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Reforming Artificial Intelligence Curriculum in FinTech Major through OBE Pedagogical Philosophy

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Abstract: In the context of rapid financial technology development, this paper explores the reform of the "Principles and Applications of Artificial Intelligence" course for financial technology majors under the Outcome-Based Education (OBE) philosophy. Focusing on addressing the disconnect between theoretical knowledge and practical skills, as well as the need for interdisciplinary competence, the study first analyzes the current curriculum challenges, such as outdated content and limited real-world engagement. It then proposes a systematic reform framework that aligns learning outcomes with industry demands, restructures the curriculum to enhance the integration of finance and AI technology, introduces problem-based and project-driven teaching methods, and establishes a multi-dimensional assessment system. By integrating OBE principles, the reform aims to cultivate students' abilities in AI application, data analysis, and innovative problem-solving, ensuring graduates meet the evolving needs of the fintech industry. The research provides a practical model for curriculum innovation in interdisciplinary fields, emphasizing student-centered design and continuous improvement.

Keywords: OBE teaching concept; Artificial intelligence course; FinTech; Curriculum reform; Practical ability; Higher education

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1. Introduction

The convergence of artificial intelligence (AI) and finance has reshaped the fintech landscape, driving a critical need for professionals who can integrate AI technologies into financial services. The "Principles and Applications of Artificial Intelligence" course, a core compulsory module for financial technology majors, plays a pivotal role in fostering such expertise. However, traditional teaching approaches often suffer from fragmented knowledge delivery, inadequate practical training, and a lack of alignment with industry outcomes, leading to graduates' skills mismatching market requirements. The Outcome-Based Education

(OBE) philosophy, which emphasizes defining clear learning outcomes, designing curricula to achieve these outcomes, and using evidence-based assessment to measure student performance, offers a promising solution. This paper introduces an OBE-driven reform for the course, aiming to bridge the gap between academic instruction and professional competence. By redefining course objectives, restructuring content, and innovating teaching methods, the reform seeks to enhance students' ability to apply AI techniques to financial scenarios, analyze complex problems, and contribute to technological innovation in finance.

2. OBE philosophy and course objective redefinition

2.1. Core tenets of OBE in fintech education

Outcome-Based Education (OBE), grounded in a focus on what students are ultimately able to achieve, has become increasingly important for fintech programs as the field continues to evolve at a rapid pace. Its core ideas, which refer to clear learning targets, purposeful learning activities, and output assessment through verifiable evidence, fit well with the interdisciplinary demands of fintech [1–2]. In practice, this approach helps ensure that course objectives correspond closely to the skills required in real industry roles, such as financial data analysts or professionals working with AI-based risk assessment [1–2]. Under this framework, the course outlines three interconnected learning outcomes. The first involves developing solid competence in AI techniques commonly used in financial scenarios, such as machine learning models for credit evaluation, along with fluency in tools like Python and TensorFlow. The second emphasizes the ability to combine knowledge from finance and computer science to apply AI models in areas such as algorithmic trading or fraud detection. The third focuses on cultivating strong analytical and problem-solving abilities, enabling students to handle complex financial questions with careful judgment and critical thinking.

2.2. Alignment with programmatic and industry standards

Redefined course objectives are systematically mapped to the fintech program outcomes of the university, ensuring an integrated balance among financial theory, technological innovation, and professional ethics. This alignment process emphasizes not only disciplinary coherence but also the cultivation of interdisciplinary competencies that fintech positions increasingly demand. In particular, the course outcomes are benchmarked against industry standards and competency frameworks issued by authoritative bodies such as the Financial Stability Board, the Basel Committee on Banking Supervision, and leading fintech industry associations [3]. These benchmarks help ensure that students acquire relevant, up-to-date skills in algorithmic decision-making, data governance, and risk-aware AI deployment. A central component of this alignment involves strengthening the ethical dimension of AI applications in financial contexts. The course redesign explicitly integrates learning outcomes related to responsible and compliant use of AI, drawing on emerging regulatory frameworks such as the EU's AI Act and global guidelines on model transparency, fairness, and accountability [4]. By incorporating these standards into both theoretical instruction and applied case studies, the course aims to equip students with the ability to critically evaluate issues such as bias detection, explainability, and auditability of machine learning models used in financial services. This ensures that graduates are not only technically proficient but also capable of navigating complex regulatory environments and upholding ethical principles in real-world fintech scenarios.

3. Current status and challenges of the AI course

3.1. Analysis of existing curriculum design

Traditional AI curricula in fintech often fail to bridge theory and practice, leaving graduates underprepared for industry demands. Courses typically present AI concepts in isolation from financial applications, with few integrated case studies to demonstrate how algorithms support tasks such as credit risk assessment, algorithmic trading, or sentiment-driven market analysis [5]. Practical training remains limited and largely procedural, focusing on reproducing algorithms on sanitized datasets rather than navigating the complexity, multi-source nature, and regulatory constraints of real financial data. Assessment practices reinforce this gap, emphasizing theoretical recall through final examinations while offering little evaluation of problem-solving, collaboration, or project-based competencies. As a result, graduates may grasp AI concepts but lack the applied skills, interpretive insight, and ethical awareness necessary to deploy AI effectively in financial settings.

3.2. Gap between student learning and industry expectations

Fintech employer surveys highlight a persistent gap between graduate capabilities and industry expectations. Graduates generally possess a solid grasp of foundational AI concepts, yet they often struggle to apply these techniques in financial contexts, such as customizing natural language processing for market sentiment analysis or employing deep learning for portfolio optimization and risk management. Equally important is the ability to translate analytical results into actionable insights for non-technical stakeholders [6]. Many graduates find it challenging to communicate complex findings clearly, limiting their practical impact in decision-making processes. Ethical and regulatory competence remains another critical shortfall. Graduates are frequently underprepared to address algorithmic bias, ensure transparency in automated systems, or comply with data protection requirements such as those mandated by GDPR. These gaps collectively indicate that current curricula are insufficiently integrated with practical application, communication skills, and ethical awareness, leaving graduates less prepared to meet the multifaceted demands of the fintech industry.

4. OBE-driven curriculum and pedagogical reform

4.1. Outcome-oriented content restructuring

The revised curriculum is structured around three interrelated modules that closely align with Outcome-Based Education principles, ensuring both conceptual depth and practical applicability. One module focuses on foundational AI techniques within financial contexts, introducing machine learning, neural networks, and natural language processing through applications such as logistic regression for predicting loan defaults, reinforced with real-world case studies including Ant Group's microcredit scoring system. Building on this foundation, another module emphasizes advanced applications and technical proficiency, guiding students through hands-on projects such as robo-advisors and fraud detection systems, while providing training on industry-standard platforms like AWS SageMaker and Tableau. A complementary module addresses ethical and regulatory considerations, exploring algorithmic fairness, GDPR compliance, and RegTech innovations to prepare graduates for contemporary financial regulatory environments. By integrating theoretical instruction with applied practice across all modules, the curriculum overcomes traditional content silos, fostering a cohesive and practice-oriented learning experience that equips students with both technical expertise and regulatory awareness.

4.2. Innovative teaching methods for active learning

Active learning replaces traditional lectures with immersive, practice-oriented strategies. Problem-Based Learning engages students with weekly challenges—such as optimizing bank customer churn models—applying AI to real datasets. Flipped classrooms shift foundational content to pre-recorded lectures, freeing class time for coding exercises, collaborative discussions, and peer troubleshooting. Industry partnerships, including a 2024 project with a local robo-advisory firm, provide access to proprietary datasets and professional mentorship, reinforcing the connection between learning and real-world fintech practice. These methods collectively enhance engagement, practical competence, and professional readiness.

4.3. Multi-dimensional assessment system

The assessment approach emphasizes continuous, formative evaluation rather than relying on traditional summative exams. Student progress is monitored through process-oriented measures, including weekly coding assignments, project milestones, and peer feedback, which collectively track skill development over time. Capstone projects are evaluated using rubrics aligned with OBE principles, assessing technical accuracy, financial relevance, and adherence to ethical standards. Reflective journals and group presentations encourage self- and peer-assessment, promoting metacognitive awareness and collaborative learning. This framework provides ongoing feedback, guiding students steadily toward the targeted learning outcomes.

5. Implementation and preliminary outcomes

5.1. Pilot implementation and feedback

The reform was piloted in the 2024–2025 academic year with a cohort of 50 fintech students. Feedback from course evaluations indicated:

5.1.1. Enhanced engagement

Student engagement in laboratory sessions and Problem-Based Learning activities showed a notable increase of 37%, reflecting the motivating effect of connecting academic tasks to real-world financial applications. Students displayed a markedly more proactive and self-directed approach to learning, actively seeking to understand the practical implications of AI techniques in finance. For example, during a PBL session centered on optimizing a bank's customer churn prediction model, learners engaged in in-depth discussions, evaluated alternative strategies, and collaboratively proposed innovative solutions. They demonstrated a strong willingness to experiment with the provided datasets, testing different hypotheses and iteratively refining their models. This level of active participation and critical inquiry contrasts sharply with observations from traditional teaching methods, where students generally adopted a more passive role, focusing on listening and note-taking rather than engaging in problem-solving. The results suggest that situating learning activities within authentic financial contexts can substantially enhance both motivation and the development of practical analytical skills.

5.1.2. Skill improvement

Pre-post-course evaluations indicated a 23% increase in students' ability to develop AI models for financial applications, as reflected in the quality and technical accuracy of their projects. In the initial assessment, students' attempts to create AI models for financial risk analysis frequently exhibited errors in algorithm

selection and data preprocessing. By the end of the course, students were able to construct more accurate and efficient models, demonstrating improved judgment in choosing algorithms suited to specific financial datasets and greater attention to data cleaning and feature engineering. These improvements translated into a notable enhancement in overall project quality.

5.2. Continuous improvement mechanism

An outcome-focused review committee, composed of faculty, industry professionals, and alumni, meets twice a year to examine assessment results and refine learning outcomes. For instance, in response to emerging applications of generative AI in finance, the 2025 curriculum was revised to incorporate modules on large language models for financial report analysis, ensuring alignment with technological developments. Faculty members contribute their academic perspective, evaluating whether the course content effectively imparts the intended knowledge and skills. Industry professionals provide insight into current trends and practical competencies essential in fintech, while alumni offer reflections on the skills they have found most relevant in the workplace. The collaborative input from these three groups enables the curriculum to evolve continuously, enhancing its relevance to both students and the industry.

6. Conclusion

This study highlights the potential of Outcome-Based Education in reshaping AI instruction for fintech majors, fostering both technical expertise and interdisciplinary competence. By aligning the curriculum with clearly defined learning outcomes, embedding real-world applications, and employing interactive pedagogical approaches, the reform develops graduates capable of driving technological innovation in finance while upholding ethical and regulatory standards. Initial results from the pilot implementation indicate increased student engagement and measurable improvements in practical skills, providing preliminary evidence of the reform's effectiveness.

Ongoing refinement remains essential. The rapid evolution of fintech, including advances such as quantum-enhanced AI and decentralized finance applications, necessitates continual curriculum updates. Similarly, assessment frameworks must evolve to capture emerging competencies as the field advances.

Future research could examine the long-term impact of OBE on graduate career outcomes. Longitudinal studies may track how fintech graduates trained under this approach perform in professional settings, their capacity to adapt to new technologies, contribute to innovation, and assume leadership roles. Additional investigation into the scalability of this OBE-based model across other interdisciplinary financial programs could further enhance educational quality, offering insights for implementing similar reforms in courses such as blockchain applications or digital banking, and better preparing students for the dynamic fintech industry.

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