Potentials of Artificial Intelligence in student support in Vietnamese universities

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Abstract

The development of Artificial Intelligence (AI) has brought many development opportunities for education, especially for developing countries such as Vietnam. In particular, in the current era of the industrial revolution, the application of AI to support learners in a personalized way creates many advantages for education. This article analyzes the advantages and disadvantages of applying AI to support students in universities following the 5.0 education trend. The paper also proposes solutions and policy implications to apply AI effectively in this field.

Keywords:

5.0 education, AI, customization, student support

I) Introduction

The boom of AI in recent years has supported many fields to experience rapid development. Education is one of the fields that takes advantage of many achievements from the 4th Industrial Revolution. Vietnam is no exception to that trend, as On January 25, 2022, the Prime Minister issued Decision No. 131/QĐ-TTg approving the Project on Strengthening the Application of Information Technology and Digital Transformation in Education and Training for the period of 2022–2025, with an orientation towards 2030. The overall goal is clearly defined as leveraging technological advancements to promote innovation in teaching and learning, enhancing the quality and accessibility of education, and improving the efficiency of education management; building an adaptive open education system based on digital platforms, contributing to the development of a digital government, digital economy, and digital society (Linh,2023). In Vietnam, several universities have boldly applied AI technology to support students, monitor the learning process, and evaluate the learner's progress. Owing to these manipulations, AI gradually supports students in many aspects of study and academic activities to relieve them from stressful work and improve study results.

1.1) Current situation of Vietnamese university education

In 2022, Vietnam has 239 higher educational institutions (172 public training and 67 non-public training establishments). Compared to previous years, there were 150 higher education establishments in 2009 and 214 higher education establishments in 2015. Thus, the number of higher education institutions has gradually increased in recent years.

In terms of enrollment, higher education in Vietnam had 2,1 million students in 2021, an increase of approximately 500,000 students compared to the 2013 school year, of which 80.56% of students studied in public training institutions. The scale of postgraduate training increased 1.5 times in the period 2011-2021, with 118 doctoral training institutions and 120 master-level training institutions. The scale of master-level training increased from 105,801 students in 2016 to 109,886 in 2021, an average increase of nearly 1% per year, and vice versa, the scale of doctoral-level training decreased from 13,587 students to 11,700 students, an average decrease of 2% per year. Vietnam's education also cooperated with more than 40 countries to implement training of human resources abroad with state budget. Vietnam universities not only rapidly increase in terms of operational scale but also improve

their quality and academic performance in the world. The universities concentrate on international publications; as a result, more research is published in the ISI/Scopus index. According to international education ranking organizations, Vietnam currently has 6 higher education institutions ranked in the top 1000 among the best universities in the world.

The progress of educational development in Vietnam creates favorable conditions for technology applications including AI. This technology is expected to modernize the education of Vietnamese universities to catch up with other developed countries. With the recent development, Vietnamese universities have enough resources to implement strategies and roadmaps to apply AI.

1.2) Application of AI in education

Artificial Intelligence in Education (AIEd) was born around the 1970s (Judy Kay, 2012), it focuses on research, development, computer software evaluation to improve teaching and learning process. The long-term goals are identified to collect learner feedback, assess learner abilities, personalize for a person or group of learners, and finally use the techniques of AI to develop teaching and learning theories (Beverly Park Woolf, 2013). Figure 1 illustrates two alternative concepts of AI + Ed: (left) AIEd as the combined benefits of AI and Educational Research; (right) AI + Ed as an independent, interdisciplinary field with its objectives and scope, situated between the respective fields of AI and Education (Björn Sjödén,2015)
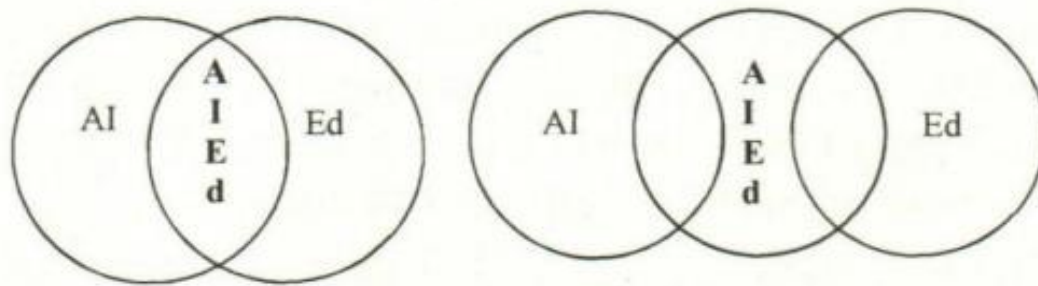

Figure 1: Two alternative concepts of the combination between AI and Ed

Source: Björn Sjödén, 2015

AIEd plays an important role by combining science-oriented (AI) and psychological/ pedagogical (educational) research. While AI puts machine learning and human-like intelligence at its core, education focuses on cultivating learning capacity and human intelligence. AIEd knowledge helps close this gap by providing techniques to foster more efficient and intelligent interactions with humans to improve educational outcomes. In the near future, we may not see the popular appearance of AI instructors completely replacing the role of teachers, but by researching and deploying products that use machine intelligence. Currently, the teaching and learning process has initially had positive changes.

From an educational standpoint, AI may serve as a tutor by keeping track of students' progress, assessing their learning results, and giving teachers the chance to delegate time-consuming work to one another (Chen et al, 2020). Customizing learning routes based on each student's skills, limitations, interests, and other variables that affect their learning styles is one of AIEd's primary goals (Huang at al,2020). Additionally, by offering materials or programs customized to meet the needs of each unique learner or student, AIEd may individualize training or learning experiences (Christudas et al,2018). AI algorithms are able to determine a student's knowledge gaps, areas of strength, and areas for improvement through data analytics. This enables individualized instruction and targeted interventions for each student. AIEd may also automate procedures for leaders or specialists in creating new curricula, innovative educational initiatives, and institutional modifications. AI algorithm models can exploit and evaluate current educational data from the database of the university-level educational system to help administrators or decision-makers make changes to courses (George et al,2019). Following Hwang (2020) AI in

education can play the role of an intelligent tutor, an intelligent teaching assistant, a tool/partner in the learning process, or a planner of main policies.

1.3) Application of AI in Vietnamese university education

In the context of international integration and the Industrial Revolution 4.0, Vietnam has identified the development of AI technology as a top priority, expected to become the most breakthrough technology in the next decade. Since 2014, the Government has regarded AI as a spearhead technology, included in the high-tech priority development list. The Ministry of Science and Technology is tasked with directing and promoting AI development, including approving the National Key Science and Technology Program until 2025. Additionally, Vietnam has organized numerous seminars and conferences to foster research and application of AI, emphasizing the role of AI as a core technology to enhance national productivity and develop a safe and civilized society (Loc et al, 2020).

In Vietnam, many educational institutions apply AI in school management and teaching that have encouraging initial achievements. FPT, Vietnamese largest private IT group in Vietnam, pioneered to utilize AI in its teaching methods and business in FPT university. FPT university also uses AI to manage students in dormitories and mark exam papers.

At the University of Food Industry, AI has been applied not only in information collection and processing that serves management work, but also in teaching English. The university AI chatbot collects students' information related to their habits, hobbies, and learning methods, and collects grammar mistakes students often make.

At the National Economics University, the NEU-Chatbot system has been deployed. It based on Artificial Intelligence (AI) technology, serving as a platform to provide students with daily updates on training programs, enrollment procedures, tuition fees, or scores for IELTS Writing Task II, among other things. The chatbot was developed using Deep Learning models integrated into the Rasa platform. NEU-Chatbot can distinguish more than fifty types of questions with an accuracy of up to 97.1% on the test dataset. It has also been deployed on the official admissions Fanpage of the National Economics University on Facebook, offering responses and information 24/7.

In July 2023, as part of implementing the Green University Regulation, the University of Economics Ho Chi Minh City (UEH) recently launched an app that uses artificial intelligence (AI) to assist in recognizing and sorting waste at its source. This app was developed by the faculty members of the university itself. Within the framework of the UEH Green University Project, the Living Lab UEH Green Campus model was initiated with the key objective of fostering a community of faculty and students who live sustainably not only within the 13 campuses of the university but also extending beyond to the wider community. A Living Lab is a model that applies technological solutions and innovative changes to address real-life challenges, centering on human needs and integrating multi-dimensional resources from various stakeholders. This tool has been integrated into the internal UEHers app for staff, and the UEH Student app for students, and is also available for free on the community mobile platform at https://gogreen.ueh.edu.vn/.

Some schools and universities in Ho Chi Minh city also use AI to make lectures more attractive to the students with the open endless space of the classrooms. It is used to manage students, call the roll, mark multiple-choice exam papers, and exchange with students. AI is especially effective in giving lectures and illustrating graphs on Geographic subjects. In other cases, Hong Bang International University has applied AI to recognize the faces and voices of students who serve the roll call.

In general, the application of AI in Vietnamese universities has initially made progress. However, these applications only restricted at private universities and universities with strong technological investment. There are still many universities in Vietnam that have not updated technical trends including public and small local universities.

II) Methods of AI application in university education for student support

There are many methods to apply AI to support students in many aspects. They are partially or fully applied in Vietnamese universities, but the application is still restricted in comparison with universities in other countries

Firstly, the AI application provides 24/7 Virtual Assistance. AI-powered chatbots and virtual assistants can provide round-the-clock support to students, answering frequently asked questions, providing information about campus services, and guiding students to relevant resources. AI algorithms can automate the feedback process for

assignments, essays, and projects, providing students with instant feedback on their work. This can help students identify areas for improvement and enhance their learning experience.

Secondly, it personalizes advices on academic works. AI algorithms can analyze students' academic records, career goals, and course preferences to offer personalized advising and course recommendations. This can help students make informed decisions about their academic pathways and stay on track towards their goals. These study plans can include recommended readings, practice exercises, and interactive materials to support students' academic growth.

Thirdly, AI application bring the solutions of Early Intervention for At-Risk Students. AI analytics can identify students who may be at risk of academic or personal difficulties based on various indicators such as course attendance, grades, and engagement. Early intervention can then be implemented to provide targeted support and resources to these students. This work improves the academic result as well as mitigate the riskes to students.

Fourthly, Emotional and Mental Health Support is also the function of AI to understand the emotions and psychology of student. AI-powered chatbots equipped with natural language processing capabilities can offer mental health support and counseling services to students. These chatbots can provide empathetic responses, control strategies, and advices on Mental Health when students need.

Fifthly, for disable students, AI technologies bring accessibility support solutions such as speech recognition and text-to-speech can improve accessibility for students with disabilities. AI-powered tools can transcribe lectures in real-time, convert text into speech, or provide alternative formats for course materials to accommodate diverse learning needs. This solution can also be applied for foreign language courses aiming at increase lingual capability of students.

Sixthly, AI also provides Predictive Analytics for student's career path. AI models can analyze data from various sources, including academic performance, extracurricular activities, and social interactions, to predict students' likelihood of success. This information can be used to tailor support services and interventions to each student's unique needs.

III) Advantages and disadvantages of AI application for student support

Using AI applications for student support can offer several advantages, but it also comes with its disadvantages. The paper refers to the advantages and emphasizes the role of AI in student support.

Firstly, AI Personalized learning: AI can analyze students' learning patterns and preferences to design and educational materials and experiences accordingly. This personalization can help students learn at their own pace and in ways that suit their individual needs. This type of learning develops the full potentials of learner, improve their enthusiasm in learning and encourage them to achieve the positive results.

Additionally, 24/7 Availability: AI applications can provide support round the clock, offering assistance to students whenever they need it. This can be particularly beneficial for students studying at odd hours or in different time zones. With the capability of big data processing, AI system can respond to the huge number of requirements from all students of Vietnamese universities.

Beside support work, AI also provide the Big Data Analysis service. It can analyze immense amounts of student data to identify trends, patterns, and areas for improvement. This data-driven approach can help educators and institutions make relevant decisions about curriculum development, teaching strategies, and student interventions.

One of the most useful advantages of AI practice is to learn foreign language. Due to capability of processing almost common language in the world, students can communicate with AI to improve their language skill. Especially, English is the main language to build and train AI system, so that student can interact in English with relatively precise semantics and grammar from machine's responses.

At last, it improves accessibility for all students including disables and non-technical students. AI-powered tools can improve accessibility for students with disabilities by providing alternative formats for learning materials, offering real-time transcription services, or facilitating communication through speech recognition technologies.

With the development of interface, non-technical students also easily give requirements and interact with AI applications nowadays.

Beside the advantages, it also exists some disadvantage aspects that prevent the growth of AI in the field of education.

Firstly, bias and fairness are serious problems for many AI systems. They may inherit biases present in the data they are trained on, which can lead to unfair treatment or recommendations, especially for underrepresented groups. Misleading results in AI system also come from the unreliable data in history or lack of data for efficient training, negatively impact on precision of system's responses. Ensuring fairness and mitigating bias in AI algorithms remains a significant challenge.

Moreover, AI system might cause depersonalization problem for users. While AI can personalize learning experiences to some extent, it may lack the human touch and empathy that students often need, especially when facing emotional or psychological challenges. Overreliance on AI support may lead to a sense of depersonalization and disengagement among students, raise the uncontrollable virtual perception for every work. Although, AI system also has function of spychological support, it is still different from real life and reduce the interaction of students with actual social network.

Further, technical issues are also remarkable problems. AI applications are prone to technical glitches, such as system failures, bugs, or incorrect predictions. Despite the fact that engineers have innovated AI system to increase the accuracy and reduce biases, there is no system ensure all answers and responses are true in all cases. Especially, difficult question with no data history may drive mistakes in response. Hence, relying heavily on AI for student support without adequate backup plans or human oversight can result in disruptions to the learning process.

Furthermore, privacy concerns are big issues for all users. AI systems often require access to sensitive student data to function effectively. However, not all AI platforms can guarantee user security; especially for new established companies with limited resources. Ensuring the privacy and security of this data is crucial to prevent unauthorized access, misuse, or breaches that could compromise students' confidentiality and trust.

The last issue is dependency. Over-reliance on AI for student support may hinder students' critical thinking skills and problem-solving abilities. At that time, students may depend strongly on AI result reducing their creativity and insight on exercises. Students may become dependent on AI tools to provide answers and solutions without fully engaging in the learning process or developing essential cognitive skills.

In general, while AI applications hold promise for enhancing student support, it's essential to recognize and address the associated advantages and disadvantages to ensure that AI is used responsibly and ethically in educational settings.

IV) Proposals and policy implications

As the above analyses, in order to develop the benefit and restrict the disadvantage of AI in university environment, the paper implies policies and suggests solutions to facilitate AI application for student support.

First, Vietnamese universities need to seek AI expert to create AI system for education with the collaboration between engineers, educators, students, community members and policymakers to guide policy and to supervise implementation. These task forces can drive innovation and ensure AI to align with educational goals.

Second, the universities should promote AI literacy in order to raise the practical application in educational curriculum. They might integrate AI into curricula and teach students to evaluate AI and its outputs critically. Students can become informed consumers and creators of AI-powered technologies by understanding AI's potential and limitations. AI experts need to customize AI to synchronize with teaching program of university.

Third, the supply of detailed and informative guideline facilitates stakeholders to use educational AI. They might establish clear guidelines for the safe and responsible use of AI in education. Stakeholders must ensure that AI tools are used ethically, focusing on student privacy and responsible usage. It has to maintain the high level of security about private information, user's history and user's actions. By providing guideline, we can ensure that AI enhances learning experiences without compromising safety or privacy.

Fourth, Vietnam Ministry of Education and Training should make plan to popularize AI applications across universities. They also need to build budget to support Vietnamese university setting up their own system. The ministry should mention the concept of digitalized university in their conferences and reports on university's operation. They are also possible to build the index of digitalized university including AI applications to evaluate and give appropriate aids to universities.

Fifth, it is necessary to collaborate between IT companies and universities to strongly engage AI in many activities including student support. Hence, IT companies may build the customized AI system for university and help to maintain the system. It is possible to hand over the technology for university staff to optimize the use of system. The cooperation also helps university realize their theoretical ideas to actual work.

Last but not least, the university has to promote interdisciplinary courses for students. In the background of 5.0 education, students are required to understand and interact with AI well during the learning time. Therefore, the AI training course is necessary for all students, that should be encouraged in training for all majors.

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