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Gamifying Finance Education: How Interactive Finance Gaming Platforms Can Improve Investment Decisions

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ABSTRACT
All around the world, Finance Education remains a challenge. However, gamified Finance Education platforms present an ideal solution to the problem. They serve as a way to bridge the gap that exists between the current understanding (or lack thereof) of personal finance andthe basic levels of knowledge necessary to make sound financial decisions. To address this, this research addresses how these interactive platforms offer the opportunity to invest fictional assets in a completely virtual world of a national economy where good investment bets make the player—now acting as a capitalist—a lot of money. Platforms such as these allow gamers to learn about the importance of diversification, the difficulty of timing the market if one isn't taking a long view, and a number of other essential finance and investing concepts.
Additionally, this research evaluates the results of quantitative techniques to compare whetherthe use of gaming platforms increases financial knowledge, behaviors, and investmentdecisions to pre-gaming levels. Ultimately, the research seeks to improve the financial approach among different individuals through Gaming.

Keywords: Finance Education, Gamification, Interactive platforms, Investing

INTRODUCTION

Becoming financially literate is one of the most effective ways a person can improve their economic standing and secure their financial future. However, the fact remains that a sadly lownumber of people in the world are actually financially educated. Cheng and Milikich (2023) did research with a sample of people from a normally underserved community in Florida and found nearly 62% were not financially educated. On the other hand, only 38% were.

In response to this problem, some governments, academic institutions, and professional bodieshave created financial education programs. These organizations aimed to boost FinanceEducation among individuals at a global level.

But financial education using conventional methods has not been very useful. Traditional financial education trainings suffer from a type of "lack of shininess" that makes people think"boring" from the start. Once learners land in that mental space at the beginning of a lesson, itis nearly impossible to get them out of it.

Virtual financial platforms on the other hand, turned finance into an enjoyable experience, almost like a game, by setting it in realistic contexts—with the kinds of real-world moves onecan experiment with their virtual money without any actual loss (Emma & Anya, 2021) (Firli,2017) (Anisah et al., 2021) (Lotter & Okoro, 2023) (Hoseiny & Niknafs, 2020).
Research has demonstrated that a person will go in depth to understand a subject when it is presented in a gaming format, as opposed to the traditional classroom lecture or textbook method (Laine & Lindberg, 2020).

Gamification in finance means that elements from games, such as scoring methods, visual representation of reward systems, challenges, and competitive aspects, have been integrated into financial platforms and products to light a spark in users' experience and to keep them engaged. This is an emerging field with several financial technology (fintech) companies incorporating gamified experiences in their products to reach the average consumer for a betterunderstanding in making financial choices (Kurniasari, 2021).

Finance Education means understanding and using financial skills effectively. These skills include managing personal finances, making budgets, and investing, among other things (Firli,2017; Saeedi & Hamedi, 2018).

Investment decision, on the other hand, is the process of putting money into various investmentalternatives, like stocks, bonds, real estate, or any other financial asset, to meet financial objectives. Making investment decisions isn't easy, especially for the average person who isn'ta professional investor or a Wall Street financier. Nonetheless, there are games, such as Monopoly or Animal Crossing, that have been proven to help laypeople learn the basic skills of investing.

LITERATURE REVIEW

H1: Financial Gaming Platforms significantly impacts Finance Education.

According to several studies, gamified Finance Education applications increase financial information and attitudes, for different age groups (Dzulfikar,et. al., 2021) (Sari,et. al., 2021) (Bermi,et. al., 2019) (Kurniasari, 2021). Several research indicates that points out gamification raises customer relaxation and modifying feeling from worst to better, the indifferent to great, as well as fear of lousy into joy of great. (Dzulfikar,et. al., 2021)(Sari et.al., 2021)

Gamified finance education programs have the potential to enhance financial knowledge,attitudes, and behaviours of individuals, according to some studies. Players on these programs enhance the financial knowledge by comprehending an ability of budgeting, saving, investing, and debt management. (Sari,et. al., 2021).

In an investigation done by college students, researchers discovered that those who used financial interactive media apps has higher grasp over the topic compared to their counterparts who relied solely on conventional studies.

Likewise, an additional investigation on the general public established that individuals who made use of a monetary gamification app expressed better monetary behaviours (Bayuk &Altobello, 2019).

However, the efficacy of these platforms may depend on the user's prior experience and financial liability. (Inchamnan et al., 2019) For example, an investigation on low-income individuals found that an educational game about finance increased the individual'sawareness about economics, but did not cause them to change their financial behaviour.

Another important factor that determines the effectiveness of a gamified platform is the level of engagement (Wang et al., 2021) (Alsawaier, 2018) (Bayuk & Altobello, 2019). Platforms that have clearly defined goals, instant feedback and demonstrate user progresshave been proved to be more engaging and impactful (Wang et al., 2021)

H2: Financial Gaming Platforms significantly impacts Investment Decision

According to Simic (2022) and Zhu & Zhang (2023), early research indicates that video games can enhance certain decision-making abilities.

In the case of the video game, "Dolphin Dash," researchers found that game participants display superior investment decision-making abilities; they diversify their portfolios morethan the control group, and select better stocks.

Furthermore, a study conducted on the video game "Animal Crossing" found that it increased conscientious decision-making. Players displayed more financial responsible behaviours such as saving money and avoiding debt, which potentially leads to better investment strategies in the real world (Maynard et al., 2012).

Engaging in virtual investing allows individuals to test various strategies, learn from theirerrors, and identify those that work the best without the threat of actual monetary loss. Thisis especially advantageous for individuals who have no prior experience investing and those with restricted access to finance advisory services. Though the efficiency of these games can vary based on their design and linkage to educational information (Maynard etal., 2012).

For example, another game "Cashflow," discovered that participants who were taught personal finance alongside their play achieved greater gains in investment decision makingthan those allowed to play the game alone.

As a result, blending gamified platforms with solid financial education curricula can be a dynamic tool to advance investment decision-making capabilities.

OBJECTIVES AND HYPOTHESIS

OBJECTIVES:

1. To explore the efficiency of gamified Finance Education platforms in improving financeunderstanding, attitude, and behavior across different individuals.
2. To explore the influence of gamified Finance Education platforms on enhancinginvestment decision-making skills and financial behaviors.

HYPOTHESIS:

H1: Financial Gaming Platforms (FGP) significantly impacts Finance Education (FE). H2: Financial Gaming Platforms (FGP) significantly impacts Investment Decision (ID)

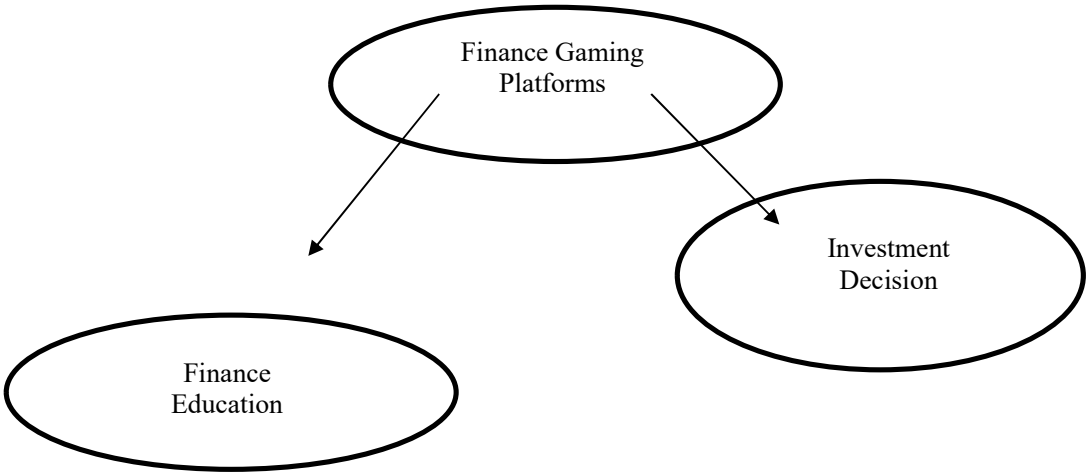

FIGURE 1: CONCEPTUAL MODEL

RESEARCH METHODOLOGY:

This is a causal study with a mixed method approach. It combines quantitative and qualitative data that are collected and analyzed in parallel. The quantitative part of the research uses surveys and objective assessments to measure how well 100 participants understand finance after using gamified education platforms for investment decision-making. The platforms themselves are also rated by the participantson how well they engage and teach them.

Meanwhile, the qualitative part of the research conducts interviews and focus groups with these same platform users to get their experiences and perceptions of not only the platforms but also the kinds of decisions they make when using these platforms. (Lyons and Kass Hanna, 2021)

DATA ANALYSIS TOOLS:

The reliability of Finance Education, Gaming Platforms, and Investment Decisions canbe checked using Cronbach's α Reliability Test. The relationship between the use of gamified platforms and financial behaviors can be seen with a simple Regression Analysis, while the relationships among Financial Gaming Platforms, Finance Education,and Investment Decisions are best seen with Multiple Regression Analysis.

FINDINGS AND DISCUSSIONS

Cronbach's Alpha Reliability

S. No.	Variables	Cronbach's Alpha	No. of items.
1.	Finance Education	.974	50
2.	Financial Gaming Platforms	.943	09
3.	Investment Decision	.935	07

Table 1: Cronbach's α Reliability values

Cronbach's alpha was used to assess the internal consistency of each variable. FinanceEducation (FE) was found to have an alpha coefficient of 0.974, which according to Hinton etal. (2004), represents "excellent" reliability. Similarly, Financial Gaming Platforms (FGP) showed an alpha coefficient of 0.943 indicating a truly "outstanding" reliability. Investment Decision (ID) demonstrated "excellent" reliable with an alpha coefficient of 0.935. Accordingto Hinton et al. (2004), values exceeding 0.90 are "exceptional" reliable and according to Taherdoost (2016), values ranging from 0.70 to 0.90 are considered "highly" reliable. Even those that range from 0.50 to 0.70 are "moderately" reliable.

S.NO.	Variable name	KMO Value	Bartlett's Test	Sign.
1	Finance Education	.853	3956.281	<.001
2	Financial Gaming Platforms	.906	758.432	<.001
3	Investment Decision	.887	586.766	<.001

Table 2: KMO and Bartlett's test of adequacy and sphericity

The adequacy of the sample size, the overall sampling efficiency, and the sampling efficacy foreach variable were assessed using the Kaiser-Meyer-Olkin (KMO) measure. The KMO valuesrange between 0 and 1, with values between 0.8 and 1 are regarded as adequate, between 0.7 and 0.79 as acceptable, and below 0.7 as inadequate (Shrestha, 2021). Furthermore, if the KMOvalue is below 0.5, there is insufficient data for exploratory factor analysis (Ling X et al., 2023).

For the current study, KMO values were obtained for Finance Education, Financial Gaming Platforms, and Investment Decision that were 0.853, 0.906, and 0.887 respectively. Since the KMO values for Financial Gaming Platforms and Investment Decision are above 0.9, it was demonstrated the appropriate size of the sample and the good overall modelling in the samplingefficiency. The KMO value of Finance Education was slightly lower but it still fell within an acceptable range, which illustrated that the sampling efficiency was satisfactory for thevariable.

The test also compares the computed inter-items correlation matrix with the identity matrix and checks whether the difference between them is significant (Babaee, 2010). In the present study, the Bartlett's Test values (Chi square) of Finance Education, Financial Gaming Platforms, and Investment Decision were 3956.281, 758.432, and 586.766, respectively, with a significant level of less than .001. Hence, we confirm the data is suitable for exploratory factor analysis (EFA)

Exploratory Factor Analysis

Factor	Eigen value	Variance	Item converged	Factor loading
Core Concepts	22.275	44.550%	FE1	.680
			FE2	.779
			FE3	.751
			FE4	.753
			FE5	.782
			FE6	.779
			FE7	.679
Applied Knowledge	2.308	4.616%	FE8	.739
			FE9	.738
			FE10	.709
			FE11	.749
			FE12	.659
			FE13	.707
			FE14	.647
			FE15	.665
			FE16	.692
			FE17	.706
Decision Making Skills	2.000	4.001%	FE18	.638
			FE19	.680
			FE20	.577
			FE21	.762
			FE22	.589
			FE23	.754
			FE24	.782
anagementPractices	1.739	3.478%	FE25	.749
			FE26	.750
			FE27	.728
			FE28	.662
			FE29	.701
			FE30	.724
Planning andGoal Setting	1.572	3.145%	FE31	.708
			FE32	.708
			FE33	.773
			FL34	.675
areness andBehavior	1.375	2.749%	FE35	.737
			FE36	.753
			FE37	.774
			FE38	.584
			FE39	.743
mmunicationand advice	1.340	2.681%	FE40	.731
			FE41	.668
			FE42	.708
Risk Management	1.134	2.268%	FE43	.681
			FE44	.806
			FE45	.752

Independence	1.100	2.201%	FE46	.762
			FE47	.769
			FE48	.765
Knowledge andunderstanding	1.090	2.180%	FE49	.809
			FE50	.715

Table 3: Exploratory Factor Analysis of Finance Education

Through exploratory factor analysis (EFA), 10 distinct factors have been identified in the EFAresults, which collectively explain a large proportion of variance in the dataset. The eigenvaluesof all factors are larger than one, indicating the significance of these factors. The first factor, called "core concept" Finance Education, contributes the largest variation by explaining 44.550%of the variance, which highlights the importance of this factor. The subsequent nine factors include not only some applied Finance Education knowledge, but also some decision- making skills and management practices, planning and goal setting, awareness and behaviour,communication and advice, risk management, confidence and independence, as well as some overall financial knowledge and understanding. Each factor has a set of items with high factorloadings, which indicates that these factors has strong associations with their respectiveconstruct. The factors have strong construct validity and internal reliability. Combined, these robust and reliable factors provide a comprehensive framework for measurement for Finance Education and will be further analysed for future research and application.

Factors name	Eigen value	Variance	Item converged	Factor loading
Awareness	6.184	68.708%	FGP1	.403
			FGP2	.576
			FGP3	.759
			FGP4	.781
			FGP5	.682
			FGP6	.725
			FGP7	.779
			FGP8	.752
			FGP9	.727

Table 4: Exploratory Factor Results of Financial Gaming Platforms

In the Table above, the "Awareness" factor has a high eigenvalue of 6.184, accounting for a meaningful 68.708% of the variance. The factor loadings show that all nine items (fromFGP1 to FGP9) are highly associated with the factor, with FGP4 having the highest connection. These findings suggest that the "Awareness" factor is a strong and lasting factor in the dataset, with agood ability to represent the latent dimensions of awareness perceptions for the participants.

Factors name	Eigen value	Variance	Item converged	Factor loading
ıancialRisk	5.104	72.910%	ID1	.653
			ID2	.817
			ID3	.823
			ID4	.806
			ID5	.699
			ID6	.788
			ID7	.518

Table 5: Exploratory Factor Results of Investment Decision

The "Financial Risk" factor identified in the EFA has a strong eigenvalue of 5.104 and explainsa substantial 72.910% of the variance. The factor loadings indicate that all seven items (ID1 toID7) are reasonably highly associated with the factor, with ID3 showing the strongest association. These results suggest that the defined factor is well constructed in the dataset, effectively capturing the underlying dimensions of financial risk perceptions among therespondents (Baistaman et. al., 2020)

Descriptive Statistics			
	Mean	Std. Deviation	N
ID	28.7347	7.39260	98
Gender	1.3673	.48456	98
Education	1.3163	.63566	98
FGP	36.6939	9.05016	98
FE	186.1633	44.95351	98

Table 6: Descriptive Statistics

The descriptive statistics presented above provide information about the central tendencies andvariations of the variables we are investigating. The mean of "ID" (Investment Decision) beingabout 28.73 suggests that on average participants scored about this value which reflects their engagement or involvement level in investment decision-making. In addition, the standard deviation of around 7.39 represents how much the individual score deviates from the mean, asa result measuring the variation in investment decision-making capabilities in the sample. Turning to "FGP" (Finance Gaming Platform) the mean of around 36.69 signifies that the participants on average reached this score of engagement with gaming platforms which are finance-focused. Meanwhile, for "FE" (Finance Education) the mean of about 186.16 indicates the participants on average achieved up to this score of Finance Education and the standard deviation of approximately 44.95 describes the degree of distribution of scores around this mean.

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.734[a]	.538	.518	5.12986	.538	27.111	4	93	.000	1.613
a. Predictors: (Constant), FE, Education, Gender, FGP										
b. Dependent Variable: id										

Table 7: Model Summary

The R-squared for the dependent variable, id, is 0.538, meaning that 53.8% of the variance in id is accounted for by the regression on the independent variables Finance Education (FE), Education,Gender, and Finance Gaming Platform (FGP).

The adjusted R-squared of the salary model is 0.518, so the model has predictive power even though many predictors are included.

Overall, the model fits the data fairly well, accounting for a good deal of the variation in the dependent variable. The Durbin-Watson statistic of 1.613 shows that there is no real autocorrelation among the errors, which is a decent indication that the errors are fairly independent of one another.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2853.766	4	713.442	27.111	.000[b]
	Residual	2447.336	93	26.315		
	Total	5301.102	97			
a. Dependent Variable: id						
b. Predictors: (Constant), FE, Education, Gender, FGP						

Table 8: ANOVA Table

The table above shows the results of the ANOVA regression analysis that was done. Our dependent variable was "Investment Decision" (ID), and we picked the predictors that we thought could influence ID the most. Those predictors were: Finance Education (a person's understanding of basic financial concepts); Education (a person's highest level of schooling); Gender (which we defined as either "M" for male or "F" for female); and the use of an investment game/single platform to provide some financial decision scenario.
When we try to judge the regression model's general good fit, we use the F-statistic. This allowsus to test the null hypothesis that all the predictors, as a group, don't relate to the value that thedependent variable takes as the subsequent value in its computational path. In this case, the F-statistic is 27.111. The significance (or "Sig.") of this predictor group is well established ($p < 0.0001$, more than adequate commercial level of significance)

To be exact, the "Regression" section of the table shows us the predictors' ability to account for the dependent variable's variance. The "Sum of Squares" for regression adds up to2853.766. On the next line, the "Residual" section represents the leftover, unaccountedvariable. That's the variance in the dependent variable that remains unexplained even after you have tried to explain it with the predictors. The sum of squares for the "Residuals" section is 2447.336.

The results from the ANOVA tests suggest that the independent variables—Finance Education, Education, Gender, and Finance Gaming Platform—all make a unique and statistically significant contribution to the prediction of the dependent variable "id" (Investment Decision).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	(Beta)		
1.	(Constant)	4.234	2.715		1.559	.122
	Gender	2.126	1.113	.139	1.911	.059
	Education	-.142	.831	-.012	-.170	.865
	FGP	.473	.095	.580	4.988	.000
	FE	.024	.019	.144	1.256	.212

Table 9: Coefficient Table with Investment Decision as dependent Variable

H2: Financial Gaming Platforms (FGP) significantly impact Investment Decision (ID).

The Beta value in the coefficient table, which stands for the standardized coefficient, is 0.580 and is significantly positive in relation to ID. The t-value for FGP is 4.988, and the p-value (Sig.) is <0.0001, which means that at least at the 0.05 level, the decision is significant—meaning we can say with confidence that FGP indeed impacts ID.

Model		Unstandardized Coefficients		StandardizedCoefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	4.610	2.912		1.583	.117
	Gender	2.349	1.185	.126	1.982	.050
	Education	-.178	.903	-.013	-.197	.844
	FE	.156	.013	.777	12.358	.000

Table 10: Coefficient Table with Finance Gaming Platform as dependent Variable

H1: Financial Gaming Platforms (FGP) significantly impact Finance Education (FE)
Here, the significant p-value (0.000) and the strong positive Beta coefficient (0.777) indicatethat Finance Education (FE) has noteworthy impact on Financial Gaming Platforms (FGP).

Hypothesis No.	Hypothesis	Supported/ Not Supported
1	Financial Gaming Platforms(FGP) significantly impact Finance Education (FE)	Supported
2	Financial Gaming Platforms(FGP) significantly impact Investment Decision (ID).	Supported

CONCLUSION

The results of the research provide useful insight into the relationships between financial gaming platforms, Finance Education, and investment decisions. The regression analysis results show that financial gaming platforms have strong impact on both Finance Education and investment decisions, which supports hypotheses 1 and 2.

These results highlight why we should include financial gaming applications into educational and decision-making processes, as they were shown to increase users' financialknowledge and investment decisions. Educational institutions, policymakers, and financialorganizations can all use these applications to increase financial knowledge and develop individuals' investment decision-making skills.

To conclude, this study adds to the growing literature on financial education, decision- making, and the potential impacts of innovative learning platforms. The results pertain tothe educational and financial sectors, asserting the potential advantages of integrating financial gaming platforms on Finance Education programs and investment decision- making process.

REFERENCES

1. Cheng, Y., & Milikich, N. (2023). An Analysis of How COVID-19 Shaped the Realm of Online Gaming and Lesson Delivery. Cornell University. https://doi.org/10.48550/arxiv.2304.06102
2. Firli, A. (2017). Factors that Influence Finance Education: A Conceptual Framework. IOPPublishing, 180, 012254-012254. https://doi.org/10.1088/1757-899x/180/1/012254
3. Delgadillo, L M. (2014). Financial Clarity: Education, Literacy, Capability, Counseling, Planning, and Coaching. Wiley-Blackwell, 43(1), 18-28. https://doi.org/10.1111/fcsr.12078
4. Hoseiny, S., & Niknafs, A. (2020). Study of the Serious Games Capacity in PromotingFinance Education. https://doi.org/10.1109/isgs51981.2020.9375426
5. Anisah, A., Suwatno, S., Ahman, E., & Disman, D. (2021). Android Based Finance Education Education for Indonesian Students: A Theoretical Approach. Atlantis Press. https://V doi.org /10.2991 /aebmr. k.210616.056

6. Didenko, I., Petrenko, K., & Pudło, T. (2023). The role of Finance Education in ensuring financial inclusion of the population. ARMG Publishing, 7(2), 72-79. https://doi.org/10.21272/fmir.7(2).72-79.2023
7. Emma, M., & Anya, S. (2021). A Study on Finance Education and Need for Financial Education. , 137-142. https://doi.org/10.53759/5181/jebi202101015
8. Lotter, M., & Okoro, C. (2023). Finance Education decision tree game: A system development exposé. https://doi.org/10.4995/head23.2023.16306
9. Laine, T H., & Lindberg, R S N. (2020). Designing Engaging Games for Education: A Systematic Literature Review on Game Motivators and Design Principles. Institute of Electrical and Electronics Engineers, 13 (4), 804-821.https: //doi.org /10.1109/tlt.2020.3018503
10. Costello, R., & Lambert, M. (2019). Motivational Influences for Higher Education (HE) Students. IGI Global, 9(1), 38-50. https://doi.org/10.4018/ijopcd.2019010103
11. Lobacheva, N A. (2020). Gamification of the Educational Process in Higher Education Institutions. https://doi.org/10.2991/iceder-19.2020.24
12. Ariff, M I M., Khalil, F M., Rahman, R A., Masrom, S., & Arshad, N I. (2022).Developing mobile game application for introduction to financial accounting. Institute ofAdvanced Engineering and Science (IAES), 27(3), 1721-1721. https://doi.org/10.11591/ijeecs.v27.i3.pp1721-1728
13. Hoseiny, S., & Niknafs, A. (2020). Study of the Serious Games Capacity in PromotingFinance Education. https://doi.org/10.1109/isgs51981.2020.9375426
14. Kurniasari, F. (2021). Implementation of GASING Stock Gamification to Increase Finance Education for High School Students. , 2(4), 274-285. https://doi.org/10.47747/ijfr.v2i4.507
15. Yulius, R., Neta, F., & Nasrullah, M F A. (2019). Improving Knowledge of Stock Marketin Batam through Gamified Mobile App. https://doi.org/10.2991/icaess-19.2019.61
16. Wolfe-Hayes, M A. (2010). Finance Education and education: An environmental scan.Taylor & Francis, 42(2), 105-110. https://doi.org/10.1016/j.iilr.2010.04.006
17. Firli, A. (2017). Factors that Influence Finance Education: A Conceptual Framework. IOPPublishing, 180, 012254-012254. https://doi.org/10.1088/1757-899x/180/1/012254
18. Saeedi, A., & Hamedi, M. (2018). Introduction: Basics of Finance Education. SpringerNature, 1-17.https: //doi.org/10.1007/978-3-319-77857-0_1
19. Lyons, A C., & Kass-Hanna, J. (2021). A methodological overview to defining andmeasuring "digital" Finance Education. Wiley, 4(2). https://doi.org/10.1002/cfp2.1113
20. Kurniasari, F. (2021). Implementation of GASING Stock Gamification to Increase Finance Education for High School Students. , 2(4), 274-285. https://doi.org/10.47747/ijfr.v2i4.507
21. Inchamnan, W., Niranatlamphong, W., & Engbunmeesakul, N. (2019). Gamification-Driven Process: Financial Literacy inThailand. https://doi.org/10.1109/ictke47035.2019.8966885
22. Maynard, N W., Mehta, P., Parker, J., & Steinberg, J. (2012). Can Games Build FinancialCapability? Financial Entertainment: A Research Overview. https://doi.org/10.7249/wr963
23. Cen, J A. (2021). Financial Literacy through Gameful Design.https: // uwspace. uwaterloo.ca /handle/10012/16775
24. Bayuk, J B., & Altobello, S A. (2019). Can gamification improve financial behaviour? Themoderating role of app expertise. Emerald Publishing Limited, 37(4), 951-975.https://doi.org/10.1108/ijbm-04-2018-0086
25. Alsawaier, R S. (2018). The effect of gamification on motivation and engagement. EmeraldPublishing Limited, 35(1), 56-79. https://doi.org/10.1108/ijilt-02-2017-0009
26. Zhu, J., & Zhang, L. (2023). Educational Game on Cryptocurrency Investment: UsingMicroeconomic Decision-Making to Understand Macroeconomics Principles. Palgrave Macmillan, 49(2), 262-272. https://doi.org/10.1057/s41302-023-00240-7
27. Cheng, Y., & Milikich, N. (2023). An Analysis of How COVID-19 Shaped the Realm of Online Gaming and Lesson Delivery. Cornell University. https://doi.org/10.48550/arxiv.2304.06102
28. Kaya, H D., & Kwok, J S. (2020). An Application Of Stock-Trak In 'Investments': What Common Mistakes Do Students Make While Studying Socioeconomic Processes?. Sumy State University, 4(1), 5-16. https://doi.org/10.21272/sec.4(1).5-16.2020
29. Ping, L Y., Heng, L K., Ean, T C G., & Kai, O J. (2020). Investigating the Effectiveness ofInter-Varsity Stock Challenge to Inculcate Stock Trading Literacy Amongst Youth. , 10(5).https: //doi.org /10.6007 /ijarbss/v10-i5/7176
30. Laine, T H., & Lindberg, R S N. (2020). Designing Engaging Games for Education: ASystematic Literature Review on Game Motivators and Design Principles. Institute of Electrical and Electronics Engineers, 13(4), 804-821. https://doi.org/10.1109/tlt.2020.3018503
31. Boot, W R., Andringa, R., Harrell, E R., Dieciuc, M., & Roque, N. (2020). Older adults andvideo gaming for leisure: Lessons from the Center for Research and Education on Aging and Technology Enhancement (CREATE). International Society for Gerontechnology, 19(2), 138-146. https: //doi.org /10.4017 /gt.2020.19.2.006.00
32. Mohsin, N F., Jali, S K., Arnab, S., Bandan, M I B., & Ma, M. (2022). The Adoption of Digital Games Among Older Adults. Science and Information Organization, 13(2). https: //doi.org /10.14569 /ijacsa. 2022.0130205
33. Firli, A. (2017). Factors that Influence Finance Education: A Conceptual Framework. IOPPublishing, 180, 012254-012254. https://doi.org/10.1088/1757-899x/180/1/012254
34. Saeedi, A., & Hamedi, M. (2018). Introduction: Basics of Finance Education. Springer Nature, 1-17.

https://doi.org/10.1007/978-3-319-77857-0_1
35. Lyons, A C., & Kass-Hanna, J. (2021). A methodological overview to defining andmeasuring "digital" Finance Education. Wiley, 4(2). https://doi.org/10.1002/cfp2.1113
36. Kurniasari, F. (2021). Implementation of GASING Stock Gamification to Increase Finance Education for High School Students. , 2(4), 274-285. https://doi.org/10.47747/ijfr.v2i4.507
37. Inchamnan, W., Niranatlamphong, W., & Engbunmeesakul, N. (2019). Gamification- Driven Process:Financial Literacy in Thailand.https://doi.org/10.1109/ictke47035.2019.8966885
38. Maynard, N W., Mehta, P., Parker, J., & Steinberg, J. (2012). Can Games Build FinancialCapability? Financial Entertainment: A Research Overview. https://doi.org/10.7249/wr963
39. Cen, J A. (2021). Financial Literacy through Gameful Design.https: //uwspace. uwaterloo.ca /handle/10012/16775
40. Bayuk, J B., & Altobello, S A. (2019). Can gamification improve financial behaviour? Themoderating role of app expertise. Emerald Publishing Limited, 37(4), 951-975.https://doi.org/10.1108/ijbm-04-2018-0086
41. Alsawaier, R S. (2018). The effect of gamification on motivation and engagement. EmeraldPublishing Limited, 35(1), 56-79. https://doi.org/10.1108/ijilt-02-2017-0009
42. Zhu, J., & Zhang, L. (2023). Educational Game on Cryptocurrency Investment: Using Microeconomic Decision-Making to Understand Macroeconomics Principles. Palgrave Macmillan, 49(2), 262-272. https://doi.org/10.1057/s41302-023-00240-7
43. Cheng, Y., & Milikich, N. (2023). An Analysis of How COVID-19 Shaped the Realm of Online Gaming and Lesson Delivery. Cornell University. https://doi.org/10.48550/arxiv.2304.06102
44. Kaya, H D., & Kwok, J S. (2020). An Application Of Stock-Trak In 'Investments': What Common Mistakes Do Students Make While Studying Socioeconomic Processes?. Sumy State University, 4(1), 5-16. https://doi.org/10.21272/sec.4(1).5-16.2020
45. Ping, L Y., Heng, L K., Ean, T C G., & Kai, O J. (2020). Investigating the Effectiveness ofInter-Varsity Stock Challenge to Inculcate Stock Trading Literacy Amongst Youth. , 10(5). https: //doi.org /10.6007 /ijarbss/v10-i5/7176
46. Laine, T H., & Lindberg, R S N. (2020). Designing Engaging Games for Education: A Systematic Literature Review on Game Motivators and Design Principles. Institute of Electrical and Electronics Engineers, 13(4), 804-821.https://doi.org/10.1109/tlt.2020.3018503
47. Boot, W R., Andringa, R., Harrell, E R., Dieciuc, M., & Roque, N. (2020). Older adults andvideo gaming for leisure: Lessons from the Center for Research and Education on Aging and Technology Enhancement (CREATE). International Society for Gerontechnology, 19(2), 138-146. https: //doi.org / 10.4017 / gt. 2020.19.2.006.00
48. Mohsin, N F., Jali, S K., Arnab, S., Bandan, M I B., & Ma, M. (2022). The Adoption of Digital Games Among Older Adults. Science and Information Organization, 13(2). https://doi.org /10.14569 /ijacsa .2022.0130205
49. Baistaman, J., Awang, Z., Afthanorhan, A., & Rahim, M Z A. (2020). Developing And Validating The Measurement Model For Finance Education Construct Using Confirmatory Factor Analysis, 8(2), 413-422. https://doi.org/10.18510/hssr.2020.8247
50. Levene's test. (2006). https://en.wikipedia.org/wiki/Levene%27s_test
51. Compen, B., Witte, K D., & Schelfhout, W. (2019). The role of teacher professional development in Finance Education education: A systematic literature review. Elsevier BV, 26, 16-31. https: //doi.org /10.1016/j.edurev.2018.12.001
52. Didenko, I., Petrenko, K., & Pudło, T. (2023). The role of Finance Education in ensuring financial inclusion of the population. ARMG Publishing, 7(2), 72-79. https://doi.org/10.21272/fmir.7(2).72-79.2023
53. Hastings, J., Madrian, B., & Skimmyhorn, W. (2013). Finance Education, FinancialEducation, and Economic Outcomes. Annual Reviews, 5(1), 347-373. https://doi.org/10.1146/annurev-economics-082312-125807
54. Didenko, I., Petrenko, K., & Pudło, T. (2023). The role of Finance Education in ensuring financial inclusion of the population. ARMG Publishing, 7(2), 72-79. https://doi.org/10.21272/fmir.7(2).72-79.2023
55. Firli, A. (2017). Factors that Influence Finance Education: A Conceptual Framework.IOP Publishing, 180, 012254-012254. https://doi.org/10.1088/1757-899x/180/1/012254
56. Lusardi, A., & Mitchell, O S. (2014). The Economic Importance of Finance Education: Theory and Evidence. American Economic Association, 52(1), 5-44. https://doi.org/10.1257/jel.52.1.5
57. Finke, M., & Huston, S J. (2014). Chapter 4: Finance Education and Education. RELX Group (Netherlands). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2402478
58. Lerman, R I., & Bell, E R. (2006). Finance Education Strategies: Where do WeGo fromHere? RELX Group (Netherlands). https://doi.org/10.2139/ssrn.923448
59. Kusuma, M., Narulitasari, D., & Nurohman, A. Y. (2021). Financial Inclusion and FinancialLiteracy Towards the Sustainability of MSMEs in Solo Raya. Jurnal Among Makarti, 14(2),62-76.