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Applying Artificial Intelligence in Station-based Learning for Primary Education in Vietnam

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ABSTRACT: *This article examines the theoretical basis and potential applications of artificial intelligence (AI) in station-based learning for primary education in Vietnam. Using a literature review approach, relevant studies on AI in education and station-based learning were collected, analyzed, and synthesized to identify trends, benefits, and challenges. The analysis highlights AI's capacity to support teachers in designing lesson plans, personalizing learning tasks, creating interactive learning stations, and monitoring students' progress within station-based learning. These functions are considered in relation to the requirements of Vietnam's 2018 General Education Program. The paper also identifies barriers to effective implementation, including limited infrastructure, insufficient teacher training, and concerns regarding ethics and data privacy. Recommendations are proposed to enhance feasibility and sustainability, including developing localized AI tools tailored to the Vietnamese curriculum and station-based learning, investing in technological infrastructure, strengthening teachers' digital and pedagogical competencies, and establishing legal frameworks for ethical AI use. By clarifying opportunities and constraints, the study contributes to the theoretical foundation for integrating AI into station-based learning. It emphasizes the need for context-appropriate applications that promote autonomy, creativity, and inclusivity in primary classrooms while ensuring alignment with national educational reform.*

KEYWORDS: **Artificial intelligence, station-based learning, primary education, general education program.**

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1. Introduction

Primary education shapes foundational knowledge, skills, and character, and lays the groundwork for lifelong learning. Within the framework of Vietnam's comprehensive educational reform, as outlined in the 2018 General Education Program (Ministry of Education and Training, 2018), it plays a decisive role in ensuring educational quality. In this context, the learning process that promotes student autonomy and creativity has gained increasing attention and practical application.

Globally, the rapid advancement of digital technologies, especially AI, has brought profound changes to education. Since its introduction by John McCarthy in 1956 at the Dartmouth Summer Research Project, AI has advanced from theoretical exploration to widespread applications that span multiple domains, including education. Unlike traditional technologies based on fixed rules, AI is characterized by its capacity to learn from data and adapt flexibly, making it particularly relevant to the Education 4.0 paradigm. AI applications have expanded considerably within the educational field, encompassing personalized learning, teaching support, inclusive education, and academic management and analytics (Abbas, 2024; Jr. & Bauyot, 2025).

Results from the reviewed studies show that AI-based systems play a transformative role in personalizing the learning process across different levels of education. Adaptive learning platforms and intelligent tutoring systems are particularly effective in tailoring instructional content, pacing, and methods to individual learner needs. Systematic reviews highlight that personalized

learning technologies are at the center of current educational innovations, with the capacity to adapt to the unique learning pathways of students (Hardaker & Glenn, 2025). At the higher education level, a systematic review of 45 selected studies from 17,899 records confirmed that AI-based personalization improved student engagement, knowledge acquisition, skills development, and socio-emotional outcomes at moderate levels (Merino-Campos, 2025). In primary education, technologies such as biosensors, speech recognition, chatbots, adaptive platforms, and automated feedback systems enhance students' learning experiences by providing timely and individualized support (Prayoga *et al*., 2025; Purba *et al*., 2025). Furthermore, AI-driven game-based learning and puzzle-making tools significantly improve motivation, creativity, communication, critical thinking, and problem-solving skills, aligning with constructivist theories of active and experiential learning (Baker & Smith, 2024; Yusuf, 2025).

The analysis also revealed that AI substantially assists teachers by automating repetitive tasks and enhancing instructional design. Automated essay scoring and scheduling tools reduce administrative workload and free up teachers' time for more interactive, student-centered pedagogical approaches (Abbas, 2024). In addition, AI-based diagnostic tools can assess students' strengths and weaknesses, providing data-driven insights that help teachers create customized curricula aligned with individual learning profiles (Chatwal *et al*., 2023). This function positions AI as a co-teacher that augments, rather than replaces, human educators. Consequently, teachers are empowered to focus on facilitation, creativity, and emotional engagement in the classroom. Predictive analytics models have been shown to identify students at risk of academic underachievement, enabling timely interventions that improve retention and reduce dropout rates (Gabriel, 2024). Moreover, AI-driven adaptive systems allow for differentiated instruction, ensuring that students with varying abilities—including those with mild to moderate learning disabilities—receive equitable access to meaningful learning opportunities (Soselisa *et al*., 2019). AI-supported interactive platforms also foster student autonomy, collaboration, and engagement, thereby strengthening inclusivity while positioning students as active agents in their learning.

AI has contributed significantly to educational management and analytics by providing robust tools for data-driven decision-making. Through the analysis of large-scale educational data, AI systems deliver insights into student performance trends, institutional efficiency, and resource allocation (Ifenthaler & Yau, 2020). Such applications have been effective in higher education, where AI has been shown to enhance governance, increase student engagement, and improve administrative processes (Merino-Campos, 2025). However, challenges remain in achieving sustainable and ethical implementation. Key barriers include insufficient technological infrastructure, limited teacher competence in AI integration, and critical concerns over data privacy, algorithmic bias, and content relevance (Abbas, 2024; E & Ramani, 2025; Purba *et al*., 2025; Tilepbergenovna, 2024). These findings indicate that AI adoption requires balanced integration, combining innovation with strong policy frameworks, ethical guidelines, and continuous teacher professional development.

In education, station-based learning is a pedagogical process in which students rotate among different "stations," each organized around a specific task or learning objective. The concept of station-based learning emerged in the early 20th century under various terms, such as classroom science centers (Irwin *et al*., 2003), learning circles (Helfand *et al*., 2017), learning centers (Olsen, 1975), station technique (Albayrak, 2016; Benek, 2012), learning stations (Bulunuz & Jarrett, 2010), and station rotation (American Institutes for Research, 2020). Despite the diversity of terminology, station-based learning shares a common pedagogical principle: organizing instruction around different stations that engage students in structured learning activities. Station-based learning, grounded in

the student-centered approach, divides classes into stations with distinct activities that allow students to work individually or collaboratively, personalizing learning and enhancing outcomes in cognition, critical thinking, collaboration, and motivation (Yuliaristiawan *et al*., 2025). International findings also demonstrate that station-based learning enhances higher-order thinking, creativity, and self-directed learning, especially in primary education settings (Christina *et al*., 2019; Yuliaristiawan *et al*., 2025).

Aydogmus and Senturk (2019) described station-based learning as a process in which students engage in a sequence of activities within designated areas inside or outside the classroom, either individually or in groups, based on teacher instructions or self-directed tasks. This process gives students opportunities for inquiry, exploration, and knowledge consolidation. Similarly, Tran (2010) emphasized that teaching with learning stations constitutes an open instructional method in which teachers organize self-directed student activities at designated classroom locations to address specific learning problems. Stations are often arranged in circular formations, and students may use them to learn new topics, reinforce prior knowledge, or engage in social science explorations (Hall & Zentall, 2000; Koseoglu *et al*., 2009). As a feasible model of personalized learning, station-based learning allows students to experience multiple modalities such as computer-based instruction, group projects, individual tutoring, and paper-and-pencil assignments (American Institutes for Research, 2020). It can be implemented within or across multiple classrooms, making it adaptable to different grade levels and institutional contexts. Empirical evidence indicates that station-based learning enhances students' responsibility, autonomy, and problem-solving abilities by engaging them in independent or group-based tasks that promote self-discovery and critical reflection (Yuliaristiawan *et al*., 2025).

Station-based learning aligns with the general structure of educational systems, comprising objectives, content, methods, instructional materials, organizational forms, teacher activities, student activities, and assessment. Each element functions in a dialectical relation with the others, and the absence of any component prevents the teaching process from functioning effectively. When applied to primary education, station-based learning fosters higher-order thinking skills, as evidenced by research showing significant improvements in elementary students' abilities to analyze, evaluate, and create (Christina *et al*., 2019; Soselisa *et al*., 2019). A large-scale study involving 217 primary students across five schools further demonstrated that station-based learning significantly improved critical thinking outcomes compared with traditional methods (Luthfi Oktarianto *et al*., 2023). Importantly, station-based learning has also been shown to be effective in differentiated classrooms, meeting diverse learning needs, including those of students with mild to moderate learning disabilities (Soselisa *et al*., 2019).

In Vietnam, the application of station-based learning at the primary level faces limitations such as restricted instructional time, inadequate facilities, and teachers' limited capacity to design differentiated activities. Furthermore, although AI is increasingly used in general teaching activities, no theoretical study in Vietnam has examined how AI can be concretely embedded within station-based learning. Therefore, this paper examines the theoretical underpinnings of integrating AI into the station-based learning process in primary education, analyzing potential benefits and the conditions necessary for effective implementation. Specifically, it explores how AI can support lesson design, station organization, and process management. Based on these insights, the study proposes recommendations for primary school teachers in Vietnam to apply AI in ways that are feasible, sustainable, and aligned with the orientations of the 2018 General Education Program.

To achieve this objective, the study focuses on answering the following research questions (RQ):

RQ1. How can AI specifically support station-

based learning within the context of Vietnamese primary schools?

RQ2. What are the challenges related to infrastructure, pedagogical competence, and ethical issues in integrating AI into station-based learning in Vietnam?

RQ3. What recommendations are needed to promote the feasible and sustainable application of AI in station-based learning for primary students in Vietnam?

2. Research methods

This study employed an integrative review methodology. This approach allows for the synthesis of findings from diverse sources, including theoretical studies, empirical research, and policy documents, to build a comprehensive theoretical framework for the application of AI in the station-based learning process. The research was conducted in three main steps:

First, relevant literature was systematically collected from reputable academic databases such as Google Scholar, ResearchGate, and SCOPUS, along with policy documents from the Vietnamese Ministry of Education and Training. The search process adhered to the following criteria:

• Keywords: Keywords used (in both English and Vietnamese) included: "Artificial Intelligence", "AI in education", "Station-based Learning", "learning stations", "station rotation", "primary education", "elementary education", and "the 2018 General Education Program".

• Timeframe: The study prioritized literature published from 2000 to the present (2025) to ensure the currency of the findings, especially considering recent advancements in AI and the 2018 General Education Program.

• Inclusion criteria: Scientific articles, conference proceedings, research reports, and legal documents directly related to the application of AI in educations, tation-based learning, and the context of primary education in Vietnam.

• Exclusion criteria: Non-peer-reviewed materials, articles that only mentioned AI or station-based learning superficially, or studies focusing solely on higher education without applicability to primary education.

Second, the collected literature was evaluated based on its relevance to the research objectives, the credibility of the publication source, and the research methodology employed. This process ensured the quality and validity of the data selected for synthesis.

Third, the study utilized thematic analysis to synthesize the information. Data from the screened literature were analyzed, systematized, and organized into key themes, including: (1) station-based learning in primary education, (2) AI and its impacts on primary education, (3) potential applications of AI in station-based learning, and (4) implementation challenges and recommended solutions. This approach facilitated the identification of research trends, highlighted key benefits, addressed existing challenges, and formed the basis for the paper's arguments and recommendations.

Table 1. Overview of Reviewed Studies

Category	Contents
Quantity	34 peer-reviewed studies, reports, and policy documents.
Methods used	Experimental / quasi-experimental: 10 Systematic & literature reviews: 11 Theoretical: 7 Policy analyses & descriptive reports: 6
Research topics	AI in education: 15 Station-based Learning/Station Rotation: 13 AI in primary education: 10 Educational policy and innovation: 6

Category	Contents
Educational scope	Effects of Station-based Learning on learning outcomes AI for personalization, assessment, and feedback AI for inclusive education and early intervention Teacher support and instructional design Implementation challenges
Synthesized findings	Station-based learning has positive effects on student engagement, autonomy, and higher-order thinking. AI enhances personalization, provides real-time feedback, and automates assessment tasks. AI-supported learning environments show increased motivation and interaction among primary learners. Major constraints include limited infrastructure, insufficient teacher capacity, the absence of localized AI tools, and concerns about data privacy. Policy-oriented documents emphasize the need for safe, ethical, and context-responsive AI integration

A total of 34 documents were included in the final analysis, representing research methods, topics, geographical contexts, and educational levels. Table 1 summarizes the main characteristics of the reviewed studies, including the total number of studies, methods used, research topics, educational scope, and synthesized findings.

3. Research results

3.1. The Potential Application of Artificial Intelligence in Station-based Learning in Vietnamese Primary Education

Implementing AI in education in Vietnam remains at an early developmental stage. The Ministry of Education and Training is formulating a national strategy for AI integration in education, setting targets for 2030: 100% of students will gain AI literacy, 100% of teachers will employ AI in teaching and assessment, and 50% will be capable of designing AI-integrated lesson content (G. Ha, 2025). At the National Forum on Artificial Intelligence in Education, Deputy Minister Pham Ngoc Thuong emphasized that the Ministry, in collaboration with UNICEF and other stakeholders, is developing thematic initiatives to operationalize the AI Strategy in Education, with the dual objectives of promoting responsible AI use and safeguarding educators' independence and creativity (UNICEF Vietnam, 2025). AI integration in station-based learning can enhance instructional effectiveness, support personalized learning, and assist teachers in classroom management. In Vietnam, station-based learning has been widely adopted in the new general education curriculum, particularly at the primary level, to foster student competencies through interactive teaching and educational activities (Ministry of Education and Training, 2018). Most AI applications in education have concentrated on online platforms, personalized practice software, and teacher-support tools for lesson preparation.

*** AI support in designing station-based lesson plans:**

Artificial intelligence can assist primary school teachers in designing station-based lesson plans by constructing lesson structures aligned with learning objectives and students' proficiency levels. Since the core of design thinking emphasizes goals and learners, the organization of activities remains flexible and adaptable. In station-based learning, teachers identify expected outcomes, learners' competencies, needs, and learning styles, alongside the knowledge units to be delivered at different stations. Based on this information, AI can generate a detailed instructional design. For instance, tools such as Google Classroom integrated with AI can suggest tasks for learning stations, such as mathematics

problems personalized according to student data. Generative AI can further support teachers by generating ideas, creating detailed lesson plans, grading, and providing individualized feedback (Center for Communication and Events – MOET, 2025). This reduces the burden of manual work and allows teachers to focus more on creative interactions with students.

The potential application of AI in station-based learning in Vietnamese primary education can be implemented as follows:

*** AI support in personalizing learning tasks at stations:**

AI can design personalized learning tasks at stations by leveraging data on students' proficiency levels and interests. It can automatically generate thousands of exercises across various difficulty levels, ranging from multiple-choice and fill-in-the-blank items to higher-order thinking problems tailored to students' capabilities. For example, AI systems such as Duolingo or Khan Academy can create mathematics or science exercises suitable for different proficiency levels. According to the study *The Role of AI in Improving Student Learning Outcomes: Evidence in Vietnam* (2024), personalized learning systems and automated assessment tools have enhanced students' engagement and learning outcomes, despite persisting challenges in infrastructure and teacher professional development (Nguyen & Phan, 2024).

AI tools can also grade assignments and provide immediate feedback, enabling students to identify and correct mistakes promptly. Intelligent Tutoring Systems from earlier stages, such as AutoTutor, exemplify personalized AI-driven learning models and continue to inform the theoretical foundations of modern applications. AI can serve as a virtual tutor at designated assistant stations to answer questions, clarify complex concepts, and provide supplementary references. Based on student performance, AI can dynamically adjust task difficulty, ensuring that learners are consistently challenged without exceeding their zone of proximal development.

*** AI support in designing interactive learning stations:**

AI can be applied to design interactive learning stations using tools such as chatbots or virtual reality applications to enhance engagement. Integrating AI with virtual reality technology can create virtual practice stations that immerse students in interactive environments, enabling them to explore the world, travel through space, or study the human body. Teachers may also develop gamified learning stations in which AI designs educational games that combine knowledge acquisition and entertainment. For example, students may be tasked with solving mathematical puzzles to overcome obstacles in a game or answering science-related questions to unlock higher levels. A study conducted in Vietnam reported the use of AI in primary school music education through speech recognition technologies, tutoring chatbots, and virtual reality, creating more dynamic and practical interactive stations (Ha, 2024).

AI tools can also develop chatbots at learning stations to provide on-demand academic support, transforming the learning process into interactive and engaging dialogue. Moreover, AI can automatically generate multimedia content such as illustrative videos, quizzes, and educational games, helping teachers save time and effort in designing station-based learning activities. Such integration enhances the flexibility and personalization of station-based learning and increases student engagement, motivation, and learning effectiveness. These applications open new prospects for pedagogical innovation toward an intelligent and modern educational environment, aligned with the ongoing digital transformation in education.

*** AI supports monitoring and assessing students' learning processes at stations:**

Research findings indicate that AI can analyse learning data, predict student performance, and support early interventions, thereby improving instructional quality and assessment practices (Nguyen & Phan, 2024). Concurrently, the Ministry of Education and Training is pursuing

the digitisation of nationwide educational data, aiming to leverage AI to analyse and optimise decision-making, management, and the monitoring of student learning outcomes (Ha, 2025). AI can collect and analyse student performance data, including completion times, numbers of attempts, and common errors. Based on this information, it can generate detailed reports on individual strengths, weaknesses, and progress. Furthermore, AI can predict students at risk of difficulties and provide early intervention recommendations to teachers, enabling timely support.

The application of AI in station-based learning in Vietnamese primary schools remains at an early stage, with concerted efforts from governmental bodies and educational institutions. AI demonstrates strong potential in supporting station-based learning across multiple dimensions, including lesson plan design, task personalization, the development of interactive stations, and monitoring and assessment. It also helps teachers save time and effort while improving the overall effectiveness of station-based instruction. However, current realities indicate the need for greater investment in infrastructure, teachers' digital competencies, clear legal frameworks, and specific implementation guidelines. These foundational elements are essential for advancing more targeted research in subsequent phases of this study.

3.2. Challenges in Applying Artificial Intelligence to Station-based Learning in Vietnamese Primary Schools

Despite the developments mentioned above, the application of AI in education, particularly in station-based learning, faces multiple challenges. These include inadequate infrastructure (e.g., insufficient access to tablets, laptops, or high-speed internet for digital learning stations), limited human resources and professional expertise due to insufficient teacher training in AI integration, and psychological barriers such as hesitation and scepticism regarding AI's reliability and effectiveness. Moreover, teachers' limited understanding of the pedagogical principles underpinning station-based learning has hindered its effectiveness. Even when AI tools are available, their use often falls short of fostering learner autonomy and critical thinking, resulting in suboptimal outcomes. These constraints help explain why the adoption of AI in station-based learning in Vietnamese primary schools has yet to meet expectations. Nevertheless, with the rapid advancement of digital technologies and increasing societal interest, the potential for AI integration in this context remains substantial. A systemic approach is required for AI-assisted station-based learning to achieve its intended impact, encompassing investment in technological infrastructure, the enhancement of teachers' digital and pedagogical competencies, and the establishment of clear policies and guidelines for effective AI utilisation in teaching.

*** Lack of localized AI tools and adequate technological infrastructure:**

Station-based learning requires substantial preparation, including diverse learning tasks, supporting tools for each station, and systems for managing multiple concurrent activities. However, most AI applications currently available in Vietnam focus primarily on general online teaching support (e.g., LMS platforms and automated grading software) rather than being designed explicitly for station-based learning. As a result, teachers are still responsible for manually creating various station-specific activities, while AI only assists at a generic lesson-planning level. No AI tools currently exist at the classroom management level to enable teachers to monitor multiple groups of students working at different stations simultaneously. Given that primary classes in Vietnam often have 35–45 students, the absence of dedicated AI solutions poses significant difficulties for teachers.

In addition, licensing costs for advanced AI software remain high, while budgets for public primary schools are limited. Many schools in rural or remote areas still lack reliable internet connections, exacerbating the digital divide

across regions. Thus, the absence of localised AI tools and sufficient infrastructure represents one of the most significant challenges to implementing AI in station-based learning at the primary level.

*** Limitations in teachers' pedagogical and technological competencies:**

Within station-based learning, teachers not only act as instructors but also serve as task designers, organizers of station rotations, and facilitators of student engagement. When AI is integrated, the demands on teachers increase further: they must know how to use AI to design tasks appropriate for each station, integrate AI into group or individual activities, and manage the data generated by AI systems.

Some teachers may rely on AI to generate student tasks but lack the pedagogical expertise to evaluate whether those tasks align with curriculum standards, competency goals, or the broader learning sequence across stations. This raises the risk of AI being used superficially; for instance, teachers may print AI-generated exercises and distribute them to stations without integrating them into a coherent learning trajectory. Consequently, students fail to experience the full benefits of station-based learning. Conversely, some teachers may have strong instructional design ideas but lack the technological skills or knowledge of which AI tools can help them realize their plans. In other words, the lack of technological literacy and pedagogical expertise for effectively integrating AI into station design constitutes a critical challenge.

*** Ethical concerns and data security in monitoring and assessment:**

One of AI's major strengths is its ability to monitor progress and assess students in real time. This is particularly advantageous in station-based learning, as teachers must simultaneously supervise multiple groups of students across different stations. However, AI's collection and analysis of student data raise significant ethical and privacy concerns. Without robust security mechanisms, student data may be exploited for unintended purposes.

The challenge of ethics and data protection goes beyond simply "safeguarding student information." It is directly linked to the quality of the learning experience at each station. For example, AI collects personal learning data (e.g., test scores, study habits) to personalise tasks; however, without adequate safeguards, such data may be exposed or used in ways that violate privacy rights. Moreover, algorithmic bias may lead to unfair outcomes—for instance, AI systems might prioritise high-achieving students while neglecting those who need additional support, thereby reinforcing existing inequities. Ethical concerns also arise when AI replaces teachers' roles in ways that reduce human interaction, potentially hindering students' socio-emotional development.

3.3. Recommendations for the Application of Artificial Intelligence in Station-Based Learning for Primary Students in Vietnam

*** Development of localized AI tools and Investment in technological infrastructure:**

The lack of localized tools tailored to the 2018 General Education Program and the psychological characteristics of Vietnamese students is one of the main reasons why the application of AI in station-based learning at the primary level remains ineffective. Current AI applications, while helpful in supporting teachers in organising activities and enhancing student engagement, do not adequately facilitate personalised learning or align closely with the knowledge standards of the 2018 General Education Program (Ministry of Education and Training, 2018). Therefore, policies are needed to encourage the research and development of localised AI products by domestic EdTech enterprises, research institutes, and training institutions, specifically designed for primary school subjects. Such tools would not only increase accessibility for students but also support teachers in designing, implementing, and managing learning stations. Once localised, AI can become a powerful and user-friendly tool for Vietnamese primary teachers.

Technological infrastructure constitutes the foundation and prerequisite for AI to function

effectively in education in general and in station-based learning in particular. The absence of smart teaching devices, subject-specific classrooms, and stable internet connectivity significantly hinders the adoption of AI in station-based teaching, resulting in fragmented and unsustainable practices. Consequently, systematic investment in facilities is required, including tablets, interactive screens, high-speed internet systems, and AI-integrated learning management software. Strengthening technological infrastructure will make the organization of AI-supported station-based learning more feasible and sustainable.

*** Enhancing teachers' digital and pedagogical competencies in implementing station-based learning:**

In practice, many primary teachers in Vietnam have actively sought opportunities to familiarize themselves with AI to improve their teaching. However, their limited understanding of station-based learning and lack of clarity regarding the appropriate use of AI in lesson design and implementation have constrained its effectiveness. To address this issue, specialized training programmes should be introduced to strengthen teachers' digital and pedagogical competencies. Such training should clarify the principles of station-based learning, guide teachers in designing stations tailored to specific student groups, and help them determine which aspects of instruction AI can best support and at which stages of the teaching process. Training should follow a "learn–practice–feedback" model, involving educational technology experts and pedagogy specialists.

Alongside in-depth training, teachers should be guided to leverage existing AI tools to support the design of station-based learning content aligned with learners' needs. This would facilitate personalized learning while reducing teachers' workload in lesson preparation and task design. Moreover, integrating chatbots or virtual assistants into practice activities can enhance students' self-directed learning capacities while enabling real-time monitoring of learning progress. Such approaches allow teachers to save time, focus on individualized student support, and provide students with immediate feedback to adjust their learning process.

*** Establishing legal frameworks and ethical data protection guidelines:**

One of the most significant barriers to AI adoption in station-based learning is concern over data privacy and student protection. As AI increasingly collects and analyzes learning data, establishing a robust legal framework is essential. Clear regulations must be issued regarding the types of data permitted for collection, methods of storage, access rights, responsibilities of stakeholders, and the ethical principles governing AI use. A transparent legal environment will provide teachers with clear guidance and reassure parents about their children's safety in digital learning contexts.

A comprehensive approach integrating the above measures is required to achieve the desired outcomes of applying AI in station-based learning in Vietnamese primary schools. The goal is not to transform teachers into technology experts but to enable them to proficiently utilize standard AI tools to enhance the quality of station-based instruction. In doing so, the use of AI in station-based learning will become feasible, sustainable, and well-suited to the realities of primary education in Vietnam.

4. Discussion

The synthesis of reviewed studies highlights various knowledge resources linking AI and student-centered approaches, including station-based learning. The findings suggest that AI holds substantial potential to enrich station-based learning by enhancing personalization, supporting differentiated instruction, and reducing teachers' workload in designing and managing multiple learning tasks. Although these studies employ a wide range of methodologies, this diversity provides a foundation for understanding the theoretical and practical advantages of AI in primary education. Researchers also agree that AI can complement station-based learning when pedagogical intentions are clearly articulated.

Despite the limited number of studies that directly integrate AI into station-based learning, the evidence points to a conceptual compatibility between AI and station-based learning. Both AI and station-based learning emphasize learner autonomy, adaptability, and the development of higher-order thinking competencies, which align closely with contemporary educational reforms, including the 2018 General Education Program. International research further indicates that AI tools can facilitate real-time assessment, automate routine tasks, and generate adaptive learning pathways, which can be leveraged to strengthen the effectiveness of station-based learning.

It is suggested that applying AI in station-based learning is not only feasible but also moves toward more personalized and dynamic learning ecosystems. While challenges such as technological readiness, teacher confidence, and the need for localised AI tools remain, these should be viewed as opportunities for growth and innovation. The current gaps in the literature on the Vietnamese context signal directions for future research and also reveal areas where policymakers, researchers, and educators can collaborate to design and implement AI in station-based learning in primary education in Vietnam. This approach contributes to improving the quality of teaching and learning, aligning with global technological advancements.

In addition, the need for teacher training presents an opportunity for their professional development in applying AI in station-based learning. The goal of applying AI in station-based learning is not to turn teachers into technology experts, but rather to help them proficiently use standard AI tools to improve teaching quality, personalize student learning experiences, and ensure feasibility and sustainability in the Vietnamese primary education context.

5. Conclusion

This study set out to examine the theoretical foundations and research on the application of AI in station-based learning, with a focus on primary education in Vietnam. By employing a theoretical research approach and synthesizing findings from international and domestic literature, the paper sought to clarify both the opportunities and challenges of using AI in this specific pedagogical model. Rather than providing empirical results, the analysis has contributed to establishing a conceptual basis that may guide future practice and research.

The findings highlight that AI has the capacity to enhance several key components of station-based learning. It can support teachers in lesson planning by generating structured activities that align with learning objectives, personalizing tasks according to students' diverse needs, creating interactive stations that foster engagement, and providing real-time monitoring and assessment of learning outcomes. These functions resonate with global trends in AI adoption in education while also showing their relevance to Vietnam's 2018 General Education Program, which emphasizes learner autonomy, creativity, and competency-based outcomes. At the same time, the paper acknowledges important limitations in the current state of AI integration in station-based learning in Vietnamese primary schools. These include the absence of standardized guidelines, insufficient infrastructure in many regions, gaps in teachers' competencies, and unresolved concerns over data ethics and student privacy. Without systematic solutions to these issues, the potential benefits of AI in the station-based learning process are unlikely to be fully realized.

From a practical perspective, the study suggests that AI integration should begin with simple, accessible, and context-appropriate applications. Primary schools in Vietnam can adopt available AI tools to design differentiated content, gamified tasks, and formative assessments in station-based learning. Such incremental use not only reduces the workload for teachers but also supports more diverse and flexible learning activities. Future research should prioritize designing, piloting, and evaluating AI-enhanced station-based learning in classroom settings to generate evidence about their effectiveness, feasibility, and alignment with curriculum goals.

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