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Research Article

Enhancing Financial Education with AI and VR: Data-Driven Insights and Future Trends

WANG Yue[1], Edwin Ng Siew Kten[2]*
[1] *aSSIST University, Seoul, South Korea, Wangyue3190680@gmail.com*
[2] *Department of Curriculum & Instructional Technology, Faculty of Education, University Malaya, Kuala Lumpur, Malaysia, 24076824@siswa.um.edu.my, ORCID: https://orcid.org/0000-0003-2761-6465*

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ABSTRACT

Financial literacy is an essential skill in today's economy, yet many lack the needed knowledge to enable them to make informed financial decisions. This paper explores the integration of Artificial Intelligence AI) and virtual reality (VR) in financial learning. It delves into the many ways these technologies create conducive and enhanced learning experiences across all spectrums of learners. With their successful integration into the financial learning experience, learners can grasp various financial concepts and improve their financial decision-making skills. With a combination of AI-driven personalized learning together with immersive virtual reality (VR) simulation, an enhanced learning environment is created. With the assimilation of the two technologies previously complex financial concepts are broken down into easy-to-understand information. The practicality of the new environment and its engaging nature only adds flavor in the better assimilation of financial concepts. The study goes through current uses of artificial intelligence (AI) and virtual reality (VR) in financial education, together with their benefits and various limitations. It also puts into perspective relevant insights from recent case studies. The findings to large extent demonstrate the improvements achieved with AI and VR in financial literacy through an interactive and experiential learning environment. The paper concludes with several recommendations for further research and strategies to maximize the effectiveness of the technologies in financial education.

Keywords: Financial Education, AI, VR

1. Introduction

There was a time in human evolution when humans could not conceptualize Artificial Intelligence or Virtual Reality, especially artificial Intelligence, which was initially conceptualized in the fictional world. The first sighting of AI in any writing is found in Isaac Asimov's work titled "Runaround ."The story is about a robot that was developed by Gregory and Mike Donavan, who were engineers. Conversely, virtual Reality has its roots earlier than Artificial Intelligence, with Jaron Lanier considered the pioneer of the virtual reality world. He is the first individual to coin virtual Reality and lead the world's top virtual reality hardware and software manufacturers. Lanier is the father of virtual Reality (Chhawchharia, 2023). These concepts do not exist separately, based on the desire to solve certain human limitations. The growth of virtual Reality was accelerated by successful early people who showed that the concept could be incorporated into many daily problem-solving situations. The successful deciphering of the Enigma code by the machine "The Bombe" is an example of a historical moment that showed Artificial Intelligence can be advanced (Nichols et al., 2023). Being financially literate is essential in ensuring an individual manages his finances and makes the best financial decisions. An issue that limits the traditional methods used in financial education is their lack of engagement and non-existent practical experiences (Mhlanga, 2020). With a necessity to solve such challenges in the financial sector, the advancement of AI and VR brings innovative solutions that are personalized, immersive, and interactive, hence improving the learning experience (Villena Zapata et al., 2024). This paper examines the integration of AI and VR in financial education, analyzing the impact of the two on learning outcomes, benefits, and challenges.

2. Artificial Intelligence in Financial Education

2.1 AI-Driven Personalized Learning

AI-driven platforms advance financial education for individuals by first analyzing their behavior to determine their specific needs. Through AI-powered Chatbots and virtual tutors, real-time financial guidance is offered, creating a more engaging and accessible learning environment (Garcia & Martinez, 2023). The environment benefits from the algorithm's ability to leverage machine learning and analyze data, combined with artificial Intelligence to create the learning environment (Zhu, 2025). In AI-driven simulations, students can experience real-world situations in a 3D manner, improving interest in the subject matter they are learning. Through these methods of new experience learning, students are motivated to pay more attention and be better in financial matters.

Table 1 highlights some AI applications in financial education.

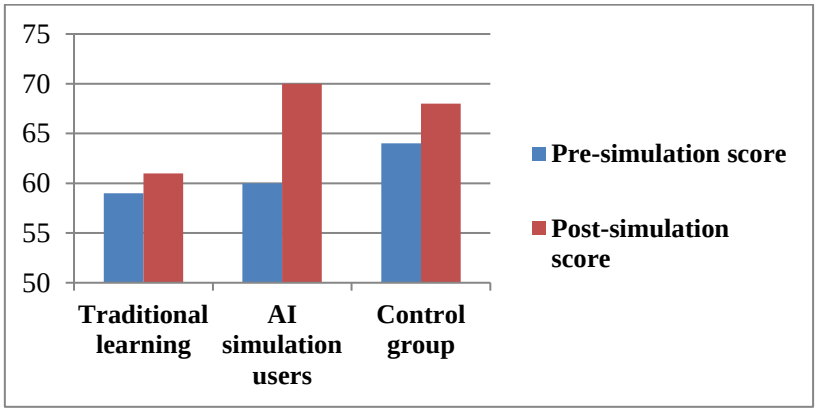
AI application	Function	Study	Example
AI Chatbots	Provide real-time financial literacy support	AI tutors in *Computers & Education* (Prasongpongchai et al., 2024)	Sendbird, Tars, and Tidio
Personalized Learning Algorithms	Tailor courses based on student needs	*AI-enhanced learning analytics* (Ouyang & Zhang, 2024).)	Mint
AI-Driven Simulations	Allow students to practice investment strategies	Stock Market VR Simulations (Hsu & Wu, 2023).	StockTrak, Robo-Advisors

2.2 AI-Based Financial Simulations

AI-driven simulations incorporate Artificial Intelligence infrastructure and machine learning to analyze financial data. Such simulations first analyze the inputted financial data, look for patterns present in data, identify the patterns present, and predict future outcomes. Doing so leads to improved accuracy, efficiency, and better decision-making in financial modeling. Through the above creation, learners can test financial strategies without real-world risks (Asquer & Krachkovskaya, 2022). An example is how AI-powered stock market simulators assist students in practicing investment decision-making in a safe and risk-averse environment (Abbas, 2024). They do this through platforms such as stockTrack, Investopedia Stock Simulator, or TradingView Paper Trading.

Illustration 1: AI-Powered Investment Simulation Model

Group	Pre-simulation score	Post-simulation score
Traditional learning	59	61
AI simulation users	60	70
Control group	64	68



The above bar chart shows the positive effect of students adopting AI-powered simulation financial tools. The students who adopted AI-powered simulation tools had the highest improvement in literacy scores compared to the students who did not use the AI tools. Such a demonstration shows the positive benefits of the assimilation of

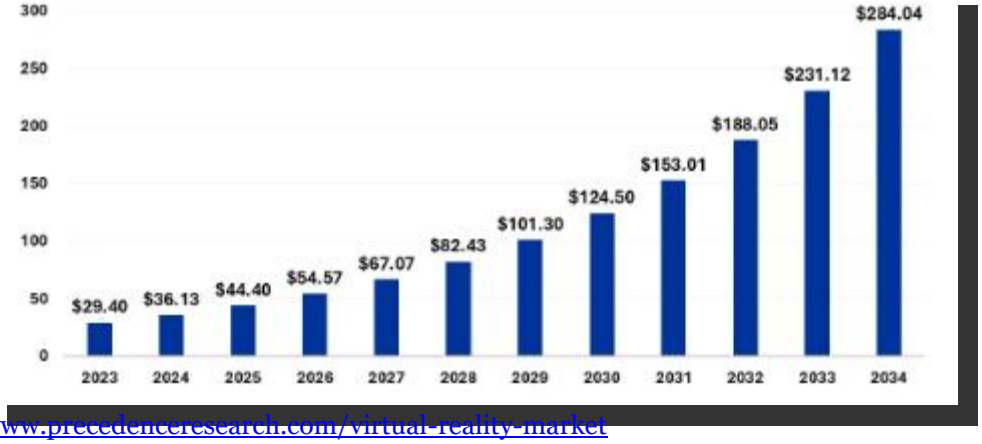
Artificial Intelligence in financial education. The challenges facing traditional learning methods are becoming more apparent each day. The world is moving faster than the methods adopted, hence their reduced efficiency and relevance (Atanasov et al., 2022). Such methods are greatly affected by modern challenges, such as the decrease in the attention span of learners. With little to no stimulation of the learner's minds to be more interesting, traditional learning has a standard or below-normal success rate in teaching.

3. Virtual Reality in Financial Education

3.1 VR-Based Financial Simulations

Virtual reality technology enables individuals to experience a three-dimensional environment that they can interact with in an immersive manner (Oyewole et al., 2024). It is a vast market, with a market value of 15.9 billion as of last year and an expected growth of up to 187 billion in the next five years. In the context of financial education, students interact in a simulated real-world financial decision-making environment. The simulated environment has examples of market scenarios and complex financial concepts that students can interact with, similar to real-world scenarios (Chen, 2024). It is an important technology that contributes to the advancement of financial education to a great extent. By simulating investment portfolios, budgeting exercises, and risk assessments, learners can experience what it is like to do it in real-life scenarios (Ratmono et al., 2024). Some platforms that offer various financial simulations include the Mana app or Virtual Reality Investment Simulator, which Bank of America created.

Illustration 2: Expected growth of Virtual Reality up to 2033



Source: https://www.precedenceresearch.com/virtual-reality-market

3.2 Case Study: VR in Investment Education

A comparative study was conducted on two student groups. One group used traditional learning methods, while the other used VR-based investment simulations.

Table 2: VR vs. Traditional Methods in Investment Education

Learning method	Average student score	Engagement level
Traditional learning course	68	55
VR-based learning course	87	92

Findings

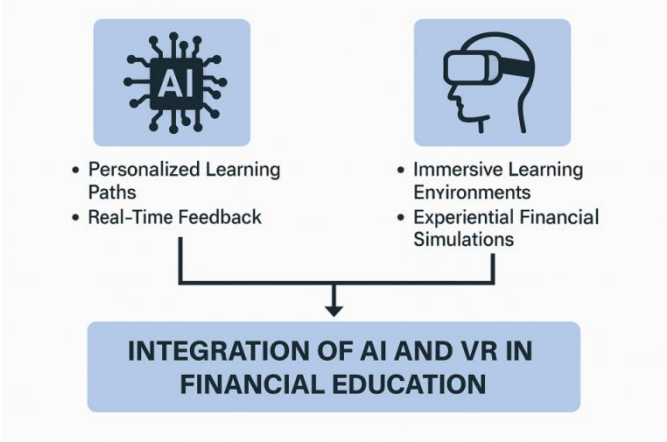
- Students using VR scored 19% higher on financial assessments than those who did not use virtual Reality.
- Engagement levels for those using virtual Reality also doubled compared to those using traditional methods.

It is a well-known fact that students' attention spans on a global scale have declined for the past few years (Marathe & Kanage, 2024). Financial education is affected by this phenomenon in equal proportion to other areas of education. Social media is often blamed for this decline in attention due to the increase in short-form videos on many platforms. The fact that Virtual Reality, another form of technology just like social media platforms, improves comprehension is just excellent. Students can now have more interest in financial topics, eventually leading to more students being financially literate.

4. Combining AI and VR in Financial Education

The benefits of artificial Intelligence and Virtual Reality, each on its own, cannot go unnoticed. Combining the two would lead to profound benefits from the merge of the two and how efficiently a collaboration results from the two. Combined, they bring on board real-time personalized learning and immersive financial simulations, enhancing financial education to a large degree (Bonelli & Liu, 2024).

Illustration 2: AI-VR Integration Model for Financial Education



The above illustration is an AI-VR Integration flowchart demonstrating how Artificial Intelligence and Virtual Reality work together to enhance financial education. The two of them have unique characteristics that are essential in the advancement of financial learning. Artificial Intelligence brings its personalized learning paths and real-time feedback on board. The two are essential factors as they enable students to get answers to their queries in an instant and make any corrections in the process. Virtual Reality, on the other hand, brings in immersive learning environments together with experimental financial simulations. Students can experience how the real world feels and works due to the three-dimensional effect of the environment. The various financial scenarios enable the fortification of confidence and experience needed in dealing with the real world. The intersection of the two creates a highly engaging and practical financial learning experience for effective learning.

5. Challenges and Considerations

5.1 Technological Barriers

- Artificial Intelligence and Virtual reality integration costs are enormous. One Virtual reality headset can cost between 300 and 1500 dollars, and the computer to support it can cost between 1000 and 3000 dollars. That is an extremely high cost for a single set, with the cost of scaling to a classroom in the hundreds of thousands (Marks & Thomas, 2022).
- Educational institutions with limited access to considerable budgets often cannot implement such technologies.
- Developing such technologies is equally capital-intensive from a macro scale of the industry. There are costs associated with data collection, analysis, and training to develop various Artificial intelligence models. The resources, too, are not readily available, with the functioning of Artificial Intelligence requiring the uptake of vast amounts of water, which humans equally need (Mytton, 2021).

5.2 Ethical and Privacy Concerns

- Data privacy and security are continuous concerns due to the vast amount of data needed to create intelligent models. The use of personal data without consent continues to occur, especially in the case of centralized servers prone to data privacy breaches (Gupta et al., 2023).
- AI algorithms also have bias, as seen in how some unfairly favor some groups of individuals over others. This is due to how the models are trained, with most preferring lighter-skinned individuals due to the training data used. In a learning environment with diverse learners, such a preference would disadvantage the darker-skinned individuals (Heldreth et al., 2024).

- User consent is a concern as Artificial Intelligence and Virtual Reality usually collect data in real time hence students may unknowingly give out their data as they interact with the two models without consent. There is also no information on how this data is used once collected (Andreotta et al., 2022).
- Once used for prolonged periods, virtual reality simulations with stressful financial situations may psychologically affect learners' mental health. To succeed long-term, financial learning simulations must be sensitive to learners' mental health (Usmani et al., 2022).

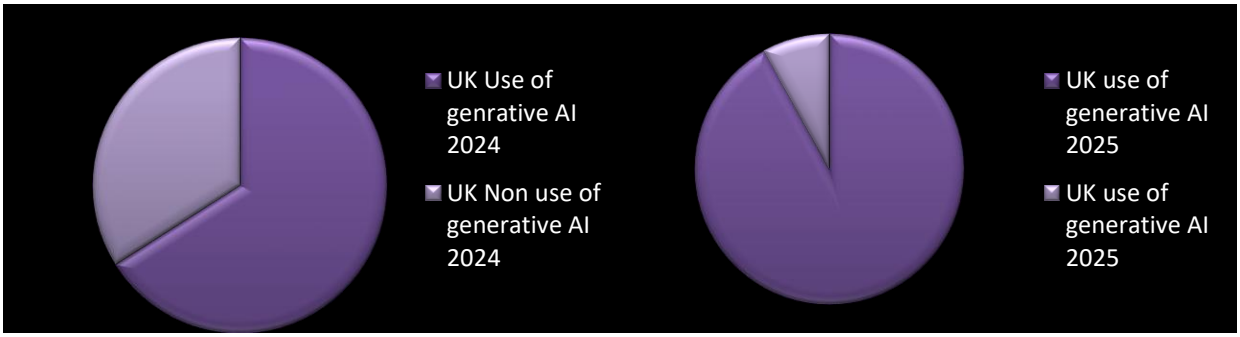
5.3 Accessibility and Inclusivity

- VR-based education may not be accessible to students with visual impairments without adding screen readers or voice-activated commands. Such features may not be accessible, especially in a setting where most learners do not have a visual problem (Heap et al., 2024).
- Students with hearing impairments may struggle to have a smooth learning experience when subtitles and haptic feedback are unavailable (Farhan & Razmak, 2022).
- If the interface is not simplified, students with cognitive difficulties may struggle to keep up with the rest of the learners (Moulaei et al., 2024).
- For a classroom setting to be inclusive, alternative learning formats should be available in all situations for inclusive education for all learners (Lin et al., 2024).

6. Future Perspectives

The future of Artificial Intelligence and Virtual Reality in financial education looks promising, considering several factors:

- Adoption by students and institutions is growing, with an increased frequency of use experienced each year. An impressive example is the United Kingdom, which only had 66% use of AI for students in 2024, significantly improving to 92% this year. At an institutional level, more institutions are investing in AI/VR tools for financial education (Komljenovic & Williamson, 2023).
- Due to the fast advancements in artificial Intelligence and smarter AI Algorithms, more intelligent models are expected to become the norm in the future. Due to the increased availability of training data and architecture, it is becoming easier to train AI models. Such is already becoming a reality with the Chinese "Deepseek," which only took 18 months to develop its AI, which is a very short time (Okaiyeto et al., 2025).
- **More Affordable VR/AI**: The costs of VR headsets are decreasing, making them more accessible at a cheaper price.The production of AI models is also decreasing, with an example being "DEEPSEEK," which was created for a fraction of what it took to create other models (Krause, 2025).



7. Conclusion

The integration of artificial Intelligence and virtual Reality has revolutionized financial education despite its various challenges. Learners can now better learn and apply financial concepts in a way that was not easy to do before the advancement of these technologies. Various tools such as Chatbots, personalized learning algorithms, and financial simulations are at the forefront of this advancement. Through such tools, learners practice investment strategies and risk management in a simulated, safe, and risk-free environment. Research has shown that learners utilizing AI-based simulations have a higher literacy score output than traditional learning methods. Such students also record better financial decision-making skills than traditional methods. Virtual Reality financial tools have increased engagement, learners' comprehension, and retention of various financial concepts through experimental

learning. An improvement of 19% resulted from implementing a Virtual reality-driven system, doubling engagement levels simultaneously. Such outcomes improve financial learning, especially considering children's declining attention span. Practical financial skills are elevated to the next level due to exposure to simulated real-world financial situations in a safe environment.

Despite the many benefits experienced, challenges such as high costs, ethical concerns in their use, and accessibility barriers continue to persist. The costs needed to invest in the two are immense, with its adoption only welcomed in resource-abundant institutions. Even on its successful implementation, customization is required. Students who are visually impaired or have hearing impairments need adjustments that favor their conditions. Going forward, the future of Artificial Intelligence and Virtual Reality seems bright. The above is because the development costs are decreasing, which was the issue for the longest time. If the issues are dealt with, AI and VR will greatly revolutionize financial literacy worldwide. Learners will access the necessary skills to navigate the complex financial landscape with confidence and competence.

7.1 Future research directions

Despite the numerous benefits already being achieved through the use of AI and VR, several areas are in need of further investigation. A focus on how AI and VR impacts financial literacy would help determine if the knowledge attained through these tools transitions into better financial decision-making over time. The accessibility of the two technologies should also be looked at, to ensure inclusivity for all socioeconomic groups and those with disabilities.

The other area to illuminate some light on is data privacy and ethical concerns involved in AI-driven financial education. An investigation on how user data is handled, with transparency, security, and ethical AI development as the focus of the investigation. Generation of more data on the performance of AI compared to VR could provide a solid base for comparative analysis of the effectiveness of the two.

Last but not least is investigating how gamification and adaptive learning enhance engagement, affect motivation, and impart knowledge in learners. If such issues are addressed AI and VR will continue to evolve as crucial tools in financial education.

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