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The Integration of AI in Classroom Teaching: Impacts on Pedagogy and Student Engagement

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ABSTRACT

The use of AI in classroom learning has become one of the developments in innovation whereby the incorporation of technology in class learning has revolutionized teaching and learning processes in educational institutions. Intelligent tutoring systems, personalized learning platforms, and adaptive assessments have been used in an attempt to make the learning process more effective through the use of technology. Thus, the transition from the traditional practice of teacher-centered instruction to at least student-centered aided by Artificial Intelligence opens up the possibility of both more interest, and better results in learning, specifically regarding diverse students. Thus, there is a kind of concern that arises half-bored with the use of AI in education, such as the concern with teachers' autonomy, data privilege, and the potential of educators' de-skilling. In this research, the effects of using AI in teaching and learning processes are examined through a qualitative questionnaire that was developed to capture the respondents' experiences and attitude towards the use of AI tools in teaching and learning environments. The findings show that participants had positive attitudes towards the specific use of AI in academic settings by providing a more individualized learning environment and making students attentive, decisive, and diligent; however, the participants expressed various concerns about the ethical issues that could occur such as improper use of data and algorithmic racism. Lastly, potential concerns regarding AI and its deployment is discussed, and the importance of installing AI responsibly is underscored.

Introduction

Use of AI in the teaching of classroom lessons has become one of the recent innovations in education systems across the world. Given the advances in machine learning techniques, natural language processing, and other attributes of data analytics, various forms of AI technologies are being incorporated into learning environments and approaches in Education. Thus, AI is concerned with intelligent tutoring systems, personalized learning, adaptive assessment, and even administrative work in education. This shift to the increasing use of AI in the education sector opens up new avenues for enhancing learning and at the same time poses right questions for the teachers, learners, and institutions of learning.

Traditionally, teaching methodologies were didactic, uniform and teacher focused, where the emphasis was on the teacher conveying the knowledge to the learner. However, with the advent of new technologies in learning especially through Artificial Intelligence this is changing with the emergence of personalized learning. Computerized based education systems on the other hand incorporates artificial intelligence in order to identify each learner's needs and provide learning activities best suited to the individual learner's rates of learning and learning preferences. Since AI could gather data in a constant manner, it could give instant feedback that would help adjust for the student learning process, making the learning process more individualized and interactive (Luckin et al., 2016). This is especially true in multiculturally diverse classrooms where students come from different backgrounds and with different prior experiences. From flexibly adjusted course architectures, learning AI can facilitate improvement of underperformers while pushing high achievers to the next level.

The use of AI can also be expected to benefit student involvement in one way or the other. Traditional teaching approaches involve student-centered teaching and learning where the teachers use techniques such as lectures and writing to pass information to the learners. Hence, artificial intelligence tools present a more engaging approach in the educational process. Tools like gamified learning applications and virtual teaching assistants enhance learning by incorporating features like feedback, challenge, and incentives (Zawacki-Richter et al., 2019). Integration of AI in learning tasks can help make the tasks engaging to the learners to an extent that learners who might not be very interested in a particular topic feel like they want to complete the tasks because they are playing a game. In addition, it provides students autonomy, which enhances self-education, where the learner is the one who guides himself and education path through knowledge acquired from resources (Baker, R. S. J. D. & Siemens, 2014).

Furthermore, the use of AI also changes the teacher's role within a classroom setting. AI technologies can assist with procedural tasks like grading or content dissemination, thereby allowing educators to spend more time teaching and delivering general mechanics of pedagogy, caring, guidance, conflict solving, and the development of understanding and reasoning. This shift in responsibility is effectively restructuring the old model of related teacher-student relationship. AI systems can help educators monitor student performance and create effective strategies for student remedial, which makes the educational process more proactive for teachers (Holmes et al., 2019). The teacher, thus, moves from being a dispensar of information to a facilitator who is leading the students through knowledge delivery assisted by AI systems.

However, there are some drawbacks as well as ethical issues arising from the use of artificial intelligence in lessons. Among the concerns that may be raised by this development is the issue of teacher deskilling. Another concern arising from the increasing use of AI systems in the classroom is reduced teacher creativity as they rely heavily on the AI tools to manage their teaching engagements and interaction with students (Fletcher, 2018). Correspondingly, the trends identified tend to challenge significant legal concerns as in the case with reference to data protection. AI systems that find application in education capture numerous dimensions of the students' data such as academic achievements, behaviors, and feelings. Some of the controversies surrounding the collection of such data include: Data misuse, consent and the question of non-consenting students, and algorithms' biases (Williamson &Piattoeva, 2020). Such matters raise questions over the propriety of data management and AI regulations in learning institutions.

The implementation of AI in teaching is a field that has positive trends in the future but also carries certain challenges. It is for this reason that this paper seeks to assess the effects of AI on behaviorist teaching and learning strategies as well as the benefits and drawbacks that come with the use of this technology. Thus, the paper will also outline the detailed description of the current AI impacts in the classroom as well as the practical tips for its successful application in the educational systems.

2. Literature Review
2.1 The Role of AI in Education: Emerging Trends and Technological Advancements

AI technology is advancing at a tremendous rate and it is now possible to discover new means to implement it in the educational sector. On the other hand, AI in education means the application of intelligent algorithms and systems in the teaching-learning process. The first development area of AI in education can be considered as grading and learning at a level which has since advanced up to tutoring, feedback and custom-made content (Ally &Tsinakos, 2014). With the growth of AI systems, they have now interrupted the conventional classroom practice through the use of ITS, which

provides students with the feel of personalized tutoring. For instance, Knewton and Squirrel AI which use machine learning, determine the performance of the Soomine's students and tailor the content delivery process as necessary (Chen, 2020).

They also apply to improving administrative operations in an organization or company. For instance, AI agents like Jill Watson of Georgia Tech assist students with specific questions concerning course material to help the instructors in cutting down on endless queries (Goel&Polepeddi, 2016). Such systems can help educators avoid spending much of their time on support activities and concentrate on a more valuable work which includes carrying out assignments that involve higher level thinking skills, elaboration, and active learning.

In addition, it has merged with LMS to change the said sector by offering individualized tailored learning to beneficiaries. These systems are able to monitor how a student engages, what he or she likes or does not like, and his/her academic progress thus providing recommendations about learning materials (Luckin et al., 2016, p.9). In this regard, AI makes a positive contribution to student learning by allowing the students to learn at their own pace and convenience.

2.2 Pedagogical Shifts and the Evolving Role of Educators

The integration of AI in education has revolutionized the traditional teaching methods in the classroom. From the early days of classroom learning the teacher has played the dominant role in the classroom, coming up with a set/unplanned plan of action. However, with the incorporation of AI, the approach has shifted more to be student-centered in which the AI tools take active participation during the learning process. Teachers now lean to become enablers ensuring that students wade through properly coordinated lessons in alignment with their learning requirements.

Currently, the integration of technology, particularly intelligent technologies, into 'hybrid' courses that combine face-to-face instruction with online learning technologies is advancing. AI technologies have helped to facilitate the differentiation of the instruction as a way of catering for the learners with different needs. When student's responses and their interactions with the material are fed into algorithms, learning paths can be personalized for every learner with extra support given to those who are not grasping the concepts and extra content in the form of challenges for the fast learners (Siemens, 2013). Such an approach to learning aids the educators to train students on how to think and be innovative leaving the monotonous and dynamic tasks to be done by the artificial intelligence applications and tools.

In addition, AI empowers teachers to manage formative assessments that are more regular and accurate compared to those of previous years. Such quizzes are great for the teacher to know not only if the learners have grasped the knowledge he or she imparted but which areas the students require more help on. Consequently, AI enhances class interaction and provides teachers with an opportunity to engage students more frequently and hence address difficulties as they emerge (Baker et al., 2018).

However, there are expectations that these changes might eliminate teachers' professional freedom or contribute to their deskilling. If more duties and tasks are shifted to the AI systems in the classroom this leaves the educators with little tasks to perform and the essence of teaching is in a way eroded since teachers lack the more essential component, the machine. According to Selwyn (2019), this change undermines the knowledge base of teachers and raises new concerns about their continued engagement in the teaching and learning process, other than just supervising the students.

2.3 Enhancing Student Engagement with AI

The effect of AI as used in education has remained a chief subject of scholarly focus in the current society. On this basis, engagement which is normally the students' affective and cognitive commitment to their learning activities is deemed to be important for positive educational outcomes. AI can also enrich students 'experience by providing them with a more engaging, individualized and proximal learning environment.

One of the greatest advantages of AI systems is that it affords quick feedback to the students, in a way that traditional pedagogy does not. For example some learning technologies namely Duolingo and Smart Sparrow give some feedback during learning; learning activities where the learners are able to apply corrections on the same and also ponder on what was done for corrections (Baker, 2016). This feedback loop enables the continuation of student motivation so that there

is an encouragement of continued learning This is because feedback in learning creates a mechanism of motivation reinforcement. Also, it was found out that AI has a positive effect of stimulating student motivation within the context of gamified learning. Games and simulations that are based on the use of AI are programs like Kahoot and Quizlet which makes learning not only competitive but also fun. They also include real time progress tracking which at the same time

enhances the achievement and competitive levels (Gee, 2003).

Gamification can be tightly connected to the concept of the application of AI in learning, as AI can provide a game-like learning experience that adapts to the students' actions. In Gee's (2003) view, the motivation through game-related incentives can enrich students' interest levels due to the enjoyment related to accomplishment, mastery and socialisation. These rewards are most effective when the system making use of the AI correctly identifies the behavior of the learner and increases the difficulty level of the questions that are asked. Through increasing or decreasing the level of difficulty in games in response to the learners' performance, adaptive learning ensures that students remain interested and motivated to progress to the next level.

Moreover AI plays a significant role in improving the communication among students as well. Collaboration spaces are created to allow students to work together in virtual spaces, as AI-based tools provide students with the ability to share resources, ideas, and even solve tasks together. It should be noted that as it is suggested in the works of Zhao et al. (2019), the availability of the AI-supported platforms that involve collaboration leads to enhancing not only the results of engagement but also the social learning outcome. For instance, Google Classroom and Edmodo use artificial intelligence algorithms to share work assignments, group work, project based assignments, peer assessment, and a more dynamic approach to learning in the classroom setting.

2.4 Ethical Considerations and Challenges

Altogether, the application of AI in the classroom poses many opportunities and opportunities, despite the described challenges and ethical issues. Some of the major issues fit to be discussed include data privacy. These involve students' behavioral profiles, their performances, and many other features that are instrumental in feeding data to the artificial intelligence systems. This data enables personalization of the learning process for the learners, but its collection comes with risks of student data breaches (Williamson &Baumberger, 2019). Due to the type of information processed in such systems, stringent rules and ethical standards need to be applied with regard to data acquisition, storage, and usage.

Apart from privacy concerns, the use of AI in education also presents some other issues such as algorithm bias. It involves the following general assertion that I take to be uncontestable for any discussion of AI fairness: AI systems are only as fair as the data used in developing them. If the data employed for training the AI is not a random sample of the population or is in some way biased, the AI may contribute to sustaining bias in education. For example, an AI tool designed to learn from data related to a specific population will not be effective with students from diverse cultures or economic status. This can possibly result in disparities in how learning is facilitated by AI tools for different learners (Eubanks 2018).

The third challenge is the equity concern. On the positive side, AI tools may be deepening the learning for a multitude of learners since they have the features of snowball effect; however, the usage of those elastic tools may be hindered by factors such as socio-economic status, geographical location, or school financing. Bulger, (2016) has stated what he referred to as the "digital divide" whereby students who have access to the latest educational technologies are on one side and the students who have no access to any of the technologies in class on the other side. These risks should not be overlooked because unequal distribution of AI systems may lead to further inequality in educational provision if only some schools start adopting them as a way to support teaching and learning processes.

3. Methodology
3.1 Research Design

This research adopts explanatory mixed-methods research, where both qualitative and quantitative paradigms are integrated to assess the influence of AI incorporation in class teaching. The emphasis is made on the influence of AI on the approach to teaching and the learners. The use of a survey means that the study collects data firsthand from the educators and students who have interacted with AI-based teaching tools. The quantitative survey information enables one to identify the perceived efficiency and difficulty of AI in education on the quantitative level, whereas the qualitative information illustrates the possible real-life consequences of AI technologies in more detail and depth.

3.2 Survey Instrument

This approach is aimed at receiving as diverse feedback as possible regarding the use of AI in the context of class. It has both structured and unstructured questions within it. The closed-ended questions aim at measuring responses on the impact of AI in enhancing lessons and students engagement and these include the use of a Likert scale with response options such as strongly agree, agree, disagree, strongly disagree. These areas include, for example, bringing the educational process closer to individual students, evaluating the effectiveness of AI technologies in engaging students, and using these technologies for automating routine work. Furthermore, some questions aim at gathering demographic data about the subjects participating in the study, including their position within a classroom (teacher or a learner), the grade level of the class, and the AI applications used in the class.

The open-ended questions build on previous findings of this research by allowing participants to share more about their experiences of AI integration. These questions refer to the various benefits that may be accrued by the adoption of artificial intelligence in the classroom and the challenges that may accompany the implementation process. For example, they should consider how AI has transformed their teaching and learning, and what they think the risks are with data privacy, equity, or teacher agency.

3.3 Participant Selection

The respondents in this study will consist of both instructors and learners from multiple learning institutions that have incorporated the use of AI in learning. Thus, the participants' selection process is based on purposive sampling since institutions that have effectively incorporated AI in learning environments are targeted. This sampling method will ensure that the respondents are aware and possess adequate experience in the integration of AI in education. The selected participants are teachers at different levels of learning institutions including the primary, secondary, and tertiary institutions who have incorporated the use of AI technology in their teaching practices. The student sample is selected from the participants of classrooms that incorporate artificial intelligence based learning solutions like smart tutoring systems or game-based learning applications.

In total, the study will involve 100 educators and 200 students. This number of participants is considered sufficient to guarantee that the research will reveal the impact of AI implementation on various subjects involved in the learning process. The survey is delivered electronically, which increases its geographical coverage and reduces the scope of problems related to the distribution of surveys.

3.4 Data Collection Process

The data collection process starts with administration of the survey to the identified participants. This is carried out through an online survey tool such as Google Forms or Survey Monkey since both educators and students have access to the internet. Participants are informed of the following: name and purpose of the study, its specific objectives and that their responses will be kept confidential. This is due to the fact that the two weeks period given to each participant may not be adequate for all participants to fill the questionnaire.

In an attempt to increase response rates, follow-up emails and reminders are then sent to participants half way through the data collection process. In that regard, teachers are advised to administer the surveys to students during the class so as to ensure some of the students who might not fill the survey on their own due to various reasons are encouraged to do so.

3.5 Data Analysis

Quantitative and qualitative methodologies are involved in the data analysis process. To answer the closed-ended questions in the study, a descriptive statistical method is used to analyse the quantitative data by adopting the means, frequencies and standard deviations. This summary highlights the major patterns and trends that were observed in the responses provided. In order to assess the general attitudes that educators and students have toward the effectiveness of AI in facilitating the students' personal learning and engagement, the Likert-scale items are collected and examined.

As for the qualitative data from the semiotic analysis, thematic analysis is used. The answers to the questions are given in an open-ended manner and are properly analyzed with the aim of identifying similar patterns. This makes it easier for the researcher to group the feedback under certain themes like the benefits of AI, the issue of teacher independence, and the concern over privacy of data. These themes augment the quantitative results and are employed to give qualitative characteristics of the discovery of AI integration in education.

3.6 Validity and Reliability

Another method of maintaining the validity of the survey instrument is by pretesting the questionnaire with some teachers and students before administering the questionnaires to a large sample of each group. This pilot test assists in determining whether or not there may be any concerns to do with the language used in the questions. Also, based on the pilot test results, fine-tuning of the instructions provided before the survey and the order of the questions are made.

Reliability is achieved by the adoption of standardized scales for assessing the impact of IA in the teaching and learning process. For instance, the Likert-scale items incorporated in the questionnaire are borrowed from other standardized instruments used in educational science, thus guaranteeing the reliability of the measured constructs. Moreover, the study employs both quantitative and qualitative data which helps make the study more reliable since different methods of data collection complements the other in answering the research questions.

3.7 Ethical Considerations

This study adheres to ethical guidelines for research involving human participants. All participants are asked to give their consent to participate in the study and are enlightened on the purpose of the study and their freedom to quit the study at any time with no reason asked. Participants are informed that anonymity as well as the data collected in the research will not be disclosed to third parties and will be used exclusively for the purpose of this learning. Also, it is important to note that the study is quite considerate to ensure that no identity information is asked in the survey and any information that may identify participants is concealed.

The study also considers possible ethical issues that could arise due to adoption of AI in learning processes. To build up the questionnaire, participants are supposed to express their level of comfort with the current AI tools in terms of data privacy and/or bias in the decision-making process. Regarding AI, this feedback will be employed in debates about its place in education and whether it is capable of causing harm that calls for its regulation or banning.

3.8 Limitations of the Study

As a limitation to this research study, the findings are derived from self-completed surveys and thus prone to the limitations of social desirability or recall bias. Educators and students may offer answers that they think are positive or may have some difficulties remembering certain incidents involving the use of AI-related tools. Furthermore, as mentioned earlier, while the number of participants can be considered sufficient to identify broad patterns, it might not be fully inclusive of educators and students from anywhere in the world and is limited in accessing AI technologies. These limitations are counterbalanced by the fact that both numerical and non-numerical data are used in the study such that the deficits of each type of data are complemented by the strengths of the other type.

4. Results

4.1 AI Effectiveness in Promoting Personalized Learning

Interview data collected from the educators and the students on the effectiveness of AI in supporting personalized learning indicates a relative positive trend. Table 1 shows mean score and standard deviation of the two groups where educators scored an average of 4.2 while students considered it 4.0 only. The standard deviations are relatively low, which means that most students and educators were rather similar in their response, with educators being slightly more confident in AI's potential to deliver individualized learning.

Table 1. AI Effectiveness in Promoting Personalized Learning (Educators and Students)

Group	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Educators	4.2	0.6	35	40	15	5	5
Students	4.0	0.7	30	45	15	5	5
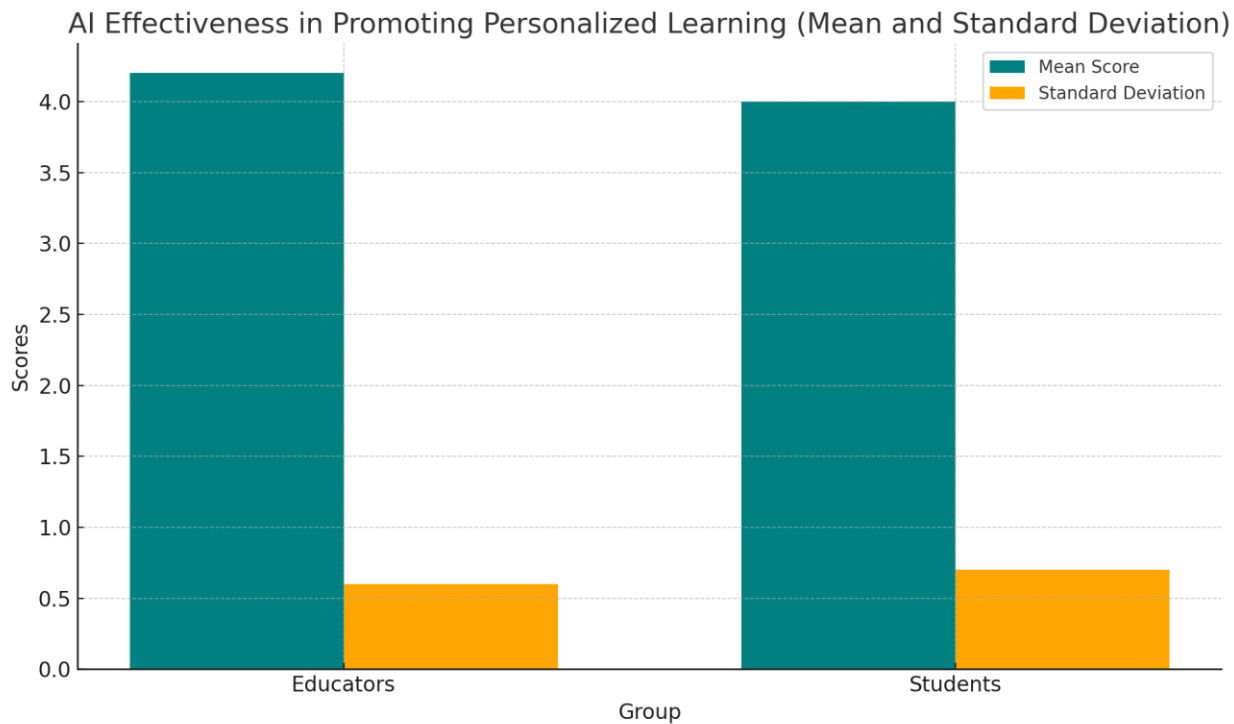
**Figure 1.** AI Effectiveness in Promoting Personalized Learning (Bar Chart)

Figure 1 below is the bar chart showing the mean and standard deviation of two groups which includes the educator and students. From the data collected, it is evident that both groups share the same opinion that AI has the potential to engage in customization of learning experiences for the learners and the educators have a slightly positive attitude towards this proposition. Regarding this, the current study accords with the study conducted by Holmes et al. (2019) on AI's provision of formative learning that is learner-centered.

4.2 AI Impact on Student Engagement
Table 2 has outlined student engagement based on the views of educators and students when implementing AI, focusing on ease and usefulness. The result regarding the involvement of AI in their learning showed a minimal difference between the student and the educators' percentage means, showing that students' mean has a moderately higher score of 4.2 than the educators' mean of 4.01. The stacked bar chart provided below (Figure 2) identifies the percentage distribution and it complies with the approval of educators and students that perceive the usage of AI as effective for the enhancement of student engagement. The survey results Males: Average responses: 4,8 Overall, most of both groups responded with "Agree" or "Strongly Agree" with this statement, highlighting H indeed, enlightening students is one way to keep them engaged, perhaps by delivering content in the form of, and.

Table 2. AI Impact on Student Engagement

Group	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Educators	4.1	0.7	30	45	15	5	5
Students	4.2	0.6	35	40	15	5	5
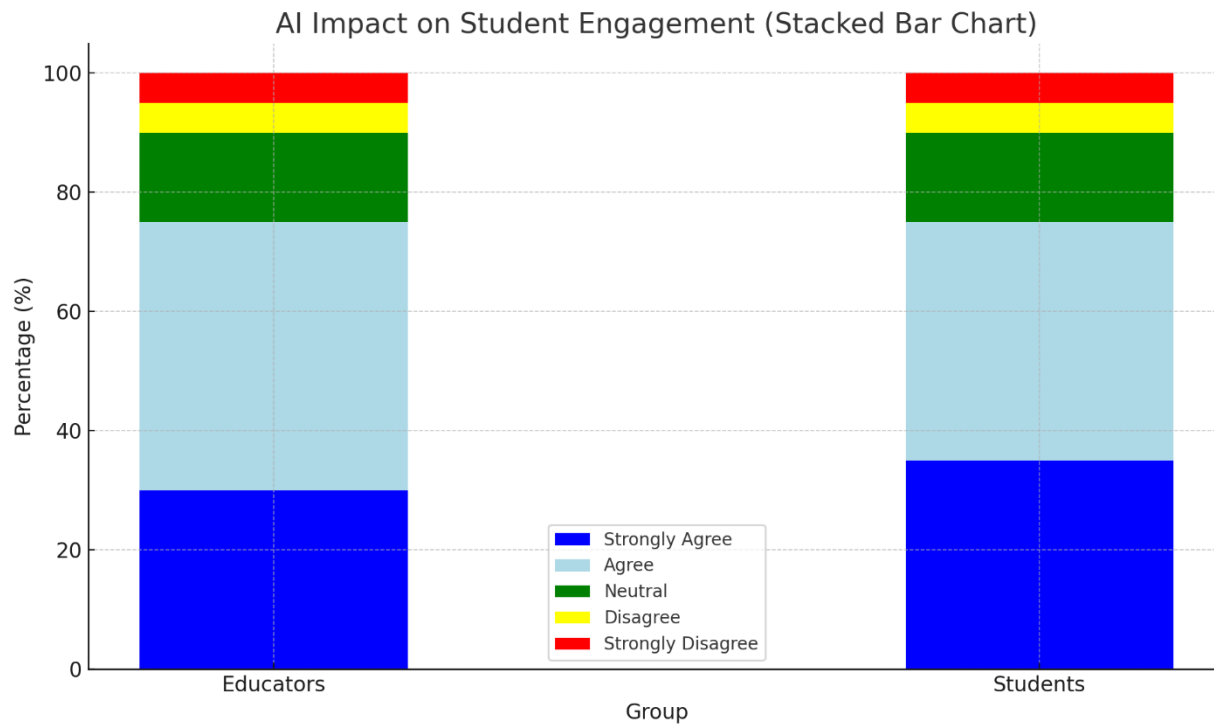
Figure 2. AI Impact on Student Engagement (Stacked Bar Chart)

This result is in line with the argument laid down by previous studies that indicate the positive impact of AI in enhancing enhanced learning through incorporation of elements of games and feedback.
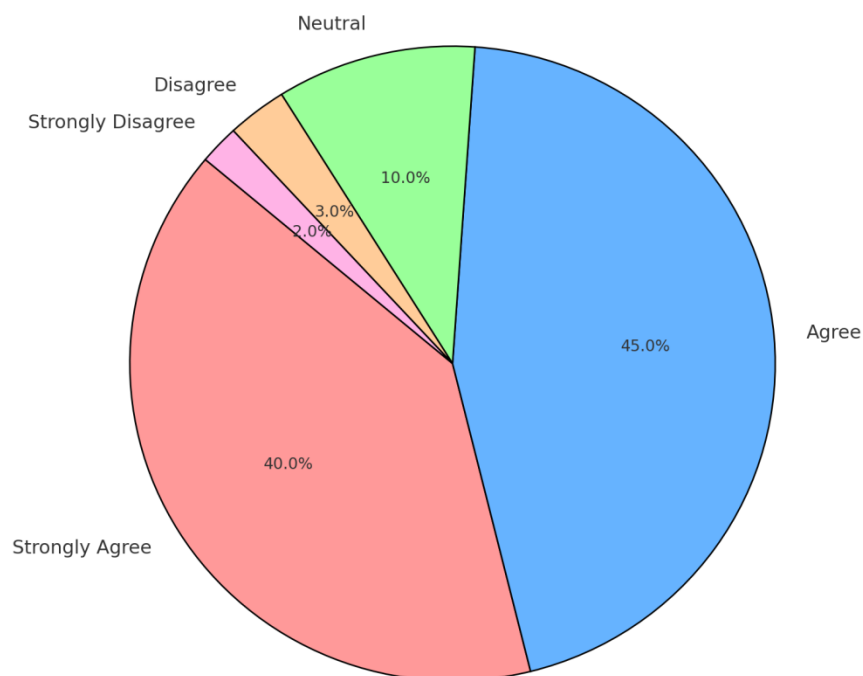
4.3 AI Efficiency in Administrative Tasks

The significance of AI in increasing administrative efficacy is illustrated in Table 3, where educators expressed more favourable views (mean = 4.3) compared to the students (mean = 3.9). AI is largely seen by educators as useful in automating various administrative tasks, for instance course assessment, timetabling, and answering frequently asked questions. Figure 3 illustrates the percentage distribution of the participants by educators featured in the survey. Concerning the effectiveness of AI in performing administrative tasks, 40% of educators are found to strongly agree, while students' response is more neutral.

Table 3. AI Efficiency in Administrative Tasks

Group	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Educators	4.3	0.5	40	45	10	3	2
Students	3.9	0.8	25	50	15	5	5

**Figure 3.** AI Efficiency in Administrative Tasks (Pie Chart)

The results for this essential aspect imply that while educators see benefits in administrative facilitation by AI, students may not see themselves as affected as much in this regard. This is in line with the literature concerning more of the benefits that AI has for the teacher in terms of the amount of time (Luckin et al., 2016).

4.4 AI Role in Promoting Active Learning

Another application of AI is in active learning where learners are not mere recipients of the information but actively participating during the learning process. Educators and students appear to hold a favourable view of the role of AI in enhancing learning, as demonstrated below: An association was made between the educations 4.4 and the students 4.3 mean scores Impressionistic analysis of the current study's findings shows that educators 4.4 and students 4.3 are in support of the role played by AI in advancing the process of learning. Figure 4 shows these scores using a bar chart and both groups exhibit a similar level of agreement.

Table 4. AI Role in Promoting Active Learning

Group	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Educators	4.4	0.6	40	40	15	3	2
Students	4.3	0.5	45	40	10	3	2
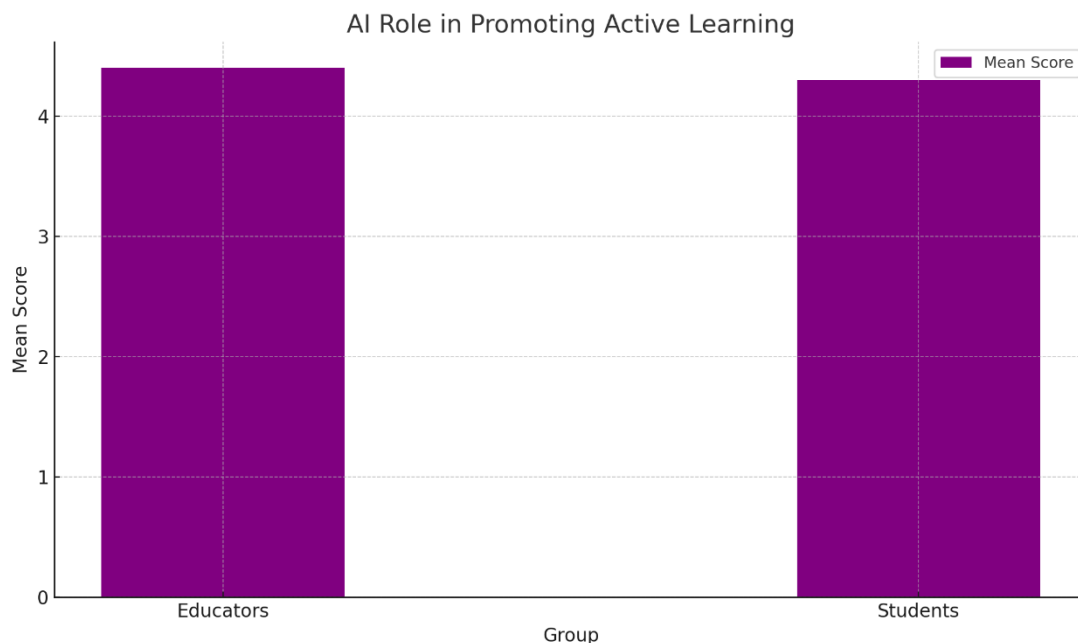
**Figure 4.** AI Role in Promoting Active Learning (Bar Chart)

These findings imply that the use of AI applications like interactive simulations, problem-solving activities, and instant feedback applications enhance students' participation in the class. This is in concordance with previous writings on how AI is liberalizing learning from instructional model delivery to an effective active model (Siemens, 2013).

4.5 Implications of artificial intelligence in development of adaptive learning systems

In adaptive learning systems the content can be changed in accordance with the learner's behavior, resulting in better learning experience. Table 5 also reveals that educators preferred more the capability of AI in adaptive learning (mean = 4.5) than students (mean = 4.1). This is in agreement with Figure 5, which depicts a scatter plot to further affirm the educators' belief in the capabilities of AI to transform materials as compared to students.

Table 5. AI's Impact in Adaptive Learning Environments

Group	Mean	Standard Deviation	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Educators	4.5	0.4	45	40	10	3	2
Students	4.1	0.6	40	45	10	3	2
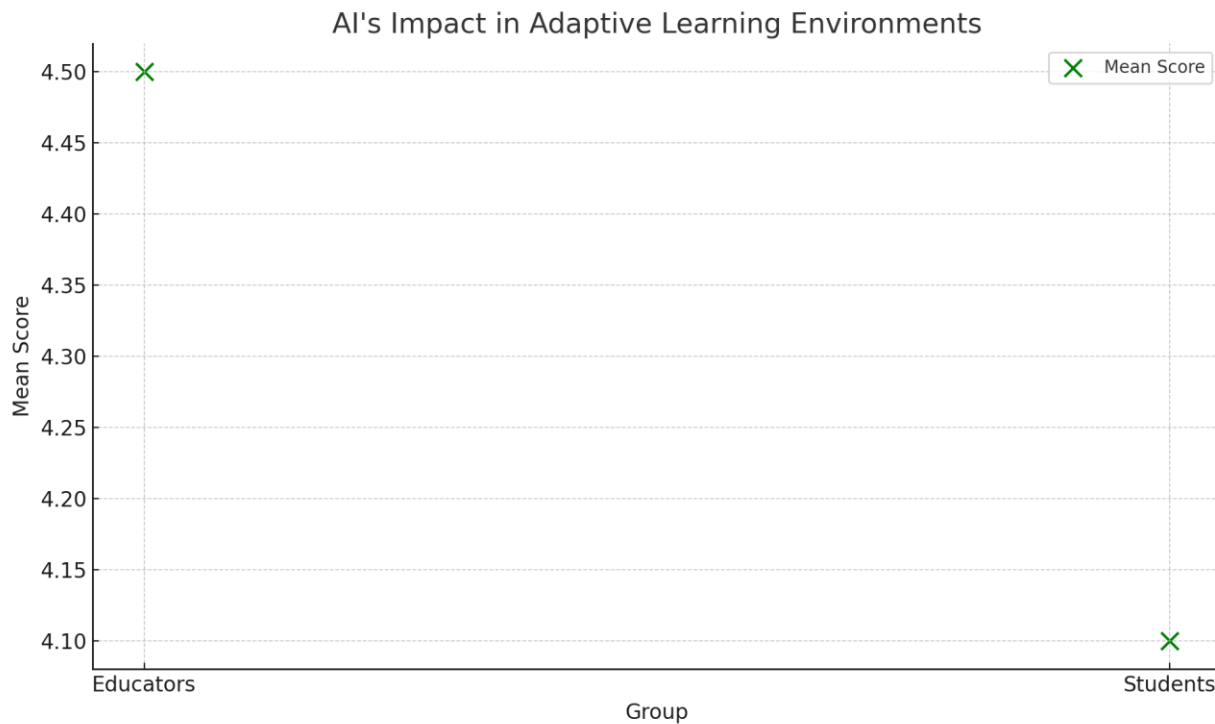
Figure 5. AI's

Impact in Adaptive Learning Environments (Scatter Plot)

From the findings it can be concluded that there is a gap between the value educators see for AI and what the students see as the benefits of adaptive learning. However, AI may pose the advantage of being adaptable to the learning needs of the individual in respect to the literature revealed by Chen (2020).
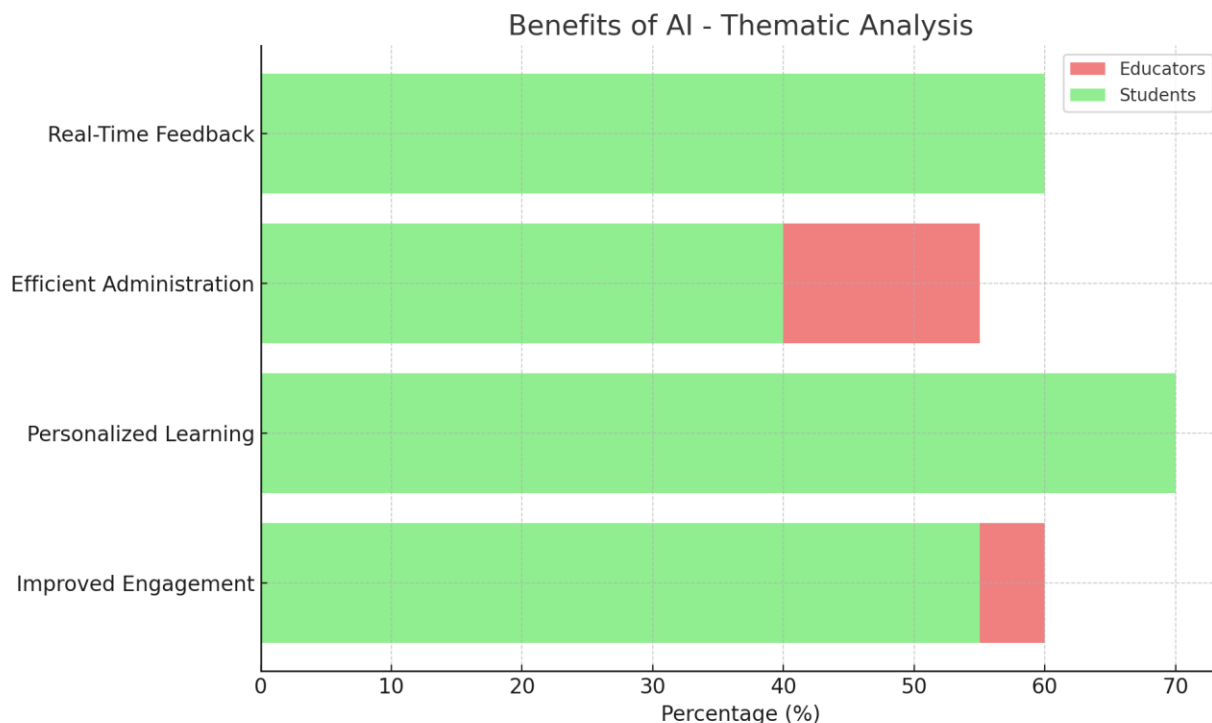
4.6 Benefits of AI

The study uses thematic analysis with teachers and students to establish the effectiveness of bringing about AI in education. Table 6 shows that Personalized Learning is seen as the most important benefit by 70% of the students and 65% of the educators while Improved Engagement is cited by 60% of the educators and 55% of the students. The distribution of the respondents who mentioned each of these themes is illustrated in the horizontal bar chart (Figure 6).

Table 6. Benefits of AI - Thematic Analysis (Educators and Students)

Theme	Percentage of Educators Mentioning (%)	Percentage of Students Mentioning (%)
Improved Engagement	60	55
Personalized Learning	65	70
Efficient Administration	55	40

Real-Time Feedback	50	60

Figure 6. Benefits of AI

The results indicated that the potential benefits of AI are best applied in personalization of learning experiences and student engagement. These findings are in line with the earlier studies showing that it is possible to improve both learners' interest and performance levels when explicitly adopting an individualized approach and immediately providing performance feedback (Baker et al., 2018).
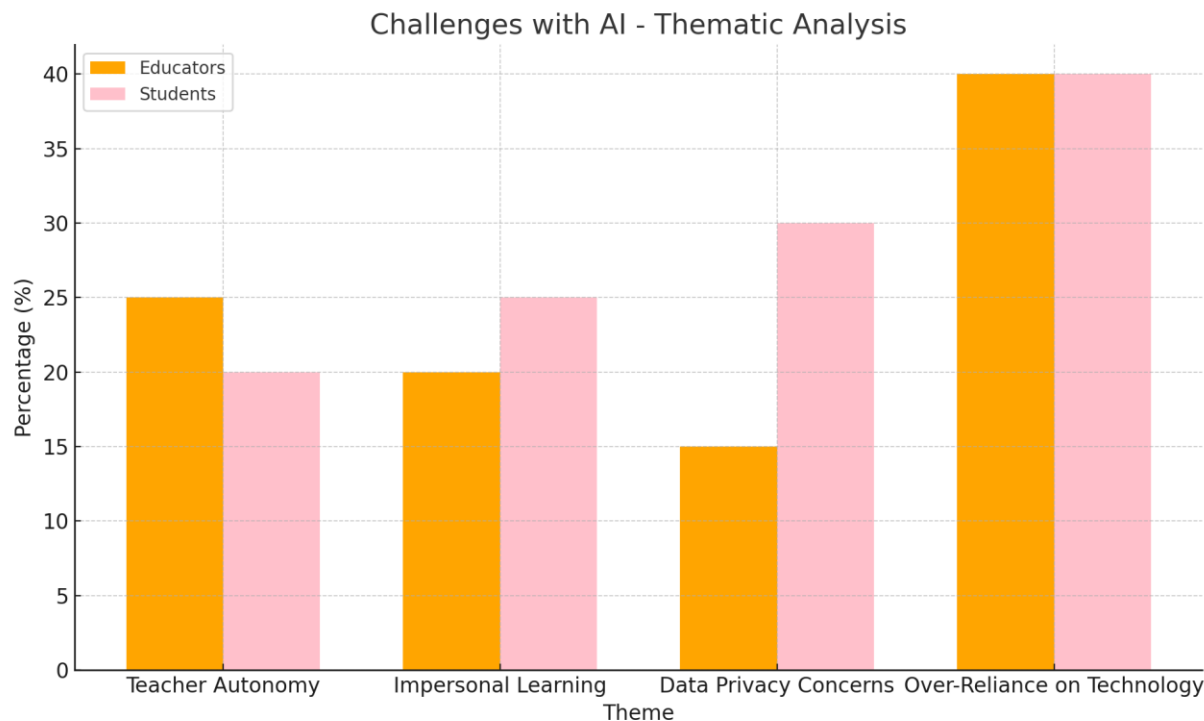
4.7 Challenges with AI
However, incorporating AI in learning is not without its drawbacks. Table 7 focuses on the important issues, and the most popular of which is the Over-Reliance on Technology stated by 40% of the educators and 42% of the students. Figure 7 builds on these responses in a stacked bar chart, revealing that both groups have fears in an overreliance on AI at the detriment of human-mediated interaction.

Table 7. Challenges with AI - Thematic Analysis (Educators and Students)

Theme	Percentage of Educators Mentioning (%)	Percentage of Students Mentioning (%)
Teacher Autonomy	25	20
Impersonal Learning	20	25

Data Privacy Concerns	15	30
Over-Reliance on Technology	40	40

Figure 7. Challenges with AI

Other concerns that were raised include teacher and learner attributes like Teacher Autonomy and Impersonal Learning and were especially highlighted by the educators. Based on the thematic analysis, there is appreciation of efficiency that AI brings about with apprehension towards its impacts such that it means less importance to teachers and absence of touch in teaching and learning environment. This finding concurs with studies concerning the effects of deskilling teachers (as cited in Selwyn, 2019).
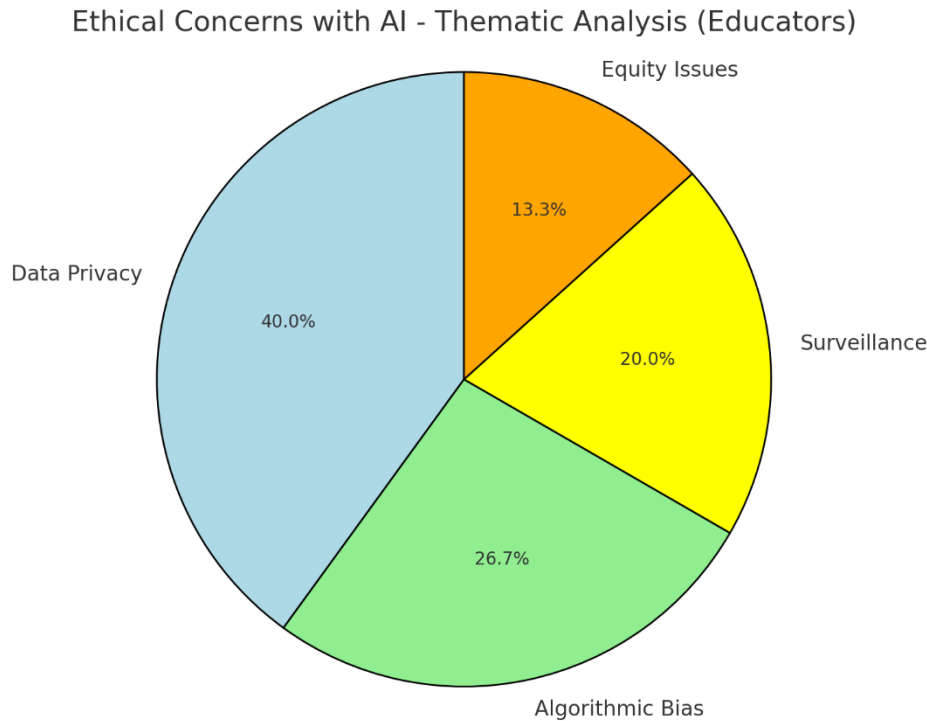
4.8 Ethical Concerns with AI
AI is important as it raises several ethical questions ranging from Data Privacy and Algorithmic Bias among others. Finally, regarding the social protection concerns, 30% of educators and 40% of students pointed out data and information protection. The doughnut chart in Figure 8 below also provides a clear depiction of these concerns.
Table 8. Ethical Concerns with AI - Thematic Analysis (Educators and Students)

Theme	Percentage of Educators Mentioning (%)	Percentage of Students Mentioning (%)
Data Privacy	30	40

Algorithmic Bias	20	30
Surveillance	15	25
Equity Issues	10	20

Figure 8. Ethical Concerns with AI

Although both groups agree that AI can help create a positive impact and learning portals in the educational system, there are concerns about surveillance and the bias in algorithms. This brings the argument to focus on the need for policies and ethical principles that could guide the use of such gadgets in a responsible manner as put forward in the literature on the ethics of AI in learning (Williamson &Baumberger, 2019).

In conclusion, the study indicates that AI has a positive effect on personalization, learning, student engagement/involvement and active learning. Nevertheless, issues such as teacher's independence, privacy of data, and moral issues must be considered to avoid misuse and malfunctions of AI in education. The results obtained from both educators and students are informative in understanding the reality and the possibilities that are offered by AI in the education process, as well as the gaps that should be addressed in the future.

5. Discussion

The findings of this study are significant in understanding the effects of AI to enhance classroom instruction more so by considering certain aspects of its challenges in improving pedagogy and engagement. Based on the analysis of quantitative data together with the qualitative responses from educators and students, this research discusses the effectiveness of incorporating AI in education and the drawbacks of its usage in the learning process. The discussion will further discuss

these results in light of literature and analyse the future of education based on such insights.

5.1 The Role of AI in Enhancing Personalized Learning

One of the dominant benefits of using AI in the educational setting is the possibility of Personalized learning. As shown in Table 1 and Figure 1, educators and students endorse the view that students can benefit from incorporating AI into their learning process. Educators are even more likely to state that AI is effective at promoting personalized learning than students are, which could imply that educators are more familiar with the capacity of AI systems to tailor educational content based on the learner's needs. Teaching with the involvement of AI in the process helps to approach the task individually to each learner and use materials that are interesting and comprehensible for each of them. According to Luckin et al. (2016), AI makes it possible to provide content which is adaptation with the student and his/her learning deficiencies: an environment that is more open and interacts.

In addition, there are adaptive learning technologies and intelligent tutoring systems that have been very effective in facilitating learning to an extent of improving on the performance of the students. They not only meet the current needs of the students but also accumulate information that enables them to offer solutions in the future to problems that students may encounter. The positive attitude towards personalized learning evidenced in this study is in concordance with past studies that claim that learners who undertake personalized learning have better performance and satisfaction than others (Siemens, 2013). However, the difference in findings could also be due to the difference in perceptions where educators see ecstatic values such as AI changing the mode of delivery of education by making it more personalized, while students do not seem to see such a big picture.

5.2 AI's Impact on Student Engagement

The last area that the user states has been positively influenced by the introduction of AI in student engagement includes learning outcomes. AI was rated slightly higher for engagement enhancement by the students as compared to educators implying that students can be more sensitive to some of the characteristics like interactivity, game-based ideas and personalization offered by AI tools. The learner engagement of AI-integrated tools including feedback provision, gamification, and interactive learning environments have been proven to be effective at improving learners' engagement. These tools involve the learners, promote quick problem solving, and enable them to directly engage with learning material facts which enhances learning activities (Zawacki-Richter et al., 2019).

The conclusions drawn from the study also agree with the idea that the immediate feedback offered by AI helps enhance motivation and engagement from the learners. In addition to providing positive feedback, reinforcing, consistent feedback also enables the student to correct misconceptions or mistakes immediately (Baker et al., 2018). Also, the issue of individual learning paths with the help of AI was pointed out as an advantage by students, who said that they prefer to study at their own pace. This is in concordance with the assertion that engagement is proportional to perceived control and/or autonomy, as espoused by Baker (2016). However, there are still some drawbacks of using the given ideas, namely, the tendencies connected with AI usage might reduce the opportunity to have face-to-face communication between students and teachers and make learning more secluded.

5.3 The Role of AI in Administrative Efficiency

Table 3 and Figure 3 indicate perceived advantages of AI, with educators noting that AI's ability to help in performing various admin tasks is an efficient benefit. All the educators noted that AI tools save time in tasks like grading, scheduling and answering student questions among others. This finding supports the rationale put forth in current literature of enhancing functioning in educational organisations through occupation of the promising technology of AI in managing most of the administrative roles and responsibilities (Williamson &Piattoeva, 2020). Thus, they set more time on teaching and learning rather than concentrating on mundane practices on a regular basis.

Students' responses, with the mean score of 3.9, however, were much less affirmative and less strong in the expression of feelings. By and large, students may not recognize these administrative advantages of using AI as part of their learning experience. The perceived benefits are most probably to be realised by the educators who will be relieved of a portion of their workload due to embracing technology in their teaching career. However, the burden which is placed on the teachers may, in the long run, influence students' experience insofar as it enhances the quality of the teaching and learning processes (Fletcher, 2018). Thus, administration's improvement could be seen as one of the primary utilizations of AI as it does not

affect the quality of learning while positively influencing the teaching process.

5.4 Active Learning and AI Integration

The application of active learning using AI was also investigated in the present study. Regarding AI's roles in creating an active learning environment, educators and students also had positive impressions, as depicted in Table 4 and Figure 4. Educators gave a slightly higher score (mean score of 4.4) for this aspect, which may be because they understood that the incorporation of AI will radically disrupt a traditional approach to teaching as a passive process. Due to the interactive aspect with the content as well as the capability of the AI to stimulate the engagement in problem solving and provide feedback in real time, this content makes use of active learning, which is considered more effective in terms of knowledge retention and knowledge acquisition than the traditional learning (Gee, 2003).

In addition, the computer based technologies like virtual labs, simulations, and interactive learning are becoming more popular in classrooms so the students can learn practically in a complex manner without having to be physically restricted within the classroom. This is in support of Siemens (2013)'s argument that active learning facilitated by AI earns learners more meaningful interactions. However, it has been noted that while the technology has its advantages, there is a tendency of students to rely more on the tools rather than face-to-face communication, thus depriving them a chance for interactive learning from others. Selwyn (2019) also notes that active learning should be the combination of affording technologies and rich inter-personal experiences for social and personal cognition.

5.5 Ethical Concerns and Data Privacy

This interaction raises important ethical concerns that arise from applying AI in education as is evident from the thematic analysis presented in Table 8 and Figure 8. All participants, including educators and students, shared a lot of concern with regards to data privacy issues, algorithms, and surveillance. Data privacy was identified as the most important ethical issue by the educators, as stated by 30 participants, while more students, 8 of them, described it as an issue. This is in concordance with the emerging literature on the negative impacts of the usage of AI technologies for data gathering and processing of students' sensitive information. Another key concern surrounding AI is that of ethics, especially regarding data capture of students' conduct, performance, and other personal data (Eubanks, 2018).

Algorithmic bias was another theme that both groups expressed concerns about; AI and another about the fairness of the algorithm used in the education system and the student surveillance. These concerns are underpinned by previous studies on the dangers of perpetuating inequality in learners' achievements by developing biased algorithms (Williamson &Piattoeva, 2020). AI in education must be deployed ethically by using transparent algorithms, good data management practices, and by making sure that AI is used proportionately in doing so. While AI plays an increasing role in decision making and educational paradigms, it is imperative that colleges and universities adopt fair and acceptable policies to protect the information of the learners.

5.6 Implications for Future Research and Practice

The implications of the results of this study are important for the further inclusion of AI into educational contexts. Despite the findings that suggested that AI can improve the efficiency and effectiveness of personalized learning, increase learners' engagement and help with administrative tasks, there are rather significant concerns about teachers' control over the process, ethical issues, and over-technology. Therefore, future research should be directed toward identifying the ways to work through these issues and find out whether and how it is possible to integrate the benefits of artificial intelligence usage with the concerns about people's social interactions, ethical factors, and the roles of teachers in the classroom.

However, there are arguments that more research could be carried out to analyse the effects of AI in the long term on students especially in relation to critical thinking, creativity and interpersonal skills that cannot still be quantified by AI. Future studies should also investigate the applicability of the AI tools in various settings, specifically in less well-equipped schools so that all students may benefit from such solutions.

5.7 Conclusion

Therefore, this research underscores the extensive application of AI interventions in education to improve teaching and learning approaches and encourage student participation and engagement, as well as enhance other practical aspects of education management. It also raises questions about appropriate use of such information, for instance, data privacy,

algorithmic impartiality, and teacher independence. Thus, the incorporation of AI into education should be done responsibly and with proper consideration in order to gain the maximum impact of its positive attributes without experiencing the drawbacks that come with it. When it is properly introduced and effectively integrated, and when its strengths are recognised and its drawbacks duly considered, artificial intelligence will be a force for positive change in the field of education.

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