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# DIGITAL TECHNOLOGY IN HIGHER EDUCATION FOR FINANCE AND BANKING

## *TECNOLOGIA DIGITAL NO ENSINO SUPERIOR PARA FINANÇAS E BANCOS*

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**Abstract**
Higher education institutions are undergoing significant educational changes alongside the digital transformation. Digital technology encompasses a range of tools selected for integration into formal university teaching environments and used by students to promote more effective learning. Technological advancements have permeated higher education institutions, forcing them to embrace digital technology in every aspect of their infrastructure that benefits their learning ecosystem, from student research to faculty teaching. In this context, the selection of a university teaching model in general, and specifically for finance and banking, to adapt to this digital transformation remains a top priority. The aim of this study is to provide an overview of the key characteristics of digital technology-based teaching models in finance and banking higher education institutions. From there, it is possible to develop these digital technology application models into a part of the modern university teaching ecosystem for finance and banking in Vietnam.

**Keywords:** Digital Technology. Digital Transformation. Higher Teaching. Finance and Banking.

***Resumo***
*As instituições de ensino superior estão passando por mudanças educacionais significativas em paralelo à transformação digital. A tecnologia digital abrange uma gama de ferramentas selecionadas para integração em ambientes formais de ensino universitário e utilizadas pelos alunos para promover uma aprendizagem mais eficaz. Os avanços tecnológicos permeiam as instituições de ensino superior, forçando-as a adotar a tecnologia digital em todos os aspectos de sua infraestrutura que beneficiam seu ecossistema de aprendizagem, desde a pesquisa estudantil até o ensino docente. Nesse contexto, a seleção de um modelo de ensino universitário em geral, e especificamente para finanças e bancos, para se adaptar a essa transformação digital continua sendo uma prioridade máxima. O objetivo deste estudo é fornecer uma visão geral das principais características dos modelos de ensino baseados em tecnologia digital em instituições de ensino superior de finanças e bancos. A partir daí, é possível desenvolver esses modelos de aplicação de tecnologia digital como parte do ecossistema moderno de ensino universitário para finanças e bancos no Vietnã.*

***Palavras-chave**: Tecnologia Digital. Transformação Digital. Ensino Superior. Finanças e Bancos.*

## 1 INTRODUCTION

Global society is changing with the innovation of science and technology, along with that higher education also needs to have corresponding transformation steps. Traditional higher education outside the digital transformation process is gradually becoming outdated in equipping students with a foundation after graduation. In this context, it is necessary to quickly find an answer to the question of how to prepare graduates after graduation to keep up with the trends of the new era? Perhaps the key point here is that research and teaching programs need to have more access to technology to enhance learners' capabilities (Robson Q. P. *et al*., 2018)

The trend of digital technology in teaching and learning spaces needs to be replicated, smart devices installed in classrooms such as: video recorders, smart desks, smart electronic boards, online meeting equipment. route,... has been put into use. Many educational institutions also create conditions for students to participate in experiences, access high technology, and even participate in virtual reality tours.

In recent years, digital transformation in the education sector has received more attention and attention. The education industry has developed a model of teaching face-to-face and online, so that learners can learn anywhere, anytime, and be proactive in learning more effectively. University digitalization is understood as the process of digital transformation in universities. Today, the differences between in-person and online universities are becoming less and less clear. Universities are currently investing increasingly in facilities to apply online programs or combine both face-to-face and online.

Having a frame of reference for teaching is essential for making strategic decisions within the organization about eLearning practices. Furthermore, it is necessary to consider the adoption and management of related infrastructure and processes. In particular, digital transformation brings more data management capabilities, which can bring more transparency and better decision-making processes for teaching as well as improve learning quality.

Technology is reshaping the entire financial and banking sector, from payment systems and risk management to investment analysis and asset management. Applying digital technology in higher education for finance and banking is essential to keeping up

with Fintech, AI, and digital banking trends, helping students master practical skills, enhance competitiveness, and meet the demand for high-quality human resources in the digital transformation era. Technology creates an interactive, personalized learning environment and provides a vast source of real-world data. Recognizing this, universities have designed practical training programs that closely integrate theoretical financial and banking principles with modern digital technology applications, creating a highly practical training ecosystem that adapts quickly to the digital labor market.

Based on a synthesis of both theoretical and practical aspects of university teaching, this paper focuses on examining the application of digital transformation in higher education for finance and banking students. This allows for appropriate adjustments to be made to the specific requirements and characteristics of the financial and banking workforce, enabling them to adapt promptly to the digital age.

## 2 METHODOLOGY

The method applied in this research is a systematic literature review. The systematic literature review is a research approach for finding, evaluating, explaining, and synthesizing the extant literature created by scholars, researchers, and practitioners (Webster J. & Watson R.T., 2002). An systematic literature review is a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically evaluate relevant research, and to collect and analyze data from the studies that are included in the review. Besides, the article also uses a system of specific scientific research methods such as analysis and synthesis method, systematization method, theoretical synthesis based on document research, ...

This study used multiple recognized scientific databases to access the papers related to digital transformation in higher education. The databases include Web of Science (WoS), Google Scholar, Research Gate, ScienceDirect. The databases enable advanced structures to be searched, which applies logical operators that are suitable for to the features of the review proposed in this study.

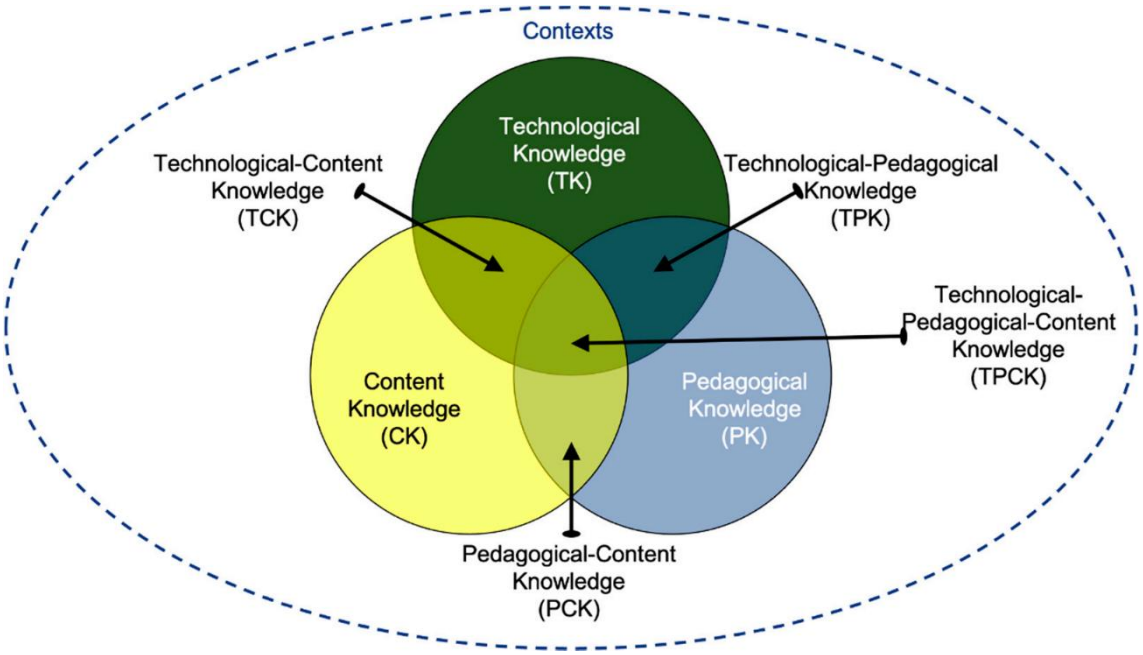
## 3 THEORETICAL TEACHING MODELS APPROACH DIGITAL TECHNOLOGY

Some higher teaching models aim to integrate guiding principles for the use of technology in education.

TPACK is the abbreviation for ‘Total PACKage’ used by Mishra and Koehler (2006) to refer to the ability to apply information technology as an integrated ‘package’ of knowledge. Its root word is TPCK (technological pedagogical content knowledge). The birth of TPACK is based on Shulman's (1987) idea of pedagogical content knowledge (PCK) integrated from content knowledge (CK) and pedagogical knowledge (PK). TPACK's model is one of the well-known models, in which lecturers need to develop both technological proficiency, pedagogical skills and appropriate professional knowledge to use information and communication technology in education (see Figure 1). The intersection between technological proficiency, pedagogical skills and professional knowledge opens up a new field of knowledge: pedagogical content knowledge (PCK) means the strategies used by teachers to teach the subject learn; Technological content knowledge (TCK) is oriented toward understanding not only the subject they teach but also how the application of technology can transform that subject; On the other hand, technological pedagogical knowledge (TPK) is concerned with the existence, composition and possibilities of different technologies as they are used in teaching environments and, conversely, knowing how teaching can how changes result from the use of specific technologies. Finally, knowing how to apply these elements to a certain context can make the most effective use of the model.

**Figure 1**

*TPACK model*




Source: Author's elaboration

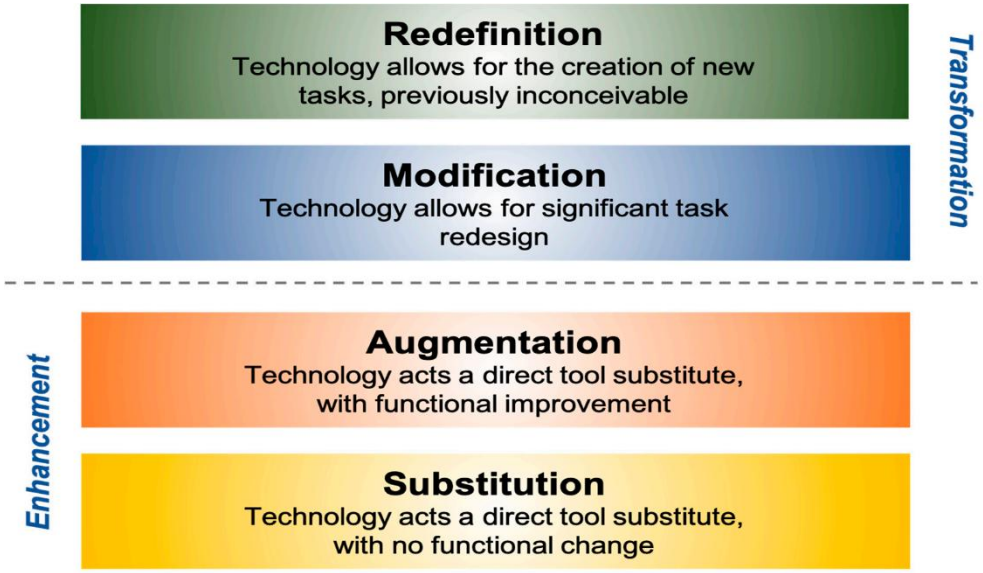
The SAMR model stands for the words Substitution, Augmentation, Modification and Redefinition. The SAMR model is described as each level of application of technological advances in education from replacement, to expansion, to modifying old things and finally redefining the part that technology has created. Change. This model consists of four tasks, as shown in Figure 2, one task for each letter, model name, grouped under two different domains, grouping the substitution, augmentation, and transformation tasks. Innovation means leveraging technology to replace and/or improve existing tools in the learning process, while transformation Implies learning opportunities that could not be easily accomplished otherwise. Technology (Hilton, 2016).

This model is often used as a scale to evaluate the effectiveness of technology in education in the current EdTech trend. In which, substitution (S – Substitution) is the first level, in the evaluation scale. At this level, technology only stops at applying new things to replace old things, for example, switching from the form of teacher reading – students taking notes to teacher sending documents and lectures – students will read first and participate in discussions. Essay. In the second stage, expansion (A – Augmentation), students are asked to apply technology such as using presentation designs such as Canvas

or Powerpoint instead of speaking orally or drawing illustrations on paper as before. This. In the modification stage (M – Modification), lecturers and students can implement blended learning that allows in-class and online learning at the same time. This flexibility allows students to study continuously, without interruption for any objective reason. Stage (4) redefinition (R – Redefinition), this is the highest level, when advances are applied and innovations are created. This transformation can completely replace the old one and needs redefinition. For example, the virtual classroom model is a combination of technology and allows flexible online learning.

**Figure 2**

*SAMR model*




Source: Author's elaboration

The models mentioned above are aimed at lecturers with the process of teaching digital transformation applications. Each model has its own advantages, depending on actual conditions, universities have their own choices to suit the digital technology process.

## 4 HIGHER TEACHING IN THE DIGITAL TECHNOLOGY

Before offering solutions to promote higher education in digital technology, it is necessary to understand that the core mission of higher education remains the same regardless of era, which is to ensure the quality of learning through digital technology. through teaching, allowing students to acquire the latest knowledge through exploratory research and maintain the development of society by means of service. But now, to train the workforce in the new era, the development of higher education needs to be associated with the digital technology process. This means that higher education institutions need to be prepared to accompany technology in both teaching, research and school services. However, within the limits of this article, we focus on university teaching during the digital technology process.

One of the main tasks of every university is teaching. Therefore, it is necessary to implement appropriate strategies and organize work in a way that promotes learning. This has implications for adaptive learning programs, which in turn create better learning experiences and lifelong learning attitudes for students.

### 4.1 Applying TPACK model to higher teaching

TPACK is fundamental to teaching with technology and requires an understanding of how to use technology; pedagogical techniques that use technology to teach content; knowledge about making concepts difficult or easy to learn and how technology can help overcome some of the problems students face; students' existing knowledge, theories of epistemology, and knowledge of how technology can be used and develop new epistemologies or strengthen old ones (Nguyen V. L., 2021).

The TPACK model has shown an approach to using information technology in teaching in the direction of specifying the role of each type of knowledge. Based on the model, knowledge standards can be developed to help with assessment and self-assessment in training and professional development. In addition, the TPACK model has shown the perspective of applying information technology in teaching towards integration and transformation. Instead of providing separate technology knowledge training, training and professional development programs for lecturers need to pay attention to the

connection between subject pedagogical knowledge and information technology knowledge to exploit the The support capacity and compatibility of technology for the process and method of learning a subject or a specific content of knowledge and skills (Mishra & Koehler, 2006). The principles of teaching and learning the subject are inseparable from the application of information technology. Knowledge and skills about information technology alone cannot help teachers apply information technology effectively.

There are two aspects of applying the TPACK model. Firstly, TPACK helps lecturers develop a better learning environment for students, develop solutions and apply lecturers' knowledge to improve the quality of teaching. Second, TPACK argues for avoiding teaching technology skills independently of other knowledge and supports an approach based on integrating appropriate techniques for teachers to use technology. TPACK indicates a learning environment that allows students and instructors to explore technologies in relation to teaching content in specific contexts.

### 4.2 Applying SAMR model to higher teaching

The first level of the SAMR model is substitution, in which new tools or technologies replace old methods. In general, this phase does not concern the students, but involves the instructors or online tutors. If students are participating, then maintain a role in the teaching methods or online training program. In some cases, technology can also completely replace tools, not just based on technology platforms. For example, instead of switching from handwriting to typing, instructors can encourage learners by assigning the assignment through email or uploading it to the respective blog they have created for the purpose. train. Thus, in the early stages of technology integration, students need to be encouraged to use technology to solve tasks, but the main task remains the same. For example, if you are asking students to work together on a group project, they can use the Internet to gather more information about the topic. However, the use of technology will not be the basis of online training projects. In essence, you should use modern tools to replace existing tools that are outdated or ineffective. It's a direct replacement that doesn't include any upgrades or additional feature updates. Deliver slowly and steadily to your students, especially those who are resistant to change.

The second step in the SAMR process is augmentation, which is the development of the alternative concept. Students are required to use the technology with existing tools, but are also encouraged to try out the features and functionality that new tools may offer. Around this time, there was a “functional shift” in teaching and learning. Integrate new technology into lesson plans, such as online collaboration tools (e.g. Google apps), to let them explore the benefits of technology directly. For example, you could create a Google document that features additional learning resources or key ideas from online training modules, then share it with them. You ask them to add their own links and comments to the spreadsheet and share it with their friends. You're not simply teaching by example, you're encouraging them to explore technology on their own.

The third step in a successful SAMR strategy is modification, which includes changes in work or online training practices. This is the stage where SAMR moves from enhancement to transformation. In this case, technology is used to change the way classes approach learning, as well as the way they solve problems. Online tasks and training activities that used to suffer from limited or no technology will now need to focus on technology-based tools. Create online assignments using “old” methods combined with new technology so your students become more familiar with the process. For example, ask students to write a script, which they must then turn into an online video presentation or slideshow. This gives them the opportunity to decide how to integrate the technology. One learner can simply record audio, another can add sound effects, background music, and clickable icons to their online presentation. Students go at their own pace and explore high-tech tools in their own way. Instead of forcing them to adapt, they have the opportunity to use technology when and how it suits them.

Redefinition is the fourth level of the SAMR model, and where technology truly transforms the online training experience. During the redefinition phase, students can complete tasks and learning activities that were not possible in the previous phases. This stage is also important for the instructor or facilitator to determine the role of technology in the classroom. If you want students to use technology by completing online assessments or other online activities, you must make them aware first. Ask students to generate ideas for new ways they can use technology to their advantage, or give them specific guidance on media they can use to accomplish their goals. into an online training assignment. For example, you could ask them to create a website to convey a core idea

of the lesson, working collaboratively online with others. Let them know what other tools are needed, such as sound effects, images, online videos, and timelines. Give them a detailed list of tools they can use, as well as links to tutorials or orientation on how to use these tools. Before technology was introduced into online training programs, students might not have been able to tackle such a task. However, now that they have access to online tools, they can enjoy the benefits of interactive and immersive learning.

In addition, when teaching during the digital technology process, instructors also need to:

- *Teaching, learning and training with wearable devices*

  Wearables are simply objects that can be worn and carried on the body. But in today's technological age, it is better known as a word used to collectively refer to all accessories that integrate computer processors, electronic technology and many other useful features that people can wear it on their body. These things can interact with smartphones, TVs, cars and can monitor health, control home devices... Products such as fitness trackers, smartwatches. and smart glasses (Google Glass) are some of the hottest wearable devices today.

The majority of wearables being produced show an early sign of another technology. Educational institutions must act now to realize the enormous potential of digital transformation to revolutionize how instructors train students and how they learn. Performing numerical simulation is also a very useful tool for engineers to analyze and predict the condition of real-world physical systems. In the era of digital technology, when the existence of cyber-physical systems becomes a new norm, digital simulation plays an increasingly important role in both education and practical applications. In the field of numerical simulation, finite element analysis (FEA) is a versatile technique that has been implemented in various fields such as engineering analysis of buildings (Marwala *et al*. 2017, Marwala 2012). Modern FEA is often performed with computer assistance. Therefore, students can understand key concepts more intuitively and engineers can proceed to model complex problems and interpret them into simple results easily. However, such a setup limited the FEA processes to a completely virtual and virtual environment. These limitations in turn detract from human perception of many physical characteristics (e.g., scale, context, spatial qualities, and materials). With the

advancement of several wearable technologies, reality will enhance the user's consciousness and interaction with the physical world thereby creating a virtual laboratory. This technology can augment reality through the application of computer-generated information in a physical context in real time, which can facilitate exploration and interpretation of results.

- *Grasp courses that are open online*

  Teaching has long been limited by scenarios where students need to gather in a lecture hall to listen to a professor or sit around a table for group discussions. However, technological innovation is loosening those limitations and bringing fundamental change to higher education. Open online courses are a form of education that provides independent instruction online. This format increasingly impacts different universities in distinct ways. Two big factors underlie the cost of university facilities and productivity limitations. As the number of students registers increases, the cost of increasing lecture halls and instructors increases. But due to capacity limits, the maximum number of students that can be squeezed into lecture locations and exam markers is limited. Open online courses can eliminate these obstacles using different spaces such as off-campus and online models. To support online education, besides needing to deploy an ecosystem including infrastructure, technology services and institutions, the role of lecturers is very important to handle the workload caused by Online training program provided.

- *Fostering creativity*

  Most students from developing or underdeveloped countries lack creative ability. To fully grasp the opportunity of another wave of industrialization, a country's higher education system must not only focus on training people with knowledge-based skills but also have a good outlook in cultivating innovation capabilities, especially among senior scientists and technologists. These scientists must be trained in an interdisciplinary environment where technologists should understand the humanities, social sciences and vice versa.

- *Applying integrated learning methods*

  There are many important subjects included in higher education because they have both social and practical value such as microeconomics, macroeconomics,... But

most of its concepts represent a high level of understanding. Highly abstract for students. In many situations, concepts are isolated, without comprehensively understanding the interrelationships of each knowledge point across the whole picture and the connection between concepts and reality. The consequence of this learning process is that only a part of students can acquire general knowledge. Faced with the above problem, the main goal of a lecturer is to help students easily access conceptual knowledge and practical connections applied to not only microeconomics but also many other subjects. To solve this problem, we believe it is necessary to use a blended learning approach (i.e. mixed e-learning and face-to-face learning). What is important to know is that virtual environments offer great educational value in the process of information transmission and interactive participation, in real time (like a live conference) or asynchronous participant engagement (such as forums and chat).

In the process, direct teaching and assessment can develop relevant analytical and problem-solving abilities. Instructors can now receive feedback on the effectiveness of imparting their knowledge to students. Understanding of specific conceptual issues is then assessed and further reinforced through online graphical representations and multiple choice test questions, and this gives students the advantage of review their results immediately. Instead of fighting against these new technologies and the theoretical teaching models that come with them, higher education systems need to consider how to create teaching and learning environments that are beneficial to both people. learn from the teacher.

### 4.3 Applying digital technology to higher teaching for finance and banking

Statistics show that over 90% of banking transactions are now conducted through digital channels, with 50-100 million transactions per day. Tellers are no longer the dominant workforce. Instead, new positions are emerging: data specialists, financial technology engineers, digital risk management specialists, and digital experience specialists (Nguyen N.N., 2025).

This requires banks to restructure their entire workforce and build a team knowledgeable in both finance and technology – a digital finance workforce. This is also

an urgent requirement for higher education institutions in finance and banking to adapt to the digital age.The application of digital technology in higher education for Finance and Banking is essential to keep up with Fintech, AI, and digital banking trends, helping students master practical skills, enhance competitiveness, and meet the demand for high-quality human resources in the era of digital transformation. Technology creates an interactive environment, personalizes learning, and provides a vast source of real-world data.

Anticipating FinTech and Digital Banking trends: The banking industry is strongly shifting towards digital platforms such as mobile banking, QR payments, e-wallets, and AI. Education needs to update these technologies so that students do not fall behind.

Bridging the gap between theory and practice: Digital technology (simulation software, big data analysis) helps students practice, analyze risks, and make financial decisions during their studies.

Improving the quality of human resources: Students are equipped with skills in using financial technology and digital thinking, helping them quickly adapt to work in modern banks.

Personalizing and flexibly adapting learning: Technology allows learning anytime, anywhere, accessing a vast knowledge base, and interacting better through online tools.

Increasing competitiveness: Helps students seize new job opportunities, while also helping educational institutions enhance their reputation and training quality.

Common technologies that need to be integrated include artificial intelligence (AI), blockchain, data analytics, and smart banking applications.

## 5 CONCLUSION

Digital technology has impacted all aspects of social life to different degrees and directions. Higher education is one of the industries strongly influenced by digital technology because training products must meet the needs of the rapidly changing labor market.

Technology is revolutionizing the finance and banking sector. Digital banking services, e-wallets, and online payments are gradually replacing traditional over-the-counter transactions. Blockchain technology increases transparency and security, while AI supports data analysis, risk forecasting, and process automation. These changes are shaping a more modern and efficient financial ecosystem. These changes not only create a dynamic market but also place an urgent demand on human resources: deep financial expertise combined with technological proficiency.

Students and workers in the industry need the ability to adapt quickly to innovation, strong analytical thinking, and sensitivity to new financial models. Those who quickly grasp trends will possess a strong competitive advantage, opening up many development opportunities in the digital age.

Although this form of higher education has been around since the time of Aristotle, today it still mostly involves students gathering at a scheduled time and place to listen to the teachings of a lecturer. pellets. With digital technology, a new form of a university is emerging, which teaches, researches and delivers university services in a different way. At this time, the type of university is interdisciplinary, with virtual classrooms, virtual laboratories, virtual libraries and virtual teachers. Along with that, integrating technology into university teaching will not be a costly experiment or many errors, on the contrary, it will make the inherently stressful process of technology transformation effective by applying TPACK or SAMR. This not only reduces but also increases experience, as well as improving education with steadier and faster steps than before.

Furthermore, in the digital age, finance and banking lecturers need to innovate their teaching methods, flexibly combining traditional and active learning approaches, and applying scientific and technological advancements to enhance the proactive and creative learning of finance and banking students.

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## Authors' Contribution

All authors contributed equally to the development of this article.

## Data availability

All datasets relevant to this study's findings are fully available within the article.

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