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EFFECT OF STUDENTS' OPINION ON THE CHANGES CAUSED BY THE INTEGRATION OF AI IN SCIENCE EDUCATION AND THE CHALLENGES FACED

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Abstract
The study investigated the effects of students' opinions on the changes caused by the integration of AI in science education and the challenges faced. The study's population included participants in the Federal College of Education (Special), Oyo State, comprising science students, sampled using proportionate stratified random sampling. From seven departments in the School of Secondary Education (Science Programs), Federal College of Education (Special), twenty-one (21) students each were chosen at random, giving a total sample size of one hundred and forty-seven (147) respondents. The instrument used for data collection was a well-designed questionnaire. Data gathered on demographic information was analyzed using descriptive statistics such as frequency counts and simple percentages. At the same time, the hypothesis was tested using Pearson's product Moment Correlation (PPMC) at a 0.05 level of significance (p>0.05). The result from the analysis of the first hypothesis shows that there is a significant relationship between the use of artificial intelligence as a science education tool and students' opinions about changes brought about by the integration of AI in science education, as indicated by Pearson's Correlation r = 0.258 computed for a significant relationship with p-value = 0.002, which is less than the Alpha level of 0.05. Furthermore, the examination of the second hypothesis revealed that Pearson's Correlation, r = 0.236, calculated a significant relationship between student's perceptions of changes brought about by the integration of AI in science education and difficulties encountered during implementation, with a p-value of 0.004, below the alpha threshold of 0.05. This suggests that there is a significant relationship between student's perceptions of changes brought about by the integration of AI in science education and difficulties encountered during implementation. The incorporation of artificial intelligence into science education and its application are greatly influenced by the opinions of the students. Students' attitudes and interest in artificial intelligence may also be impacted by the difficulties in integrating AI into science instruction. Encouragement of the use of AI in instruction, activities, learning contracts, and other educational experiences is advised when it comes to the teaching-learning process. Policymakers and educators alike ought to make greater investments in AI, respond to students' worries about it, and motivate them to get the most out of integrating AI.

Introduction
In a short period, artificial intelligence (AI) has proven to be a game-changer in several sectors, including education. A wide range of facets of human existence have been impacted by the numerous innovations and advancements brought about by the development of AI. AI development has been extremely beneficial to education, which is essential to the advancement of society and individual development. The way teachers teach, how students learn, and how institutions operate are all changing as a result of AI's integration into educational systems. AI is

transforming education, closing gaps, and promoting a more inclusive and productive learning environment through giving immediate feedback, automating administrative chores, and customizing learning experiences. It is necessary to consider the ramifications of incorporating AI in education given its significance. The current state of society is increasingly headed towards a widespread modernization process in all spheres (political, economic, educational, social, etc.). A range of technologies that enable communication with the user, known as "virtual assistants," have been developed as a result of this trend of adapting to new technological interaction communities. These technologies use computer algorithms to mimic human intelligence, giving users the impression that they are interacting with a real person. The term "artificial intelligence" (AI) refers to this idea (Ocaña, Valenzuela, & Garro, 2019; Yang, Zhuang, & Pan, 2021).

AI has gathered important attention in educational settings due to the increased opportunities for communication that arise between educators and students when utilizing virtual information assistants. This is because the tool's response simulates a human conversation, and as it is used, the user becomes accustomed to and recognizes the interaction on an intuitive level. Nevertheless, in the current global environment of the technological revolution, certain human attributes like creativity, the capacity to generate original ideas, improvise, and constant evolution cannot yet be replicated by AI. The literature on AI in instruction has expanded as a result of the growing demand for education in recent years. This has given rise to a booming new field of research that blends AI and education. Additionally, and to update this terminology, educational artificial intelligence is associated with various fields, including robotics (Jawaid et al., 2020), smart device applications (Petko, Schmid, Müller, & Hielscher, 2019), electronic devices (Pyörälä et al., 2019), e-learning (Reister & Blanchard, 2020; Singer-Brodowski, Brock, Etzkorn, & Otte, 2019), or virtual (VR) and augmented reality (AR) (Bower, Dewitt, & Lai, 2020; Kavanagh, Luxton-Reilly, Wuensche, & Plimmer, 2017), Virtual assistants (Jee, 2019), intelligent conversational software agents (chatbots) (Schachner, Keller, & Wangenheim, 2020), and self-learning online platforms (Moreno, 2019). Considering all the above, this study targets an empirical analysis of the effects of students' opinions on the changes caused by the integration of AI in science education and the challenges faced.

Statement of the Problem

The incorporation of Artificial Intelligence (AI) in science education has resulted in significant changes to the learning environment. One critical aspect that must be investigated is the influence of students' opinions on these changes. Understanding how students perceive and interact with AI technology in science education is essential for educators and policymakers to effectively implement AI tools in the classroom. Additionally, it is essential to ascertain and address the challenges that arise from integrating AI into science education, as these obstacles can hinder the successful adoption of this technology.

Aim and Objectives of the Study

This study aims to evaluate the effects of students' opinions on the changes caused by the integration of AI in science education and the challenges faced.

Objectives:

1. To evaluate the relationship between relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education.

2. To evaluate the relationship between students' opinions about changes caused by the integration of AI in science education and challenges faced when implementing AI in Science Education

Hypothesis

$H0_1$: There is no significant relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education.

$H0_2$: There is no significant relationship between students' opinions about changes caused by the integration of AI in science education and challenges faced when implementing AI in Science Education

Purpose of the Study

This study's main goal is to examine how student opinions impact and shape the use of AI in science teaching. Through investigating students' viewpoints, dispositions, and encounters with AI technology, this study seeks to pinpoint possible avenues for enhancement in the efficient integration of AI instruments in scientific learning environments. Additionally, the study aims to give policymakers and educators advice on how to best handle student concerns and optimize the advantages of AI integration.

Research Methodology / Design

This study used a descriptive cross-sectional survey research approach to collect information on the use of AI in science education today and how it affects students' academic performance across departments and levels. Twenty-one (21) students each were randomly selected from seven departments in the School of Secondary Education (Science Programmes), Federal College of Education (Special), giving a total of one hundred and forty-seven. Proportionate stratified random sampling was used for the selection of departments to ensure proportional representation from each department and level. The seven departments include biology, chemistry, computer science, integrated science, mathematics, physics, and physical health education (PHE). A structured questionnaire was used to analyze respondents' demographic data, including age, gender, and year of study. The questionnaire was constructed using insights from previous studies and is specifically designed to investigate the correlation between students' academic performance and their engagement with artificial intelligence in science education. The measurement instrument comprised a scale of 25 items, employing a 4-point Likert scale. The available response options on this scale encompassed a variety of opinions, starting with "strongly disagree" (1) and extending to "Strongly agree" (4). The content validation of the questionnaire was done by experts in both artificial intelligence and educational research fields to ensure its relevance and reliability for measuring the intended constructs accurately.

Data Analysis

Data collected from the questionnaires will be analyzed using statistical methods such as descriptive statistics to ascertain and summarize the demographic profile of the respondents. The statistical metric used to assess the direct relationship between two variables evaluated on an interval or ratio scale is the Pearson correlation coefficient, denoted by the symbol r. It ranges from -1 to 1, indicating the strength and trend of the link.

Results and Discussion

The results of the data analysis are presented in the following tables:

Analysis of Data and Presentation of Results

Frequency Distribution of the Demographic Data of Respondents

Table 1: Respondents' Demographic Data (n = 147)

Demographic Variables	Frequency (F)	Percentage (%)
Age (Years)		
Under 16 years	27	18
16 – 20 years	82	56
Above 20 years	38	26
Total	**147**	**100**
Gender		
Male	67	46
Female	80	54
Total	**147**	**100**

Source: Fieldwork, 2024

Table 1 shows that 27(18%) of the respondents are below 16 years old, 82(56%) of the respondents are within 16-20 years, and 38(26%) of the respondents are above 20 years old. Furthermore, 67(46%) of the respondents are male while 80(54%) are females. This shows that there are more female respondents than males.

Test of Hypothesis

$H_0$1: There is no significant relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education.

Table 2: Correlation Analysis Showing a Significant Relationship Between the use of Artificial Intelligence as a Science Education Tool and Students' Opinions about Changes Caused by the Integration of AI in Science Education

		Integration of AI in science education.	Students' opinions about changes caused by the integration of AI in science education.
Integration of AI in science education.	Pearson Correlation	1	0.258**
	Sig. (2-tailed)		0.002
	N	147	147
Students' opinions about changes caused by the integration of AI in science education.	Pearson Correlation	0.258**	1
	Sig. (2-tailed)	0.002	
	N	147	147

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Fieldwork, 2024

The relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education is perfectly positive as indicated in Table 2 above, showing a +1 Pearson Correlation each. This means that if

we correlate each variable with itself i.e. correlating either the use of artificial intelligence as a science education tool with the use of artificial intelligence as a science education tool. or correlating students' opinions about changes caused by the integration of AI in science education and students' opinions about changes caused by the integration of AI in science education, it will give a perfect positive correlation. The action correlation coefficient *(r)* as indicated in the table is 0.258 shows the strength of the linear relationship between the variables. In this case, it is a weak positive correlation since it falls between 0.4-0.2. Also, from the table, the significant p-value is 0.002, which is less than the Alpha level of 0,05, therefore the hypothesis that states "there is no significant relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education" is hereby rejected. This confirms that there is a significant relationship between the use of artificial intelligence as a science education tool and students' opinions about changes caused by the integration of AI in science education.

$H0_2$: There is no significant relationship between students' opinions about changes caused by the integration of AI in science education and challenges faced when implementing AI in Science Education

Table 3: Correlation Analysis Showing a Significant Relationship Between Students' Opinions about Changes Caused by the Integration of AI in Science Education and Challenges faced when implementing AI in Science Education.

		Students' opinions about changes caused by the integration of AI in science education.	Challenges faced when implementing AI in Science Education
Students' opinions about changes caused by the integration of AI in science education.	Pearson Correlation	1	0.236**
	Sig. (2-tailed)		0.004
	N	147	147
Challenges faced when implementing AI in Science Education	Pearson Correlation	0.236**	1
	Sig. (2-tailed)	0.004	
	N	147	147

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Fieldwork, 2024

The relationship between students' opinions about changes caused by the integration of AI in science education and challenges faced when implementing AI in Science Education is perfectly positive as indicated in Table 3 above, showing a +1 Pearson Correlation each. This means that if we correlate each variable with itself i.e. correlating students' opinions about changes caused by the integration of AI in science education with students' opinions about changes caused by the integration of AI in science education or correlating challenges faced when implementing AI in Science Education with challenges faced when implementing AI in Science Education, it will give a perfect positive correlation. The action correlation coefficient *(r)* as indicated in the table

is 0.236 shows the strength of the linear relationship between the variables. In this case, it is a weak positive correlation since it falls between 0.4-0.2. Also, from the table, the significant p-value is 0.004, which is less than the Alpha level of 0.05, therefore the hypothesis that states "there is no significant relationship between students' opinions about changes caused by the integration of AI in science education and challenges faced when implementing AI in Science Education" is hereby rejected. This confirms that there is a significant relationship between students' opinions about changes caused by the integration of AI in science education and the challenges faced when implementing AI in Science Education.

Conclusion

With the result, it is concluded that students' opinions about the use of artificial intelligence have a significant role to play in its integration into science education or the use of artificial intelligence. Also, the challenges of implementing AI in science education are another factor that can affect students' opinions or cause them to lose interest in artificial intelligence.

Recommendation

Based on the findings, it is recommended that the use of AI in the teaching-learning process should be encouraged, whether in instruction, activities, learning contracts, or other educational experiences. Both educators and policymakers should invest more in artificial intelligence and address students' concerns about artificial intelligence, encouraging them to maximize the benefits of AI integration.

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