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Use and Effectiveness of Artificial Intelligence in Personalized Learning of Students as Perceived by Selected Public Secondary School Teachers

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Abstract

Artificial Intelligence (AI) is a product of highly advanced breakthroughs in technology. Nowadays, learners and teachers are keen in using AI as they navigate the tool to supplement all teaching and learning needs specifically on the amount of data and information needed. However, arguments and drawbacks have become a controversial issue in the academic world on the basis that learners rely heavily on the use of AI instead of studying their lessons on their own. The above rationale has led the proponents to assess the use of AI as well as to further determine its effectiveness in the personalized learning of students. Employing descriptive-correlation research, the study gathered 400 randomly selected public secondary school teachers as respondents. Results revealed that Artificial Intelligence, as an advanced digital tool for teaching and learning, was highly utilized by teachers in order to proceed with a more engaging and effective personalized learning experience for learners. Artificial intelligence was also highly effective in establishing quality-based instructional content, instructional strategies and gathering of reliable academic information. Distinct from the results is "tutoring as an AI feature" as this effectively develop personalized learning of learners through tailored support and content. However, systems and prompts produced by AI may not provide adequate instructional content for higher level of engagement, learning and retention. Thus, a proposed pedagogical model was recommended to be utilized in order to effectively use artificial intelligence in the teaching and learning process.

Keywords: artificial intelligence, personalized learning, learners, public secondary teachers, tutoring

INTRODUCTION

Education plays critical roles in the development of learners' knowledge and skills. As education is confronted to various changes, it tends to directly shape the forms of learners' learning acquisition process. Changes in the societal system, such as the continued developments of technology, directly influence the systems and structure of education. One of the apparent changes that significantly shaped educational forms in the 21st century is the development and use of artificial intelligence (AI). By definition, artificial intelligence is a technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy (Stryker & Kavlakoglu, 2024). In addition, AI creates algorithms and systems that enable computers to perform tasks that commonly require human intelligence. In this regard, AI involves the acquisition of information and rules, reasoning, problem-solving and many other functions which is comparative to what humans can do. The generation of information is dependent on

the users' intent as to what specific information or tasks he or she commands. Different types of artificial intelligence are used. According to Hintze (2016), the most basic types of AI systems are purely reactive, and have the ability neither to form memories nor to use past experiences to inform current decisions. On the other hand, limited memory AI contains machines that can look into the past. Self-driving cars do some of this already. The "theory of mind" AI builds on the understanding that people, creatures and objects in the world can have thoughts and emotions that affect their own behavior while self-awareness AI is an extension of the "theory of mind" AI. Here, consciousness is also called "self-awareness" for a reason that conscious beings are aware of themselves, know about their internal states, and are able to predict feelings of others.

The development and use of AI has become a controversial issue in the academic world on the basis that learners rely heavily on the use of AI instead of studying their lessons on their own. Also, learners are highly complacent with the use of AI in which they can easily create their answers without utilizing so much time and effort to study their academic tasks. Luan (2020) argued that the framework and advocacies which discuss cold technology and warm humanity has been on the critical dialogue whether the use of AI is beneficial to the actual teaching and learning settings while Alexandrowicz (2020) asserts that the use of robots and artificial intelligence instruments can generate disconnection with emotions, students and teachers). The ethical and social drawbacks of AI are rarely introduced in educational contexts (Akgun & Greenhow, 2021). On the other hand, the challenges in using AI are related to pedagogy, educational frameworks and literacy. Threats arise are the related security of personal data (Saputra et al., 2023).

The above rationale has led the proponents to assess the use of AI as well as to further justify its effectiveness in the personalized learning of students as perceived by the selected public secondary school teachers. The study further aims to determine the quality of learning students obtain when they utilize AI during their personalized learning experiences.

Statement of the Problem. This study assessed the perceptions of public secondary school teachers on the use of Artificial Intelligence in personalized learning of students. Specifically, the study sought answers to the following questions:

1. How may the teachers perceive the use of Artificial Intelligence as personalized learning tool of students in terms of:
   1.1 Tutoring;
   1.2 Decentralized learning systems; and,
   1.3 Assessment integrity?

2. How may the teachers perceive the effectiveness of Artificial Intelligence in the personalized learning of students based on the following aspects:
   2.1 instructional content;
   2.2instructional strategies; and,
   2.3reliable academic information?

3. Is there a significant relationship between the use of artificial intelligence and its assessed effectiveness in the personalized learning of students?

4. Based from the findings, what pedagogical model can be formulated in order to develop or sustain the use of artificial intelligence in the personalized learning of learners?

METHODS

The study used descriptive-correlation to assess the use and effectiveness of artificial intelligence in the personalized learning of learners as perceived by selected public secondary schools in the Philippines. To gather data, a researcher-made survey-questionnaire was developed with a 4-point Likert Scale to measure each indicator in the questionnaire. The instrument also undergone pilot testing. Results obtained has indicated a Cronbach alpha result of .856 which signified that the instrument is reliable, hence, acceptable.

The respondents were given informed consent and subjected to short orientation in order to understand the nature and intent of the study. There were 400 randomly selected public secondary school teachers who participated in the study. Anonymity was used in order to conceal their identities. Meanwhile, formal letter of permission to gather data among the respondents was also forwarded to the school heads.

To analyze the data, weighted mean and Pearson r were used. Weighted mean was utilized to derive the perceived use and effectiveness of artificial intelligence personalized learning tool of students as perceived by the selected public secondary school teachers. On the other hand, Pearson r was employed to determine the relationship between the use of artificial intelligence and its assessed effectiveness in the personalized learning.

RESULT AND DISCUSSION

Use of Artificial Intelligence. Table 1 presents the use of AI in the personalized learning experience of students in terms of tutoring. Based on the table, it shows that an overall mean of 3.12, which is verbally described as "Utilized", implies that the teachers utilized the personalized tutoring features of AI in which they gather relevant approaches and styles in order to create meaningful learning experiences toward their learners.

Table 1
Use of artificial intelligence in terms of tutoring

Items	wm	Verbal description
Tutoring		
1.AI offers personalized tutoring	3.42	Highly Utilized
2.AI is powered by tutoring systems providing assistance to learners	2.51	Utilized
3.AI offers instant feedback	3.18	Utilized
4.AI contains systems that adapt the content difficulty of learning based on learners individual needs	3.23	Utilized
5.AI monitors learners' engagement and participation	3.28	Highly Utilized
Overall Mean	3.12	Utilized

Apparently, the results also show that personalization of learners' learning experiences with the use of AI established critical points for academic enhancement such as their engagement and motivation to learn. Part and parcel of AI's use is provision of objective and clear feedbacks where learners are provided with objective and sound judgement as to their accomplished tasks.

In Table 2, teachers' assessment on the use of AI in terms of decentralized learning systems shows that an overall mean of 3.23, which is verbally described as "Utilized", implies that AI underscores a wide and reliable distribution of learning resources which optimized favorable learning conditions for individual learners. Seemingly, AI connects learners into multiple sources of information where they can actually employ their analytical skills based on certain subject or topic they would want to understand.

Table 2
Use of artificial intelligence in terms of decentralized learning systems

Decentralized Learning Systems		
1.AI let learners access varied online educational resources	3.18	Utilized
2.AI connects learners with peers for collaborative learning	3.29	Highly Utilized
3.AI provides prompts that distribute learning resource across different platform	3.31	Highly Utilized
4.AI systems accommodate larger number of data	3.23	Utilized
5.AI provides insights for engagement in learning	3.18	Utilized
Overall Mean	3.23	Utilized

As shown in Table 3, the use of AI in personalized learning in terms of assessment integrity obtains an overall mean of 3.39, which is verbally described as "Highly Utilized." This signifies that teachers highly utilized AI for assessment purposes in which AI as a tool maintains the integrity of assessments. In this regard, AI also reflects as an accurate assessment tool which emphasizes academic honesty.

Table 3
Use of artificial intelligence in terms of assessment

Assessment Integrity		
1.AI offers automated proctoring which let learners monitors their scores	3.21	Utilized
2.AI identifies plagiarism on learners submission and maintain academic honesty	3.56	Highly Utilized
3.AI analyze assessment data	3.42	Highly Utilized
4.AI enhances security of online assessment	3.33	Highly Utilized
5.AI detects unusual patterns in assessment results	3.45	Highly Utilized
Overall Mean	3.39	Highly Utilized

The use of AI, based from the assessment of teachers, became pervasive and highly effective in terms of tutoring, decentralized learning

system and assessment integrity. Teachers utilized AI as a teaching and learning tool which engages learners to search and understand multiple academic sources emphasizing the accuracy and reliability of information or data they gathered. These findings are supported by the study of Lee (2021) revealing that AI is an effective tool which helped learners develop their understanding, behavior, creative and problem-solving ability.

Effectiveness of Artificial Intelligence in Personalized Learning. The effectiveness of AI in personalized learning in terms of instructional content obtained an overall mean of 3.46, which is verbally described as "Highly Effective" (Table 4). This implies that AI's ability as a digital tool enhances the learning experiences of learners effectively in which current information and relevant data trends are provided significantly to them. With the accurate and relevant data given, teachers are able to craft sound teaching and learning process which contains volumes of information positively affecting a well-founded learning acquisition of the learners.

Table 4

Effectiveness of artificial intelligence in personalized learning in terms of instructional content

Items	wm	Verbal description
Instructional Content		
1.AI systems are tailored with individual learning needs	3.71	Highly Effective
2.AI generated prompts enhances topical understanding	3.56	Highly Effective
3.AI systems positively implicates learners' understanding	3.33	Highly Effective
4.AI updates and improves instructional content	3.45	Highly Effective
5.AI prompts promote critical thinking skills	3.27	Highly Effective
Overall Mean	3.46	Highly Effective

In Table 5, the effectiveness of AI in terms of instructional strategies obtained an overall mean of 3.44 ("Highly Effective"). This indicates that teachers value creativity, novelty and innovative strategies provided by AI helping them to proceed with progressive and relevant teaching styles. Along with the provisions of creative and innovative instructional strategies, teachers ensure that there is a meaningful delivery of instruction in which traditional and cyclical use of teaching strategies are superseded by the information provided by AI. Hence, the provision of constructive and actionable feedback to teachers when using AI-driven instructional strategies elevate the quality of instructions they deliver.

Table 5

Effectiveness of artificial intelligence in personalized learning in terms of instructional strategies

Instructional Strategies		
1.AI systems offers creative and innovative strategies	3.33	Highly Effective
2.AI adapts teachers' own instructional strategies and design	3.56	Highly Effective
3.AI creates collaborative activities for learners	3.38	Highly Effective
4.AI driven strategies are aligned with learners' needs and interests	3.45	Highly Effective
5.AI systems provides constructive and actionable feedback	3.52	Highly Effective
Overall Mean	3.44	Highly Effective

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The effectiveness of AI in terms of reliable academic information obtained an overall mean of 3.42 (Table 6). This shows that AI-sourced academic information are consistently reliable and accurate. With the accuracy of information provided by AI for teachers, it ascertains that meaningful learning can take place. Artificial Intelligence is highly effective as it provides varied data and information relating to the pedagogical aspect where teachers can explore multiple data and information easily. The potential of AI in the surfaces of teaching and learning practices play a transformative role in which it provides greater and significant source of knowledge emphasizing novelty, creativity and innovation. AI concepts and information positively influenced both teachers teaching preferences and learners' learning acquisition techniques (Wu & Yang, 2022).

Table 6

Effectiveness of artificial intelligence in personalized learning in terms of reliable academic information

Reliable Academic Information		
1.AI provided accurate and trustworthy data	3.27	Highly Effective
2.AI sourced and integrate reliable academic information	3.33	Highly Effective
3.AI access current and relevant academic resources	3.61	Highly Effective
4.AI provides links and sources of information	3.56	Highly Effective
5.AI data are based from research and other scholarly studies	3.33	Highly Effective
Overall Mean	3.42	Highly Effective

Relationship Between the Use of Artificial Intelligence and its Assessed Effectiveness in Personalized Learning Experiences of Learners. Tutoring of AI as a digital tool for

teaching and learning shows significant positive relationship with instructional content which indicates that AI tutoring features through provision of multiple accurate information helps learners acquire meaningful learning process. Meantime, the use of AI in decentralized learning system reveals a significant negative relationship with instructional content. This suggests that the systems produced by AI may hamper the quality of instructional content provided to learners. Though AI systems create accurate and reliable information about the topics, this may not strongly adhere to the learning competence ought to be obtained by the resources provided by AI.

Table 7

Relationship between the use of artificial intelligence and its assessed effectiveness in personalized learning experiences of learners

Use of AI	*Assessed Effectiveness*		
	Inst Cnt	Inst Strat	Rlb Acad Inf
Tutoring	.233*	.334	.345
	.029	.175	.182
	400	400	400
Decentralized Learning System	-.477	-.281	-.311
	.045	.258	.208
	400	400	400
Assessment Integrity	-.175	-.100	-.312
	.487	.694	.207
	400	400	400

AI as dominant technological tool in personalized learning experiences of learning under the modern teaching and learning process, tutoring as AI feature can effectively develop personalized learning of learners through tailored support and content. However, systems and prompts produced by AI may not provide adequate instructional content for higher level of engagement, learning and retention. The results were affirmed in the study of Kumar, Prasad and Singh (2024) asserting that AI significantly influence teacher and student interaction, learning environment and subject-matter knowledge.

Proposed Pedagogical Model Using Artificial Intelligence. The proposed model (Figure 1) suggests a cyclical relationship among instructional conditions in using AI. This involves trainings and workshops in the use of AI for teachers, formulation of instructional policies in the use of AI, teaching strategies using AI and effectiveness of AI. The model underscores the significance of AI in the teaching and learning process specially on the personalized learning of learners. Comprehensive training and workshops for teachers are needed in order to create deeper understanding in the proper use of AI in instructional process. More so, the model suggests that careful and consistent evaluation of AI should be done effectively. This may include modifications and enhancements as to the use of AI in teaching and personalized learning of learners.

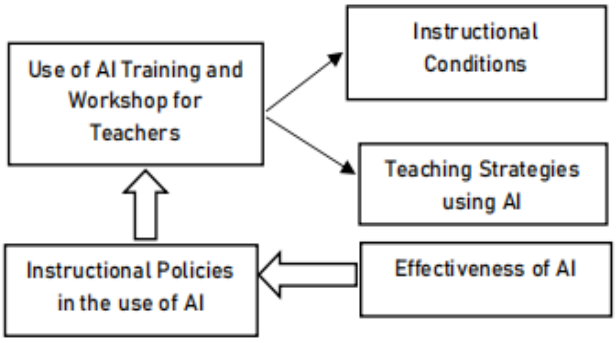

Figure 1

Proposed pedagogical model using AI.

Conclusion. Artificial Intelligence as an advanced digital tool for teaching and learning was highly utilized by teachers in order to proceed with a more engaging and effective personalized learning experiences of learners. More so, artificial intelligence was highly effective in establishing quality-based instructional content, instructional strategies and gathering of reliable academic information. Thus, tutoring as an AI feature can effectively develop personalized learning of learners through tailored support and content. However, systems and prompts produced by AI may not provide adequate instructional content for higher level of engagement, learning and retention.

Recommendation. The proposed pedagogical model is recommended to be utilized in order to effectively use artificial intelligence in the teaching and learning process. Teachers and learners should also take into closer analysis the relevance of information provided by AI as it

should be responsive to their needs and interests specially in academic aspects.

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