American families are struggling with debt, especially credit card debt, which is estimated to stand at \$ 16,000 and is payable at an annual percentage rate of 16.47 percent<sup>27</sup>. The majority of such families end up paying excess money due to the high-interest rates charged on credit card debts<sup>28</sup>. For example, a credit card debt of \$ 16,000 will force the average American family to use ten years to pay the entire debt completely. However, in the next ten years, the family would have incurred other loans such as a car, home mortgage, education that attract interests too. This way, the cycle of borrowing never ends. The other ever-growing trend is payday lending, which involves the taking of a short loan, which usually attracts very high-interest rates and is generally based on the borrower's credit profile as well as the income of the borrower. The interest attracted by these payday loans is typically cumulative, and by default, the borrower ends up with a massive debt, which keeps on accumulating<sup>29</sup>.

User

### Gen Z: An Opportunity?

Generation Z individuals were born after 1995 and before 2015. This was during the housing bubble and the economic recession crisis. They firsthand saw the effect of massive student debts on the millennials. Being born at a time when technology was rapidly picking pace has enabled this generation to quickly adapt to changes that come their way with ease. Generation Z controls the markets because they have a combined

<sup>27</sup>. Rodrigues, Luís Filipe, Abílio Oliveira, and Carlos J. Costa. "Does ease-of-use contributes to the perception of enjoyment? A case of gamification in e-banking." *Computers in Human Behavior* 61 (2016): 114-126.

<sup>28</sup>. deCos, Liliia. "Opportunity for banks to utilize gamification as a tool to promote financial education to children." (2015).

<sup>29</sup>. Melzer, Brian T. "The real costs of credit access: Evidence from the payday lending market." *The Quarterly Journal of Economics* 126, no. 1 (2011): 517-555.

purchasing power of approximately \$44 billion and is expandable to roughly \$600 billion when their parents are included in the analysis of their combined purchasing power<sup>30</sup>. Generation Z individuals usually aim at getting value for their money because they are financially sensitive. Eighty-four percent of Generation Z individuals depend on their parents for the financial information they need. However, this poses a challenge because their parents have outdated information because they grew up in different financial times. Therefore, the information they end up getting does not provide much help and leaves the Gen Z-ers more concerned about their financial future. It is, therefore, important for children to be taught the importance of financial literacy from as early as three years. In the average American family, it is vital that both parents take part in educating their child on the importance of financial literacy<sup>31</sup>.

Gamification has increasingly picked up the pace and is now being introduced to the learning environment. Gamification aims to increase student participation as well as to develop healthy habits. Students across campuses are encouraged to participate in online activities, which help students to stay in college while at the same time enjoy their campus experiences<sup>32</sup>. For example, students are able to read about financial topics whenever they are participating in online programs, e.g., through completing badges designed by the universities. Gamification will help equip students with essential life skills and knowledge, especially when it comes to managing their finances. Children can use gamification techniques to improve their financial literacy, thereby becoming more responsible adults when handling their finances<sup>33</sup>.

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<sup>30</sup>. "Predatory Lending: Laws & Unfair Credit Practices." Debt.org. Last modified November 7, 2012. <https://www.debt.org/credit/predatory-lending/>.

<sup>31</sup>. Lusardi, Annamaria, Olivia S. Mitchell, and Vilsa Curto. "Financial literacy among the young." *Journal of consumer affairs* 44, no. 2 (2010): 358-380

<sup>32</sup>. Huotari, Kai, and Juho Hamari. "Defining gamification: a service marketing perspective." In *Proceeding of the 16th international academic MindTrek Conference*, pp. 17-22. ACM, 2012.

<sup>33</sup>. Kapp, Karl M. *The gamification of learning and instruction*. San Francisco: Wiley, 2012

## Methodology

### Motor Learning

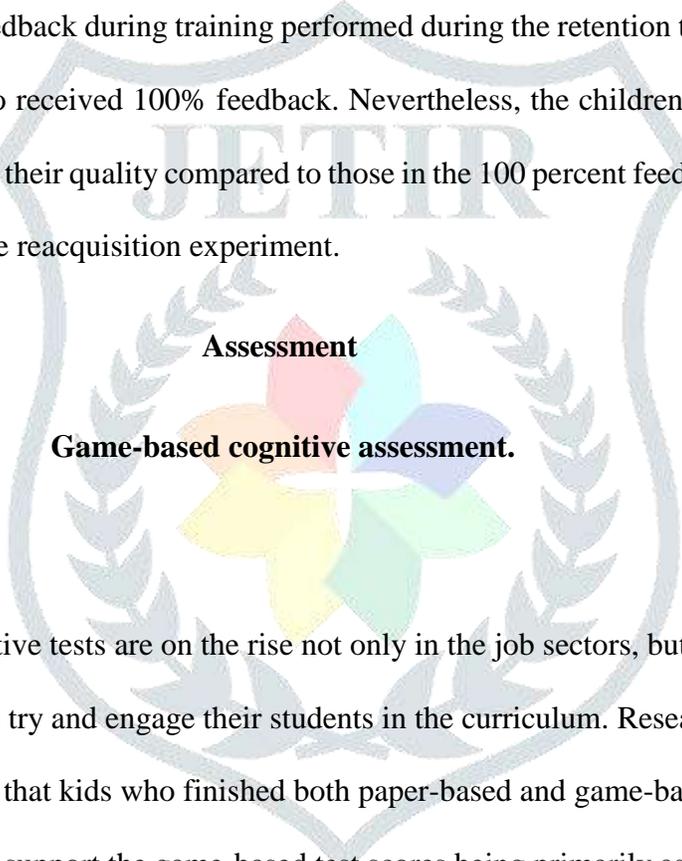
Motor learning is a set of processes aimed at learning and refining new skills through practice. There are three different stages to it.

First, Cognitive stage. The goal is to have an overall understanding of the skill. As a learner, kids need to identify the objective of the task in order to be able to process all the surrounding factors that might influence their ability to grasp specific knowledge. An excellent example of this would be learning to walk. Before a child starts walking, they will look somewhat awkward and will tumble a couple of times too. The way towards figuring out how to walk starts way before the child takes their first step. They have been outwardly watching others around them strolling and starting to comprehend the reason for it. So while they might look clumsy at this phase of learning, they are just barely starting to change from understanding the skill to executing it. Second is the associative stage. The learner starts to demonstrate a more refined movement through practice during this stage. Now that the learner has had some training and recognized various possible triggers, they may focus on "how to do" move in the first stage from the "what to do."

Visual signals such as watching someone walk are becoming less critical here, and proprioceptive indications are becoming very important. Proprioceptive signs apply to the learner concentrating more on how their body moves in space and how their joints and muscles experience feedback. The more realistic, the more proprioceptive feedback the student provides to aid training. So, the better, the more you work! How about we proceed with walking. During the clumsy stage, the kid may show little, uneven advances, wide base of help, arms up high in a protected position, and practically no trunk rotation. In this stage, you may see the learner taking longer, progressively controlled advances, narrowing their base of help, and enabling their arms to unwind at their sides. These practices demonstrate that the learner has moved past the underlying phase of learning and has advanced to a progressively refined development. Third is the autonomous stage. During this last phase of learning, motor skill turns out to be generally programmed. The movement to this degree of learning enables the student to play out the expertise in any condition with almost no subjective

association compared with the initial stage. The learner will currently have the option to walk in an unpredicted environment, for example, at home or in the park<sup>34</sup>. I believe Motor learning of financial literacy in a gamified setting will be a a useful way to tackle the problem of financial illiteracy because kids will be brought up with knowledge to make smart financial decisions.

Research conducted by scientists showed that the adults showed slightly less error than the kids during the duration of the test. During the retention test, adults who practiced with decreased feedback responded with more excellent reliability compared to those who practiced with 100% feedback. In comparison, children who received decreased feedback during training performed during the retention test with less reliability and consistency than those who received 100% feedback. Nevertheless, the children in the decreased feedback group were able to improve their quality compared to those in the 100 percent feedback group when feedback was reintroduced during the reacquisition experiment.



**Assessment**  
**Game-based cognitive assessment.**

Game-based cognitive tests are on the rise not only in the job sectors, but schools have also started implementing these tests to try and engage their students in the curriculum. Research conducted with 51 students in 6th grade states that kids who finished both paper-based and game-based tests in a randomized order displayed results that support the game-based test scores being primarily associated with the paper-based test scores with the recommendation that the game-based evaluation was regularly updated and that

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<sup>34</sup>. "Motor Learning: Stages of Motor Learning and Strategies to Improve Acquisition of Motor Skills." Starfish Therapies, October 16, 2012. Assessment and Treatment. O'Sullivan, S. B., Schmitz, T. J. 1994. pgs 366-367.

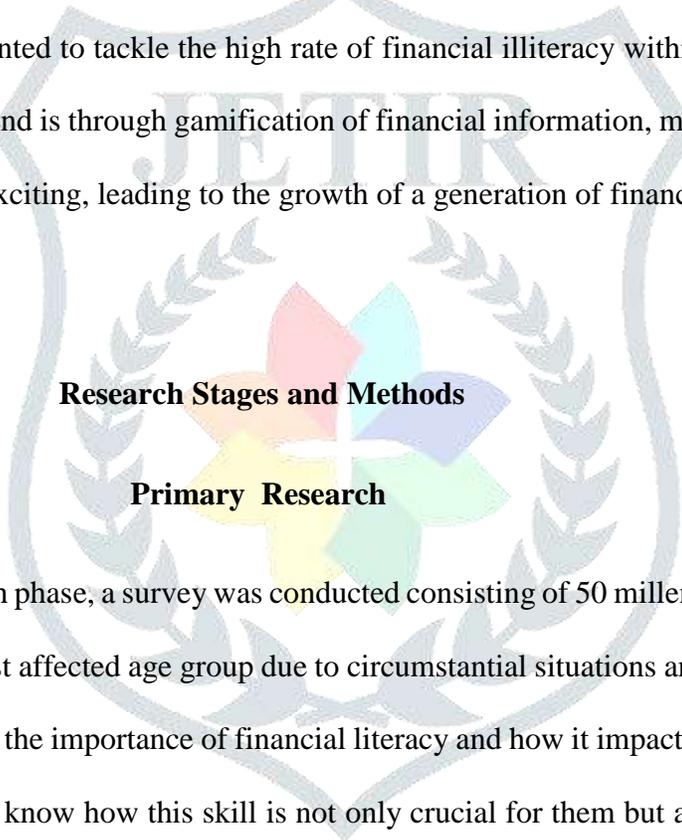
Katherine J Sullivan, Shailesh S Kankar, Patricia A Burtner, Motor Learning in Children: Feedback Effects on Skill Acquisition, *Physical Therapy*, Volume 88, Issue 6, 1 June 2008, Pages 720-732,

it gave the paper-based test approach morally equivalent information. More importantly, the outcomes revealed that the game based assessments lowered the anxiety levels amongst the students<sup>35</sup>.

Another study revealed Games to be useful in education as they can increase the motivation and engagement of learners<sup>36</sup>.

This makes it easier to understand why this might be a better way to test kids without making them anxious about their performance.

Financial literacy is crucial because it ensures that people make the right decisions financially. Permanent solutions must be implemented to tackle the high rate of financial illiteracy within the country. One way of reducing this worrisome trend is through gamification of financial information, making tedious and lethargic tasks understandable and exciting, leading to the growth of a generation of financially sensitive children.



## Research Stages and Methods

### Primary Research

During the primary research phase, a survey was conducted consisting of 50 millennials. Research has shown that millennials are the most affected age group due to circumstantial situations and lack of financial literacy education. Questions about the importance of financial literacy and how it impacts day to day activities were asked while also getting to know how this skill is not only crucial for them but a shocking amount of users responded, saying that they would volunteer to teach their kids financial literacy lessons at an early age. On various other occasions, I also have encountered millennials being more aware of this situation due to facing these issues firsthand. The primary research phase also focused on identifying the root cause behind financial

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<sup>35</sup>. K. Kiili and H. Ketamo, "Evaluating Cognitive and Affective Outcomes of a Digital Game-Based Math Test," in *IEEE Transactions on Learning Technologies*, vol. 11, no. 2, pp. 255-263, 1 April-June 2018.

<sup>36</sup>. Mavridis, A., and Tsiatsos, T. (2017) Game-based assessment: investigating the impact on test anxiety and exam performance. *Journal of Computer Assisted Learning*, 33: 137– 150. doi: 10.1111/jcal.12170.

illiteracy, and hence a one on one interviews were conducted with financial experts who believe "You cannot teach someone financial literacy of the books, the concepts have a hierarchy and should be taught practically." Saying that I do believe financial knowledge could be taught in a practical setting, having real-world experiences will help alter the behavior upon receiving instant feedback.

Research was conducted with game designers to understand game dynamics and how it could help in creating an immersive and engaging experience to keep kids interested. To which I got a response stating, " The gaming industry revolves around trends, creating experiences that evolve and are digitally accessible can help distribute the assets to a much wider audience." Through this insight, I conducted follow-up research, which showed that digital games have a significantly higher number of users and engagement ratio than any other form of game-based media.

To understand the behavior of a gamer, research was conducted with avid gamers to find out their take on games and has it ever helped them learn anything unintentionally. To which one user stated, "I do not think I have ever learned anything from The Life or Monopoly."

The user replied, saying that he has seen improvements in his reflexes. To which the rest of the participants agreed. The research concluded with a conceptual question interview by asking them, "how could one engage kids into playing a game?" To which I got a response saying, "Kids these days tend to get distracted easily, engaging the kids by providing them incentives In any part of the process will boost morale."

An interview with a child specialist helped me explore areas where I could execute this problem more efficiently, stating, "Kids spend about 75% of their time in their homes, and hence they are likely to observe the actions that their parents take." This response helped me zero down on creating an experience that could be taught by a parent in a home setting.



## What's out there? (Market Research)

1. There are quite a lot of websites that give you information about financial literacy, but very few are targeted towards kids.
2. Apps that help you budgeting and planning : Mint, Plaid and Money.
3. Role playing games that teach you about finances.
4. Lack of visual elements.
5. Current solutions seem too complex.



## Design Process, Ideation & Initial Concept

Parts of the answers always lie within the question, and with this thought, I started my initial design phase. I did a quick brainstorm session on the topic, put all the thoughts and ideas that came to my mind on paper to have a clearer picture of where this topic could head. I followed the exercise with a set of mind maps to derive keywords to conclude as to where I should direct myself in the broad topic.

These insights vastly helped me induce the approach for my project. To narrow down my findings, I revisited the keywords I had written earlier and consolidated the different insights according to how important and valid it was for the direction I was inclined to go towards. To organize my process and make it easier for me to make a game, I created a crisp spine that would help me sum up my design direction before I move ahead into the creativity phase.



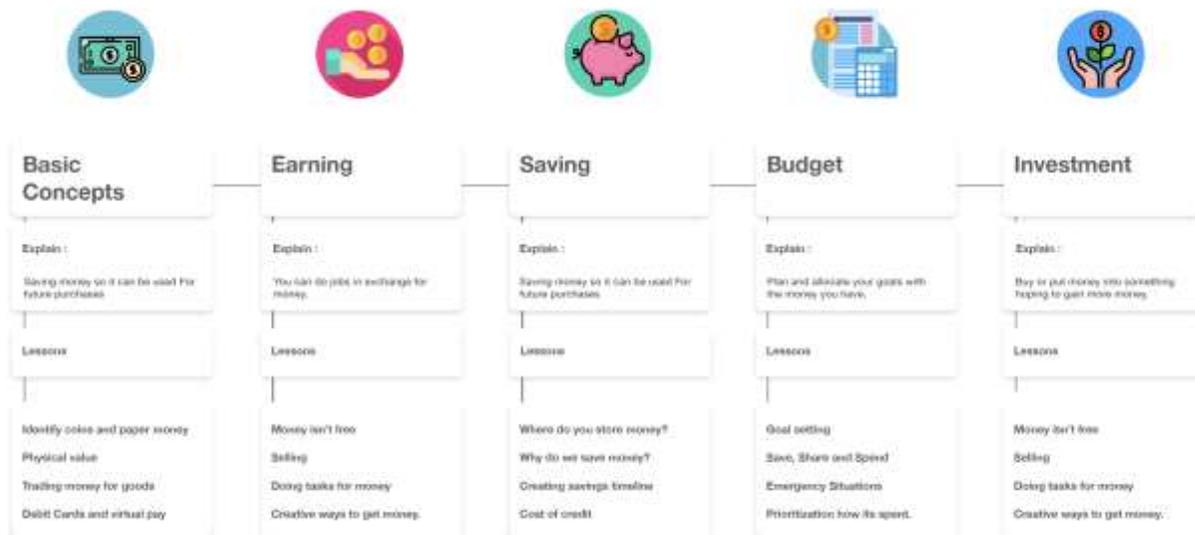
Before starting to make my game, I concluded that for the successful execution of any financial lesson, it is a must to incorporate practical tasks for a long-term acquisition of knowledge and skills, along with adding incentives for successful user retention. While also incorporating real-world problem-solving tasks that can provide instant feedback for measuring success.

### Confining to a medium

I considered two different mediums to be the base of my design concept. The first one being a "board game." which, through my Primary research findings, would have accessibility issues for the target group I am trying to aim. Board games are usually large physical units that the user needs to purchase from either online or in-store retailers and are not accessible to everyone at all times. This insight led me into considering "Digital games," which are readily available to download on any of your smart devices—hence giving it an edge to be easily accessible. According to my secondary research, 69% of people in the U.S own a smartphone, which leaves 31% of the population out of reach. That 31% could be the potential participants that I am trying to target. Hence, I decided to create a physical board game which would also have a simplified digital version that could be easily downloadable by teachers or students using their school computers. This decision helps me reach a larger audience as the majority of the country is connected to the internet. It also helps me retain the accessibility aspect, which is at the forefront of my design direction.

## What do I want the kids to learn?

Ideation of possible financial concepts and finding the right gap between which lessons would be beneficial at what age. This process helped me identify financial literacy lessons and segregate them into different stages to form a hierarchy. Starting from basic concepts which include the core principles of financial literacy to achieving financial independence while being able to invest money the right way.

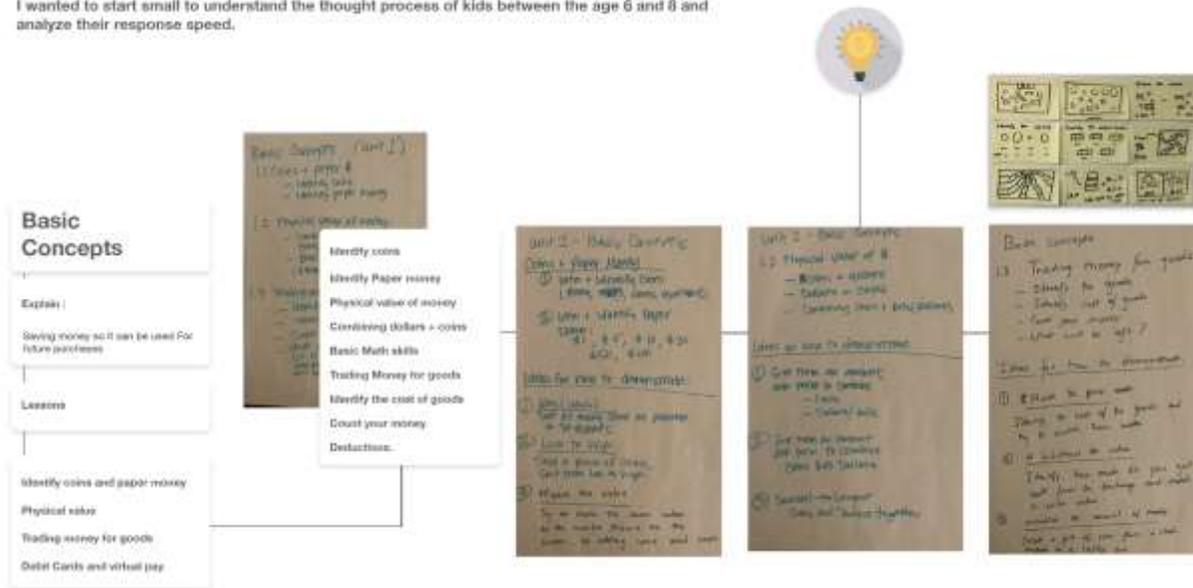


I decided to create the game on the bases of basic financial concepts. As we are trying to solve this issue from the grass root, the only way to achieve that was to teach kids the basics of money, such as identifying coins and paper money, learning about the physical value of money, and also trading cash for goods.

## Ideation

I started the ideation phases by diving deep into the foundation of basic financial knowledge and ideated on possible game-based concepts to reenact these lessons in a gamified environment. This process helped me visualize what the game could look like and how it would function. All the concepts were designed based on the assumption that a guardian would be a moderator throughout the duration of this game.

I wanted to start small to understand the thought process of kids between the age 6 and 8 and analyze their response speed.



### Design concept

The final concept consisted of 3 different components. First is the board game, which would host all the players and track their progress. The second component is the tasks that the user has to complete to move ahead towards the goal. Each task is designed to get more challenging to achieve gradually. The third component consisted of a treasure box that hosted a surprise element creating a sense of excitement. The initial onboarding of the game has two tasks, which prompts the users to identify the name and the value of the coins and currency of the U.S. Failure to do so results in not being able to join the game. In that case, the user will communicate with other participants or the moderator and learn about money.

### Mockups and Testing

#### Mockup 1

After the creativity phase, I created a quick mockup to test the first concept with a group of game designers. The concept included a physical board game where the users can map their progress towards achieving the goal. The goal consists of a treasure chest that can be filled with incentives that the moderator thinks suits best for the kids. In this test situation, I decided to insert small mint chocolates.

## Test Concept

### The Treasure island quest

The players start from the bottom of the deck  
And need to climb towards the chest to conquer the quest

- Start the quest by identifying coins and their value.

Evaluate by checking if your answer fills the gaps.

- Deduct coins to for a value

Evaluate by checking if your answer fills the gaps.

- Identify the cash

Evaluate by checking if your answer fills the gaps.

- Deduct coins and cash to identify the remaining value

Use the last digit of each answer to form a code

- Unlock the chest to collect your prize.



The game also consists of tasks curated to teach kids the basics of financial literacy. There are three tasks ranging from easy to hard.

The first task is identifying the coins and their values. The second task asks the players to sum up and find the value of the coins that are displayed on the card. This task helps them to sort the coins and sum their values to identify their total amount.

### Low fidelity prototype

#### Task 1

Identify the coins and add them up

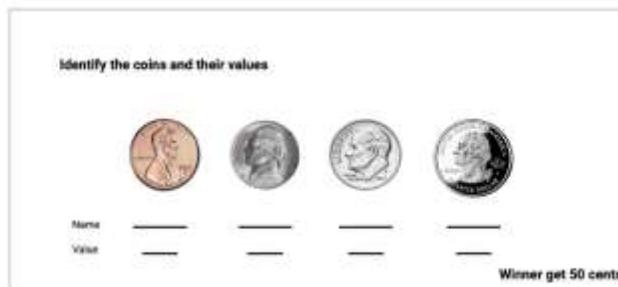


Cheat sheet

Using this cheat sheet sheets is word clock timer after which the cheat sheet is taken away.

#### Task 2

Add the coins to find the total value



Task two and three focuses on introducing kids to identifying cash and deduct them with coins.

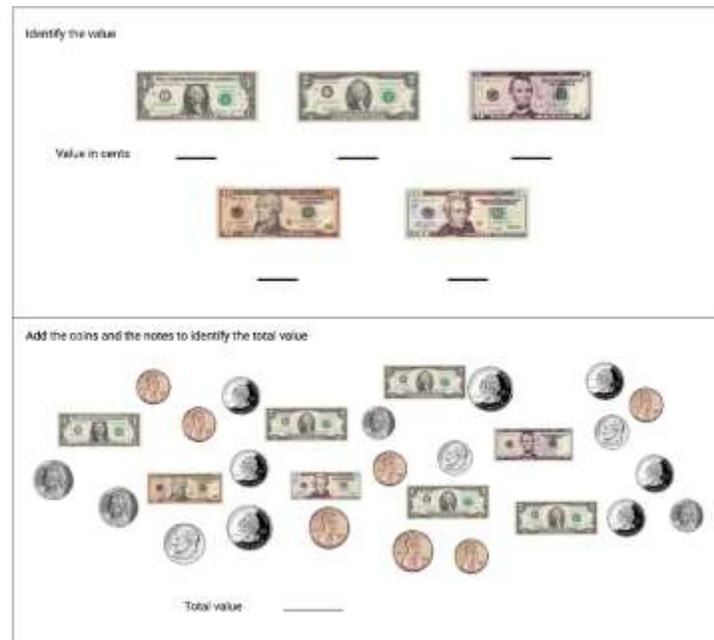
## Low fidelity prototype

### Task 3 and 4

Identify cash and deduct the coins



The payer is allowed to use cheat sheet but it costs in minus points



This specific task imitates the real-world experience of exchanging cash during a transaction.

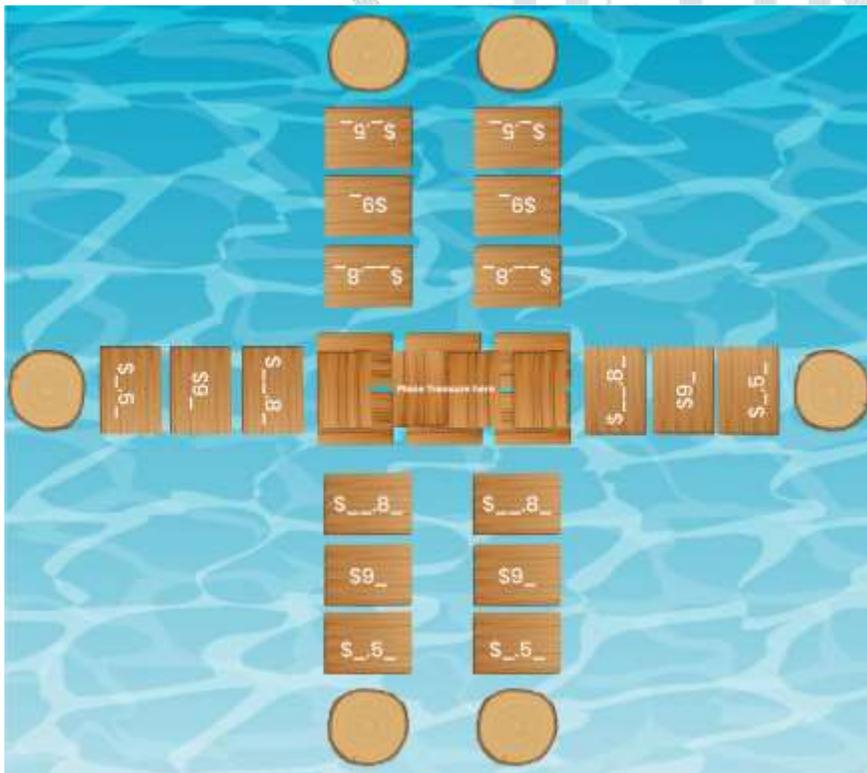
### Feedback 1

The treasure aspect got a good response due to it being captivating and something that gets kids really excited. I got a strong reaction to add visual elements to attract the kids to play this game out of excitement rather than just the incentives. I was also asked to give headings to each card to avoid any confusion.

### Re-iteration

For the next steps, I gathered all the feedback and reiterated on them to create a more comprehensive and detailed concept. I decided to conduct a visual design research to identify the current trends that would suit the games and the target user. My study concluded on selecting the pirate theme and the aesthetics of a famous show called SpongeBob square pants. I redesigned the board game to make it look more exciting for kids by selecting bright colors and creating assets that look cartoonish.

## Mockup 2



## Focus group 2

After successfully implementing the feedback, I was lucky enough to conduct a second focus group, which would consist of 6 users (6 to 10 years old). This focus group would help me identify the response time and align the difficulty level to that of the user's pace of learning.



## Feedback 2

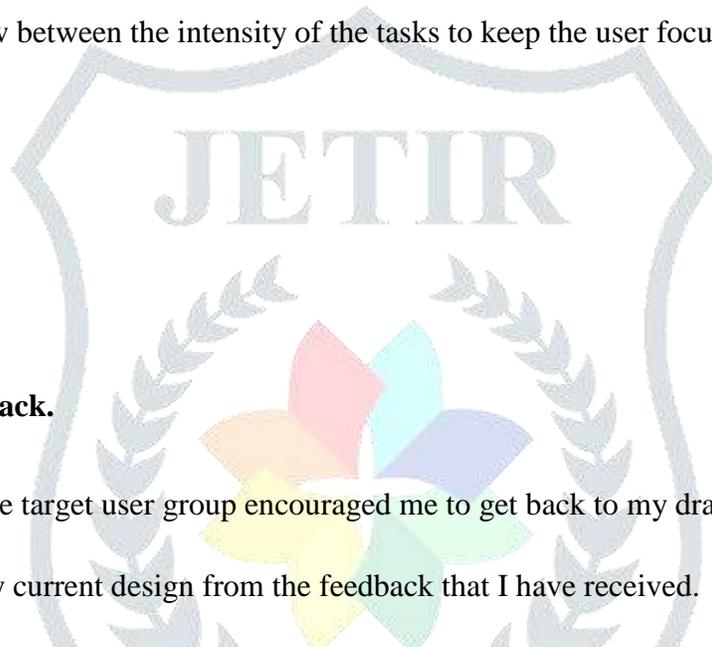
The feedback consisted of individual elements that were missing from the game that confused the participants. It took way longer for the users to understand rather than what was intended. The onboarding experience was not at all structured and lacked proper instructions. This led to confusion amongst the participants on how to play the game. The Onboarding tasks were difficult for the kids below the age of 8, hence not allowing them to understand the game and join the rest of the participants.

The participants were excited by the visual identity and were encouraged to play the game after discovering the treasure element, which also sparked joy and excitement. Kids were likely to play this game for the



incentive element. As the attention span for kids between the age of 6 to 8 is really short, the idea of a surprise inside the treasure chest motivated them to surround and indulge to try and solve the tasks even when my onboarding process failed. The game managed to keep the target audience curious at all times. The excitement around the board game as a whole was positive.

The primary learnings for me from this focus group was to create a comprehensive book of instructions and to ideate and redesign an onboarding experience as straightforward as possible. Try and cover the very basics of money as I should not get drifted away from the learning pace of my target audience. To also create a more natural flow between the intensity of the tasks to keep the user focused on completing the game.



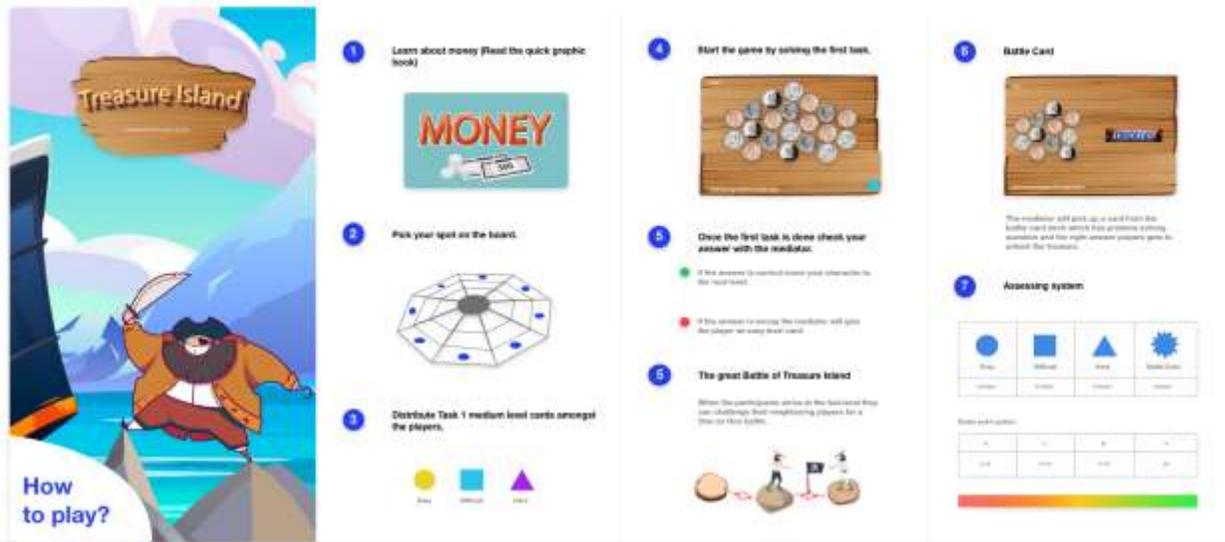
### Implementing the feedback.

Having interacted with the target user group encouraged me to get back to my drawing board and make iterations to my current design from the feedback that I have received.



Creating an instruction manual to ease the on-boarding process.

### Instruction manual.



Creating an easy to learn “What is money” guide book for the kids to learn about money.

### Instruction manual.



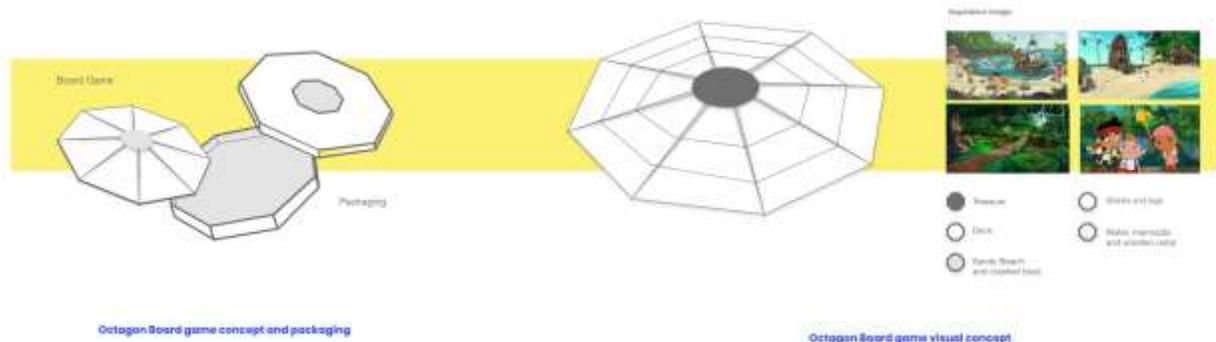
### Character Cards

When discussing visuals with my focus group participants, they were eager to talk about their favorite shows and what they liked about them. A mood board was made based on some of the visual elements in Jake and

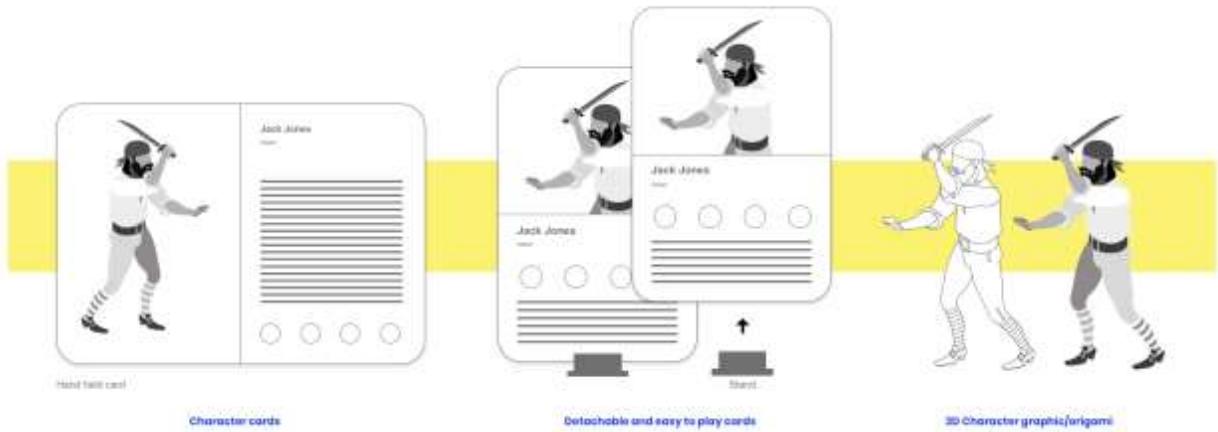
the Neverland Pirates and Paw Patrol.



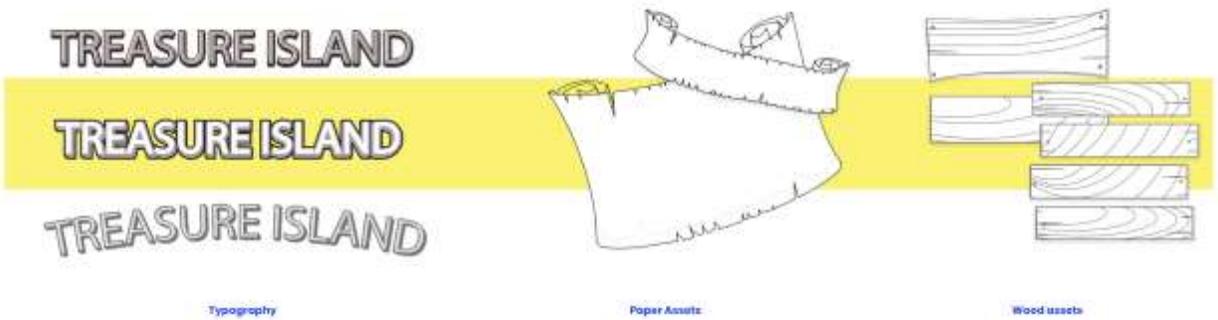
Identifying possible assets and elements to design around the board game. These assets would help enhance the board game experience by introducing characters and surprise elements which would create a sense of excitement.



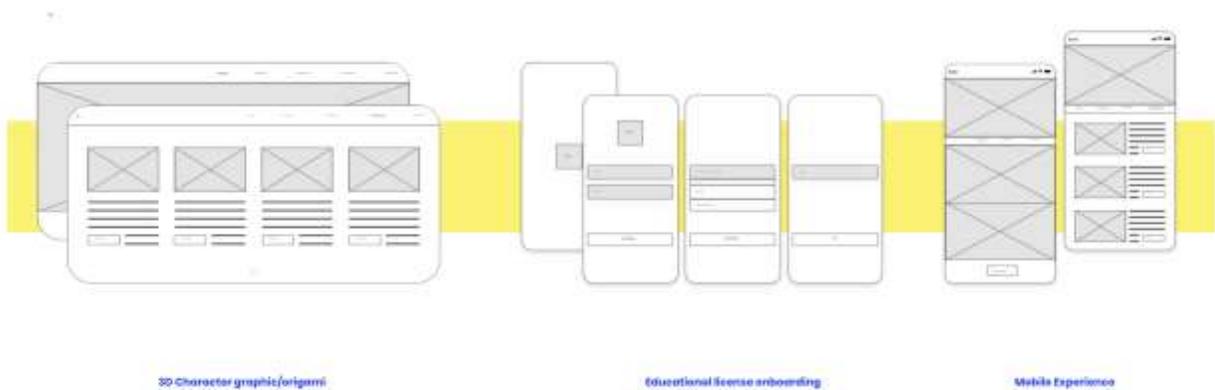
### Character cards



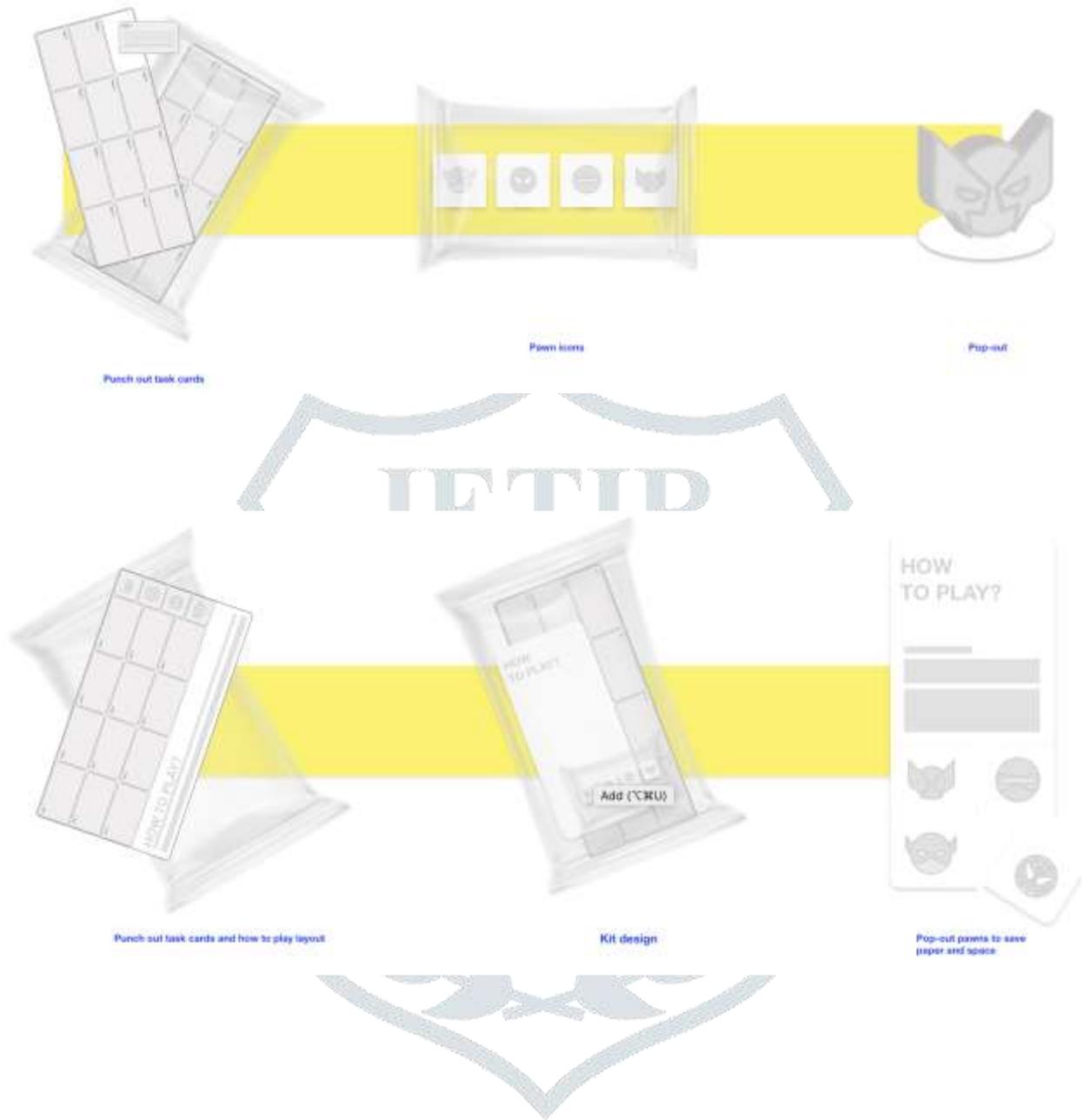
### Typography and texture assets



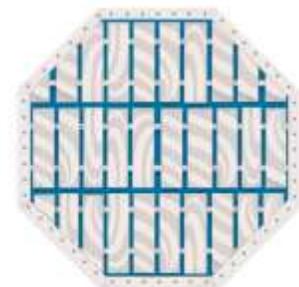
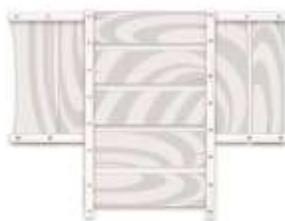
### Website and application User Interface



### Cereal box assets

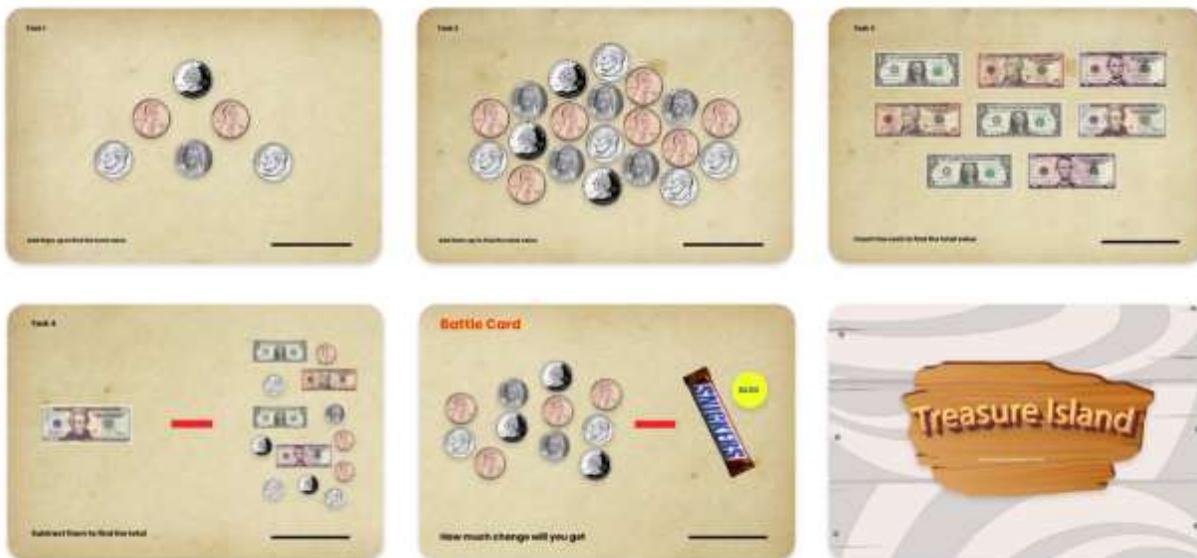


### Board game theme



Wood assets

### Task cards



### Syllabus

Visual segregation of the structured syllabus from the age of 6 and above.



### Character Cards

Introducing a wide variety of characters to add to the storyline.



### Final theme

The final theme was inspired by Jake and the Neverland pirates.





## Final prototype

The goal for the final prototype validation was to secure a successful onboarding process, create a strong and polished visual identity, and also an easy navigation system within the experience.



## Final prototype

The final input was a mixed evaluation within the focus group. The children who belonged to the 7 to 12 age bracket were able to perform the tasks with ease, while the children who belonged to the 5 and 6 age group failed to solve the simple tasks.

To address this issue the tasks were segregated into 3 different levels of difficulties. Easy, difficult, and hard. The mediator would start the game by distributing the difficult level card. If the player failed to complete this specific task it would be replaced with an easier one. This system would help bespoke the learning curve for each and every kid.



### User scenario

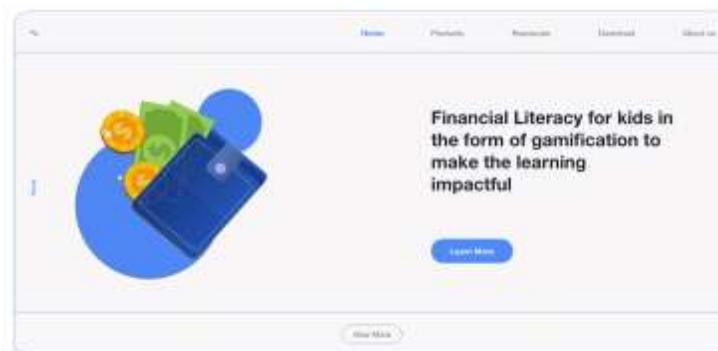
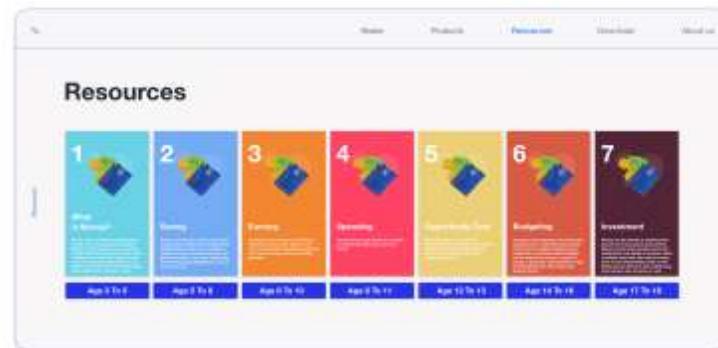
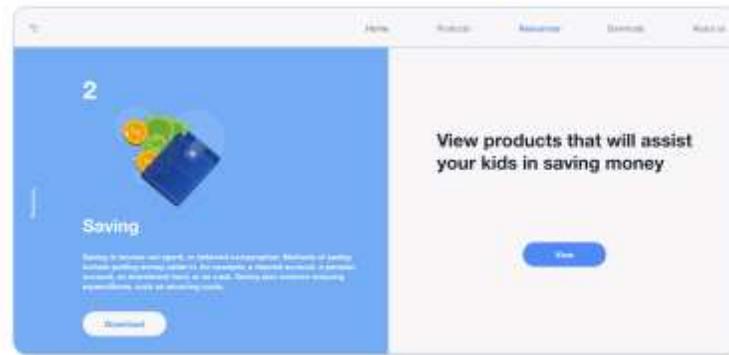


### Covid 19 Pivot

The COVID 2019 situation helped me revisit my concept with a fresh new set of restrictions. I chose to insert my game into a custom made cereal brand to reach kids conveniently.



Online portal



## Conclusion

This thesis has helped me identify the financial hardships and problems people face daily. It helped me understand the underlying issues that would trigger such problems. I tried to understand and articulate solutions that might work to resolve these issues at a certain level. To start with implementing financial literacy courses in schools for children as young as 6 years old. The course could be structured in a gamified

environment to make learning fun and practical. This will not only create good user retention but also create a sense of excitement to learn new things, which can be a positive outcome for kids and their families.

### Appendix

Interview	Insight's	Outcome	
Financial expert	"You can't teach someone financial literacy of the books, the concepts have a hierarchy and should be taught systematically."	Practice	Syllabus
Game designers	"The future is digital, focus on creating a product which can be distributed rapidly. This would help you reach the audience efficiently."	Digital	Accessible
Gamers	"Kids these days tend to get distracted easily, engaging the kids by providing them incentives in any part of the process will boost morality." "I don't think I have ever learned anything from The Life or Monopoly."	Reward	Boardgames
Child psychologist	"Kids don't start reading until the age of 5 to 6 and sometimes even the 1st grade." "Kids spend about 75% of their time in their homes, and hence they are likely to observe the actions that their parents take."	Parenting	Limited vocabulary
Focus Group with target	Set for March 3rd 2020		
Testing With target audience	Planned for March 31st 2020		

### Survey

Understanding the customer. (Survey for millennials from the age 23 to 38)



I conducted a quick survey to understand the stakeholders and gain their insights on the problem of financial illiteracy.

To my surprise they had an understanding of how serious the issue is and they would happily volunteer to teach their kids about the importance of financial literacy.

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