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FINANCIAL LITERACY IN EDUCATION THROUGH ARTIFICIAL INTELLIGENCE TOOLS IN HIGHER INSTITUTIONS

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Abstract

In today's digitally driven economy, financial literacy is increasingly recognized as a fundamental life skill—especially for students in higher institutions preparing to navigate complex economic systems. This paper explores how Artificial Intelligence (AI) tools can be strategically integrated into financial education to improve learning outcomes, digital competencies, and real-world financial decision-making among students. The research design for this study was descriptive survey design, the population was made up of 222 Business Education B.Ed students in Federal University of Education, Zaria for the 2024/2025 academic session. A sample size of Business Education 300 B.Ed students was selected from department using multi-stage sampling procedure. The instrument used for data collection was a structured four-point Likert scale questionnaire titled Financial Literacy in Education through Artificial Intelligence Tools in Higher Institutions Questionnaire (FLEAITQ). The reliability of the instrument was established using Cronbach-Alpha which yielded a reliability coefficient of .82. Data collected were analyzed using Pearson product moment correlation (PPMC). The study recommends that Professional Development for Educators, Universities and teacher training institutes should implement ongoing workshops and certification programs focused on AI integration in pedagogy. Financial literacy instructors should be trained in using simulation tools, adaptive learning platforms, and data visualization technologies.

Keywords: Financial Literacy, Artificial Intelligence (AI), Higher Education, Digital Learning and AI in education

Introduction

In today's globalized digital economy, financial literacy is increasingly recognized as an essential life skill for all individuals, particularly young adults in higher education. According to UNESCO (2022), financial literacy is no longer a luxury for business students alone—it is a universal competency required for personal empowerment, economic participation, and sustainable

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development. Yet, across many higher institutions globally, particularly in developing countries, financial literacy education remains inadequate in both reach and quality. The content is often abstract, instructor-centered, and disconnected from the realities of modern financial systems.

Concurrently, the integration of Artificial Intelligence (AI) in education is reshaping how knowledge is delivered and consumed. As observed by Holmes, Bialik, and Fadel (2022), AI has shifted the educational paradigm from one-size-fits-all instruction to personalized, data-driven, and adaptive learning environments. These developments are especially promising for financial education, where students often struggle to grasp abstract concepts like compound interest, budgeting, credit management, and investment strategies. AI tools—such as intelligent tutoring systems, virtual assistants, and real-time simulations—have the potential to make these concepts more practical and accessible.

In the realm of business and financial education, AI integration is still emerging but growing rapidly. Zhang and Yu (2020) emphasize that digital tools powered by AI, such as chatbots and predictive analytics, can bridge the learning gap between theoretical financial knowledge and real-world application. Their research shows that students trained using AI-enhanced platforms demonstrate significantly higher engagement and problem-solving skills. Similarly, Schmidt and Taylor (2022) argue that AI enhances learner autonomy and confidence, particularly when used in simulations that mimic real-life financial environments.

However, many scholars have also pointed out significant gaps in implementation. Adegbite and Nwosu (2024) note that while AI tools are increasingly available, their adoption in African higher institutions remains limited due to infrastructural constraints, faculty unpreparedness, and lack of context-relevant content. Additionally, Siau and Wang (2021) caution that the absence of ethical frameworks and localized financial scenarios in AI-driven platforms may lead to misuse or ineffective learning outcomes.

Statement of the Problem

Despite the increasing importance of financial literacy in today's data-driven economy, many students in higher institutions still graduate without the necessary skills to make informed financial decisions. Traditional classroom methods often lack practical engagement, contextual relevance, and adaptive support, making it difficult for students to understand and apply complex financial concepts such as budgeting, credit analysis, debt management, and investment planning.

At the same time, Artificial Intelligence (AI) tools—which offer personalized instruction, simulation environments, and predictive learning analytics—remain underutilized in financial education. According to Adegbite and Nwosu (2024), most institutions in developing countries continue to rely on lecture-based approaches, with little integration of modern digital tools. Additionally, many educators lack the training, frameworks, and confidence to implement AI in pedagogically meaningful ways. As a result, there is a misalignment between the financial competencies students need in the real world and the methods used to teach them.

This gap presents an urgent need to explore how AI can be effectively integrated into financial literacy curricula to promote deeper learning, enhance student engagement, and equip graduates with 21st-century financial skills.

Objectives of the Study

The primary aim of this study is to investigate the use of Artificial Intelligence tools in enhancing financial literacy among students in higher institutions. The specific objectives are to:

1. Examine the current state of financial literacy instruction in higher institutions and identify gaps in traditional teaching methods.
2. Explore the potential of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts.
3. Analyze the challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts.

Research Questions

1. What is the relationship of financial literacy instruction in higher institutions and identify gaps in traditional teaching methods?
2. What is the relationship of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts?
3. What is the relationship challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts?

Literature review

The intersection of Artificial Intelligence (AI) and financial literacy education in higher institutions represents a transformative paradigm shift in how financial knowledge is delivered, understood, and applied by learners. This discourse explores the theoretical underpinnings and functional dynamics of integrating AI into financial literacy instruction, based on pedagogical and technological constructs.

Artificial Intelligence refers to computer systems and algorithms that simulate human intelligence to perform tasks such as problem-solving, learning, and decision-making. In education, AI manifests in tools like intelligent tutoring systems, predictive analytics platforms, chatbots, and adaptive learning environments. These tools offer real-time feedback, content personalization, and learner analytics.

Financial literacy, on the other hand, involves the knowledge and application of financial concepts such as budgeting, saving, investing, credit management, and risk assessment. It is not only theoretical but also behavioral—demanding learners to apply cognitive, affective, and practical skills.

Pedagogical innovation is required to bridge these two domains. Traditional teaching methods are inadequate for the dynamic, personalized demands of financial education in the digital age. AI becomes an enabler for innovative pedagogy, supporting differentiated instruction, gamified learning, and data-informed interventions.

AI as a Pedagogical Catalyst in Financial Literacy

The integration of AI within financial education creates a shift from static, curriculum-bound teaching to responsive, learner-centered pedagogy**.** For instance, intelligent tutoring systems like *Socratic AI* or *FinBot* provide adaptive assistance based on student input, enabling mastery of

financial concepts at a personalized pace. Virtual simulations, such as stock market games or budgeting apps, mimic real-world economic decisions and consequences, making financial theories more concrete.

AI Tools Applicable to Financial Literacy Education

Several AI-powered tools are suitable for teaching financial literacy. Oke and Fernandes (2023) categorize these tools into four groups:

i. Intelligent Tutoring Systems (ITS) – which offer step-by-step guidance on financial tasks (e.g., budgeting, calculating interest).
ii. Virtual Financial Assistants – such as ChatGPT or FinBot, which respond to user queries and simulate banking advice.
iii. Predictive Analytics Platforms – like Civitas Learning or DreamBox, which track student engagement and predict academic risk.
iv. Simulation-Based Learning Environments – such as Budget Challenge and Stock Market Simulators, which allow students to apply financial theories in practical scenarios.

These tools can help students move beyond theoretical learning to experiential engagement—developing real-world financial habits and critical thinking.

Benefits of AI Integration in Financial Literacy

The incorporation of Artificial Intelligence in financial literacy education offers substantial improvements in instructional quality, learner engagement, and student outcomes. Its benefits extend far beyond convenience, transforming the very way students learn financial principles and apply them to real-world decision-making.

i. **Personalized Learning and Adaptive Instruction:** AI has the capability to analyse individual student learning patterns, strengths, and weaknesses. This allows platforms to tailor content delivery according to each learner's pace and level of understanding. In financial literacy, this is especially beneficial as students often enter higher education with diverse backgrounds—some may be familiar with financial apps, while others struggle with basic money management concepts. AI tutors or dashboards can offer remedial practice for weak areas (e.g., understanding interest rates) while simultaneously advancing others in more complex topics like portfolio analysis.
ii. **Simulation-Based and Experiential Learning:** A key advantage of AI integration is the facilitation of real-world financial simulations. Using tools such as stock market simulators, virtual banking environments, or digital budget challenges, students are able to "experience" financial decision-making without real-world consequences. This promotes experiential learning, which has been shown to increase retention, confidence, and critical thinking. For example, a student can practice investing in a simulated market and immediately receive AI-generated feedback explaining profit-loss outcomes.
iii. **Increased Accessibility and Learning Flexibility:** AI tools provide 24/7 learning access, which is especially important for part-time students or those in remote or under-resourced regions. Chatbots, virtual advisors, and automated tutorials are available outside classroom hours,

allowing students to learn at their convenience. This flexibility is critical in financial literacy, where self-paced mastery is more effective than time-constrained lectures.

iv. **Real-Time Feedback and Progress Analytics:** One of the strengths of AI is its ability to provide instant feedback and continuous assessment. Students receive notifications about errors, hints on correcting mistakes, and even personalized learning paths. Teachers, on the other hand, gain access to dashboards showing which financial concepts students are struggling with—allowing them to adjust instruction dynamically. This **data-driven teaching** leads to better performance and more targeted interventions.

v. **Improved Financial Reasoning and Decision-Making Skills:** Zhang and Yu (2020) affirm that AI-supported instruction in financial literacy courses leads to higher engagement and comprehension levels. Siau and Wang (2021) add that AI improves students' ability to make reasoned financial decisions by presenting them with simulated dilemmas and multiple outcomes. This nurtures not only financial knowledge but also the cognitive skills needed to weigh options, assess risks, and plan long-term.

Methodology

The research design chosen for this study was descriptive survey design, the population was made up of 222 Business Education B.Ed students in Federal University of Education, Zaria for the 2024/2025 academic session. A sample size of Business Education 300 B.Ed students was selected from department using multi-stage sampling procedure. The instrument used for data collection was a structured four-point Likert scale questionnaire titled Financial Literacy in Education through Artificial Intelligence Tools in Higher Institutions Questionnaire (FLEAITQ)" developed by the researchers. The instrument was validated by experts in School of Education. The reliability of the instrument was established using Cronbach-Alpha which yielded a reliability coefficient of .82. The survey data collected were analyzed using Pearson product moment correlation (PPMC).

Results and Discussion

Research Question 1: What is the relationship of financial literacy instruction in higher institutions and identify gaps in traditional teaching methods?

Variable	Mean	Std. Dev.	N	R	P	Remark
Financial literacy instruction	30.26	4.51	300	.503**	.000	Sig.
Traditional teaching methods	29.37	3.22				

Table 1 above shows that there was a positive significant relationship of financial literacy instruction in higher institutions and identify gaps in traditional teaching methods ($r = .503$, $N = 300$, $p < .05$). The result shows that there was significant relationship between financial literacy instructions in higher institutions and traditional teaching methods.

Research Question 2: What is the relationship of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts?

Variable	Mean	Std. Dev.	N	R	P	Remark
AI tools as intelligent tutoring	30.26	4.51	300	.462**	.000	Sig
Teaching financial concepts	29.28	4.37				

Table 2 above shows that there was a positive significant relationship of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts (r = .462**, N= 300, p<.05). The result shows that there was a positive significant relationship of of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts.

Research Question 3: What is the relationship on challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts?

Variable	Mean	Std. Dev.	N	R	P	Remark
Challenges facing AI	30.26	4.51	300	.646**	.000	Sig
Resource-limited educational	28.62	4.18				

Table 3 above shows that there was a positive significant relationship on challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts (r = .646**, N= 300, p<.05). The result shows that there was a positive significant relationship challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts.

Findings of the study

It was revealed that there is positive significant relationship of financial literacy instruction in higher institutions and identify gaps in traditional teaching methods (r = .503, N= 300, p <.05), as he result shows that there was significant relationship between financial literacy instructions in higher institutions and traditional teaching methods.

It was also revealed that there was a positive significant relationship of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts (r = .462**, N= 300, p<.05), meanwhile the result shows that there was a positive significant relationship of of AI tools—such as intelligent tutoring systems, simulations, chat box, and predictive analytics—in teaching financial concepts.

From the result of the study it was revealed that there was a positive significant relationship on challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts (r = .646**, N= 300, p<.05), also the result shows that there was a positive significant relationship challenges facing the integration of AI in financial education, particularly in resource-limited educational contexts.

Discussion of Findings

The findings reveal a dual narrative—great promise on one hand and practical constraints on the other. On the positive side, AI tools offer transformative potential for teaching financial literacy. With financial systems becoming increasingly digital, students must be trained not only to understand core concepts but also to use financial technologies confidently. AI enables instructors to move beyond chalk-and-talk approaches and offer interactive, adaptive, and personalized learning experiences.

However, the study also underscores critical systemic barriers. The lack of technological infrastructure, particularly in African higher institutions, prevents many schools from implementing even basic digital learning environments, let alone advanced AI tools. This infrastructural gap is compounded by a skills gap—educators often do not receive the training required to meaningfully integrate AI into their instructional methods.

Furthermore, the absence of clear ethical frameworks in most institutions raises concerns. As financial learning becomes more data-driven, students' personal information may be collected, analyzed, and even used in ways they do not fully understand. Without proper governance, such practices could lead to mistrust, misuse, or marginalization. Lastly, while pedagogical models like TPACK provide a roadmap, they require institutional commitment for full adoption. Curriculum reforms, faculty development programs, and policy support are necessary to turn these theoretical models into practical classroom strategies.

Conclusion

In the age of digital transformation, the relevance of financial literacy has never been more pronounced. Students in higher institutions must be equipped not only with theoretical knowledge but also with practical skills that enable them to navigate increasingly complex financial landscapes. Artificial Intelligence presents an unprecedented opportunity to bridge gaps in financial education through personalized, interactive, and intelligent instruction.

However, the successful integration of AI tools into financial literacy education depends on more than technological access. It requires the thoughtful application of pedagogical models, the training and support of educators, and the development of infrastructure that sustains digital learning environments. Additionally, institutions must address ethical concerns, ensuring that AI technologies are deployed transparently, inclusively, and responsibly.

Ultimately, this paper concludes that AI can significantly enhance financial literacy in higher education if supported by systemic investment, informed pedagogical design, and a collaborative policy framework. Institutions that embrace these principles are likely to produce graduates who are not only financially literate but also digitally empowered to thrive in the modern economy.

Recommendations

Based on the insights from the literature and findings, the following recommendations are proposed:

i. Professional Development for Educators, Universities and teacher training institutes should implement on-going workshops and certification programs focused on AI integration in pedagogy. Financial literacy instructors should be trained in using simulation tools, adaptive learning platforms, and data visualization technologies.
ii. Curriculum Reform and Integration, Curriculum developers should embed AI-supported modules directly into financial literacy courses. This includes incorporating AI-based budgeting apps, investment simulators, and intelligent tutoring systems as part of classroom activities and assessments.
iii. Investment in Digital Infrastructure, Governments, development agencies, and educational stakeholders must prioritize the development of reliable digital infrastructure—such as high-

speed internet, access to devices, and stable electricity—to support AI implementation in financially under-resourced institutions.

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