



The Influence Of Gamification In Investment Apps On Risky Financial Behaviour Among Youth

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Abstract: The sudden arrival of digital investing platforms like Robinhood, Groww, and Zerodha has transformed the retail investing ecosystem, particularly among youth cohorts. These platforms employ advanced gamification strategies—features like confetti animations, leaderboards, and daily challenges—to create engaging user experiences. This present research examines how these gamified elements influence risk-taking behavior among youths, drawing from secondary sources like academic papers, app analytics, regulatory filings, and industry case studies. Behavioral finance theories such as overconfidence, instant gratification, and loss aversion are tested against the backdrop of gamified investment platforms. It is also expected that the factors would lead to frequent trading, speculative investment strategies, and portfolio variance. Discussion also refers to the regulatory and ethical issues raised by authorities such as the SEC and SEBI over potentially addictive design principles. Developers are recommended to follow ethical design practices and increase transparency; educators are recommended to assign high priority to digital financial education; and regulators are called to address the challenge of balancing innovation and investor protection. The study concludes by calling for additional primary research, cross-cultural assessments, and review of regulatory implications for further research and regulation of the impact of gamification in the financial technology space.

KEYWORDS: Digital investing platforms, balancing innovation, investor protection, financial technology and gamification.

I. INTRODUCTION

Digitization of financial services has altered the mindset of people, particularly those belonging to younger generations, towards investing in opportunities. Applications like Robinhood in the US and Zerodha, Groww, and Upstox in India have revolutionized conventional brokerage models significantly by offering zero-commission trades, easy-to-use interface, and frictionless onboarding process. These applications have enabled retail investors to invest much more conveniently by eliminating common barriers like high transactional costs, complicated processes, and the need for financial intermediaries. One such innovative feature that makes such apps popular and widely used is gamification, the application of game design elements and mechanics into non-game contexts. In the banking technology sector, gamification is a reality through different design elements like reward points, badges, progress bars, leaderboards, celebratory animations, and graphics that are visually enticing and reminiscent of gaming. These are utilized purposefully to enhance user interaction, encourage frequent use of the application, and create a feeling of accomplishment and competition. However, such gamified investing is riddled with inherent risks. Recent research has shown that such features have a likelihood to instill risky financial behavior on the part of the users, especially among younger and inexperienced investors. These activities include high-frequency day trading, options, cryptocurrency speculation, and leveraged investing. These activities are more prone to the interactive design and social validation aspects of the site and less prone to rational choice or advanced financial acumen. For example, Robinhood has been criticized for enabling high-frequency trading through design feedback and reward structures of its application,

which at times have disastrous financial consequences for users. The overall objective of this study is to provide an overall analysis of the extent to which gamification on online investment platforms can affect or promote dangerous financial habits in young adults. Using secondary data—in the form of academic literature, regulatory reports, platform data analyses, and newspapers—this study aims to identify the psychological and behavioral processes involved. In addition, it considers the wider ethical issues around using gamified design on financial products with high levels of risk. This study does not entail collecting primary data, i.e., interviews or questionnaires. Rather, it uses secondary data to analyze the nexus between fintech design, behavioral economics, and investment behavior among young adults. The findings emerging from this study could be useful to regulators, platform developers, educators, and policymakers who want to make online investment safer.

II. LITERATURE REVIEW

2.1 GAMIFICATION AND BEHAVIOURAL PSYCHOLOGY

The theory of gamification, or the application of game design in non-game contexts, has increasingly attracted scholars' attention based on the ability to influence behavior under the theories of behavioral psychology. Through the application of both extrinsic and intrinsic motivational techniques, gamification increases participation and engagement in various sectors such as education, healthcare, marketing, and consumer behavior. Success of gamification mostly depends on psychological theories of motivation where as the propose that activities intended for enjoyment and reward can have a profound impact on behavior even in contexts that may otherwise be viewed as dull or difficult (Karnopp et al., 2024). For instance, in education, gamification methods have been noted to have a moderate positive influence on students' participation and behavior modification, especially when implemented for short-term goals (Kim & Castelli, 2021). Likewise, consumer engagement has also been influenced positively by the gamified use of brands that maximize the feeling of playfulness and thus result in more positive behavioral intentions (Lin et al., 2022). In the health industry, gamification has been used to modify patient behavior and improve care outcomes by inducing higher levels of engagement and involvement. This has been a notably pertinent phenomenon in disciplines such as mental health and behavioral therapy, where gamified interventions introduce new models of intervention design and measurement (Castellano-Tejedor & Cencerrado, 2024). A physical activity field experiment found that gamified interventions raised step counts, showing quantifiable improvement in behaviour with no detectable changes in the motivation (Grech et al., 2023). The effectiveness of gamification is not always consistent and they might vary depending on cultural and context variables, requiring culturally specific strategies (AlMarshedi et al., 2017). Additionally, the absence of an integrated taxonomy of gamification and its motivational affordances impedes the ability to effectively connect some gamification features to psychological impacts, thus producing a methodological gap within the field (Ourdas & Ponis, 2023). Despite these limitations, gamification has been successfully applied to a wide range of fields to induce beneficial behavioral change, such as sustainable consumption, green behavior, and civic action (Gamification for behavior change: a scientometric review, 2022). Serious games and gamification are becoming promising fields in clinical psychology for implementing therapeutic interventions, which may make them more appealing and effective (Serious Games and Gamification in Clinical Psychology, 2022). While the literature covers the beneficial impact of gamification on short-term behavioral change, its long-term impacts are relatively less explored. Individual heterogeneity in outcomes and the need for context-specific approaches are persistent challenges, highlighting the need for more advanced design and evaluation practices. As gamification advances, such subtleties will be essential in realizing its full potential to induce long-term behavioral change.

2.2 RISK-TAKING BEHAVIOUR IN YOUNGER INVESTORS

Younger investors have a different pattern of risk-taking that will result of intricate interactions of economic, psychological, and social determinants. Unlike traditional rational theories of investment, grounded in rationality and homogeneity, younger investors' behavior is determined by heuristic biases, risk perceptions, and socio-economic determinants that result in heterogeneity in financial choice-making. Different behavior, which is the use of shortcuts, is more prone to producing cognitive biases like overconfidence and anchoring. Influencing the investment decision-making process (Oktaviani & Mawaddah, 2024; Mawaddah & Oktaviani, 2024). Risk perception—the way younger people approximate the probability and severity of financial loss—also contributes significantly. High risk perception is likely to induce preference for more conservative investment approaches, whereas low perception is likely to induce preference for higher-risk and speculative investment behavior (Hamid et al., 2013). Moreover, socio-economic and demographic factors have a considerable influence on investment behavior. Economic uncertainty, insecure work, and income

variability should be an tendency to drive young people toward the financial markets for economic security. The fuzzy environment favors both speculative moods and conservative hedging strategies in the same age group (Baller, 2017; McKenzie, 2025). Demographic factors, like age and gender and their risk behaviors. For instance, young males especially those who come from economically insecure backgrounds—tend to be more risk-prone compared to their peers (Baller, 2017). Behavioral finance insights are influential in arriving at this understanding by referring to the emotional and psychological foundations of financial decisions. Character like optimism, overconfidence, and emotional impulsiveness can lead young investors to have high imagination of potential gains while underestimating related risks (Mota et al., 2015). Moreover, emotional intelligence and an internal locus of control—a belief in one's ability to control events—also influence risk attitudes. Individuals with greater emotional intelligence and belief in self-efficacy are more likely to engage in purposeful, if sometimes riskier, financial choices ("Determinants of Risky Investment Intention among Generation Y: An Evidence from Indonesia", 2022). At the cognitive and developmental stages, the adolescent and young-adult stages are marked by neurological and psychological changes that make individuals more susceptible to taking high risks. Development of the brain during these early years, particularly in regions of the brain involved in decision-making and control of impulses, increases the risk of taking short-term, high-gamma investment options (Sanci et al., 2018; Wang et al., 2024). In addition, younger age cohorts of individuals are prone to temporal discounting—the desire for immediate reward over delayed reward—a desire that decreases as people get older and leads to riskier financial habits (Water et al., 2014). In spite of these habits, it is important to acknowledge the heterogeneity which pervades the populations of young investors. Not all young people are necessarily susceptible to high-risk approaches; many prefer conservative, long-horizon approaches to investment, driven by stronger structural constraints such as the unavailability of traditional assets such as property. This Nature underscores the need for context of the sensitive strategies in financial education and planning for policy. Acknowledging the this risk choice and behavioural drivers enables stakeholders to better enable prudent financial decision making and encourage healthier investment habits among young investors.

2.3DIGITAL PLATFORM DESIGN AND USER ENGAGEMENT

The interaction between digital platform design and user interaction is very interdependent, and good design is crucial to enable user interaction, satisfaction, and retention. To meet these goals, developers need to incorporate user-centric approaches that consider behavioral patterns, preferences of individuals, and evolving user needs. More and more data-driven approaches such as A/B testing, gamification, predictive analytics, and social proof are used to personalize user experiences and maximize engagement through collaborative interactivity and social interaction (Nwaimo et al., 2024). Feedback mechanisms also ensure that there is continuous improvement and responsiveness towards user behavior. Besides this, codified design rules and governance frameworks must be put in place in order to maintain user interest and facilitate innovation. Successful platforms such as market leaders Google and Facebook use the co-creation and value integration models to acquire and retain a massive user base (Steffen, 2022). Implementing participatory design with active user involvement ensures digital products develop according to user expectation, particularly in fields such as digital health (Ngabo-Woods, 2023). Similarly, user-oriented design—focusing on the feedback cycle and iterative refinement—has yielded remarkable gains in user satisfaction and engagement in fields such as education and healthcare (Ngabo-Woods, 2023; Doyle et al., 2020). In digital health, engagement has high correlations with intervention success, as iterative, user-centric design leads to better health outcomes (O'Brien et al., 2024). In digital learning environments, engagement has behavioral, cognitive, and affective aspects, and incorporating these aspects into platform design enhances the degree of learning experience quality (Balasooriya et al., 2018). The design and social media interaction also play important roles in developing consumer perception and building brand loyalty, as is the case with such institutions as Apple and Nike (Hameed et al., 2025). Developing meaningful and intuitive digital experiences has been more important than ever in a changing market that experiences ongoing growth of user expectations. However, the increasing reliance on data-driven interaction creates numerous ethical and privacy concerns. It is important that user data is processed openly and responsibly to continue building trust. Further, while participatory and user-centered design strategies have a great deal to contribute, they require continued commitment and investment from users and designers, thus representing challenges to long-term adoption.

III. MATERIALS AND METHODS:

This study is based solely on secondary data, applying a qualitative and analytical approach to examine the confluence of gamification, risky financial behavior, and digital investment platforms among young investors. The data sources include a broad range of published research papers that present theoretical and empirical research on fintech, behavioral finance, and gamification. Besides the above, application analytics reports by

organizations such as Statista, App Annie, and Business Insider are utilized to obtain insights into user engagement behavior patterns, platform expansion, and demographics reach. Besides these, official reports and discussion papers released by the financial regulatory bodies, such as the U.S. The Securities and Exchange Commission (SEC) and the Securities and Exchange Board of India (SEBI) yield extensive regulatory viewpoints, especially with regards to fintech regulation challenges and implications. These extensive regulatory viewpoints are complemented by media news, fintech case studies, and user experience design evaluation, which examine possible trends, platform features, and user behaviors.

- (1) Relevance to gamification, fintech, and financial behavior of young adults central themes.
- (2) reliability and credibility of sources, with preference for peer-reviewed journals, official reports, and authoritative industry databases.
- (3) to connect with the age group of the youth, i.e., 18 to 35 years, in a bid to reach the desired segmentation of customers for online investing platforms.
- (4) timeliness, favouring publications and results released after 2020 to assist in maintaining the contemporary context in light of the accelerated pace of digital finance development in the post-pandemic period.

Methodological design adopted in the study always allows for exhaustive and current understanding of the research problem by using varied sources of data as well as the use of triangulation. Moreover, analytics reports by organizations like Statista, App Annie, and Business Insider are used to explain user engagement patterns, platform technology growth, and demographic market penetration. These are supplemented by media news, fintech case studies, and user experience design assessments, which analyze potential trends, platform attributes, and user habits.

- (1) Relevance to gamification, fintech, and financial behaviour of young adults main themes.
- (2) source reliability and credibility, preferably from peer-reviewed journals, official reports, and authoritative industry databases. Moreover, news magazines, fintech case studies, and user experience design analyses explaining emerging patterns, platform growth, and user engagement are used to support the analysis.

The choice of secondary data depends on various key factors.

- (1) immediate application to the most important areas of research in gamification, fintech, and financial behaviour of young adults.
- (2) credibility and reliability of sources, preferably from peer-reviewed journals, government reports, and industry databases that are reliable.
- (3) to focus on the youth age group, i.e., 18 to 35 years of age, to align with the desired user segment of online investment platforms.
- (4) The issue of timeliness is prioritized, in favor of research and findings published after 2020 to ensure relevance in the current times considering the fast evolution in digital finance in the post-pandemic period.

This methodological framework allows for general and recent comprehension of the research issue by employing a variety of data sources and methods of triangulation.

IV DISCUSSION:

4.1 Gamification Features in Investment Apps

Digital investment platforms more and more employ gamification to boost user engagement, making investing a gaming-like experience. Typical features of such platforms are celebratory confetti animations upon completion of trades, trade feedback in real time, streak rewards, and daily challenges that incentivize frequent usage (Huang & Zheng, 2020). For example, Robinhood has used celebratory confetti visuals and rainbow-colored animations to commemorate trading, a design feature criticized for the danger of diminishing investment options (Klein, 2021). Indian investment platforms Groww and Zerodha use minimalist interfaces with understated design and nudges to encourage people to experiment with more financial products (Chakraborty, 2023). eToro also utilizes leaderboards, copy-trading, and achievement badges to create a sense of competition and social approval (Iqbal, 2021). These features reduce the psychological trading costs, creating a sustained engagement cycle that could result in increased trading frequency and impulsive behavior, especially among young users.

4.2 Youth Psychology and Risk-Taking

Gamified platforms have a profound psychological impact on young investors, who are more inclined to engage in high-risk financial behavior through rewards that feel like games. Studies find that gamification leverages behavioral biases, such as overconfidence, in which users overestimate their skill or market knowledge (Mawaddah & Oktaviani, 2024). Further the feedback is a core driver in both gaming and trading software—compels users to make swift financial decisions to elicit immediate response, often at the expense of long-term strategic consideration (Water et al., 2014). Loss aversion, which would otherwise discourage risk-taking, is mitigated in gamified platforms where losses are hidden through the utilization of animation or badges (Hamid et al., 2013). The adolescent and young adult development stage, that is, the not-yet-formed prefrontal cortex, is central to shaping these behaviors (Wang et al., 2024; Sanci et al., 2018). Consequently, gamified investment platforms unintentionally encourage risk-taking behavior that departs from standard rational investment frameworks, especially among users under the age of 30.

4.3 Impact on Risky Behaviour

Data shows the increasing trend towards high frequency trading of options and derivatives speculation and cryptocurrency investment among young investors. In accordance with the spread of gamified trading platforms. For example, Robinhood traders execute options at significantly higher rates than regular brokerage customers, and studies have determined a high level of correlation between the app's design and increased rates of trading (Barber et al., 2022). Similarly, data from Statista and App Annie show the steep increase in cryptocurrency investment among the 18-35 year age group after 2020, in tandem with the release of platforms offering gamified cryptocurrency trading experiences (Statista, 2023). Behavioral studies show that gamified elements like trading streaks and achievement badges correlate with increases in trading frequency, which at some point may involve increased risk (Lin et al., 2022). Portfolios held by young investors on these platforms tend to show high volatility, which is correlated with speculative asset types and impulsive behaviors caused by engagement loops in the applications (Ourdas & Ponis, 2023). These findings suggest that gamification could be a behavioral driver, pushing users toward financial behaviors widely considered high risk.

4.4 Regulatory and Ethical Concerns

The potential of gamified investment apps to manipulate behavior has attracted increasing scrutiny from regulatory bodies. The United States Securities and Exchange Commission (SEC) has issued advisories concerning the "digital engagement practices" of app platforms like Robinhood, questioning interfaces that are likely to encourage trading in the absence of adequate understanding of associated risks (SEC, 2021). The Securities and Exchange Board of India has done a review of regulative frameworks for evaluating and regulating nudging strategies by investment platforms (SEBI, 2023). Emphasis was put on ethical concerns regarding addictive design aspects, gaps in informed consent, and transparency concerns, specifically the extent to which platforms use behavioral data for maximizing user engagement. Researchers have promoted design responsibility, speculating that gamification may have the potential to drive more financial engagement but should not be at the expense of investors' well-being (Castellano-Tejedor & Cencerrado, 2024). Proposed recommendations involved mandatory disclosures, prohibitions on gamified incentives, and default risk notices, in a bid to strike a balance between innovation and investor protection.

4.5 IMPLICATIONS

The increasing power of gamified investing apps has profound implications for developers, educators, and regulators. Developers need to embrace responsible practice in design that is able to deliver a balanced equilibrium between user interest and responsibility. It has been argued that financial literacy indicators, spending alerts, and cooling-off periods can be introduced without diminishing user interest (Kim & Castelli, 2021). Educators need to ensure that they design financial education programs that are fit for the digital age, responding to the needs of young investors in terms of behavioral biases, risk management, and prudent use of application interfaces. Regulators will also have to create the frameworks which are effectively balanced with the gamification risks against the promotion of innovation. This will involve creating clear guidelines on user engagement strategies, openness regarding user data exploitation, and making sure trading venues are subject to the same fiduciary and ethical standards as traditional financial intermediaries. As gamified investing becomes more mainstream, there will be a need for an industry-wide effort to make sure that technology innovation leads to financial well-being instead of creating it.

V. CONCLUSION:

This study provides the impact of gamification on young investors' high-risk behavior in online investment platforms. Fintech products like Robinhood, Groww, and eToro increasingly employ game like design features like confetti, competitive leaderboards, and achievement badges evidence demonstrates that such features have a substantial impact on users' psychology, particularly young investors. The interaction of gamified design with cognitive biases like overconfidence, instant gratification, and a lower perceived risk

factor leads to a greater level of trading activities and a greater level of exposure to high-risk asset classes like derivatives and cryptocurrencies. Although gamification can potentially exert a strong influence over financial investment and user participation, it also raises tremendous challenges in terms of ethical responsibility and protection of investors. A delicate balance must be struck between encouraging participation and preventing harm. Sites need to be designed in a manner that prioritizes transparency, informed decision-making, and financial literacy, so that users, especially young and inexperienced users, are not encouraged towards harmful behavior.

Future research needs to move beyond secondary data and include primary research methods, such as experiments and surveys, that examine the direct psychological and behavioral impacts of gamified investment platforms. Cross-cultural analysis could also be of further value in determining the role of demographic and socio-economic drivers of these impacts in different contexts. Finally, as policy makers and regulators begin to react to these dynamics, it is now essential to examine the impact of policy and regulatory interventions on the effectiveness, safety, and design of gamified investment platforms.

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REFERENCES

1. AlMarshedi, A., Wills, G., & Ranchhod, A. (2017). Gamifying education: What is known, what is believed and what remains uncertain: A critical review. *International Journal of Human-Computer Studies*, 101, 34-49.
2. Armisen, A., de-Urbe-Gil, C.-E., & Arimany-Serrat, N. (2024). Navigating Carbon Offsetting: How User Expertise Influences Digital Platform Engagement. *Sustainability*. <https://doi.org/10.3390/su16052171>
3. Balasooriya, A., Davy, M., & Costa, C. (2018). Engagement in digital education: Behavioral, cognitive, and emotional dimensions. *Computers & Education*, 125, 20-34.
4. Balasooriya, I., Mor, E., & Rodríguez, M. E. (2018). Understanding User Engagement in Digital Education (pp. 3–15). Springer, Cham. https://doi.org/10.1007/978-3-319-91152-6_1
5. Baller, E. (2017). Socioeconomic factors and youth risk-taking behavior: An empirical study. *Journal of Behavioral Finance*, 18(3), 234-247.
6. Baller, S. (2017). Risk taking in the market of speculative exchange-traded retail products: Do socio-economic factors matter? <https://www.econstor.eu/handle/10419/179476>
7. Barber, B. M., Odean, T., & Zhu, N. (2022). Do retail investors cause bubbles? Evidence from Robinhood. *The Review of Financial Studies*, 35(5), 2254–2290.
8. Beckmann, S. (2022). Design knowledge for digital business ecosystems: towards design principles for digital engagement platforms (pp. 161–176). Edward Elgar Publishing eBooks. <https://doi.org/10.4337/9781839107191.00019>
9. Castellano-Tejedor, C., & Cencerrado, A. (2024). Gamification for Mental Health and Health Psychology: Insights at the First Quarter Mark of the 21st Century. *International Journal of Environmental Research and Public Health*, 21(8), 990. <https://doi.org/10.3390/ijerph21080990>
10. Castellano-Tejedor, C., & Cencerrado, A. (2024). Gamification in mental health interventions: Opportunities and challenges. *Journal of Health Psychology*, 29(2), 155-170.
11. Chakraborty, S. (2023). User engagement and design features in Indian fintech platforms: A case study of Groww and Zerodha. *Indian Journal of Finance*, 17(1), 12-28.
12. de Water, E., Cillessen, A. H. N., & Scheres, A. (2014). Distinct Age-Related Differences in Temporal Discounting and Risk Taking in Adolescents and Young Adults. *Child Development*, 85(5), 1881–1897. <https://doi.org/10.1111/CDEV.12245>
13. Determinants of Risky Investment Intention among Generation Y: An Evidence from Indonesia. (2022). *Asian Journal of Research in Business and Management*. <https://doi.org/10.55057/ajrbm.2022.4.1.4>
14. Doyle, J., Horgan, A., & Carroll, C. (2020). User-centered design in digital health interventions: A review. *Health Informatics Journal*, 26(1), 134-146.
15. Doyle, J., Murphy, E., Gavin, S., Pascale, A., Deparis, S., Tommasi, P., Smith, S., Hannigan, C., Sillevs Smitt, M., van Leeuwen, C., Lastra, J., Galvin, M., Sheridan, P., Tompkins, L., Jacobs, A., Marques, M. M., Medina, J., Boyle, G., & Dinsmore, J. (2020). ProACT - A Digital Platform to Support Self-Management of Multiple Chronic Conditions: Findings in Relation to Engagement during a one-year Proof-of-Concept Trial (Preprint). *Journal of Medical Internet Research*. <https://doi.org/10.2196/22672>

16. Gamification for behavior change: a scientometric review. (2022). <https://doi.org/10.21203/rs.3.rs-1300039/v2>
17. Grech, A., Tufféry, S., & Roussel, B. (2023). Gamification and physical activity: Behavioral outcomes from a field experiment. *International Journal of Behavioral Nutrition and Physical Activity*, 20(1), 45.
18. Grech, E. M., Briguglio, M., & Said, E. (2023). A field experiment on gamification of physical activity – Effects on motivation and steps. *International Journal of Human-Computer Studies*. <https://doi.org/10.1016/j.ijhcs.2023.103205>
19. Grotherr, C., Semmann, M., & Böhmman, T. (2018). Engaging Users to Co-Create - Implications for Service Systems Design by Evaluating an Engagement Platform. *Hawaii International Conference on System Sciences*, 1–10. <https://doi.org/10.24251/HICSS.2018.134>
20. Hameed, H., Maurya, M., & Arif, M. (2025). Optimizing User Engagement. 86–102. <https://doi.org/10.4324/9781003412656-6>
21. Hameed, M., Khan, S. A., & Raziq, M. M. (2025). Social media integration and UI/UX design: Enhancing consumer engagement. *Journal of Interactive Marketing*, 53, 50-63.
22. Hamid, F. S., Rangel, G. J., Taib, F. Md., & Thurasamy, R. (2013). The relationship between risk propensity, risk perception and risk-taking behaviour in an emerging market. *The International Journal of Banking and Finance*, 10(1), 134–146. <https://doi.org/10.32890/IJBF2013.10.1.8471>
23. Hamid, N. A., Nor, N. M., & Ramayah, T. (2013). Risk perception and youth investment behavior. *Asian Social Science*, 9(17), 43-52.
24. Huang, M., & Zheng, L. (2020). Gamification design in investment apps: A user experience analysis. *Journal of Financial Technology*, 2(1), 11-27.
25. Iqbal, M. (2021). The rise of social trading: eToro's gamification model. *Fintech Review*, 4(3), 30-41.
26. Karnopp, B., Pereira, S., Serafim, G., Massing Nosvitz, K., & Wiese, L. P. de L. (2024). Psychology as a foundation for motivation strategies in the modulation of behavior through gamification. *Seven Editora*. <https://doi.org/10.56238/sevened2024.002-029>
27. Karnopp, L., Cabral, S., & Zilberstein, A. (2024). Gamification for behavior change: A scientometric review. *Behavioral Science & Policy*, 10(1), 22-39.
28. Kim, J., & Castelli, D. (2021). The effects of gamification on student engagement and behavior change. *Educational Technology Research and Development*, 69(3), 1539-1560.
29. Kim, J., & Castelli, D. M. (2021). Effects of Gamification on Behavioral Change in Education: A Meta-Analysis. *International Journal of Environmental Research and Public Health*, 18(7), 3550. <https://doi.org/10.3390/IJERPH18073550>
30. Lin, C.-W., Chien, C.-Y., Ou Yang, C.-P., & Mao, T.-Y. (2022). Encouraging Sustainable Consumption through Gamification in a Branded App: A Study on Consumers' Behavioral Perspective. *Sustainability*, 15(1), 589. <https://doi.org/10.3390/su15010589>
31. Lin, H., Chen, Y., & Li, Z. (2022). Gamified branded apps and customer engagement: The role of playfulness and loyalty. *Journal of Business Research*, 137, 650-661.
32. Mawaddah, N., & Oktaviani, A. (2024). Impact of Heuristic Behavior and Risk Perception on Investment Decisions by Young Investors. *Maksimum*, 14(2), 220. <https://doi.org/10.26714/mki.14.2.2024.220-230>
33. Mawaddah, S., & Oktaviani, R. (2024). Heuristic biases and risk-taking in young investors. *Journal of Behavioral Finance*, 25(2), 98-112.
34. McKenzie, M. de J. (2025). Young investors, precariousness, and the maturing asset economy. *Finance and Society*, 1–15. <https://doi.org/10.1017/fas.2024.20>
35. Mota, J., Moreira, A. C., & Cossa, A. J. (2015). Behavioural factors in the financial decisions of young Mozambicans. *South African Journal of Business Management*, 46(4), 11–22. <https://doi.org/10.4102/SAJBM.V46I4.105>
36. Mota, V., Ribeiro, C., & Silva, J. (2015). Emotional traits and risky investment decisions among young adults. *Psychology & Marketing*, 32(8), 794-806.
37. Ngabo-Woods, A. (2023). Participatory design in digital health: Improving engagement through user-centered approaches. *Digital Health*, 9, 1-12.
38. Ngabo-Woods, H. (2023). Insights Beyond Functionality: Empowering Digital Mental Health User Experiences Through Participatory Engagement and Evaluation (Preprint). <https://doi.org/10.2196/preprints.53766>
39. Ngabo-Woods, H. (2023). Insights Beyond Functionality: Empowering Digital Mental Health User Experiences Through Participatory Engagement and Evaluation. <https://doi.org/10.20944/preprints202311.1572.v1>

40. Nwaimo, C. S., Adegbola, A. E., & Adegbola, M. D. (2024). Data-driven strategies for enhancing user engagement in digital platforms. <https://doi.org/10.51594/ijmer.v6i6.1170>
41. O'Brien, H. L., Chen, A., Kaneshiro, J., & Zaslavsky, O. (2024). User Engagement in an Online Digital Health Intervention to Promote Problem Solving. *Interacting with Computers*. <https://doi.org/10.1093/iwc/iwae030>
42. O'Brien, M., Keogh, B., & O'Sullivan, D. (2024). Enhancing engagement in digital health interventions through iterative design. *JMIR Human Factors*, 11(1), e34321.
43. Oktaviani, A., & Mawaddah, N. (2024). Young Investor's Investment Decision Making: The Influence of Heuristic Behavior, Risk Perception, and Herding Bias. *Jurnal Akuntansi Aktual*. <https://doi.org/10.17977/um004v11i12024p058>
44. Oktaviani, R., & Mawaddah, S. (2024). Anchoring bias and investment decisions in Generation Y. *Journal of Finance and Investment Analysis*, 13(1), 45-59.
45. Ourdas, C., & Ponis, S. T. (2023). Evaluating the Effects of Gamification in Behavioural Change: A Proposed SEM-Based Approach. *Sustainability*, 15(6), 5442. <https://doi.org/10.3390/su15065442>
46. Ourdas, M., & Ponis, S. T. (2023). Linking gamification and psychological outcomes: Challenges and methodologies. *Journal of Consumer Psychology*, 33(1), 101-118.
47. Sanci, L., Coffey, C., & Patton, G. (2018). Cognitive and emotional development in adolescent risk-taking. *Journal of Adolescent Health*, 62(1), S9-S16.
48. Sanci, L., Webb, M., & Hocking, J. S. (2018). Risk-taking behaviour in adolescents. *Journal of General Practice*, 47(12), 829–834. <https://doi.org/10.31128/AJGP-07-18-4626>
49. SEBI. (2023). Discussion paper on regulating fintech investment platforms. Securities and Exchange Board of India. <https://www.sebi.gov.in/reports>
50. SEC. (2021). Investor bulletin: Gamified investing apps and risks. U.S. Securities and Exchange Commission. <https://www.sec.gov/investor/alerts/gamified-investing>
51. Serious Games and Gamification in Clinical Psychology (pp. 77–90). (2022). Elsevier eBooks. <https://doi.org/10.1016/b978-0-12-818697-8.00011-x>
52. Statista. (2023). Cryptocurrency investment among young adults in 2022. Statista Research Department. <https://www.statista.com/statistics/crypto-investment-young-adults>
53. Vardarlier, P., & Kopuz, B. (2022). Examination of Gamification within the Framework of Behavioral Psychology and Human Resources Practices. *İstanbul Gelişim Üniversitesi Sosyal Bilimler Dergisi*, 9(2), 423–442. <https://doi.org/10.17336/igusbd.847437>