

NAVIGATING DIGITAL FINANCIAL RISKS AMONG ADOLESCENTS: A SCOPING REVIEW OF FINANCIAL LITERACY EDUCATION THROUGH GAMIFICATION

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Abstract

The development of digital financial services has facilitated adolescents' access to various financial products, including installment payment features and online lending services. However, this increasing accessibility is not always accompanied by adequate financial management skills, potentially leading to excessive consumption behavior and digital debt risks. This study aims to examine the existing literature on gamification-based financial literacy education as an approach to improving adolescents' financial understanding and supporting their ability to navigate digital financial risks. A scoping review methodology was employed by analyzing 21 research articles focusing on financial literacy, digital financial risks, and the implementation of gamification in financial education. The findings indicate that while financial literacy plays an important role in developing responsible financial behavior, it needs to be strengthened through interactive learning experiences, enhanced self-control, and social support. Gamification-based educational approaches incorporating simulations, challenges, rewards, and interactive learning activities demonstrate potential in improving adolescents' engagement and financial understanding in a sustainable manner. This study proposes the conceptual framework of "CuanEra" as an integrative approach that combines engaging financial education, digital risk awareness, and community support to strengthen adolescents' financial resilience in the digital era.

Keywords: Financial education; Gamification; Young generation; Digital financial literacy; CuanEra

INTRODUCTION

The rapid development of technology has transformed nearly every aspect of societal life, including the ease of conducting various economic activities such as transaction methods and financial decision-making. Digital transformation not only brings convenience in communication but has also shaped a new economic ecosystem that is highly dependent on digital platforms such as financial applications and electronic payment systems. Indonesia is one of the countries with the highest level of digital economy adoption in Southeast Asia (Afdal et al., 2026).

Based on the results of the 2025 National Survey of Financial Literacy and Inclusion (SNLIK) conducted by the Financial Services Authority (OJK), the financial literacy level of the Indonesian population was recorded at 66.46 percent, while the financial inclusion level reached 80.51 percent. However, among the 15- to 17-year-old age group, the financial literacy level remained at only 51.86 percent. This gap between inclusion and literacy suggests that increased access to financial services has not been matched by adequate understanding of how to use them and the risks associated with available financial products and services. (Safina, 2026). Adolescents, or Generation Z, who have grown up in the digital era, have easy access to various digital financial services such as mobile banking, e-wallets, pay later, and online investment platforms. This convenience gives adolescents strong opportunities to manage their finances effectively. However, if not balanced with adequate financial literacy, it will give rise to other risks.

Financial literacy is the ability to manage financial resources effectively, which is important for every individual to possess. It concerns not only knowledge about finance but also attitudes and skills in managing finances. According to Lusardi and Mitchell (2014), poor financial decision-making is the result of low literacy, which affects a person's future economic well-being. In addition, low understanding of financial literacy can give rise to various serious risks for consumers, such as being trapped in debt, losing control over personal data, and becoming a victim of fraudulent financial practices or bogus investment scams.

The lack of effective learning methods in delivering financial concepts means that although financial literacy has received attention, challenges remain in improving adolescents' understanding. The financial literacy approaches used so far tend to be less interactive and theoretical in nature (Kaiser, 2020). According to Kansarina (2015), low financial literacy among Generation Z influences consumptive behavior and a preference for a hedonistic lifestyle, causing Generation Z to be reluctant to save and to disregard priorities. The culture of saving is not merely an economic behavior but is also closely related to character building, in which children learn about responsibility, discipline, and the ability to delay gratification for long-term needs through the habit of saving (Muttaqin, 2026).

Gamification has a positive impact on efforts to improve participants' understanding and skills in various fields, including financial literacy. The gamification approach allows participants, namely adolescents or Generation Z, to learn actively rather than merely listening to or reading theory, but through direct practice and experience (Chisholm-Burns et al., 2017). The use of game-based financial management simulations can help participants understand concepts more easily, such as financial planning, investment, and risk management in a

more applicable manner. In addition, the competitive element in gamification can increase participants' motivation to be more active in learning and to try to apply the concepts they have learned (Rahim et al., 2022).

Gamification has the potential to become a bridge between knowledge and practical simulation through experiences such as everyday financial problems. In the context of digital risk, learning can be designed by creating challenges to distinguish between safe and unsafe transactions, to recognize fraud attempts, to protect personal information, to consider the consequences of online purchases, as well as to evaluate financial decisions. Through such practical simulations, Generation Z gets the opportunity to understand the consequences of a decision without having to experience actual financial loss. Research on financial literacy education and gamification-based learning has developed, although the focus of the literature remains varied. Some studies focus solely on improving financial literacy, while others focus more on the use of gamification as a learning medium. On the other hand, the growth and development of digital financial services present very clear risks, so it is necessary to map how education on financial literacy through gamification strategies is used to prepare adolescents to face these risks.

Based on these problems, a scoping review is needed to systematically map the development of research on financial risks among adolescents related to financial literacy education through gamification for adolescents in the digital financial era. This study is also directed at identifying the characteristics and forms of intervention used, the types of digital risks focused on, the aspects of financial literacy developed, and the results reported in previous research. This scoping or mapping is expected to show the development of knowledge in this field and identify research gaps, thereby providing insight for the development of research and interventions in digital financial literacy education that are suited to the needs of adolescents.

RESEARCH METHOD

This study employed a scoping review approach to identify, map, and summarize the existing literature on gamification-based financial literacy education as a strategy to help adolescents better understand and respond to digital financial risks. The review followed the scoping review framework proposed by Arksey and O'Malley and later refined by Levac et al., while the reporting process was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).

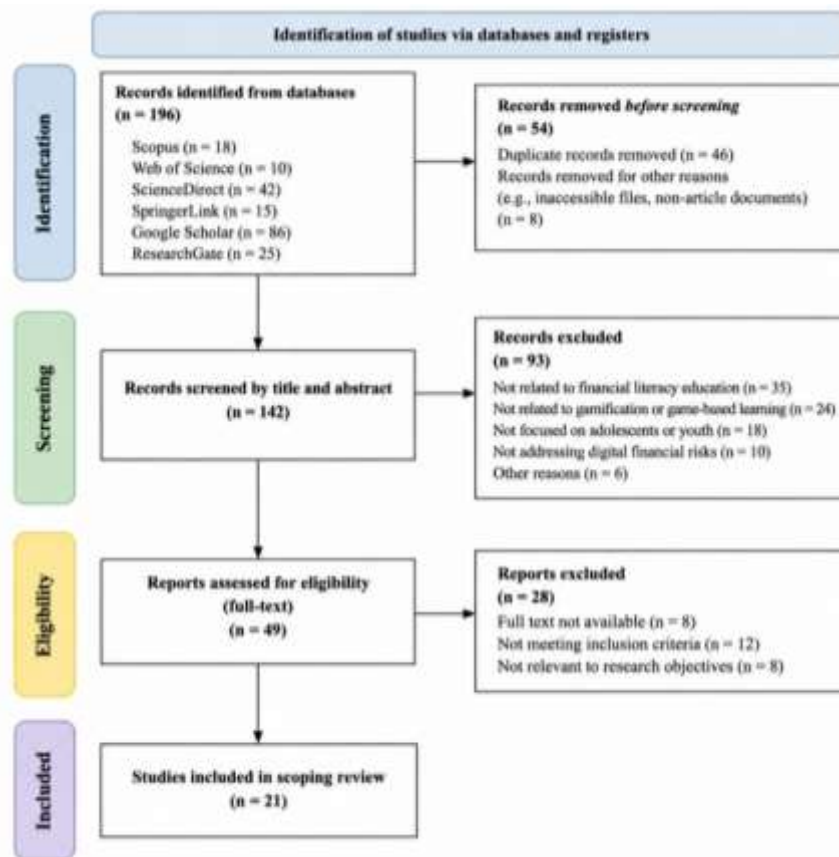
The research question was developed using the Population–Concept–Context (PCC) framework. Adolescents were defined as the population, gamification-based

financial literacy education as the concept, and digital financial risk as the context. Based on these elements, the study addressed the following question: “How is gamification used in financial literacy education to help adolescents understand and respond to digital financial risks?”

Relevant literature was identified through searches of several academic databases, including Web of Science, ScienceDirect, SpringerLink, and Google Scholar. The search strategy focused on three main concepts: adolescents, financial literacy or digital financial risks, and gamification. Keywords related to these concepts were combined using the Boolean operators AND and OR to retrieve studies that were relevant to the research focus.

All articles identified through the search were compiled and initially assessed for their relevance to the objectives of the study. The screening process was then conducted in stages, beginning with a review of titles and abstracts, followed by a full-text assessment of articles that met the initial screening criteria. Final eligibility was determined based on the predefined inclusion and exclusion criteria. The inclusion criteria covered studies related to adolescents, financial literacy, digital financial risk, and the implementation of gamification or game-based learning. All stages of article selection were documented through a PRISMA flow diagram.

Figure 1. PRISMA-ScR Flow Diagram of Study Selection Process



Data from the eligible articles were extracted using a data charting sheet. The information recorded included the authors, year of publication, country of study, research design, participant characteristics, type of intervention, gamification elements, financial literacy topics, types of digital financial risks, and the main findings of each study. The extracted data were then analyzed descriptively and thematically to identify recurring patterns and trends in the literature, particularly in relation to the types of digital financial risks faced by adolescents, the forms and implementation of gamification in financial literacy education, and the reported learning outcomes or impacts. The results of the analysis are subsequently presented in the form of tables and narrative descriptions to provide an overview of the development of research in this field while also identifying research gaps that still need to be examined further.

RESULTS AND DISCUSSION

Mapping of Literature Characteristics and Methodological Trends

The results of the literature mapping show that studies on gamification-based financial literacy education have developed quite rapidly in recent years (Effendi et al., 2026). The increasing attention to this topic cannot be separated from the increasingly widespread use of financial technology (fintech) among adolescents and Generation Z. This change has also influenced the way young people conduct transactions, manage money, and interact with various digital financial services (Gunibala, 2025).

Based on the articles analyzed, most studies used a quantitative approach with experimental or quasi-experimental designs, particularly in educational settings such as schools and universities (Kaiser & Menkhoff, 2020). The dominance of this approach indicates that previous research largely attempted to measure changes in financial knowledge, understanding of financial concepts, and behavioral change following an educational intervention (Johnson et al., 2021).

However, the mapping results also show that research using qualitative approaches, such as in-depth case studies or exploration of user experience, remains relatively limited. In fact, such approaches are needed to understand the psychological and social factors that influence adolescents' financial decisions, including how environmental pressure, peer influence, and personal experience shape their financial behavior (Sutisna et al., 2025).

Typology of Digital Financial Risks among Adolescents

Based on the synthesis of the literature, there are several major forms of risk that frequently arise in the use of digital financial services by adolescents and young people. The first risk relates to the increasing use of digital credit and a tendency toward impulsive consumption. The presence of Buy Now Pay Later (BNPL) services

provides convenience in conducting transactions, but at the same time can alter an individual's perception of purchasing ability because payment is not made directly. This condition can create the perception that a product is more affordable than its actual value (Kholifah et al., 2026).

The ease of access without a complex credit process can also increase the tendency toward impulsive purchasing, especially when users are exposed to digital promotions, lifestyle trends, and marketing strategies through social media (Restike et al., 2024). For adolescents who are still in the stage of forming financial habits, this condition can increase the risk of financial decision-making that gives insufficient consideration to long-term consequences.

The next risk relates to the increasing presence of illegal online lending and the potential misuse of personal data. Low understanding of digital security and consumer protection mechanisms can make adolescents more vulnerable to illegal financial services (Fatkhuri et al., 2025). The resulting impact is not only economic problems due to payment burdens, but also psychological pressure caused by unethical collection practices and the misuse of users' personal information (Sutisna et al., 2025).

In addition, there is a gap between the high level of access to financial technology and individuals' ability to evaluate the risks of its use. Although Generation Z shows a high level of digital payment usage, understanding of consumer protection, financial security, and the consequences of credit decisions still needs to be strengthened (Morgan et al., 2019). This condition becomes increasingly complex with social influences such as Fear of Missing Out (FOMO) and peer pressure, which can affect consumption decisions and the use of digital credit services (Haqi & Trisnaningsih, 2025).

Implementation and Integration of Gamification as a Financial Education Approach

The results of the study show that gamification has the potential to transform the previously one-way financial education approach into a more interactive learning process that actively involves participants (Hamari et al., 2014; Schöbel et al., 2020). Across the various studies analyzed, real-situation-based simulation is one of the approaches frequently used because it allows participants to practice financial decision-making within a safe learning environment.

Through such simulations, adolescents can practice budgeting, determining spending priorities, building saving habits, and understanding the consequences of certain financial decisions, such as the use of digital credit or BNPL services (Frisancho et al., 2021). The advantage of this approach lies in its ability to provide direct experience without exposing participants to actual financial risk.

In addition to simulation, gamification elements such as challenges, achievement badges, leaderboards, and virtual rewards can increase participants'

motivation and engagement during the learning process (Schöbel et al., 2020). Interactive digital quiz-based learning also shows potential in increasing participant participation compared to conventional education methods that rely solely on one-way material delivery (Elfita et al., 2025; Fatkhuri et al., 2025).

Learning Impact and Changes in Adolescents' Financial Behavior

Based on the synthesis of various studies, game-based financial education makes a positive contribution to improving adolescents' financial understanding and ability (Mancone et al., 2024). However, changes in financial behavior are not only influenced by increased knowledge but also require other supporting factors such as self-control and the social environment.

Digital financial literacy acquired through interactive learning can help improve an individual's ability to understand the consequences of the financial decisions they make (Safina & Hardini, 2026). Adolescents with better self-control tend to be able to control consumption impulses and consider financial decisions more rationally when facing various digital credit offers (Tamara & Agustina, 2024).

On the other hand, group-based learning also provides room for peer learning and the formation of more positive social norms toward financial management (Bandura, 1986). Through interaction with peers, adolescents not only gain financial knowledge but can also act as disseminators of information and agents of change within their social environment (Amagir et al., 2018; Fatkhuri et al., 2025).

Development of the CuanEra Conceptual Framework as an Innovative Solution

Although research on digital financial literacy and consumptive behavior among Generation Z continues to develop, there remains room to develop an educational approach that not only enhances financial knowledge but also helps adolescents address the risks associated with the use of digital financial services. One approach that can be developed is to combine gamification-based education with efforts to prevent the risks of digital debt. Based on the synthesis of the literature, this article develops CuanEra as a conceptual framework for financial education that connects knowledge, learning experience, and social support.

The development of CuanEra is also grounded in conditions observed in the field. This idea was further supported by the author's experience in conducting a simple financial literacy education activity in the Tabanan area of Bali. The activity provided an indication that financial education for children and adolescents cannot rely solely on the delivery of theoretical material, but needs to be presented through activities that are more interactive and relevant to their everyday lives. This experience subsequently became one of the considerations in developing CuanEra as a learning framework that focuses not only on the delivery of knowledge, but also provides opportunities for participants to practice financial decision-making and receive continuous support.

As a solution for financial education, CuanEra is designed through three interconnected stages. The first stage is conducted through school-based education in the form of discussions and interactive practical activities involving student volunteers and financial practitioners. Students are not only provided with material on financial management, but are also encouraged to distinguish between needs and wants, develop saving habits, and understand the importance of sharing. The involvement of student volunteers can also provide examples of financial behavior that are more relatable to students' lives. This is consistent with Social Cognitive Theory, which explains that individuals can learn behavior by observing others who serve as models (Bandura, 1986).

The second stage is conducted through the CuanEra application, which functions as a medium for continuing the learning process while developing financial habits. The application incorporates gamification elements, such as budget management simulations, peer saving challenges supported by points and badges, and modules on the risks of PayLater and illegal online lending. Through these simulations, students can practice financial decision-making without having to immediately face the financial consequences in real life. The materials also include an introduction to digital credit risks, hidden fees or interest, and technology-based fraud. Thus, the learning process does not stop at conceptual understanding, but is directed toward the ability to identify and consider risks before making simple financial decisions, thereby developing everyday financial habits.

The third stage involves community-based support to sustain the learning process and behavioral change. This support is provided through peer educators who can serve as discussion partners for adolescents regarding the financial issues they encounter. In addition, CuanEra proposes the establishment of community financial consultation posts at the village level as a place where adolescents can obtain information and support when facing financial problems. These posts can provide education on the long term consequences of digital debt, including its implications for credit history within SLIK OJK. If the problems encountered require further intervention, the consultation posts can collaborate with financial institutions, psychologists, and police complaint services to provide appropriate support.

These three stages demonstrate that CuanEra does not position financial literacy merely as a process of delivering knowledge. Knowledge needs to be accompanied by opportunities to practice decision-making and support from the social environment so that the learning process is more closely connected to behavioral change. Therefore, CuanEra integrates three main components, namely knowledge, learning experience, and social support. Knowledge provides adolescents with a foundation for understanding financial concepts, choices, and risks; learning experience provides opportunities to apply this knowledge through

simulations and interactive activities; while social support helps sustain the learning process through peer and community support. Through the combination of these three components, CuanEra is expected to serve as an alternative approach to improving adolescents' readiness to use digital financial services more responsibly.

This framework is also aligned with several policy directions and development agendas. The strengthening of knowledge and learning experience is related to SDG 4 (Quality Education) because it supports financial learning that is more relevant, contextual, and applicable for adolescents. Efforts to build an understanding of digital debt risks and strengthen social support are also related to SDG 1 (No Poverty) because they can help reduce vulnerability to financial decisions that may worsen economic conditions. Meanwhile, the combination of knowledge, learning experience, and social support supports SDG 8 (Decent Work and Economic Growth) by strengthening financial capabilities that can serve as a foundation for healthier and more productive economic participation in the future.

In addition, CuanEra is aligned with Presidential Regulation Number 114 of 2020 concerning the National Strategy for Financial Inclusion, which identifies students, university students, and youth as important target groups in efforts to increase financial inclusion. This framework is also aligned with the vision of Indonesia Emas 2045 and the Asta Cita as outlined in Indonesia's 2025–2029 National Medium-Term Development Plan (RPJMN), particularly Asta Cita 4, which emphasizes the strengthening of human resources, education, science, technology, and the role of young people, as well as Asta Cita 6, which emphasizes development at the village level, economic equity, and the strengthening of community economies. Thus, CuanEra not only offers a gamification-based approach to financial education, but also has relevance to national development directions that position youth, education, financial inclusion, and the strengthening of community economies as important components of long-term development.

CONCLUSION AND RECOMMENDATIONS

The findings from this scoping review of 21 articles indicate that gamification-based financial literacy education has the potential to serve as an alternative approach to improving adolescents' financial understanding in the digital era. This study shows that the use of interactive elements in learning can increase student engagement and help them better understand financial concepts. However, improving financial literacy requires strengthening self-control and fostering a positive social environment to encourage lasting changes in financial behavior.

The literature review also indicates that research on financial education through gamification still has limitations, particularly regarding the integration of digital financial risks and psychosocial factors specific to adolescents. Therefore, this

study proposes the CuanEra conceptual framework as an integrative approach combining financial education through gamification, digital risk awareness, and community support through the role of CuanHero peer educators. This framework should serve as a basis for developing a financial education model better suited to the characteristics of the younger generation.

Further research is recommended to empirically test the *CuanEra* framework using experimental, qualitative, and longitudinal approaches with different groups of adolescents. In addition, future studies could consider factors related to digital literacy, socio-environmental influences, and consumer protection aspects to develop more effective and sustainable gamification-based financial education strategies.

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It is hoped that this article can contribute to the development of innovative approaches to financial education for young people in the digital age, particularly through the integration of technology, gamification, and community support to strengthen financial literacy and resilience among adolescents.

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