Exploring Teachers' Perspectives on Adaptive Learning in Undergraduate Programs, Vietnam National University, Hanoi

Duong Thi Thu Huyen[1*], Nguyen Thi To Hoa[1], Hoang Tuyet Minh[1]

[1] Vietnam National University, Hanoi, International School, Vietnam
[*]Corresponding author's email: huyendtt@vnuis.edu.vn
https://orcid.org/0009-0006-9756-6618
https://doi.org/10.54855/ijte.24437

Received: 09/06/2024 Revision: 06/08/2024 Accepted: 12/08/2024 Online: 12/08/2024

ABSTRACT

This study addresses the growing trend of adaptive learning in higher education, focusing on the under-explored area of faculty perspectives at Vietnam National University, Hanoi (VNU). The research aims to understand how 68 instructors perceive and implement adaptive learning in undergraduate programs. Conducted within the context of VNU, the study employs a mixed-methods approach: quantitative data collected through survey questionnaires and qualitative insights gained from semi-structured interviews. The results reveal diverse attitudes among instructors, highlighting varying levels of comfort and familiarity with adaptive learning strategies. Key findings suggest a need for targeted support and discourse to enhance the implementation of adaptive learning. This study contributes to the ongoing discourse by providing practical recommendations for improving adaptive learning at VNU, ultimately aiming to elevate the educational experience for both students and faculty.

Keywords:
Adaptive learning, adaptive education, teachers' perspectives, undergraduate programs

Introduction

Adaptive learning has emerged as a significant trend within higher education, providing personalized learning experiences tailored to meet each student's unique needs (Cavanagh et al., 2020; Kim & Maloney, 2020). Higher education institutions worldwide are increasingly adopting adaptive learning technologies to enhance the learning environment and improve educational outcomes. The need to develop dynamic and responsive learning experiences that use technology to accommodate different learning preferences is what is driving this shift (Mulyadi et al., 2021; Wu et al., 2022; Phan, 2022).

The integration of technology in educational settings is crucial, as it offers potential solutions for personalized learning, which is becoming increasingly important to students (Webster & Hackley, 1997). As technological advancements continue, the role of computer-based learning is expected to grow, emphasizing the need for effective instructional delivery that ensures students not only learn and retain information but also apply it in the future (Lepper & Malone, 2021; Jannah et al., 2020; Burbules et al., 2020; Darling-Hammond et al., 2020; Dinh, 2023).

Adaptive learning systems aim to replicate the personalized interaction between a human tutor and a student on a larger scale. This involves studying one-on-one learning processes (Kaplan-

CITATION | Duong, T. T. H., Nguyen, T. T. H., & Hoang, T. M. (2024). Exploring Teachers' Perspectives on Adaptive Learning in Undergraduate Programs, Vietnam National University, Hanoi. *International Journal of TESOL and Education*, 4(3), 110-129. DOI: https://doi.org/10.54855/ijte.24437

Rakowski & Gruber, 2021) and implementing similar procedures through computer-based platforms. While sophisticated intelligent tutoring systems remain less common, limited systems designed for specific types of questions are more prevalent (Forsyth & Ponce de Leon, 2001; Huynh, 2022).

In this context, Vietnam National University, Hanoi (VNU), is a pivotal example of applying adaptive learning technologies within higher education. VNU is a prestigious educational institution in Vietnam, known for its diverse educational programs and research initiatives. It plays a crucial role in Vietnam's academic and economic development, striving to uphold high standards in research, education, and innovation (Ryu & Nguyen, 2021; Tien et al., 2021).

Our study focuses on exploring VNU instructors' perceptions of the integration of adaptive learning technologies into their courses. This research is essential for understanding the factors influencing instructors' acceptance and use of these technologies at VNU. VNU lecturers bring diverse perspectives to teaching, often viewing technology as a tool for knowledge dissemination that aligns with their preferred teaching methods. These perspectives significantly impact their attitudes toward the utility of technology and their willingness to incorporate it into their teaching practices.

Our research aims to provide valuable insights into the successful implementation and promotion of adaptive learning technologies within the university curriculum by examining specific aspects such as technological usability, pedagogical impact, and organizational integration. This study contributes to the existing literature on higher education by offering guidance for effectively integrating adaptive learning technologies into academic programs, enhancing the educational experience for both instructors and students.

Literature Review

An Overview of Adaptive Learning

According to researchers' findings, adaptive learning may be seen as both a technology and a process. On the one hand, it is used in educational technology to describe a tool that gives each student incredibly thorough and carefully tailored personalized teaching and direction to meet and exceed their specific needs. Discovery learning is mostly about independence and exploration. On the other hand, adaptive learning goes to a whole new level of personalization and individualization (Cavanagh et al., 2020; Taylor et al., 2021). Additionally, error diagnosis and correction is an interesting example of adaptive learning (Bonavita & Laloyaux, 2020). It is comprehensive and innovative, adapting the teaching approach to students' diagnoses. This strategy analyzes and interprets students' replies to identify their strengths and weaknesses. Teachers can simply and specifically instruct them to match their requirements and maximize learning. It basically makes a virtual classroom that changes and grows along with the students, easily responding to their growth and always pushing the limits of what they can do in school (Barron et al., 2020; Liu et al., 2020).

On the other hand, adaptive learning is still considered an educational process requiring a learning-friendly infrastructure and environment. This requires seamless integration of disruptive technologies, communication tools, and online distribution settings to deliver personalized challenges that fit learners' goals. Personalized adaptive learning accommodates diverse learning methods and preferences (El-SabSabagh, 2021; Maaliw III, 2020). Adaptive learning also acknowledges the need for diverse professional roles and methodologies in education. Using varied teaching methods, educators may meet each student's needs. A flexible

and adjustable educational environment promotes engagement, motivation, and progress (Mirata et al., 2020).

In short, adaptive learning considers individual differences, resulting in a unique learning experience (Liu et al., 2017). This contributes to improving the academic pathway, the learning process, and learner satisfaction in a diverse array of learning scenarios (Rosita et al., 2016). Adaptive learning can be classified as either a technology or a process.

Benefits and Challenges of Adaptive Learning

Adaptive learning technologies offer numerous benefits by providing personalized learning experiences tailored to each student's unique needs. These systems utilize software that adapts to students' interactions, creating distinct learning paths that enhance engagement and effectiveness. According to Muñoz et al. (2022), this tailored approach addresses individual student requirements, thereby improving learning engagement and outcomes.

One key advantage of adaptive learning technologies is their ability to provide real-time personalization, feedback, and adjustments, offering a viable alternative to traditional education methods. By assessing student performance data, digital tools enable educators to customize support and instruction for diverse learners, catering to their specific strengths and weaknesses. This approach not only enhances the educational experience but also saves time and resources for instructors (Alqahtan, 2021; Marienko et al., 2020).

Furthermore, adaptive learning technologies support teachers rather than replace them, allowing educators to focus on providing personalized support and fostering stronger teacher-student interactions. This leads to improved educational outcomes, as teachers can dedicate more time to addressing individual student needs and facilitating meaningful learning experiences (Wang et al., 2023).

Implementing adaptive learning technologies in education presents several challenges that must be addressed to ensure their effectiveness. One major challenge is providing students with the necessary resources and environments to maximize their learning potential. Training educators to effectively use these platforms is crucial, yet it can be time-consuming. Additionally, the rapid pace of technological advancement may hinder the full integration of adaptive learning systems.

Motivating educators to adopt innovative ideas is essential, but implementing new technologies in low-cost, independent schools or other resource-limited settings can be challenging (Mirata et al., 2020; Muñoz et al., 2022). Successful implementation of new teaching methods and educational initiatives requires careful planning, efficient organization, and positive collaboration among instructors, administrators, and support staff. Teachers must also be proficient in using cutting-edge teaching techniques to adapt to evolving educational landscapes (Rana & Rana, 2020; Yurtseven et al., 2020).

Another critical concern is the data privacy and security associated with adaptive learning systems. These systems monitor student interactions, preferences, and performance across various learning scenarios. Ensuring this data's proper utilization and protection is vital, as the increasing complexity of online environments poses new privacy risks. Continuous awareness and updated safeguards are necessary to protect individuals' well-being, identity, and personal boundaries in a connected society (Cavanagh et al., 2020; Muñoz et al., 2022).

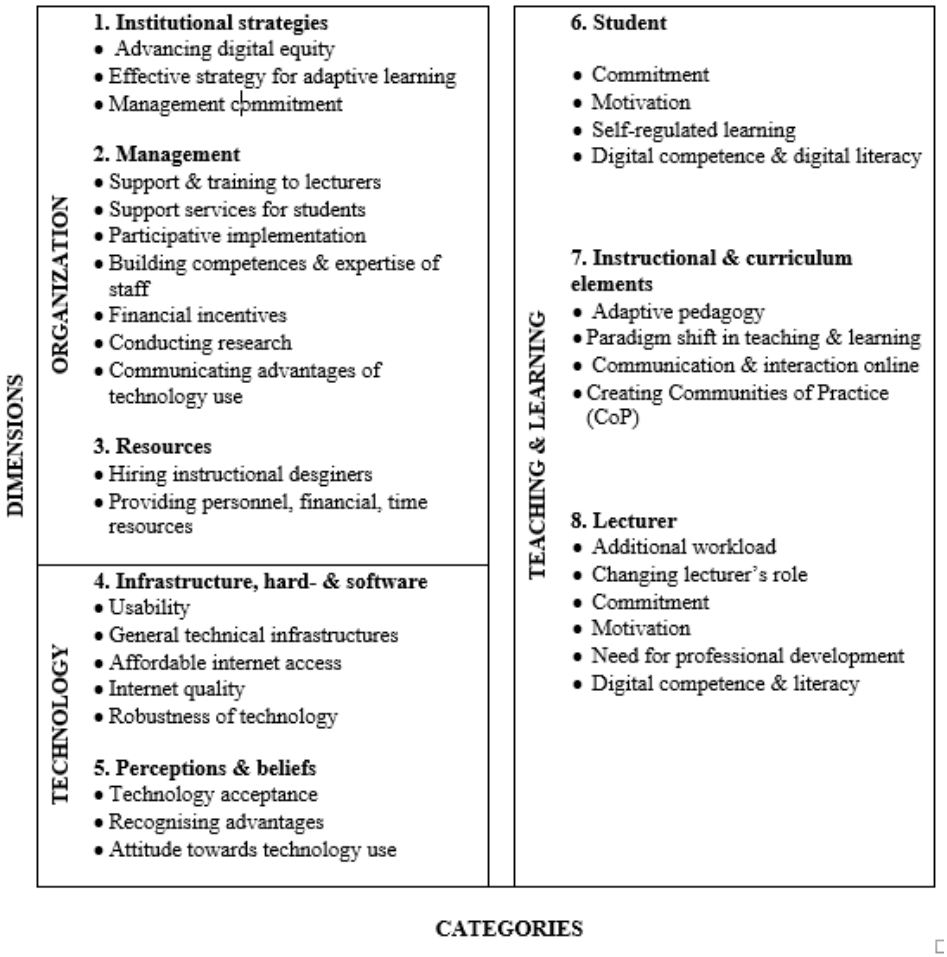
Research Framework

Mirata et al. (2020) examined barriers to higher education institutions using adaptive learning techniques in teaching. Using a four-stage Delphi approach, they experimentally identified,

classified, and prioritized adaptive learning concerns from experts from two Swiss and South African institutions. With eight categories, the researchers found three primary dimensions: technology, teaching and learning, and organizational problems. Figure 1 shows the eight categories: infrastructure, hardware, and software; perceptions and beliefs about adaptive technology (lecturers and students); instructional and curriculum elements; lecturer and learner characteristics; institutional strategies; management; and resources. This research adopted these three dimensions and eight categories of adaptive learning. However, this study uses the term *pedagogy* to replace the third dimension - teaching and learning.

Figure 1

Dimensions and Categories of Adaptive Learning (Adopted from Mirata et al., 2020)



Previous Studies on Adaptive Learning in Higher Education

In recent years in Vietnam, especially following the COVID-19 pandemic, adaptive learning has gained popularity due to its benefits. Research on adaptive learning in Vietnam may focus on factors involved in adaptive learning, such as learners, teachers, etc., or its implementation process.

In the world

In the world, recent systematic reviews on adaptive learning cover methodologies and technology by Martin et al. (2020) and Muñoz et al. (2022). Using PRISMA, Muñoz et al. (2022) reviewed the literature on adaptive learning technologies in higher education. They analyzed 112 adaptive learning studies to determine their status and identify literature gaps.

Research indicated that adaptive learning studies focused on study focus, adaptive methods, and adaptive technology. The writers employed content, instructional, and adaptive sources to study adaptive techniques. The most studied adaptive objectives were learner attributes, including learning style, adaptive feedback, and navigation. This study highlights potential research gaps for adaptive learning designers and researchers. While previous theoretical reviews focused on methodological challenges and techniques and a narrower application of adaptive learning, this study used varied implementation techniques, a qualitative literature review, and a systematic selection and analysis of research studies to broaden the application areas.

A 2020 systematic review by Martin et al. examined adaptive learning research designs, context, tactics, and technology from 2009 to 2018. They strategically searched for adaptive learning research by focus, publishing trends, instructional context, study methodological components, and technology. By analyzing 61 papers, they assessed the present level of adaptive learning research and literature gaps. This study affects adaptive learning designers and future researchers by identifying research needs. Future research may examine adaptive learning's growing availability and capabilities as a learning technique for tailored growth.

In addition to reviewing literature related to adaptive learning, researchers have also paid attention to various perspectives on this topic. Case studies by Bray (2017), Smith (2018), and Ramdani et al. (2021) probe educators' opinions about adaptive learning in a range of learning settings. Ramdani et al. (2021) examined Indonesian teachers' perceptions and readiness for adaptive learning during pandemics. Qualitative research with theme content analysis models was employed to achieve these goals. 327 teachers chosen through purposive sampling completed online surveys. Respondents' views on learning process modifications vary, depending on their readiness and adaptability. Teachers' excellent change management practices showed their readiness. These results show that respondents understood that face-to-face learning was still adaptive for them to teach. Teachers thought an adaptive learning guide was essential throughout the adjustment. This analysis identifies current learning ideas and predicts adaptive learning guides.

Smith (2018) examined US preservice teachers' views on adaptive learning programs in K-8 mathematics. This qualitative research included 17 undergraduate teacher education students. A survey, semi-structured interviews, and archival notebooks from K-8 Math Methods students were used to examine the data. This study found that preservice teachers believe adaptive learning tools benefit students and know they have numerous choices about what to use and how to incorporate them into the classroom. The study also indicated that preservice teachers' K-8 Math Methods course helped them understand the many possibilities of adaptive learning programs. These studies help to clarify the benefits, challenges and need for flexible guides, as well as the growth of research on the possibilities of adaptive learning to support customized education.

In Vietnam

In terms of learners, in order to improve adaptive learning, Nguyen et al. (2019) developed a model to monitor and identify students' postures and gestures during class to assess their participation in teachers' content and teaching methods. Based on this conclusion, the researchers believe they can advise trainers and training managers on topic material and teaching techniques for each object. In another adaptive learning study, Nguyen et al. (2020) used a competency-based approach to give learners who are high school principals individualized learning paths to acquire educational management competencies.

In terms of adaptive learning implementation, Nguyen and Ho (2006) developed a Bayesian network-based learning activity model to pick adaptive learning activities for each learner that meet their knowledge and help them learn topics. The Vietnam National University, Hanoi University of Engineering and Technology research project partially funds this work. Bui et al. (2022) examined adaptive education research, theoretical foundations, and practical applications in several countries, including Vietnam, and then suggested an adaptive educational model for general education in Vietnam. This paradigm addresses educational goals, content, delivery, evaluation, facilities, and the law. This concept works for general education, not higher education. Another piece of research relating to adaptive learning implementation is the technical evaluation, which outlines adaptive learning advice and examines its use in the UK and Vietnam (see Gransden et al., 2024). Next, practical issues and strategies for building and maintaining adaptive learning were derived. Questions were then created to assess if adaptive learning should be used in teaching and learning.

There has been little research on adaptive learning in higher education in Vietnam, notably from the perspectives of learners, teachers, or managers. Thus, this study should fill the research vacuum and examine Vietnam National University, Hanoi lecturers' views on this problem.

In short, adaptive learning has been the subject of a number of research initiatives throughout the world; however, there is no evidence of any study having been conducted on lecturers' perceptions in undergraduate programs. Therefore, this study aims to fill the research gap and investigate the perspectives of lecturers at Vietnam National University in Hanoi on this matter.

Research Questions

The main objective of this research was to explore teachers' perspectives on the adoption and practice of adaptive learning in the context of the VNU with the following research questions:

1. What are lecturers' understandings of adaptive learning?
2. What are lecturers' perceptions towards adaptive learning implementation from different aspects at their institutions?

Methods

Settings

Vietnam National University, Hanoi (VNU) is a leading institution in Vietnam, encompassing numerous affiliate members dedicated to innovative teaching pedagogy. VNU actively encourages its lecturers to continuously update their teaching methodologies, particularly by incorporating adaptive learning strategies, because they share common educational missions and regulations. This steadfast commitment ensures that VNU remains at the forefront of educational advancements, fostering a dynamic and responsive learning environment across its diverse academic units. Specifically, VNU has released a project entitled *"Innovating Teaching Activities at VNU"* in order to innovate teaching and learning practices in an urgent response to technological advancement applied from 2019 to 2025 (Vietnam National University, Hanoi, n.d.). That explains why this study seeks to explore the viewpoints of lecturers about adaptive learning in undergraduate programs across several majors at Vietnam National University, Hanoi. Through examining their perspectives and practices, our objective is to understand the reality of integrating adaptive learning in higher education within this particular setting.

Participants

The study includes a group of 68 lecturers, with 74.5% females participating in various undergraduate programs at Vietnam National University, Hanoi. This pool of participants majors in different areas of expertise, in which language and education account for the biggest part—more than 70%. The others specialize in technology and the natural sciences. The majority of the participants are between 36-55 years old, with 10 to 20 years of teaching experience. A subset of 7 instructors is chosen from this pool for in-depth, semi-structured interviews, guaranteeing a varied representation and different viewpoints within the sample.

Instruments of the Study

This study uses a mixed-methods approach, which means it uses qualitative and quantitative methods to determine how lecturers perceive adaptive learning. Both the survey questionnaires and the interview questions were adapted from the framework, which comprises dimensions and categories of adaptive learning" (Mirata et al., 2020).

Carefully crafted with two main sections, the first to assess lecturers' knowledge of adaptive learning and the second consisting of 35 Likert-scale questions to evaluate three dimensions of adaptive learning implementation, specifically excluding proper information. The survey questionnaire investigated dimensions of technology, pedagogy, and organization. Questions 1–8 were divided into views and benefits (6–8), infrastructure, hardware, and software (1–5) in the technical component. The pedagogy component examined instructional and curricular aspects (9–13), teacher/lecturer characteristics (14–19), and learner characteristics (20–23). Questions 24-35 covered organization, 24-26 institutional techniques, 27-33 management, and 34-35 resources.

In addition, a set of semi-structured interviews was created, consisting of 14 in-depth questions that required open-ended responses. The 14 items were organized in the following manner: Questions 1-6 gathered information about the participants' demographics; question 7 investigated their understanding of the concept of adaptive learning; and questions 8-14 sought to obtain a thorough understanding of their opinions on specific topics, such as technology (question 8), pedagogy (questions 9-11), and organization/management (questions 12-14).

Data Collection & Analysis

The electronic distribution of structured questionnaires through Google Forms facilitated the efficient collection of data from 68 instructors. The electronic distribution of structured questionnaires through Google Forms facilitated the efficient collection of data from 68 instructors. The questionnaires were distributed to 108 academics from seven member universities within VNU over a four-week period (from the end of March to early April 2024). However, only 68 responses were received. Explicit instructions were implemented to ensure confidentiality and uniformity. Furthermore, in order to guarantee adaptability and privacy, seven interviews were conducted in person (three respondents) or via Zoom (four respondents). We randomly selected seven lecturers from various member units within VNU to participate in in-depth interviews to obtain more detailed information on the three aspects of adaptive learning. These interviews were conducted in the final two weeks of April 2024.

A multiple-choice question was used to find out the way lecturers define adaptive learning, and the data was illustrated in percentages. For other question items to explore lecturers' perceptions towards adaptive learning implementation from different aspects at their institutions, R software was used during data analysis to calculate the mean value and standard deviation (SD). Each question in the questionnaire consists of a 5-point scale ranging from 1 to 5. The level of interpretation for the mean value is as follows: 1.0 - 2.4 (negative attitude), 2.5 - 3.4 (neutral

attitude), and 3.5 - 5.0 (positive attitude). The standard deviation is a single number that summarizes the variability in a dataset. It represents the typical distance between each data point and the mean. Smaller values indicate that the data points cluster closer to the mean - the values in the dataset are relatively consistent. Conversely, higher values signify that the values spread out further from the mean. Data values become more dissimilar, and extreme values become more likely. As a rule of thumb, a standard deviation that is equal to or greater than 1 indicates a relatively high variation, while a standard deviation below one can be considered low.

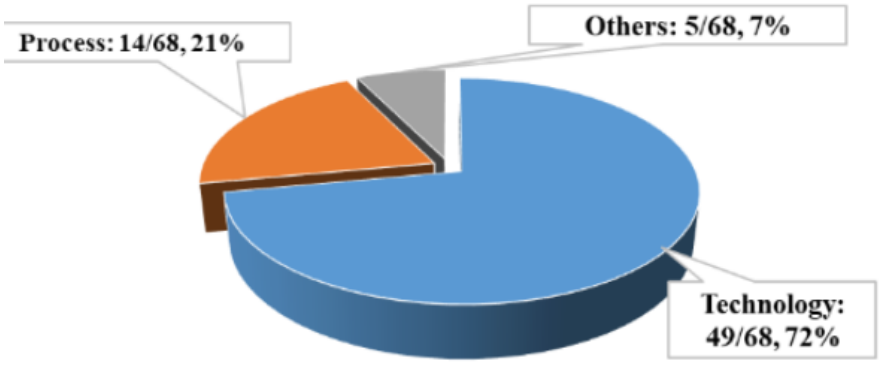
This study examined the perspectives of lecturers on adaptive learning in undergraduate programs at Vietnam National University, Hanoi, using R software for analysis. Descriptive statistics were used for data analysis. The content is classified as previously described, and the data analysis results are presented to address two research questions.

Results/Findings

The first part is an investigation of teachers' understanding of adaptive learning. The survey results show what lecturers thought about adaptive learning; the details are as follows:

Figure 2

Lecturers' Understanding of Adaptive Learning



The data demonstrates that the majority of participants (72%) predominantly view adaptive learning through the lens of educational technology, demonstrating a strong connection to tools and platforms that support individualized learning experiences in the given field. This viewpoint underscores the significance of technological solutions in the execution of learning strategy applications. Therefore, the instructors at VNU have comprehended the notion of adaptive learning as an educational technology, which aligns with the perspectives of earlier scholars (Barron et al., 2020; Bonavita & Laloyaux, 2020; Cavanagh et al., 2020; Liu et al., 2020; Taylor et al., 2021).

In contrast, more than one-fifth of lecturers (21%) view adaptive learning as an educational process, having found the truth focused on teaching methods and strategies adapted to the needs of individual learners. This emphasizes an understanding of adaptive learning as a dynamic and ongoing process aimed at tailoring education to a student's unique abilities and progress. According to the findings of researchers (El-Sabagh, 2021; Maaliw III, 2020; Mirata et al., 2020), this understanding is in agreement with their perspectives.

The remaining 7% of participants were given alternative definitions, which could include a variety of explanations, a combination of technology and process, or malicious framework concepts that could not be included in the remaining two types. This diversity in definitions reflects the evolving nature of appropriate learning and how it can be understood and applied in an educational context.

The second result of the study is lecturers' perceptions of adaptive learning implementation from different aspects at their institutions. The results are presented in alignment with eight groups designed in the theoretical framework of the study, as follows:

Technology

In this case, technology is characterized by two components: a) infrastructure, hardware, and software, and b) perceptions and beliefs. The first component - infrastructure, hardware, and software - is characterized by such factors as usability, general technical infrastructure, affordable internet access, internet quality, and robustness of technology.

Overall, lecturers do not strongly believe that the infrastructure, hardware, and software at their institution can facilitate the implementation of adaptive learning. It can be seen in the following table:

Table 1
Lecturers' Perceptions Towards the Institution's Infrastructure, Hardware, and Software in Implementing Adaptive Learning

No	**Statement**	**Mean**	**SD**
1	The adaptive learning system at the university is easy to use.	3.8	0.90
2	The university invests in technical infrastructure on campus (software, hardware, licenses).	4.0	0.87
3	Internet access at the university is affordable for students.	4.0	0.80
4	The university invests in appropriate technological infrastructure (e.g., Wi-Fi) to ensure internet quality.	4.1	0.77
5	The information technology (IT) team works on improving the stability of an adaptive learning system.	4.1	0.79

Table 1 shows that the lecturers have rather positive feedback about their institutions' infrastructure, hardware, and software, with the average mean scores centering around 4.0 on the 5-point Likert scale. The standard deviation (SD) for the five aspects (usability, general technical infrastructures, affordable internet access, internet quality, and robustness of technology) is below 1.0, which indicates that data are clustered tightly around the mean value and there is a low level of variability in the opinions of lecturers.

The second component in technology is perceptions and beliefs, which are characterized by such factors as technology acceptance, recognizing advantages, and attitude towards technology use. It is illustrated in the following table:

Table 2
Lecturers' Insights on Perceptions & Beliefs about Technology in Implementing Adaptive Learning

No	Statement	Mean	SD
1	You are willing to accept changes in teaching when using technology.	4.3	0.68
2	The use of technology in teaching brings about a lot of benefits.	4.4	0.63
3	The use of technology in teaching is an obvious trend nowadays.	4.6	0.70

As revealed in Table 2, the average mean score on the Likert scale is around 4.5, indicating that the professors had exceptionally favorable feedback regarding the infrastructure, hardware, and software at their respective universities. The standard deviation for the three characteristics (technology acceptance, identifying advantages, and attitude towards technology usage) is still below 1.0, which suggests that the data are clustered closely around the mean value and that there is variety in the opinions of lecturers. In addition, the data reveal a significant amount of variation around the mean value. With a mean score of 4.6 on the Likert scale, the lecturers are more than anything else in agreement that the utilization of technology in the classroom is a trend that is becoming increasingly apparent in today's world.

Pedagogy

Within the frame of this research, pedagogy involves the three following components: a) students, b) instructional and curriculum elements, and c) lecturers.

The first component, - student - is characterized by four factors: commitment motivation, self-regulated learning, digital competence, and digital literacy.

Table 3
Lecturers' Perceptions towards Benefits of Adaptive Learning on Students

No	Statement	Mean	SD
1	Adaptive learning helps to increase learner's commitment.	4.0	0.76
2	Adaptive learning helps to increase a learner's motivation.	4.2	0.70
3	Adaptive learning helps to increase a student's self-learning ability.	4.2	0.78
4	Adaptive learning helps to increase learner's digital literacy.	4.3	0.72

As can be seen from Table 3, the lecturers have really positive feedback about the benefits of adaptive learning for students at their institutions, with average mean scores ranging from 4.0 to 4.3 on the 5-point Likert scale. The standard deviation for the four aspects (student's commitment, motivation, self-regulated learning, digital competence, and digital literacy) still centers around 0.7, which indicates that the data are clustered tightly around the mean value and there is low variability in the opinions of lecturers.

The second component involved in pedagogy is instructional and curriculum elements. This includes the following factors: adaptive pedagogy, paradigm shift in teaching and learning, communication and interaction online, and creating Communities of Practice (CoP).

Table 4
Lecturers' Perceptions towards the Implementation of Adaptive Learning at their Institutions

No	Statement	Mean	SD
1	The university provides time for course instructors to adopt adaptive pedagogy in teaching practices.	4.2	0.74
2	Faculty members put effort into the didactically sound course design.	4.1	0.70
3	Faculty members spend time redesigning instructional materials and courses for adaptive learning.	4.1	0.72
4	The faculty members have frequent online communication and interaction.	4.0	0.68
5	The faculty members create Communities of Practices (CoP).	4.0	0.76

What can be seen in Table 4 is that the lecturers have really positive feedback about the practice of implementing adaptive learning at their institutions, with average mean scores ranging from 4.0 to 4.2 on the 5-point Likert scale. The standard deviation for the related aspects, including adaptive pedagogy, paradigm shift in teaching and learning, communication and interaction online; creating groups of people who share a common interest or profession and learn from each other through regular interaction and knowledge sharing called Communities of Practice (CoP) (Wenger, 1998)., still centers around 0.7, which indicates that data are clustered tightly around the mean value and there is a low variability in the opinions of lecturers.

The last component involved in pedagogy is the lecturer. This includes the following six factors: additional workload, changing lecturer's role, commitment, motivation, need for professional development, digital competence, and literacy.

Table 5
Lecturers' Perceptions towards the Effect of Adaptive Learning on Lecturers

No	Statement	Mean	SD
1	Adaptive learning will give lecturers additional workload.	3.9	0.92
2	Adaptive learning will change the lecturer's role.	4.0	0.87
3	Adaptive learning will increase a lecturer's commitment.	4.0	0.76
4	Adaptive learning will increase the lecturer's motivation.	4.0	0.74
5	Adaptive learning is necessary for a lecturer's professional development.	4.2	0.72
6	Adaptive learning helps to improve lecturer's digital literacy.	4.3	0.81

As can be seen from Table 5, it is clear that lecturers at VNU have positive perceptions towards the impact of adaptive learning on them. There are a great deal of changes if a lecturer implements adaptive learning, such as their workload, their role in class, their commitment, their motivation, their professionalism, and their digital literacy. The changes are obvious and inevitable due to the rapid changes in education nowadays, especially in the era of 4.0.

Among ideas relating to lecturers in the implementation of adaptive learning, the highest mean value (0.92) goes to the statement that adaptive learning will give lecturers additional workload. This suggests that lecturers have a variety of opinions about how adaptive learning will affect them; whether adaptive learning will result in increased workload or benefits is something lecturers perceive to be rather contentious.

Organization

Within the framework of this research, the aspect of organization involves the three following components: a) institutional strategies, b) management, and c) resources.

The first component is institutional strategies, which include digital equity, effective strategies for adaptive learning, and management commitment. The three statements in the questionnaires—described in the table below—contextualize this.

Table 6
Lecturers' Perceptions towards the Institutional Strategies for Adaptive Learning Implementation

No	Statement	Mean	SD
1	The university ensures students have equal access to technology-enhanced learning.	4.2	0.76
2	The university dedicates sufficient time to lecturers for adopting adaptive learning in teaching practices.	4.0	0.83
3	University management aligns the adaptive learning strategy with the broader institutional goals to ensure the long-term leadership support of the adaptive learning program.	4.1	0.74

As seen from Table 6, the lecturers have really positive feedback about their institutions' strategies in implementing adaptive learning, with the average mean scores centering around 4.1 on the 5-point Likert scale. The standard deviation for the three aspects (advancing digital equity, effective strategy for adaptive learning, and management commitment) centers around 0.8, which indicates that the lecturers' opinions exhibit minimal variability and the data are tightly concentrated around the mean value. The universities where these lecturers work have policies facilitating the implementation of adaptive learning, which is good news for educational innovation.

The second component relating to the organization is management, which includes support and training for lecturers, support services for students, participative implementation, building the competence and expertise of staff, financial incentives, conducting research, and communicating the advantages of technology use. As shown in the table below, the statements in the questionnaires contextualize these ideas.

Table 7
Lecturers' Perceptions towards Organizational Management for Adaptive Learning Implementation

No	Statement	Mean	SD
1	The university management provides ongoing support and training to lecturers during adaptive learning implementation.	4.1	0.71
2	The university management provides ongoing support services to students during adaptive learning implementation.	4.1	0.69
3	The university management involves all stakeholders during adaptive learning implementation.	4.0	0.74
4	The university management has policies to build the competencies and expertise of staff for adaptive learning implementation.	4.0	0.78
5	The university management offers financial incentives to instructors for the adaptive learning course development.	3.9	0.81
6	The university management conducts research on the effectiveness of adaptive learning courses.	3.9	0.82
7	The management communicates the advantages/ added value of adaptive learning to all stakeholders at the university.	3.9	0.81

As seen from Table 7, the lecturers have rather positive feedback about the management at their institutions in implementing adaptive learning, with the average mean scores centering around 4.0 on the 5-point Likert scale. Support and training for lecturers; support services for students; participatory implementation; building and expertise of staff; financial incentives; conducting research; communicating the benefits of using technology; and support and training for lecturers all have standard deviations that are close to 0.7. This means that lecturers' opinions do not vary much, and the data are mostly centered on the mean value. However, the lowest standard deviation (0.69) belongs to the idea that university management provides ongoing support services to students during adaptive learning implementation. This means there is a consistent tendency in universities to favor adaptive learning, and they continuously facilitate students in the implementation process. This is really good news and shows the increasingly common student-centered approach. One more thing that can be seen from the table above is that the mean value is below 4, which shows that the lecturers do not have a very high appreciation for the efforts of the university management in providing financial incentives, conducting research on the effectiveness, and communicating the advantages and added value of adaptive learning to all stakeholders.

The last component relating to organization in the implementation of adaptive learning is the resources, which include hiring instructional designers and providing personnel, financial, and

time resources. As shown in the table below, the statements in the questionnaires contextualize these ideas.

Table 8
Lecturers' Perceptions towards the Organizational Resources for Adaptive Learning Implementation

No	Statement	Mean	SD
1	The university's management hires instructional designers for adaptive learning courses.	3.7	0.96
2	The university management provides personnel resources for implementing adaptive learning.	3.9	0.83

From Table 8, it can be concluded that lecturers at VNU have rather positive perceptions towards the organization's effort in hiring instructional designers and providing personnel, financial, and time resources to facilitate the implementation of adaptive learning. Among the ideas relating to organizational resources in the implementation of adaptive learning, the highest mean value (0.96) goes to the statement that the university management hires instructional designers for adaptive learning courses. This implies that lecturers have various ideas about the practice of hiring instructional designers at their universities, and maybe this practice is not common at their institutions. This is the reason why lecturers' perceptions of organizational resources for adaptive learning implementation vary.

The average mean scores are below 4.0 on the 5-point Likert scale, which shows that the lecturers do not highly appreciate the university management's efforts in providing favorable resources for implementing adaptive learning.

Discussion

This research presents the opinions of VNU Hanoi lecturers on adaptive learning and the value of combining technology and pedagogy. Definitional variety may have an impact on the discussions and discoveries around adaptive learning, perhaps improving understanding.

Technology

Standardized surveys yielded quantitative data showing a significant awareness of adaptive learning systems. Most participants (79%) who stated that adaptable learning aids are necessary for customized education confirmed the idea that technology improves and customizes teaching. According to Muoz et al. (2022), the use of specialized techniques in their research significantly increases learners' engagement and efficacy. Qualitative interviews concur. Interviewee 3 explained that adaptive learning is a harmonious blend of pedagogical innovation and educational technology tailored to each student's individual needs, indicating that it extends beyond technology. Interviewee 5 stated:

> *"Viewing adaptive learning solely as a technological solution overlooks its deeper significance as an educational process that empowers learners."*

According to Cavanagh et al. (2020) and Taylor et al. (2021), adaptive learning is a comprehensive approach that transcends technology to provide personalized learning experiences. Both qualitative and quantitative data support adaptive learning. The most significant data analysis mean (4.6 out of 5) indicates that academics are enthusiastic about

incorporating ICT into their teaching, which indicates VNU instructors' willingness to implement innovative pedagogical methods.

Pedagogy

Many VNU professors acknowledge the power of adaptive learning to enhance and personalize learning. Interviewee 1 indicated that

> *"It's not just about technology; it's about leveraging pedagogical insights with technical expertise to tailor learning experiences."*

Adaptive learning must be perceived as a pedagogical approach that empowers learners rather than merely a technological tool**.** Adaptive learning establishes a dynamic virtual classroom that accommodates students' needs, as per Barron et al. (2020) and Liu et al. (2020). Interviewees 2 and 4 advocate for seminars and training courses to remind instructors that adaptive learning necessitates ongoing professional development. This supports Johnson and Sampson's (2019) assertion that educators require continuous training to remain informed about evolving educational methodologies and technologies. Interviewee 6 indicated:

> *"Adaptive learning remains underutilized when instructors are unable to fully comprehend its potential."*

According to Bonavita and Laloyaux's (2020) findings on teacher competency in these systems, this statement emphasizes the significance of thorough professional development for maximizing the advantages of adaptive learning systems.

Organization

The data suggests that adaptive learning necessitates a greater allocation of resources and institutional support. Hiring instructional designers for adaptive learning courses resulted in the lowest score (3.7 out of 5), which suggests a resource shortage**.** Interviewee 7 underscored the importance of digital literacy and the time and effort required for lecturers to implement adaptive learning. Mirata et al. (2020) identified organizational support and infrastructure as the primary challenges associated with the implementation of adaptive learning technology. In order to resolve these challenges, VNU should employ instructional designers, investigate the efficacy of adaptive learning courses, and compensate instructors. This strategy supports Brown and Green's (2020) emphasis on the significance of organizational infrastructure in the adoption of new educational technology**.** Interviewees 2 and 4 also suggested that the institution should offer seminars and training courses to assist instructors in the adoption of adaptive learning, contending that a structured support system is indispensable. Universities should allocate additional resources to technical and pedagogical adaptive learning courses, as the implementation of adaptive learning necessitates a comprehensive approach and supportive infrastructure, as per Maaliw III (2020) and El-Sabagh (2021).

This investigation focuses on the theoretical and practical aspects of adaptive learning. Understanding the perspectives of Vietnamese undergraduate instructors, including majors, enhances research findings. This article consolidates and clarifies prior research on adaptable learning. This comprehensive comprehension is essential for the advancement of adaptive learning in higher education and future research.

Conclusion

This study shows that lecturers had different ideas on how adaptive learning is defined, and they had positive opinions on the acceptance of implementing it. This study also reveals the overall positive perceptions of lecturers towards various factors involved in implementing adaptive learning, which are categorized into three aspects: technology, pedagogy, and organization. Among these three categories, organizations have received the least positive feedback, implying the need for better investment from VNU affiliates to ensure the effective implementation of adaptive learning. Though concerns about the growing workload exist, lecturers understand the positive impact of adaptive learning on student involvement and their professional development. The findings of this research highlight the need for organizers to allocate more resources and support for implementing adaptive learning systems, addressing organizational challenges to improve efficiency and reduce associated workloads. For stakeholders, the study underscores the importance of investing in infrastructure and training, providing insights into the strategic allocation of resources to establish a robust framework for adaptive learning at Vietnam National University, Hanoi. Additionally, lecturers are encouraged to engage with adaptive learning tools and participate in professional development opportunities to adopt innovative teaching methods that cater to diverse learning needs and enhance student engagement.

Nevertheless, there are substantial constraints, such as the study's emphasis on only VNU and potential biases in personally provided data from lecturers' perspectives. A larger sample size could be used in future research to achieve a more comprehensive understanding of the implementation of adaptive learning in a wide range of educational contexts. Also, given the small sample size (68 out of over 1,700 lecturers at VNU), caution must be taken, and the findings might not be generalized to all lecturers at VNU.

The research concludes with a perceptive examination of the perspectives on adaptive learning at Vietnam National University, Hanoi. However, additional research is required to address the identified deficiencies and enhance comprehension in this field.

Acknowledgments

We would like to express our sincere gratitude to Vietnam National University and Hanoi International School for their unwavering support and resource provision throughout this research. The research facilities and infrastructure provided by Vietnam National University and Hanoi International School have played a significant role in successfully completing this study.

References

Alqahtani, R., Kaliappen, N., & Alqahtani, M. (2021). A review of the quality of adaptive learning tools over non-adaptive learning tools. *International Journal for Quality Research*, 15(1), 45-72. DOI: 10.24874/IJQR15.01-03.

Bonavita, M., & Laloyaux, P. (2020). Machine learning for model error inference and correction. *Journal of Advances in Modeling Earth Systems*, 12(12), e2020MS002232. https://doi.org/10.1029/2020MS002232.

Bray, N. R. (2017). Faculty perceptions of implementing adaptive learning: A case study. *Electronic Theses and Dissertations*. University of Memphis Digital Commons. https://digitalcommons.memphis.edu/etd/1688

Bui, T. D., Dang, T. T. H., Vuong, Q. A., Do, T. H., & Nguyen, T. T. (2022). Nghiên cứu đề xuất mô hình giáo dục thích ứng cho giáo dục phổ thông Việt Nam. *Tạp chí Khoa học giáo dục Việt Nam*, 18(2), 14-22. https://doi.org/10.15625/2615-8957/12220203

Burbules, N. C., Fan, G., & Repp, P. (2020). Five trends of education and technology in a sustainable future. *Geography and Sustainability*. https://doi.org/10.1016/j.geosus.2020.05.001

Cavanagh, T., Chen, B., Lahcen, R. A. M., & Paradiso, J. R. (2020). Constructing a design framework and pedagogical approach for adaptive learning in higher education: A practitioner's perspective. *International Review of Research in Open and Distributed Learning*, 21(1), 173-197. https://doi.org/10.24874/IJQR15.01-03

Darling-Hammond, L., Schachner, A., & Edgerton, A. K. (2020). Restarting and reinventing school: Learning in the time of COVID and beyond. *Learning Policy Institute*. http://learningpolicyinstitute.org/product/restarting-reinventing-school-covid.

Dinh, T. H. (2023). Exploring EFL university lecturers' perceptions of benefits and challenges of using Audio-visual Aids. *International Journal of Language Instruction*, 2(4), 43–53. https://doi.org/10.54855/ijli.23243

Forsyth, R., & Ponce de Leon, P. (2001). Adaptive learning systems: A review and analysis. *Educational Technology Publications*, 35(2), 5-27. https://doi.org/10.1017/CBO9781139049580.004

Gransden, C., Hindmarsh, M., Le, N. C., & Nguyen, T. H. (2024). Adaptive learning through technology: A technical review and implementation. *Higher Education, Skills and Work-Based Learning*, 14(2), 409-417. https://doi.org/10.1108/HESWBL-05-2023-0121

Huynh, N. (2022). Teachers' Perceptions on Questioning Strategies at Pre-Speaking Stage in EFL Classroom Interaction – A Case of a University of Mekong Delta. *International Journal of Language Instruction*, 1(1), 53–64. https://doi.org/10.54855/ijli.22116

Jannah, M., Prasojo, L. D., & Jerusalem, M. A. (2020). Elementary school teachers' perceptions of digital technology based learning in the 21st century: Promoting digital technology as the proponent of learning tools. *Al Ibtida: Jurnal Pendidikan Guru* MI, 7(1), 1-18. https://doi.org/10.24235/al.ibtida.snj.v7i1.6088

Kaplan-Rakowski, R., & Gruber, A. (2021). One-on-one foreign language speaking practice in high-immersion virtual reality. In *Contextual language learning: Real language learning on the continuum from virtuality to reality* (pp. 187-202). *Springer Singapore*.

Kim, J., & Maloney, E. J. (2020). *Learning innovation and the future of higher education*. Johns Hopkins University Press.

Lepper, M. R., & Malone, T. W. (2021). Intrinsic motivation and instructional effectiveness in computer-based education. In *Aptitude, learning, and instruction* (pp. 255-286). Routledge.

Liu, M., Kang, J., Zou, W. T., Lee, H., Pan, Z. L., & Corliss, S. (2017). Using data to understand how to better design adaptive learning. *Technology, Knowledge, and Learning*, 22(3), 271-298. https://doi.org/10.1007/s10758-017-9326-z

Marienko, M., Nosenko, Y., & Shyshkina, M. (2020). Personalization of learning using adaptive technologies and augmented reality. (PDF) Personalization of learning using adaptive technologies and augmented reality (researchgate.net)

Martin, F., Chen, Y., Moore, R. L., & Westine, C. D. (2020). Systematic review of adaptive learning research designs, context, strategies, and technologies from 2009 to 2018. *Educational Technology Research and Development*, 68, 1903-1929. https://doi.org/10.1007/s11423-020-09793-2

Mirata, V., Hirt, F., Bergamin, P., & van der Westhuizen, C. (2020). Challenges and contexts in establishing adaptive learning in higher education: Findings from a Delphi study. *International Journal of Educational Technology in Higher Education*, 17(1), 1-25. https://doi.org/10.1186/s41239-020-00209-y

Muñoz, J. L. R., Ojeda, F. M., Jurado, D. L. A., Peña, P. F. P., Carranza, C. P. M., Berríos, H. Q., & Vasquez-Pauca, M. J. (2022). Systematic review of adaptive learning technology for learning in higher education. *Eurasian Journal of Educational Research*, 98(98), 221-233. https://doi.org/10.14689/ejer.2022.98.014

Mulyadi, M., Tonapa, S. I., Rompas, S. S. J., Wang, R. H., & Lee, B. O. (2021). Effects of simulation technology-based learning on nursing students' learning outcomes: A systematic review and meta-analysis of experimental studies. *Nurse Education Today*, Vol. 107, December 2021, 105127. https://doi.org/10.1016/j.nedt.2021.105127

Nguyen, Q. T., Hoang, T. B., Bui, T. D., & Nguyen, T. P. D. (2019). Student postures and gestures recognition system for adaptive learning improvement. *Proceedings of the 6th NAFOSTED Conference on Information and Computer Science* (NICS), 494-499. https://doi.org/10.1109/NICS48868.2019.9023896

Nguyen, T. T., Pham, B. T., & Pham, D. T. (2020). Competence-based adaptive e-learning in the regular training for school principals in Vietnam. *International Journal of Management* (IJM), 11(6), 1102-1111. https://doi.org/10.34218/IJM.11.6.2020.098

Nguyen, V. A., & Ho, S. D. (2006). ACGS: Adaptive course generation system - An efficient approach to build e-learning courses. *Proceedings of the IEEE Sixth International Conference on Computers and Information Technology*, 259-265. https://doi.org/10.1109/CIT.2006.32

Phan, M. N. V. (2022). EFL Teachers' Perceptions of the Implementation of Active Learning in Reading Classroom. *International Journal of Language Instruction*, 1(1), 65–85. https://doi.org/10.54855/ijli.22117

Tien, N. H., Anh, D. T., Van Luong, M., Ngoc, N. M., & Le Doan Minh Duc, N. D. (2021). Sustainable Development of Higher Education: A Case of Business Universities in Vietnam. *Journal of Hunan University (Natural Sciences)*, 47(12), 41-56. Sustainable Development of Higher Education: A Case of Business Universities in Vietnam (jonuns.com)

Ramdani, Z., & et al. (2021). Teachers' perception and readiness towards adaptive learning in the COVID-19 pandemic: Thematical content analysis study. *AL-ISHLAH Jurnal Pendidikan*, 13(2), 1383-1393. https://doi.org/10.35445/alishlah.v13i2.915

Rana, K., & Rana, K. (2020). ICT integration in teaching and learning activities in higher education: A case study of Nepal's teacher education. *Malaysian Online Journal of Educational Technology*. 8(1). 36-47. http://dx.doi.org/10.17220/mojet.2020.01.003

Rosita, C. M., Vittorini, P., & di Orio, F. (2016). An adaptive learning system for developing and improving reading comprehension skills. *Journal of Education Research*, 10(4), 195-236.

Ryu, J. H., & Nguyen, A. T. (2021). Internationalization of higher education in Vietnam: current situations, policies, and challenges. *International Journal of Comparative Education and Development*, 23(3), 227-241. https://doi.org/10.1108/IJCED-10-2020-0074

Smith, K. (2018). Perceptions of preservice teachers about adaptive learning programs in K-8 mathematics education. *Contemporary Educational Technology*, 9(2), 111-130. https://doi.org/10.30935/cet.414780

Vietnam National University, Hanoi. (n.d.). *Đổi mới hoạt động giảng dạy ở ĐHQGHN*. https://www.vnu.edu.vn/ttsk/?C2095/N23588/doi-moi-hoat-dong-giang-day-o-dHQGHN.htm

Wang, S., Christensen, C., Cui, W., Tong, R., Yarnall, L., Shear, L., & Feng, M. (2023). When adaptive learning is effective learning: Comparison of an adaptive learning system to teacher-led instruction. *Interactive Learning Environments*, 31(2), 793-803. https://doi.org/10.1080/10494820.2020.1808794

Webster, J., & Hackley, P. (1997). Teaching effectiveness in technology-mediated distance learning. *Academy of Management Journal*, 40(6), 1282-1309. https://doi.org/10.2307/257034

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press. https://doi.org/10.1017/CBO9780511803932

Wu, L., Hsieh, P. J., & Wu, S. M. (2022). Developing effective e-learning environments through e-learning use mediating technology affordance and constructivist learning aspects for performance impacts. *The Internet and Higher Education*. 55(2):100871 https://doi.org/10.1016/j.iheduc.2022.100871

Yurtseven Avci, Z., O'Dwyer, L. M., & Lawson, J. (2020). Designing effective professional development for technology integration in schools. *Journal of Computer Assisted Learning*, 36(2), 160-177. https://doi.org/10.1111/jcal.12394

Biodata

Duong Thi Thu Huyen, a Ph.D. candidate, focuses on language education, assessment, and educational management. She specializes in applied linguistics and delves into English language pedagogy, assessment methodologies, and educational administration. She is committed to teaching English and enhancing language skills and ensures fair language assessments. Huyền's research interests include academic English proficiency, cultural intersections in language education, and effective educational management. She aims to enrich language teaching practices, advance assessment strategies, and contribute to educational management, fostering a holistic approach to language education and assessment.

Dr. Nguyen Thi To Hoa is a lecturer at Vietnam National University, Hanoi (VNU), International School (IS). She obtained her PhD in contrastive linguistics from Vietnam Academy of Social Sciences and MA degree in ELT at University of Languages and International Studies, VNUH. Her research interests include ELT and linguistics.

Assoc. Prof. Dr. Hoang Tuyet Minh is a linguist at Vietnam National University, International School. Specializing in comparative linguistics, theoretical linguistics, and applied linguistics, her research explores language structures and cultural nuances. With a focus on semantics, pragmatics, and language-culture relationships, she contributes significantly to theoretical linguistics. Dr. Minh also teaches courses like Theoretical Linguistics and Academic English Writing, mentoring students in research and writing skills. Her dedication to advancing linguistic knowledge and nurturing future scholars underscores her commitment to the field. Dr. Minh enriches the understanding of language's complexities and societal roles through research, teaching, and mentorship.