AI in Student as Manager Model-Future Directions of Business Studies

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***Abstract*—In the business programs of Universiti Pendidikan Sultan Idris (UPSI), the Three-Pronged teaching technique is implemented as a student-centered learning process. This approach combines elements of the game, problem, and challenge-based learning with the larger goal of preparing business students to handle complicated, unanticipated global or industrial problems. It promotes an interactive and dependable classroom that calls for students' innovative contributions, teamwork, and participation in the professional world. Micro credential platforms, artificial intelligence, and a new pedagogical strategy: that's the idea for UPSI's undergraduate business. Therefore, this kind of instruction is increasingly being used in business courses like Strategic Management. Undergraduate students benefit from this teaching method since they are exposed to industrial phenomena while developing 21st- century abilities (collaborative, creative, critical thinking, and communication).**

***Keywords— artificial intelligence, three-pronged teaching approach, student as manager model, business studies***

1. INTRODUCTION

AI, or artificial intelligence, has the potential to revolutionize higher education in several ways [1]. AI refers to the ability of machines to learn from data, make decisions, and perform tasks that typically require human intelligence. In the context of higher education, AI can be used to automate administrative tasks, support personalized learning, and improve student outcomes [2].

One area where AI is already being used in higher education is in the administration of online courses [3]. AI- powered chatbots can help students with enrollment, scheduling, and other administrative tasks, freeing up human staff to focus on more complex issues [4]. AI can also be used to analyze student data and identify trends, such as which courses have the highest drop-out rates, which students are at risk of failing, and which teaching methods are most effective [5].

AI can also be used to support personalized learning by providing adaptive learning experiences that are tailored to each student's needs and learning style [4]. AI-powered learning platforms can analyze student data to determine their strengths and weaknesses, and then provide customized learning materials and assessments that are optimized for each

student. This can help students learn more efficiently and effectively, and can also help instructors identify areas where students may need additional support [2].

Hence, AI can help improve student outcomes by providing early warning systems for at-risk students, identifying areas where additional support may be needed, and helping instructors tailor their teaching methods to better meet the needs of their students [2]. By leveraging the power of machine learning and data analysis, AI has the potential to transform the way we approach higher education, making it more efficient, effective, and personalized. The use of AI has the potential to revolutionize educational methods, speed up the achievement of SDG 4, and solve some of the world's most pressing problems [6]. However, with such rapid technical advancements come a myriad of hazards and difficulties that have thus far outrun policy discussions and regulatory frameworks. UNESCO is dedicated to helping Member States use AI to advance the Education 2030 Agenda, and to doing so in a way that upholds universally accepted standards of fairness and inclusiveness [7].

Since helping people is one of UNESCO's main goals, it makes sense that the organization would take a people- oriented stance toward artificial intelligence [8]. Its goal is to guarantee that AI does not exacerbate technical divisions within and between nations and to reframe the discourse to include AI's role in resolving existing inequalities in access to information, research, and the diversity of cultural expressions. The goal of "AI for all" should be to ensure that everyone can participate in and reap the benefits of the ongoing technological revolution, especially in terms of innovation and knowledge [9].

In Malaysia, there are several initiatives to implement AI in the educational system [10]. The Malaysian Ministry of Education has outlined a plan to incorporate AI and other emerging technologies into the curriculum at all levels of education, from primary school to university [11]. Here are some examples of AI implementation in the Malaysian educational system such as the Smart School Management System which is an AI-powered platform that allows school administrators to manage administrative tasks such as attendance, student records, and exam results. The system uses machine learning to analyze data and provide insights to help school leaders make better decisions [12].

Next, AI-powered Language Learning whereby Malaysian startup GilaGuru has developed an AI-powered language learning app that uses speech recognition technology to help students improve their pronunciation and conversation skills [13]. Further, AI-powered Learning Analytics in the Malaysian Digital Economy Corporation (MDEC) has launched a project called the Malaysia Smart Campus Initiative, which aims to implement AI and data analytics in higher education institutions. The project includes an AI- powered learning analytics system that analyzes student data to provide insights to instructors and administrators [14]. Moreover, Chatbots for Student Support for several Malaysian universities have implemented chatbots to provide support to students. The chatbots can answer frequently asked questions, guide on academic matters, and direct students to the appropriate resources [15]. AI-powered Assessment in Malaysian startup MyPrepscore has developed an AI-powered assessment platform that uses machine learning algorithms to analyze student performance and provide personalized feedback and recommendations for improvement [16].

Overall, AI implementation in the Malaysian educational system is still in the early stages, but several promising initiatives are underway. These initiatives are aimed at improving the quality of education and providing students with the skills they need to succeed in a rapidly changing world.

There are several challenges that the Malaysian educational system is facing in implementing AI. Some of the main challenges are:

1. Limited Infrastructure: The implementation of AI requires a significant amount of computing power and resources, which may be difficult to obtain for many schools and universities in Malaysia, especially those located in rural areas [8].
2. Limited Resources: The implementation of AI requires a significant investment in terms of financial and human resources, which may be difficult for schools and universities with limited budgets and staff [17].
3. Lack of Awareness: There is a lack of awareness and understanding of AI among educators and administrators in Malaysia. Many of them may not be familiar with the technology, its capabilities, or how it can be integrated into the educational system [18].
4. Limited Access to Data: The implementation of AI requires access to large amounts of data, which may be difficult to obtain in Malaysia due to privacy concerns and limited data collection practices [19].
5. Resistance to Change: Many educators and administrators may be resistant to change and may prefer to stick to traditional teaching methods rather than embrace new technologies like AI [20].

Overall, while there is a growing interest in implementing AI in the Malaysian educational system, there are several challenges that need to be addressed to ensure successful implementation. These challenges will require a collaborative effort from educators, policymakers, and technology providers to overcome.

There are several research gaps in the field of AI in higher education and business studies [21]. Some of the main gaps include:

1. Ethical Implications: While AI has the potential to transform higher education and business, there are

significant ethical implications that need to be explored. These include issues related to privacy, bias, and discrimination, as well as questions about the impact of AI on employment and human autonomy [22].

1. Implementation Challenges: While there have been several successful implementations of AI in higher education and business, there are still significant challenges that need to be addressed. These include issues related to infrastructure, data collection and management, and human capacity building [8].
2. Impact on Learning Outcomes: While there is evidence that AI can improve learning outcomes in certain contexts, there is a need for more research to explore the impact of AI on different types of learners, as well as the long-term impact on student success [23].
3. Business Applications: While there has been a significant amount of research on the use of AI in higher education, there is a need for more research on the use of AI in business contexts. This includes exploring the potential applications of AI in areas such as marketing, finance, and operations management [24].
4. Interdisciplinary Approaches: While there has been significant research in both AI and higher education/business studies, there is a need for more interdisciplinary research that combines expertise from both fields. This can help to bridge the gap between theory and practice and ensure that AI is implemented in a way that is effective and ethical [25].

Overall, these research gaps represent significant opportunities for scholars to contribute to the development of AI in higher education and business studies. Addressing these gaps will require a collaborative effort from researchers across disciplines, as well as partnerships between academia, industry, and government.

1. LITERATURE REVIEW
2. *Definition*

There are many definitions of AI, but here are a few commonly used ones. AI is the simulation of human intelligence in machines that are programmed to think and learn like humans [26]. AI is a field of computer science that focuses on the development of intelligent agents, which can perceive their environment and take action to achieve specific goals. AI is the use of algorithms and computer programs to perform tasks that would normally require human intelligence, such as recognizing speech, understanding natural language, or making decisions. AI is the study of how to create machines that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, and decision-making. Overall, AI is a broad and evolving field that encompasses many different approaches and techniques for creating intelligent machines. At its core, AI involves the development of algorithms and models that can simulate or replicate human cognitive processes, such as learning, reasoning, and problem-solving, to achieve specific goals.[7].

AI is rapidly transforming many industries, including education. In recent years, there has been a growing interest in using AI to improve the quality and effectiveness of education, from personalized learning to intelligent tutoring systems. In this review, we explore the current state of

research on AI in education and identify key areas for future research [26].

One of the main areas of research on AI in education is personalized learning. Personalized learning involves tailoring educational content and delivery to the individual needs and preferences of each learner. AI can be used to analyze data on learner performance, preferences, and behavior, and to provide personalized recommendations and feedback. For example, intelligent tutoring systems can adapt to the learner's pace and style of learning, providing personalized feedback and guidance [23].

Another area of research on AI in education is assessment. AI can be used to analyze student performance and provide real-time feedback on areas of weakness or strengths. This can help teachers to identify students who need extra support or challenge, and adjust their teaching strategies accordingly. AI can also be used to automate grading and assessment, freeing up teacher time and reducing the risk of bias or error in grading [2].

In addition to personalized learning and assessment, AI can also be used to enhance collaboration and communication in education. For example, chatbots and virtual assistants can be used to facilitate communication between students and teachers, providing quick and personalized responses to questions or concerns. AI can also be used to analyze data on student interactions and collaborations, providing insights into group dynamics and identifying areas for improvement [27].

However, there are also concerns about the use of AI in education. One concern is the risk of bias in algorithms and data. If AI is trained on biased data, it may perpetuate or amplify existing biases and inequalities in education. Another concern is the potential for AI to replace teachers and undermine the human aspect of education [28].

Overall, while there is significant potential for AI to improve education, there are also significant challenges and risks that need to be addressed. Future research in this area should focus on developing AI systems that are ethical, transparent, and inclusive, and that enhance rather than replace human teachers and educators.[7].

1. *AI applications and pedagogy*

AI has the potential to revolutionize educational pedagogy by providing personalized, adaptive, and engaging learning experiences. In recent years, there has been growing interest in the use of AI in educational pedagogy, from intelligent tutoring systems to chatbots and virtual assistants. In this review, we explore the current state of research on AI applications in educational pedagogy and identify key areas for future research [23].

One of the main areas of research on AI in educational pedagogy is personalized learning. Personalized learning involves tailoring educational content and delivery to the individual needs and preferences of each learner. AI can be used to analyze data on learner performance, preferences, and behavior, and to provide personalized recommendations and feedback. For example, intelligent tutoring systems can adapt to the learner's pace and style of learning, providing personalized feedback and guidance. Chatbots and virtual assistants can also be used to provide personalized support and guidance to learners, answering questions and providing feedback on demand [29].

Another area of research on AI in educational pedagogy is gamification. Gamification involves incorporating game-like elements into educational activities to increase engagement and motivation. AI can be used to design and optimize gamified educational activities, analyzing data on learner behavior and preferences to provide personalized feedback and incentives. For example, AI can be used to create adaptive games that adjust the difficulty level based on the learner's performance, or to provide real-time feedback and incentives to keep learners engaged [30].

In addition to personalized learning and gamification, AI can also be used to enhance collaboration and communication in educational pedagogy. For example, chatbots and virtual assistants can be used to facilitate communication between students and teachers, providing quick and personalized responses to questions or concerns. AI can also be used to analyze data on student interactions and collaborations, providing insights into group dynamics and identifying areas for improvement [31].

However, there are also challenges and risks associated with the use of AI in educational pedagogy [21]. One challenge is the need for effective and ethical data management and privacy protection. AI systems require access to large amounts of data to provide personalized recommendations and feedback, raising concerns about privacy and data protection. Another challenge is the need for effective teacher training and support to ensure that AI is used in a pedagogically sound and effective manner [8].

Overall, while there is significant potential for AI to enhance educational pedagogy, there are also significant challenges and risks that need to be addressed. Future research in this area should focus on developing effective and ethical AI systems that enhance rather than replace human teachers and educators, and that support effective teaching and learning practices [32].

Almost every existing commercial AI product created to help learners successfully has a naive approach to teaching and learning while employing state-of-the-art technologies and frequently being anchored in the cognitive sciences [33]. The standard method entails a heavy dose of pedagogical spoon-feeding, with information carefully tailored to each learner's prior successes. In other words, despite assertions to the contrary, the approach is effectively behaviorist or instructions, and it disregards over 60 years of pedagogical research and development (in, for example, deep learning, [34]; guided discovery learning, [35]; productive failure, [36]; project-based learning, [37]; and active learning, [38]. This behaviorist method, especially rote memorization, and recitation, undermines learner agency and prevents deep understanding by placing too much emphasis on recalling information rather than analyzing it critically.

Comparatively, the study community and business sector have invested much in developing AI-driven e-proctoring. Due to the shift toward online schooling and testing during the pandemic, e-proctoring services saw explosive growth as an industry. However, e-proctoring has been criticized for allegedly intruding on students' privacy, being biased against certain races, not functioning as intended, preventing students from taking exams and worsening students' mental health, all while having a negligible effect on exam cheating and student achievement [39, 40]. This is a case of employing AI to

automate and scale up ineffective teaching methods, rather than to create new ones.

1. *Three-Pronged Teaching Approach*

The Three-Pronged Teaching Approach is a pedagogical strategy that combines three different teaching methods: direct instruction, collaborative learning, and individualized instruction. This approach is designed to provide students with a balanced and effective learning experience that incorporates different modes of instruction and caters to different learning styles [41].

Direct instruction involves the teacher leading the class and providing explicit instruction on a particular topic or skill. This method is useful for introducing new concepts, providing background information, or clarifying complex ideas. Direct instruction can take the form of lectures, demonstrations, or guided practice [2].

Collaborative learning involves students working together in groups to solve problems, complete tasks, or engage in discussions. This method promotes active engagement and participation, as well as social and cognitive development. Collaborative learning can take the form of group projects, discussions, or problem-based learning [1].

Individualized instruction involves providing personalized learning experiences that are tailored to the needs and preferences of individual students. This method can involve differentiated instruction, adaptive learning technologies, or personalized feedback and support. Individualized instruction is designed to address individual strengths and weaknesses, promote self-directed learning, and enhance motivation and engagement [42].

The Three-Pronged Teaching Approach combines these three teaching methods to create a comprehensive and effective learning experience for students. By incorporating direct instruction, collaborative learning, and individualized instruction, teachers can cater to different learning styles, promote active engagement, and foster student-centered learning [43].

For example, a teacher might use direct instruction to introduce a new concept or skill, followed by collaborative learning activities that allow students to apply and practice what they have learned. Finally, individualized instruction might be used to provide personalized feedback and support to students who are struggling or who need additional challenges.

Overall, the Three-Pronged Teaching Approach is a flexible and adaptable pedagogical strategy that can be used in a wide range of educational contexts and with different age groups and subject areas [41].

In the business programs of Universiti Pendidikan Sultan Idris (UPSI), the Three-Pronged teaching technique is implemented as a student-centered learning process. This approach combines elements of the game, problem, and challenge-based learning with the larger goal of preparing business students to handle complicated, unanticipated global or industrial problems [44].

This action research strategy for the classroom included a three-pronged challenge. Action research in the classroom has generated a large body of written material. The action research sequence, as outlined [45], is a powerful tool for enhancing instruction and learning at all levels of education and in every

community. As a result, this system, which incorporates GBL, PBL, and CBL into business courses, was implemented over one semester (Strategic Management). The Kahoot online tool was utilized for the GBL method, while the lecturer provided both internal and external industry situations for the PBL method. In addition, the tasks necessitate (commitment, discipline, and initiative) among the teams while using a CBL method. For each class session, students will need to organize into groups of nine to ten members, and from a short list of possible business models, the instructor will have them choose one to research. In addition, each group must create a business based on the chosen industry and then evaluate it against a successful business in the same field (competitor analysis). All students will now take on managerial responsibilities inside their company (role play). Managers can have a variety of related roles, including those dealing with human resources, operations, finances, and so on. In line with course goals, this assignment will introduce students to real-world managerial scenarios complete with roles and duties. The formation of a company specializing in an unusual line of work also has the educational goal of exposing students to a new business paradigm. Business processes such as the External Factor Evaluation Matrix (EFE), Internal Factor Evaluation Matrix (IFE), Competitive Profile Matrix (CPM), and Quantitative Strategic Planning Matrix were discussed (QSPM). Each instructor, after employing this method in the classroom, may evaluate the student's progress via the lens of the course's culminating evaluation. The Three-Pronged Approach to Teaching and the Student-as-Manager Model depicted in Figure 1 provide the basis for this.



Fig. 1. Student as Manager Model

The Three-Pronged Approach was developed for use in higher education, particularly in the field of business studies. Students are encouraged, focused on, and motivated by this kind of instruction. By giving students more control over their education, GBL increases student involvement and motivation in the classroom [46]. Most studies show that the GBL improves students' motivation and interest in their academics. Compared to more traditional methods, it significantly increases pupils' motivation to learn. The instructor spoke to the class of volunteers for the GBL Kahoot. Kahoot is a widely used platform for online education. Kahoot is a fun and engaging way to test and improve students' knowledge and understanding of course material. Kahoot inspires kids to participate, keep tabs on the game, foster their natural curiosity, and take pleasure in the session as a valuable learning opportunity. Good learning can only happen when the learner is intrinsically motivated. When compared to the standard approach, the GBL is potent and ready to provide a stimulating educational environment. Students improve their work when they feel motivated. This study also demonstrates that students found using Kahoot for GBL to be a positive educational experience. When a course is fascinating,

intriguing, and pleasant, students are more likely to put in the extra effort. Undergraduates are receptive to activities that stimulate participation and provide opportunities for instant feedback from instructors and peers. Then, pupils would be held to a higher level concerning the subject's information substance.

The GBL technique by Kahoot was another fascinating outcome of the Three-Pronged approach to education, since it tended to have students thinking about, and talking about, various learning approaches. The pupils are visually stimulated in that they may examine the difficulties in the form of visuals on the main screen. If you're an auditory learner, Kahoot has some great sports music for you to enjoy as you play. The selection process in Kahoot typically involves physical activity, which appeals to kinesthetic learners. If the instructor uses methods and materials that are consistent with the student's patterns, the student's performance is likely to improve dramatically (Basuki & Hidayati, 2019). However, students needed to sign into Kahoot to complete the activity, and this GBL method uses internet access as an example of a constraint that must be overcome. They wouldn't be able to finish the job if their internet connection was too sluggish or they couldn't get online at all.

Project-Based Learning (PBL) is one of the three pillars of the Three-Pronged approach to education. This technique for group study was developed by the instructor with student- centered instruction in mind [48]. When students work on both internal and external industrial concerns that are pertinent to new occurrences in the industry, the PBL approach comes into play. Problems including reducing operating costs, finding enough qualified workers, addressing safety concerns, conducting internal audits, and training and educating employees are all examples of internal challenges that arise in industrial settings. The external challenges include things like audits and complaints from customers, water shortages, rising oil and material costs, and so forth. Furthermore, the purpose of providing students with actual challenges from the industry is to provide them with the opportunity to get the experience and expertise they'll need to succeed. In addition, during instructional times, students will recognize issues, analyze them, and develop strategies to solve them. In this scenario, students take on the role of a manager in charge of solving issues in the industry. Students will also learn how to use the analytic skills learned in business studies to help them make decisions in the face of unforeseen challenges. Students who engage in what is known as "deep learning," in which they find solutions to issues without consulting textbooks, tend to feel more prepared to deal with challenges.

This is a win-win for everyone involved: students, professors, and educational institutions. During this student- centered learning experience, students take the initiative to identify and formulate viable solutions to problems. Students will have fun while gaining up-to-date information relevant to the course material and their potential future careers in the industry. This fosters deep comprehension, helping pupils reach their goals. Because they are working on actual industry problems and coming up with solutions, students have a high rate of experience in industrial phenomena. According to the results of a prior study, problem-based learning can effectively foster knowledge retention. There is a positive correlation between lecturers' use of problem-based learning strategies and student attendance rates because these strategies

encourage students to learn about topics from other disciplines. In addition, pupils might gain additional intrinsic benefits from using this approach. In addition to the benefits to students, this kind of education provides institutions with more credible proof of the quality of their teaching, which is sure to please the many constituencies with which they interact.

Students, professors, and schools might experience drawbacks while using the PBL technique. University academic councils should seek out and employ lecturers who are specialists in the industrial area and have a higher academic qualification to help students who lack prior knowledge and learning experiences on this approach due to fewer exposures by a lecturer. It is impossible for problem- based learning to be successful without the direction of industry specialists. Neither the students nor the teachers will be able to reach their learning goals if the techniques used to teach them are ineffective. Because students require more time to actively participate in classroom activities, this type of instruction also requires greater time investment than more conventional approaches.

This is followed by the CBL strategy, which stands for the modern workforce. Students work together in "companies," solving problems in global business with the use of digital tools. The challenge for professors is to collaborate with their students to take knowledge from other disciplines that are based on standards, establish connections to current events, and create a setting in which students can make a difference in the workplace. To reach this goal, students must have the opportunity to lead their learning, use their creativity, and feel intrinsically driven. The lecturer's actions during the CBL cycle change depending on the student's performance. Lecturers model the CBL approach for their students and encourage them while they engage in the method themselves by sharing information, providing direction, and answering students' concerns regarding the process. Students plan and study their work at the intermediate levels, and they collaborate with teachers and peers to get through challenging points and stay on track. In the latter phases, students actively participate in their practices, having acquired the necessary knowledge and abilities via thorough evaluations. In conclusion, the managerial students' role is putting their ideas to use, evaluating them, and reporting on them. CBL strategy, on the other hand, is novel for these undergraduates since it presents ongoing in-class business issues.

When taken as a whole, this three-pronged method of instruction is an effective method for instructing business students at the undergraduate level. This style of learning, in which students actively participate, interact, and research, is widely regarded as a key component of the education of the twenty-first century [49]. However, the Three-Pronged model still requires students to act, engage, and research through the imposition of discipline tasks, proactiveness tasks, and investment chores. Discipline assignments help students get ready to follow the norms and regulations of the workplace. Students take on the role of management and must adhere to the guidelines set out by the instructor during this activity. In the actual world of work, employees are expected to abide by the established policies and procedures of their employer; failure to do so may result in reprimand, other disciplinary measures, and a decline in performance [50].

To be sure, the use of AI in the micro-credential platform is an extension of this breakthrough in education. Business

students from all across the world will find this platform convenient and accessible.

Here are some recommended AI steps that can be integrated into the Three-Pronged Teaching Approach:

* Direct instruction: AI can be used to provide personalized and adaptive direct instruction that caters to individual learning needs and preferences. For example, an AI-powered intelligent tutoring system can analyze student performance data and provide targeted instruction and feedback to help students master a particular concept or skill.
* Collaborative learning: AI can be used to support and enhance collaborative learning by facilitating communication and collaboration between students. For example, a chatbot or virtual assistant can be used to help students coordinate their work, share ideas, and provide feedback to each other.
* Individualized instruction: AI can be used to provide personalized and differentiated instruction that meets the unique learning needs and preferences of each student. For example, an AI-powered adaptive learning system can analyze student performance data and provide tailored instruction and support that matches each student's level of mastery and learning pace.

Overall, AI can be a powerful tool for enhancing the Three-Pronged Teaching Approach by providing personalized and adaptive instruction, facilitating communication and collaboration between students, and supporting differentiated and individualized learning. However, it is important to ensure that AI is used in a pedagogically sound and effective manner that promotes student-centered learning and does not replace human teachers and educators.

1. METHODOLOGY

This study's recommended approach entails the following steps.:

* This section provides a review of the existing literature on the topics of artificial intelligence, the three-pronged approach to education, and the intersection between these three topics. This analysis will provide light on the current state of AI in education and highlight problems that the proposed platform may be able to address.
* Collecting information about what will be needed is called "requirements collection," and in this case, it means learning what the potential customers of your three-pronged method of instruction are expecting and needing.
* The obtained requirements may be used to guide the platform's design and development, which can include the use of AI tools and algorithms to offer autonomous scoring and assessment result computation.
* User testing: Putting the platform to the test with a sample of potential end users to get feedback and enhance its capabilities. This will make sure the platform delivers what the intended pupils need.
* In this last stage, we'll take into account the testing results of our pupils to determine the platform's efficacy and make any necessary improvements.

For the aim of student testing, assessment, and improvement, a prototype of the proposed platform was developed.

1. PROPOSED CONCEPT

The micro-credential platform is proposed to have 3 main sub-platforms (Input, process, and output) as shown in Figure 2.



Fig. 2. sub-platform in micro-credential

TABLE I. SUB-PLATFORM DESCRIPTION

|  |  |
| --- | --- |
| Input | * Student register and log in Micro credential platform.
* The system will form a group of enrolled students
 |
| Process | * Students follow the task as assigned in the system.
* Students’ contributions will be

counted from the total time engaged in the system. |
| Output | * Students received a result at the end of the semester automatically
 |

The details of the total process of AI in this innovational teaching and learning as below figure:

Fig. 3. Proposed process framework in the micro-credential platform TABLE II. PROCESS DESCRIPTION

|  |  |
| --- | --- |
| **Process** | **Description** |
| Student Enrol | Student register and logged in Micro credential system |
| Group creation | The system will auto-create the group based on the students enrolled in the course. |
| Company formation | Based on group creation, a company will be formulated as programmed on a micro-credential platform. |
| GBL | Each company will give weekly topic-basedquizzes during the online course and the points will be converted into total profits. |
| PBL | Industrial-based problems give each company give a solution. |
| CBL | Each company will be facing challenges all the while considering time, given tasks, andsome investment tasks which need to take care of. |
| Performance evaluation | Each company's performance is evaluated. |
| Final Assessment | The final assessment is given in the system |
| Final Mark | The final mark will release based on students' performance by engaging in this online. |

1. CONCLUSION

In conclusion, the Three-Pronged Teaching Approach is a pedagogical strategy that combines three different teaching methods: direct instruction, collaborative learning, and individualized instruction. The use of AI can enhance this approach by providing personalized and adaptive instruction, facilitating communication and collaboration between students, and supporting differentiated and individualized learning. By incorporating AI into the Three-Pronged Teaching Approach, educators can provide a more comprehensive and effective learning experience for their students, catering to different learning styles and promoting active engagement and participation. However, it is important to ensure that AI is used in a pedagogically sound and ethical manner that aligns with the principles of student-centered learning and does not replace human teachers and educators.

How well do we know that the educational goals being pursued by AI technologies now being used in classrooms and other learning environments are being met? Do they want to make learning "more efficient," or do they want to improve it as a fundamentally human and social activity? Whom do they intend to help more—teachers or replace them? Do they help students prepare for tests by customizing their paths via predetermined curricula, or do they facilitate the development of student's unique potential by fostering the achievement of their goals? [51]

When combined with high-quality teaching and learning resources, artificial intelligence can help students make significant progress. Additionally, AI systems can speed up the process of getting students back on track by alerting teachers to issues that the human eye misses. Some techniques, like computerized essay grading, may not have an obvious impact on teachers and students. Instead, the state uses a speedier and more efficient system to mark the tests. Educators might also be the recipients of this type of benefit.

In a line with AI supports in education, currently this three- pronged teaching approach moving forwards in the micro- credential platform. Hope many students from higher education around the world can get benefit from this remote learning.

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REFERENCES

1. Bredeweg, B. and M. Kragten, Requirements and challenges for hybrid intelligence: A case-study in education. Frontiers in Artificial Intelligence, 2022. **5**.
2. Liu, Y., L. Chen, and Z. Yao, *The application of artificial intelligence assistant to deep learning in teachers' teaching and students' learning processes.* Frontiers in Psychology, 2022. **13**.
3. Lin, Y.-S. and Y.-H. Lai, Analysis of AI Precision Education Strategy for Small Private Online Courses. Frontiers in Psychology, 2021. **12**.
4. Wollny, S., et al., Are We There Yet? - A Systematic Literature Review on Chatbots in Education. Frontiers in Artificial Intelligence, 2021. **4**.
5. Bulut, O., et al., Effects of Digital Score Reporting and Feedback on Students' Learning in Higher Education. Frontiers in Education, 2019. **4**.
6. Sawers, N., N. Bolster, and A. Bastawrous, The Contribution of Artificial Intelligence in Achieving the Sustainable Development Goals (SDGs): What Can Eye Health Can Learn From Commercial

Industry and Early Lessons From the Application of Machine Learning in Eye Health Programmes. Frontiers in Public Health, 2021. **9**.

1. Holmes, W., et al., Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law. 2022: Council of Europe.
2. Pedro, F., et al., Artificial intelligence in education: Challenges and opportunities for sustainable development. 2019.
3. De Europa, C., Recommendation CM/Rec (2019) 10 of the Committee of Ministers to member States on developing and promoting digital citizenship education. Acedido em: https://search. coe. int/cm/Pages/result\_details. aspx, 2019.
4. Ahmad, M.F. and W.R.G.W.A. Ghapar, The era of artificial intelligence in Malaysian higher education: Impact and challenges in tangible mixed-reality learning system toward self exploration education (SEE). Procedia Computer Science, 2019. **163**: p. 2-10.
5. Halili, S.H., *Technological advancements in education 4.0.* The Online Journal of Distance Education and e-Learning, 2019. **7**(1): p. 63-69.
6. Zhang, Y., et al., Interactive Smart Educational System Using AI for Students in the Higher Education Platform. Journal of Multiple-Valued Logic & Soft Computing, 2021. **36**.
7. Ruan, S., et al. Englishbot: An ai-powered conversational system for second language learning. in 26th international conference on intelligent user interfaces. 2021.
8. Musa, M., M.N. Ismail, and M.F.M. Fudzee, *A survey on smart campus implementation in Malaysia.* JOIV: International Journal on Informatics Visualization, 2021. **5**(1): p. 51-56.
9. Mohd Rahim, N.I., et al., AI-Based Chatbots Adoption Model for Higher-Education Institutions: A Hybrid PLS-SEM-Neural Network Modelling Approach. Sustainability, 2022. **14**(19): p. 12726.
10. Mai, N., THE MERLIN PROJECT: MALAYSIAN STUDENTS’ACCEPTANCE OF AN AI CHATBOT IN THEIR LEARNING PROCESS. Turkish Online Journal of Distance Education, 2022. **23**(3): p. 31-48.
11. Zhao, S., et al. The development of artificial intelligence education resources under the background of the internet of things. in 2020 Chinese Control And Decision Conference (CCDC). 2020. IEEE.
12. Okunlaya, R.O., N. Syed Abdullah, and R.A. Alias, Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education. Library Hi Tech, 2022. **40**(6): p. 1869-1892.
13. Renz, A. and R. Hilbig, Prerequisites for artificial intelligence in further education: identification of drivers, barriers, and business models of educational technology companies. International Journal of Educational Technology in Higher Education, 2020. **17**(1): p. 1-21.
14. Treve, M., What COVID-19 has introduced into education: Challenges facing higher education institutions (HEIs). Higher Education Pedagogies, 2021. **6**(1): p. 212-227.
15. Luan, H., et al., Challenges and future directions of big data and artificial intelligence in education. Frontiers in psychology, 2020. **11**: p. 580820.
16. Nguyen, A., et al., *Ethical principles for artificial intelligence in education.* Education and Information Technologies, 2022: p. 1-21.
17. Xu, J.J. and T. Babaian, *Artificial intelligence in business curriculum: The pedagogy and learning outcomes.* The International Journal of Management Education, 2021. **19**(3): p. 100550.
18. Buntak, K., M. Kovačić, and M. Mutavdžija, *Application of Artificial Intelligence in the business.* International journal for quality research, 2021. **15**(2): p. 403.
19. Chatterjee, S. and K.K. Bhattacharjee, Adoption of artificial intelligence in higher education: A quantitative analysis using structural equation modelling. Education and Information Technologies, 2020. **25**: p. 3443-3463.
20. Zhai, X., et al., A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. Complexity, 2021. **2021**: p. 1-18.
21. Edwards, C., et al., I, teacher: using artificial intelligence (AI) and social robots in communication and instruction. Communication Education, 2018. **67**(4): p. 473-480.
22. Popenici, S.A. and S. Kerr, *Exploring the impact of artificial intelligence on teaching and learning in higher education.* Research and Practice in Technology Enhanced Learning, 2017. **12**(1): p. 1-13.
23. Tapalova, O. and N. Zhiyenbayeva, *Artificial Intelligence in Education: AIEd for Personalised Learning Pathways.* Electronic Journal of e-Learning, 2022. **20**(5): p. 639-653.
24. Grivokostopoulou, F., I. Perikos, and I. Hatzilygeroudis. An innovative educational environment based on virtual reality and gamification for learning search algorithms. in 2016 IEEE Eighth International Conference on Technology for Education (T4E). 2016. IEEE.
25. Arsarkij, J. and T. Laohajaratsang, *A Design of Personal Learning Network on Social Networking Tools with Gamification for Professional Experience.* International Journal of Emerging Technologies in Learning (iJET), 2021. **16**(18): p. 53-68.
26. [32]
27. Anderson, J.R., et al., *Cognitive tutors: Lessons learned.* The journal of the learning sciences, 1995. **4**(2): p. 167-207.
28. Entwistle, N. Promoting deep learning through teaching and assessment: conceptual frameworks and educational contexts. in TLRP conference, Leicester. 2000. Citeseer.
29. Gagne, R.M. and L.T. Brown, *Some factors in the programming of conceptual learning.* Journal of experimental psychology, 1961. **62**(4): p. 313.
30. Kapur, M., *Productive failure.* Cognition and instruction, 2008. **26**(3): p. 379-424.
31. Kokotsaki, D., V. Menzies, and A. Wiggins, *Project-based learning: A review of the literature.* Improving schools, 2016. **19**(3): p. 267-277.
32. Matsushita, K., *An invitation to deep active learning.* Deep active learning: Toward greater depth in university education, 2018: p. 15-33.
33. Brown, L.X., How automated test proctoring software discriminates against disabled students. Center for Democracy and Technology, 2020.
34. Conijn, R., et al., *The fear of big brother: The potential negative side‐ effects of proctored exams.* Journal of Computer Assisted Learning, 2022. **38**(6): p. 1521-1534.
35. Verpoorten, D., M. Poumay, and D. Leclercq, *The eight learning events model: A pedagogic conceptual tool supporting diversification of*

*learning methods.* Interactive Learning Environments, 2007. **15**(2): p. 151-160.

1. Beck, J., M. Stern, and E. Haugsjaa, *Applications of AI in Education.* XRDS: Crossroads, The ACM Magazine for Students, 1996. **3**(1): p. 11-15.
2. Woolf, B.P., Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning. 2010: Morgan Kaufmann.
3. 44. Nallaluthan, K., et al., Triple-based teaching approach:‘student as manager’model in business studies (evaluation and result). Global Advances in Business Studies, 2022. **1**(2): p. 68-80.
4. Hine, G.S., *The importance of action research in teacher education programs.* Issues in Educational research, 2013. **23**(2): p. 151-163.
5. Tan Ai Lin, D., M. Ganapathy, and M. Kaur, *Kahoot! It: Gamification in higher education.* Pertanika Journal of Social Sciences & Humanities, 2018. **26**(1).
6. [47]
7. Zabit, M.N.M., Problem-based learning on students critical thinking skills in teaching business education in Malaysia: A literature review. American Journal of Business Education (AJBE), 2010. **3**(6): p. 19-32.
8. Tang, A.C. and M.C. Chow, To evaluate the effect of challenge-based learning on the approaches to learning of Chinese nursing students: A quasi-experimental study. Nurse Education Today, 2020. **85**: p. 104293.
9. Vercellotti, M.L., Do interactive learning spaces increase student achievement? A comparison of classroom context. Active Learning in Higher Education, 2018. **19**(3): p. 197-210.
10. Davies, H.C., R. Eynon, and C. Salveson, *The mobilisation of AI in education: A Bourdieusean field analysis.* Sociology, 2021. **55**(3): p. 539-560