

The effect of training Program based on AI to maximize teaching and learning skills in Abu Dhabi primary schools

Ayesha Almansoori

Prof. Reda Mosaad Elsaid Abouassar

College of E-Education Hamdan Bin Mohammed Smart University,
UAE.

Abstract:

This research focuses on developing and implementing QaiPL, an AI tool aimed at customizing learning experiences for primary school students in Abu Dhabi. The tool seamlessly integrates with Quizizz to analyze results and provide personalized learning paths. We conducted a study in a randomly selected primary school in Abu Dhabi with students in the fourth grade. Surveys and interviews revealed the positive effects of QaiPL on the learning experience, supported by data showing enhanced learning outcomes. This research showcases the exciting possibilities of AI in improving teaching and learning in primary education settings in Abu Dhabi.

Key words : training Program based on AI - teaching and learning skills - Abu Dhabi primary schools

Introduction:

The recent development of artificial intelligence has attracted the attention of both governments and organizations. Artificial intelligence has been incorporated into many aspects of our daily lives but is mainly used in education. United Arab Emirates has been one of the countries to adopt AI and has established Mohamed Bin Zayed University of Artificial Intelligence. United Arab Emirates interest in adopting and implementing AI especially in education sector by providing the required tools and infrastructure for both learners and teachers. This paper presents a plan for applying AI educational platform for primary schools in Abu Dhabi. The platform has been

supported by elementary schools in Abu Dhabi. The purpose is to implement AI platform to enhance the learning and teaching skills in Abu Dhabi primary schools.

Literature Review:

According to Haenlein and Kaplan (2019b), The idea of artificial intelligence (AI) was initially presented in the 1950s by computer scientist John McCarthy. John McCarthy also used the term "Artificial Intelligence" (Haenlein & Kaplan, 2019b). Furthermore, the release of the book "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig in 1995 has paved the road for artificial intelligence (AI) implementation in different aspects (Ng et al., 2022b). The book laid the groundwork for many advancements in artificial intelligence by providing a detailed review of AI approaches.

Over the past few years, artificial intelligence applications have moved beyond the usual technological areas and advanced into various fields, including education (Ng et al., 2022b). Applications and methods for education that are driven by artificial intelligence have been presented and applied in non-technological situations, such as language acquisition, personalized learning, and adaptive evaluations (Ng et al., 2022b). Artificial Intelligence (AI) is a field of study that encompasses the scientific and technical principles used to develop intelligent computers and systems. These systems are capable of performing a wide range of activities and solving various issues using techniques like neural networks, machine learning, and natural language processing (Su & Ng, 2023b). Artificial Intelligence (AI) describes the science and engineering behind the creation of intelligent computers and systems. According to Su and

Ng (2023b), these artificial intelligence approaches provide computers with the ability to learn, spot patterns, make judgments, and even interpret and produce language similar to human language.

Education is one of the many disciplines affected by the implementation of artificial intelligence. Personalized learning, data analysis, and different approaches to teaching are just some of the innovations that this technology might make possible, potentially transforming the educational system. Several studies have recently shed light on the numerous advantages that may be gained by integrating artificial intelligence into academic environments. One of these studies, conducted by Ayanwale and colleagues (2022), attempts to investigate the readiness and intention of educators to teach artificial intelligence in educational settings. The findings of the research conducted by Ayanwale and colleagues (2022) indicate that educators, on the whole, have a favorable disposition toward incorporating artificial intelligence into their instructional methods. According to what they discovered, educators view artificial intelligence as a helpful tool for improving children's learning outcomes and for giving individualized support to students with various learning objectives. Furthermore, the study's findings demonstrated that educators are eager to successfully participate in training programs to integrate artificial intelligence technology into their instructional strategies.

Moreover, Zhang and Liu (2021) performed another study investigating artificial intelligence-based educational technologies' influence on students' engagement and academic achievement. Based on their findings, learning environments powered by artificial intelligence boost

student engagement and participation and enhance academic accomplishment. The findings of this research show the potential benefits that might accrue to educators and students, as well as the rising interest in using artificial intelligence within educational settings. According to Zhang and Liu (2021), artificial intelligence can enable educators to take control of their teaching practices and support individualized, data-driven training, thereby influencing the future of education. In addition, the study conducted by Ayanwale and colleagues (2022) describe the primary elements that play a role in determining whether or not educators are willing to teach artificial intelligence. Confidence in teaching artificial intelligence and the relevance of AI in the classroom are two of these factors. In order to achieve the confidence in teaching AI, teachers need to be provided with required knowledge (Ayanwale et al., 2022). Over the past several years, a growing movement has been toward incorporating artificial intelligence into educational environments. Through the providing of individualized learning experiences, the automation of administrative work, and the enhancement of student participation and cooperation, artificial intelligence has the potential to transform the educational system entirely (Xia et al., 2023).

In addition, it is vital to conduct further studies and analyses of the implications and possible obstacles to integrating artificial intelligence in educational settings to reap this technology's benefits fully. The insights that may be collected from the current studies, in particular the structural model that was presented by Ayanwale et al. (2022), can be utilized by policymakers and professional development programs to design interventions and give

support to teachers in their efforts to deploy artificial intelligence in their classrooms successfully. The effects of AI-driven digital educational platforms on students and teachers may be briefly stated in many crucial aspects according to EL ASMAR (2022):

- For students: Personalization: Artificial intelligence algorithms can assess an individual's knowledge and interests to offer customized learning experiences.
- Career Guidance: Certain AI systems assist students in identifying their prospective career trajectories and options for further study.
- Efficiency: AI can enhance learning processes, potentially reducing time and improving educational results.
- For educators: Teaching Strategies: AI can aid educators in formulating and implementing more efficient teaching methodologies through data analysis.
- Resource optimization is achieved using AI, which takes care of administrative work, enabling instructors to dedicate their attention to more intricate problem-solving and decision-making.
- Professional Development: AI's progress requires instructors to change their professional duties, which may result in the emergence of new organizational structures.
- Factors to consider: Privacy Concerns: The acquisition and management of data from students and teachers give rise to concerns around openness and digital privacy.
- Attitudinal Shift: It is crucial to consider the attitudes of both students and instructors towards AI in education since these attitudes can substantially impact the acceptance and efficacy of AI technologies.

In general, AI systems have the potential to enhance education through the customization of learning, assistance with administrative duties, and facilitation of data-driven decision-making. Nevertheless, it is crucial to persist in tackling privacy concerns and effectively handling the influence on the roles and viewpoints of educational stakeholders.

Research on integrating ChatGPT into Grade 12 Quantum Theory Education: This study investigates the utilization of ChatGPT in Quantum Theory courses for Grade 12 at Emirate School. The study revealed that individuals who utilized ChatGPT experienced notable enhancements in their post-test scores, heightened engagement, improved comprehension, and enhanced problem-solving abilities. Nevertheless, it was observed that there were certain difficulties, including the requirement for more detailed explanations and supplementary visual aids. The study indicates that ChatGPT shows potential in improving educational experiences (Wardat, 2024).

The Integration of AI in UAE Education Sector: Written by Feryan Ahmed, this article delves into the effects of implementing AI technologies in the education sector of the UAE. The findings suggest that AI has the potential to revolutionize the way we learn, making it more engaging and efficient through personalized educational approaches. Nevertheless, the article emphasizes the difficulties faced, such as opposition from educators and the requirement for extensive preparation.

The Influence of AI-Powered Digital Educational Platforms in Abu Dhabi Schools: Centered on the Alef Platform, this study encompassed both students and

teachers from various schools and discovered a direct link between utilizing the platform and enhanced learning and engagement. The platform also supported the growth of educators and proposed the expansion of AI educational platforms to establish a well-rounded learning environment (Alyammahi, 2020).

AI Adoption and Educational Sustainability in Higher Education in the UAE: This research investigates the correlation between the adoption of AI and the sustainability of higher education in the UAE. It emphasizes the potential advantages of AI in improving operational efficiency and sustainability objectives. However, it also tackles issues like data privacy, the importance of well-rounded policies, and the impact of cultural factors on the integration of AI (Shwedeh et al., 2024).

Idea Prioritization:

The focus of the research will be educating teachers about AI educational use through the implementation of an AI application. The use of QaiPL application will help both learners and teachers. Teachers will learn about the feature and uses of the application that will help in enhancing their teaching skills.

The 6 Ws of the research :

AI has emerged as a new educational technology in the United Arab Emirates, and a serious effort needs to be made to embrace it. The step we, researchers and a member of the educational organization, are taking to implement and educate learners will enhance learning and teachings skills. As a result of a lack of awareness of the potential use of artificial intelligence in education, there is a gap

between what the organization intends to accomplish when it uses AI to maximize teaching and learning skills. The gap has emerged as a result of the shift in the educational technology and the emerge of AI. The focus of the problem in this paper is implementing AI in primary schools in Abu Dhabi. In order to overcome the gap, teachers will receive training on AI for education and learn how to use Alef application for teaching

Problem statement and questions:

Teachers do not fully comprehend the potentials of AI tools and they do not have enough training. The main question behind this paper is:

- How to utilize AI-based training to maximize teaching and learning in Abu Dhabi primary schools?
- How implementing AI will affect the learning and teaching process?
- How to implement AI tools to enhance learning skills?
- How using AI tools will affect teachers' teaching skills?

Purpose statement:

The paper discusses the effect of AI-based training on teaching and learning skills, specifically in Abu Dhabi primary schools. The paper will investigate the implementation of AI in primary schools. The AI tool is expected to help in enhancing learning by creating an immersive learning experience. Aside from this, teaching will also be impacted by AI tools as they will assist teachers in creating personalized learning paths and achieving deep learning through a variety of applications. The main two goals of the research are to:

- Study the use of AI tool (QaiPL) in primary schools and its effect on learning skills.

- Use AI to enhance teaching skills.

Significance of the research:

In primary schools, the use of AI is limited to LMS automated grading. There are some issues that primary schools struggle with in terms of implementing AI in learning and teaching. I have conducted a survey to identify these issues. According to the survey, I have found out that teachers are focusing on using AI in assessments. Other teachers suggested that using AI will help with differentiation learning strategy. Moreover, Teachers were concerned about the ethical issues related to AI. To summarize the finding of the survey, the main two issues I have found are:

- Teachers do not fully comprehend the potentials of AI tools and they do not have enough training.
- Teachers are concerned about ethical standards when using AI in education.

During the investigation of the problem, I have found that some teachers are not aware of the purpose of AI use in education. Despite providing some basic training on artificial intelligence, the organization did not implement any AI applications in primary schools. Our objective is to identify AI tools that are suitable for primary schools, educate teachers about the use of AI in education, and facilitate the use of AI in primary schools.

Sample and population:

A group of students from a primary school in Abu Dhabi were selected randomly to take part in a study that aimed to test QaiPL tool. The selection process ensured that the sample was representative of the larger student population within the school, providing a diverse cross-

section of academic abilities and backgrounds. Given that all participants were in grade four, they had a comparable level of previous computer experience and had been introduced to Quizizz as an educational tool in their classrooms. Having a solid understanding of technology was crucial in order to avoid any potential bias that could arise from differences in technological skills. This ensured that the study could solely focus on evaluating the effectiveness of Quizizz as a learning tool, rather than the students' proficiency in using the platform.

Grade four students age range between 9 and 10 years old. The classes in primary schools are mixed so the sample chosen from grade four has different numbers of boys and girls according to the school distribution in each section. Most of the students in the school chosen are locals. However, there is number of other nationalities in grade four from the school. I have not focused in my study on the gender and nationality of participants assuming that it will not affect the outcome of my research.

Instruments:

I have created a survey for both students and teachers. There are two parts to the students experience feedback survey. The first part investigates the ease of use of the Quizizz Ai Personalized learning (QaiPL) tool. In this part, I wanted to find out if students can open and use the tool without help. Based on the collected feedback on this matter, I can decide if I need to create a tutorial on using the tool. The second question is related to ease of use, and it measures the ease of navigating between questions and editing answers before the final submission. If students can navigate the questions and edit their answers, it can lessen the mistakes because some may skip some questions

unintentionally. The last question in this section is related to time; the default time for answering a single question in QaiPL is one minute. The data collected from this question can determine if I might increase the time limit or remove it. The second part of the questions is related to accessibility. The first question concerns students' ability to read and understand the questions without help. If students cannot read the questions and content easily, it will include voiceover, hints, and explanations. The last question in this section concerns providing accessibility tools for vision-impaired students.

The second part of the questions, which I intend to use when interviewing the participants, focuses on their viewpoint. I plan to understand and think about how the participants see the tool. I know that each participant has a different perspective regarding using the QaiPL tool. The questions target that perspective they have.

Procedures:

I have tested the QaiLP prototype to determine user interface ease of use, accessibility, and applicability for all subjects. It is important to test QaiLP ease of use from the point of both grade four students and teachers. I have shared the link to the website that includes the tool with the target audience and guided them through it. I needed to verify that all target audience can navigate the tool easily. The second issue I wanted to evaluate was the accessibility of the tool and if target audience are able to read and understand the questions without interference from me or their teachers. This issue explains my choice of testing the tool on Mathematics because it doesn't require reading long sentences. Next, upon the completion of the test, I surveyed target audience on applicability of using the tools

for other subjects. The prototype test was conducted in Almozdalifa School in Abu Dhabi. The participants were students of grade four.

Steps:

1. Introduction:

Introduce participants to QaiLP tool and explain the purpose of using it. Assure target audience that data collected during the process will remain anonymous and confidential.

2. Warm-up

Prepare target audience for the questions and the topics used in QaiLP prototype.

3. Scenario and Tasks (Ease of Use):

Instruct students to navigate the tool and successfully complete a predetermined set of mathematical activities of different levels of complexity.

4. Observation (Ease of Use):

Observe the manner in which target audience engage with the interface. Take note of any challenges encountered while browsing menus, comprehending directions, or doing activities.

5. Accessibility Testing (Math Focus):

Display a collection of mathematical problems on QaiLP for both students and teachers. Make sure that the questions are suitable for the age group and specifically address the topics taught in the fourth-grade curriculum. Assess if pupils are able to read and understand the questions autonomously. Teachers should evaluate if the tool effectively delivers the questions in a straightforward manner and minimizes any potential distractions.

6. Applicability Survey:

Upon completion of prototype test, conduct a survey to inspect if the tool is applicable for other subjects.

7. Data Analysis:

Finally, survey participants on the tool regarding all the above. Moreover, conduct interviews with some participants to evaluate the possible effect of the tool on enhancing teaching and learning.

Data Collection Method

Utilizing mixed methods in data collection provides a well-rounded approach to research that is built on the best outcomes of both quantitative and qualitative methodologies. Through the use of quantitative data, researchers are able to accurately measure and quantify variables, allowing them to draw broader conclusions from a sample to a larger population. However, qualitative data brings a deeper understanding and context, offering valuable insights into the processes, meanings, and interpretations that cannot be uncovered by numbers alone. This combination allows for a comprehensive understanding of research questions, as the Quantitative data can provide a broad range of information, whereas qualitative data can provide more specific details and nuanced perspectives. In addition, utilizing mixed methods can enhance the validation and depth of data by employing triangulation. This approach involves combining findings from different methods to bolster the credibility and strength of the results. This approach is especially beneficial in intricate research settings where various factors impact outcomes, aiding in capturing the complete complexity of human experiences and organizational systems.

In order to collect data, I have chosen to use survey and interviews. The Survey was conducted by creating five questions with Likert scale. The survey helps in collecting

quantitative data about the interface of QaiPL tool. Surveys play a crucial role in quantitative research. They enable researchers to collect organized data from a wide range of participants. Statistical analysis can reveal valuable insights into student performance, engagement, and satisfaction with the QaiPL tool. After testing the prototype, survey was conducted. Participants from two sections from grade four completed the survey based on their experience during the test. The survey will help me measure users' satisfaction regarding the tool design. The result of the survey will allow me to identify the areas that I need to adjust in the tool interface design. Also, the result collected during the survey might affect the implementation of the tool by providing more assistant to learners.

Conversely, interviews explore the subjective experiences of individual users in more depth. The interview allows participants to express their own viewpoints on the QaiPL tool, encompassing its impact on learning and teaching, challenges, and potential areas for enhancement. Open-ended interview questions may go Allow participants to share their perception of the tool and as interviewer to observe the nonverbal gestures of the interviewees. For examples, it's easy to capture interviewees concern when they were talking about the challenges that they might face as think of implementing the tool.

There is some potential limitation in using survey and interviews such as, these tools require time to reach participants and collect data. To resolve this issue, I have conducted my survey and interview during the test of the prototype with defined number of participants in school

that I can get in touch with if I needed to revise the data. Moreover, analyzing data from different resources can be critical and complex. To overcome this issue, I have created codes for my survey and used SPSS to analyze data. Also, I have analyzed the interviews by creating themes for each question.

Statistical Analysis:

The first step in data analysis is to filter data in order to analyze them. Ensuring the reliability of data analysis requires the crucial steps of data filtering and cleaning. Filtering requires a discerning approach to concentrate on specific subsets of data that align with research analytical objectives. Tidying up addresses involves rectifying errors, resolving inconsistencies, and filling in missing data. This may involve fixing any typos, addressing formatting inconsistencies, and handling any missing values. When it comes to data coding, assigning categories or numerical values to represent data attributes is crucial. This process helps to structure the data and makes it much more manageable for analysis purposes. Understanding coding allows for the application of statistical techniques and the development of impactful visualizations. Data from the survey has been coded as the shown in figure3.

Data	Code
Strongly Agree	5
Agree	4
Neither agree or disagree	3
Disagree	2
Strongly disagree	1
Participants	1

Figure 3

After defining the codes of my data, I used SPSS software to analyze my data and define main values. I have created numerical codes for survey answers which has been created according to Likert scale. There were five questions in the survey and each question has five options strongly agree, agree, neither agree or disagree, disagree, and strongly disagree. The answers were coded in scale from 1 to 5, where 5 is strongly agree and 1 is strongly disagree. In SPSS, Participants were referred to number 1.

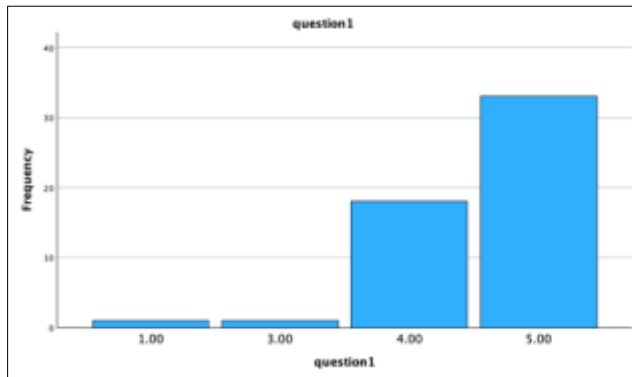
Survey:

Question 1 Analysis:

Question one was investigating ease of use and if participants are able to open Quizizz without assistant. As shown in figure 4 thirty-three participants answered with strongly agree and eighteen participants agreed that they can open Quizizz without help. Accordingly, fifty-one participants out of fifty-three do not find any difficulty opening the site. In the other hand, two participants might need assistant on opening Quizizz. Thus, incorporating Quizizz as a personalized learning tool is well-suited for primary students.

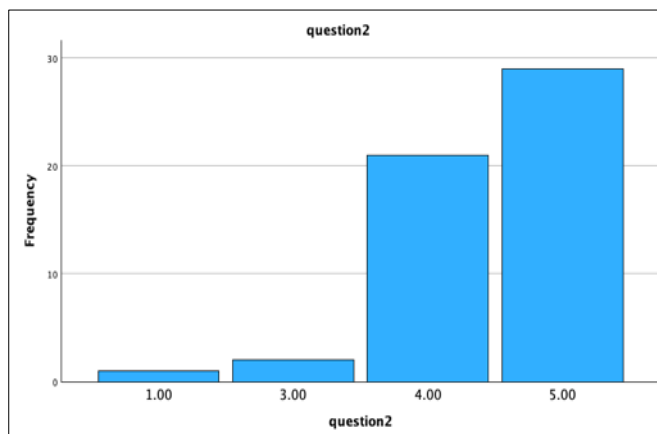
		question1			
		Freque ncy	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.9	1.9
	3.00	1	1.8	1.9	3.8
	4.00	18	31.6	34.0	37.7
	5.00	33	57.9	62.3	100.0
	Total	53	93.0	100.0	
Missing	System	4	7.0		
Total		57	100.0		

Figure 4



Question 2 Analysis:

Question two investigate if participants can navigate QaiLP tool. The aim of this question is to measure the ease of navigation through the tool. The result in figure 5 was satisfying as twenty-nine participants strongly agree and twenty-one participants agree that it's easy to navigate the tool. The high number of participants agreeing on ease of QaiLP tool navigation indicates that the design of the tool is easy and well structured. Since three participants did not agree, teachers should be prepared to provide support to some learners when implementing the tool.



question2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.9	1.9
	3.00	2	3.5	3.8	5.7
	4.00	21	36.8	39.6	45.3
	5.00	29	50.9	54.7	100.0
	Total	53	93.0	100.0	
Missing	System	4	7.0		
Total		57	100.0		

Figure 5

Question 3 Analysis:

Question three measures the satisfaction of the participants regarding time given to complete answering the questions in QaiPL tool. As previous two questions, the majority of participants agree that were given enough time to complete the QaiPL task. One participant dissented on having enough time to answer questions on QaiPL tool. Further investigation needs to be done to figure out the reason behind this participants disagreement. One of the questions that could be asked is did the participant face issues with the tool or did the participants needed assistant on reading questions. Another participant was neutral about the time given. It was not clear if the participant was satisfied about the time given. Results are represented in figure 6.

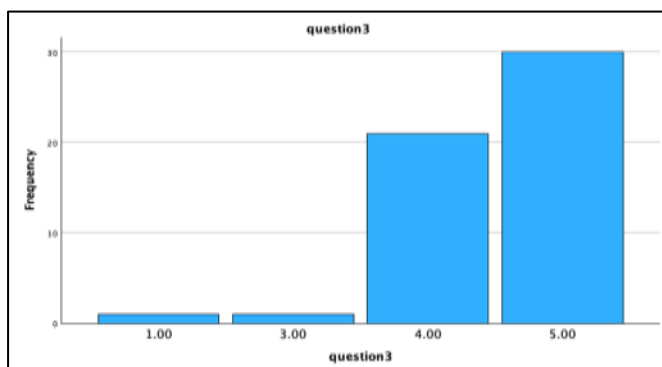
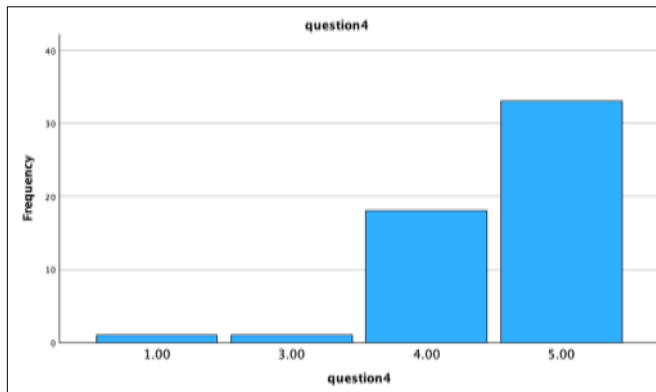


Figure 6

question3					
		Frequ ency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.9	1.9
	3.00	1	1.8	1.9	3.8
	4.00	21	36.8	39.6	43.4
	5.00	30	52.6	56.6	100.0
	Total	53	93.0	100.0	
Missing	System	4	7.0		
Total		57	100.0		

Question 4 Analysis:

Question four measures participants ability to understand questions and content without assistant. It's important that learners can understand the content of QaiPL tool and use it independently. The use of the tool independently will provide an opportunity for asynchronous learning in the feature. The result showed that thirty-three participants strongly agree that it's easy to understand the content without assistant. Eighteen participants agree while one participant is neither agree or disagree. Finally, only one participant strongly disagrees. According to the results in figure 7, content of QaiPL is easy to understand.



question4					
		Frequ ency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.9	1.9
	3.00	1	1.8	1.9	3.8
	4.00	18	31.6	34.0	37.7
	5.00	33	57.9	62.3	100.0
	Total	53	93.0	100.0	
Missing	System	4	7.0		
	Total	57	100.0		

Figure 7

Question 5 Analysis:

Last question in the survey is about accessibility option in QaiPL tool. The tool provides voice over, the ability to read questions for users. It's important to understand that none of the participants was determination student. However, the it was explained to participants that there is a voice over an accessibility option that they can test. As shown in figure 8, twenty-eight participants strongly agree that the tool provides accessibility options. Next, twenty-three agrees while one participant is neutral. One participant strongly disagrees that the tool support accessibility options. The result indicates that the tool has

options that support learners with determination at some level.

question5					
		Frequ ency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.9	1.9
	3.00	1	1.8	1.9	3.8
	4.00	23	40.4	43.4	47.2
	5.00	28	49.1	52.8	100.0
	Total	53	93.0	100.0	
Missing	System	4	7.0		
Total		57	100.0		

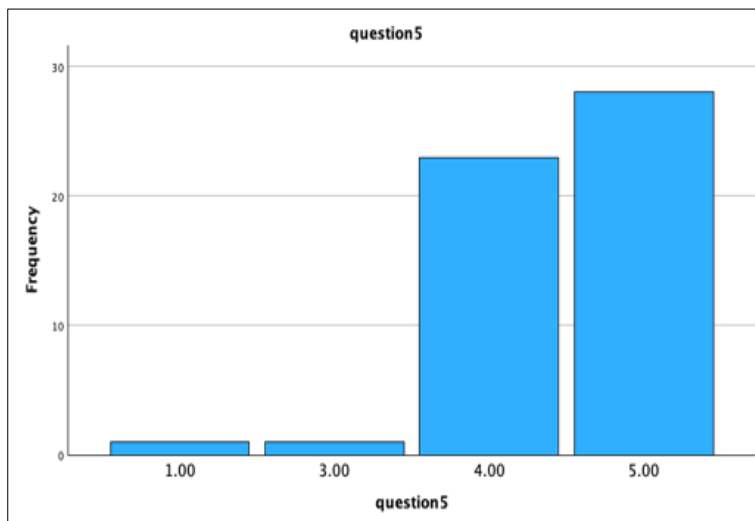


Figure 8

		Statistics					
	group		question1	question2	question3	question4	question5
N	Valid	53	53	53	53	53	53
	Missing	4	4	4	4	4	4
Mean		1.0000	4.5472	4.4528	4.4906	4.5472	4.4528
Median		1.0000	5.0000	5.0000	5.0000	5.0000	5.0000
Std. Deviation		.00000	.72234	.74849	.72384	.72234	.72234
Variance		.000	.522	.560	.524	.522	.522
Minimum		1.00	1.00	1.00	1.00	1.00	1.00
Maximum		1.00	5.00	5.00	5.00	5.00	5.00
Sum		53.00	241.00	236.00	238.00	241.00	236.00

Figure 9

Interview:**Question 1 Analysis:**

Question one in the interview was how can QaiPL be utilized to support teachers in various subjects. The three interviewees agreed that QaiPL tool can support teachers mostly in creating learning experience that is suitable for different learning styles and levels. Adding that the tool provides teachers with assistant on exploring educational resources and materials. The second most recurring answer was that the tool motivates learners to learn by creating an engaging content.

Question 2 Analysis:

Question two was investigating how the use of QaiPL tool impacts teaching and learning. The interviewees responded to the question from different perspectives. However, they all agreed that it's easy tool to use to create individualized learning that will positively impact teaching and learning. Also, some interviewees agreed that QaiPL

will introduce engaging learning environment. One of the most interesting answers during the interviews conducted was that QaiPL supports sustainability by reducing the use of paper.

Question 3 Analysis:

Question three study the challenges that might occur during the application of QaiPL tool. The challenges mentioned by interviewees varies between technical issues to providing training for teachers. Two interviewees agreed that teachers will need training and support to fully employ the tool in their classes. Also, providing assistant for learners was one of the main issues mentioned during the interviews. Other issue mentioned were internet connection, technical support, privacy issues, and AI algorithms bias. These issues were mentioned once by different interviewees. The result indicates, that providing support for both teachers and students and training them is the most challengeable issues.

Question 4 Analysis:

Question four explores how QaiPL will support students with Determinations. Most of the answers were indicating that providing an interactive activities and tools that stimulate different senses can support learning of students with determinations. Also, creating personalized learning bath for learners can support their learning. The answers imply that the tool can support students with determinations when used to create inclusive learning environment with interactive activities that engage learners by stimulating their different senses.

	Question 1	Question 2	Question 3	Question 4
• Themes	• Support differentiation and personalized learning • Help Teachers resources • Engage learners • Feedback	• Individualizing learning • Impact learning & teaching • Engagement •	• Training teachers on using the tool • Technical support • Support learners • Bias in AI algorithms. • Privacy	• Personalized learning • Interactive activity/ Hands on activity/ stimulate senses. • Instant feedback. • Creating inclusive learning environment

Figure 10 Qualitative data themes.

Conclusions:

In conclusion, the data indicates that some learners will need support and assistance from teachers while using QaiPL. While most participants expressed their ability to independently access, browse, and read information, I suggest aiding learners until they become proficient with the tool. According to the finding, QaiPL supports individualized learning, motivates learners, and improve engagement due to its interactivity. For future studies, I suggest considering sustainability in schools and how QaiPL can support it.

Ethical Consideration:

Regarding artificial intelligence in elementary, middle, and high school education, the most important ethical issues are ensuring that the implementation of AI respects and improves the learning experience without inflicting

any harm. According to Adams et al. (2023), these factors are concepts such as transparency, which ensures that the functions and decision-making processes of the artificial intelligence are intelligible; justice and fairness, which advocates for equitable access to AI tools and prevents prejudice via the elimination of bias; and Non-maleficence, which means preventing students from being harmed as a result of the use of artificial intelligence; responsibility, which means guaranteeing accountability for the impact of AI; privacy, which means safeguarding students' sensitive information; and beneficence, which means trying to improve students' well-being and educational outcomes. In addition, ethical principles that are specific to K-12 education have been identified. These principles include Pedagogical Appropriateness, which aligns the use of artificial intelligence with educational goals; Children's Rights, which acknowledges the special status of children; AI Literacy, which equips students with the ability to understand AI; and Teacher Well-being, which acknowledges the impact that technology has on educators (Adams et al., 2023). These principles guide the appropriate and intelligent incorporation of artificial intelligence (AI) in educational settings, with a particular emphasis on the specific requirements and rights of children.

References:

- Adams, C., Pente, P., Lernermeier, G., & Rockwell, G. (2023). Ethical principles for artificial Intelligence in K-12 education. *Computers & Education: Artificial Intelligence*, 4, 100131. <https://doi.org/10.1016/j.caeai.2023.100131>
- Ahmed, F. (2020). *The adoption of artificial intelligence in UAE education sector*. <https://bspace.buid.ac.ae/handle/1234/1608>

- Alyammahi, A. (2020). *Investigating the impact of AI-Powered digital educational platforms on students' learning and teachers' practice in Abu Dhabi schools*. <https://bspace.buid.ac.ae/handle/1234/1840>
- Ayanwale, M. A., Sanusi, I. T., Adelana, O. P., Aruleba, K., & Oyelere, S. S. (2022). Teachers' readiness and intention to teach artificial intelligence in schools. *Computers & Education: Artificial Intelligence*, 3, 100099. <https://doi.org/10.1016/j.caeai.2022.100099>
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research*. Sage publications.
- Darayseh, A. A. (2023). Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers & Education: Artificial Intelligence*, 4, 100132. <https://doi.org/10.1016/j.caeai.2023.100132>
- EL ASMAR, W. (2022). The Effectiveness of AI-Powered Digital Educational Platforms: Students' Attainment and Teachers' teaching strategies in a private high school in Dubai [Dissertation, The British University in Dubai]. In *The British University in Dubai*. https://bspace.buid.ac.ae/buid_server/api/core/bitstreams/8d7b6add-dd6b-4a38-bcdc-54913677e654/content
- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational evaluation and policy analysis*, 11(3), 255-274.
- Haenlein, M., & Kaplan, A. (2019b). A Brief History of artificial Intelligence: on the past, present, and future of artificial intelligence. *California Management Review*, 61(4), 5–14. <https://doi.org/10.1177/0008125619864925>
- Hung, H. T. (2015). Designing a technology-enhanced, learner-centered knowledge management system to facilitate self-regulation in an online learning environment. *Computers & Education*, 82, 314-327. <https://doi.org/10.1016/j.compedu.2014.11.019>

- Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field methods*, 18(1), 3-20.
- Karageorgakis, T. (2022, Nov 3rd). *SAM: How to use it and when NOT to use it*. Educraft. <https://educraft.tech/sam-how-to-use-it-effectively/>
- Kolb, D. (1983). *Experiential learning : Experience as the source of learning and development*. <http://ci.nii.ac.jp/ncid/BB1767575X>
- MonkeyLearn. (n.d.). Your Guide to Data Cleaning & The Benefits of Clean Data. Retrieved from <https://monkeylearn.com/data-cleaning/>
- Ng, D. T. K., Lee, M., Tan, R. J. Y., Hu, X., Downie, J. S., & Chu, S. K. W. (2022). A review of AI teaching and learning from 2000 to 2020. *Education and Information Technologies*, 28(7), 8445–8501. <https://doi.org/10.1007/s10639-022-11491-w>
- Park, W., & Kwon, H. (2023). Implementing artificial intelligence education for middle school technology education in Republic of Korea. *International Journal of Technology and Design Education*. <https://doi.org/10.1007/s10798-023-09812-2>
- Piaget, J. (1954). The construction of reality in the child. In *Basic Books*. <https://doi.org/10.1037/11168-000>
- Shwede, F., Salloum, S. A., Aburayya, A., Fatin, B., Elbadawi, M. A., Ghurabli, Z. A., & Dabbagh, T. A. (2024). AI adoption and educational sustainability in higher education in the UAE. In *Studies in big data* (pp. 201–229). https://doi.org/10.1007/978-3-031-52280-2_14
- Su, J., & Ng, D. T. K. (2023). Artificial intelligence (AI) literacy in Early Childhood education: the challenges and opportunities. *Computers & Education: Artificial Intelligence*, 4, 100124. <https://doi.org/10.1016/j.caeai.2023.100124>
- Tableau. (n.d.). Data Cleaning: Definition, Benefits, And How-To. Retrieved from <https://www.tableau.com/learn/articles/what-is-data-cleaning>
- Wardat, Y. (2024). Integrating ChatGPT in Grade 12 Quantum Theory Education: an exploratory study at Emirate School (UAE).

International Journal of Information and Education Technology, 14(3), 398–410. <https://doi.org/10.18178/ijiet.2024.14.3.2061>

- Xia, Q., Chiu, T. K. F., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers & Education: Artificial Intelligence*, 4, 100118. <https://doi.org/10.1016/j.caeai.2022.100118>
- Zhai, X., Chu, X., Chai, C. S., Jong, M. S., Starčič, A. I., Spector, M., Liu, J., Jing, Y., & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, 2021, 1–18. <https://doi.org/10.1155/2021/8812542>
