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Application of Artificial Intelligence (AI) in Education and Educational Assessment

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Abstract

This paper examined the application of artificial intelligence (AI) in education and educational assessment. The delivery of education goods is mostly centered around evaluation and assessment of students work as well as teachers and school administrators service delivery in the school system which has warranted this conceptual overview on the subject matter. The paper started with a critical conceptual overview of the major concepts being artificial intelligence and educational assessment. This paper promptly overviewed some of the types of educational assessment as well as the advantages and disadvantages of educational assessment. Also reviewed in this paper were the purposes of educational assessment as well as artificial intelligence in educational assessment, the paper also viewed some artificial intelligence tools. The paper concluded with the suggestion that, the application of artificial intelligence in educational assessment should be encouraged by the government and educational managers to engender academic development.

Keywords: Artificial intelligence, Education, Educational assessment, Formative assessment, Ipsative assessment, Diagnostic assessment.

Introduction

The value of education in every society stands taller than any other sector across the globe, this is because, the excellence of other sectors solely depends on the education sector, this is why it is widely said, “no nation can grow above its education sector”. This is why the overall development of education is of great and general concern to education stakeholders, in the respect, frantic efforts have been made by the stakeholders to rescue education from imminent collapse, one of such efforts is the integration of artificial intelligence into educational practices generally which to some extent have made tremendous impacts towards the development of education in that regards. Artificial intelligence is viewed across multiple sectors, particularly, in the area of educational development, the writer is mostly concerned with the application of artificial intelligence in education and educational assessment.

The paper poised is to review credible literatures on artificial intelligence and educational assessment, relevant literatures on the subject matter as it relates to the major and minor variables were reviewed, prominent among them were some examples of artificial intelligence technology as well as some advantages and disadvantages of AI.

In the area of educational assessment, some of the types of educational assessment, purpose of educational assessment as well as the nexus and exploits of the integration of artificial intelligence and educational assessment form the major highlights of this paper, and was closely followed by conclusion and suggestions.

Conceptual Overview of Artificial Intelligence (AI)

The exigencies and complexities of human existence have necessitated humans to devise several credible and acceptable means of making life more meaningful which has heralded the array of challenges human beings go through on a daily basis. However, as a higher animal, humans are expected to navigate their way through any stringent situation using experience, sharpness and foresightedness which are all attributes on intelligence. Therefore, intelligence is the ability to learn, understand and apply such knowledge to manipulate one's environment to his or her advantage (Marriam Webster 2022). Consequently, Robinson and Davidson, (2006) describe intelligence as the ability of someone to show a highly developed experience gathering, knowledge acquisitions, cognate understanding of issues, reasoning, imagination and sense of judgment that is capable of unbiased delivery of dispute resolution mechanism.

On the strength of the above and in line with growing global demand for productivity enhancement, hence the need to create something unnatural that has the ability to imitate humans in all aspects of human endeavor, not as a replacement of humans but as an assistant and support giver to human efforts. This is said of artificial human creations that are capable of standing in for humans in case of tiredness, fatigue and most importantly, for optimal output. The phrase artificial intelligence is a combination of two words namely: "artificial and intelligence" whose conceptual overview have been explained earlier.

It is widely considered to be the smartness or cleverness of humans to catalyze or bring to existence certain devices and softwares that can help or assist human efforts, such devices like motor, computer, electronics, telephones are human creations that are not humans but helps to make life easy and bearable for human beings. Thus, Nwankwo (2007) defined artificial intelligence as the development of human friendly devices and effective usage of such devices like computer systems, telephones, software etc that performs and or executes such functions

usually performed by human beings using smart and intelligence approach. In a related development, Marriam Webster Dictionary sees artificial intelligence as ability of machine(s) to imitate intelligent human behavior. The emphasis according to the positions of the above authors on artificial intelligence explains the invention of a device or some devices that are sensitive enough to complement human efforts intelligently.

An historical perspective of artificial intelligence was drawn to mean an animated object endowed with intelligence existed since the ancient times and was used by the Greek god Hephaestus, the animated objects was like a robot whose duty at the time was to serve the Greek God. The trend continued until the late 19th century up to the early 20th century when computer emerged in 1836 by the Cambridge university mathematician, Charles Babbage and Augusta Ada King. This gave rise to several versions of computer productions till date (Burns 2023). In specific terms, Burns identified artificial intelligence as the stimulation of human intelligence processes by machines such as computers. Premised on the above, the author mentioned some examples of artificial intelligence technology as,

- i. Automation
- ii. Machine learning
- iii. Machine version
- iv. Natural Language Processing
- v. Robotics (vi) Self driving cars
- vi. Text, image and
- vii. Language audio generation.

It was also advanced that artificial intelligence is important because it has the potentials to change our general lifestyle, work life and play life because it is used to automate tasks done by humans. Also identified where some of the advantages of artificial intelligence which included,

- a) Good and detailed oriented jobs
- b) Reduced time for data heavy task
- c) Saves labour and increases productivity
- d) Delivers consistent results
- e) It improves customer satisfaction through personalization
- f) AI powered agent are always available.

While some of the disadvantage of AI include,

- a) Expensive
- b) It requires deep technical expertise
- c) Limited supply of qualified workers to build AI tools
- d) Reflect the biases of its training data
- e) Lack of ability to generalize from one task to another
- f) Eliminates human jobs, increasing unemployment rate.

Concept of Educational Assessment

The term educational assessment is a terminology commonly used in the education profession to evaluate and analyses the performance of both students, academic and non-academics staff in the school systems. It is a systematic process of documenting and using empirical data to estimate or ascertain the performance level of individuals in the school systems. Pigott and polanin (2020) asserts that, educational assessments can be seen as any effort to gather systematic evidence that will enhance the attainment of learning goals and objectives, either at the level of individual student or at the level of larger organization. The definition above on educational assessment insist that, every organization, including the schools have their primary goals and objectives to achieve within a stipulated time fame, here, the need for assessment becomes imminent in other to ascertain that, educational goals are achieved.

In most of the cases, whenever educational assessment is mentioned, what runs through the mind of most person's is either assessment through examinations or test. However, assessment is far from just test, and examinations, it is a holistic approach that involves the documentation of knowledge, skills, attitudes and beliefs that can be measured. Against this background, Mishra, (2022) opined that, educational assessment is the process of gathering information about what students have learned in their educational environments. Mishra further asserts that, educational assessments is an ongoing process, ranging from the activities that teachers undertake with students in class every day to standardized testing, collage theses and instrument that measure the success of collage training programmes. Further understanding of the conceptual overview of educational assessments is hinged on the facts that, educational assessments is not based in exams and test alone, it involves all the activities of the teacher both within and outside the classroom as long as teachers and students are involved. Educational assessments also involves a careful and systematic gathering of necessary data about all that

the students have learned in their educational environment, with a view of making an informed judgment that is capable of suggesting a particular area or direction that requires improvement.

Types of Educational Assessment

Nevertheless, engaging in a review of this sort without identifying some of the types of educational assessments may render the work incomplete, on this premise, Formplus, (2023), have identified about nine types of educational assessments which includes:

1. Alternative assessments
2. Authentic assessments
3. Summative assessment
4. Formative assessment
5. High stakes assessments
6. Pre-assessments
7. Performance assessment
8. Portfolio based assessment
9. Diagnostic assessments

Alternative Assessments

This type of assessments involves evaluating student's ability based on their newly acquired skills to execute task or handle educational problems. It is different from the traditional assessments methods because it is programed to handle individual student's needs. Alternative assessments methods enable the instructor to have a complete insight of the students' level of assimilation because of the complex task given to them by the teacher. This type of assessments encourages deeper learning and understanding, it develops deeper thinking and problem-solving skills, foster creativity and innovation and also reduce test anxiety and stress.

Authentic Evaluation

The authentic assessments method is geared towards training students to use their acquired skills from the school to solve real life situations. This further explains, just like every human being, students also face some real-life challenges, however, the authentic assessments model is aimed at training students with the right aptitude that is capable of sowing real-life tasks, requiring students to apply their knowledge, skills and critical thinking abilities and complete tasks that are relevant and meaningful outside the classroom. Authentic assessments prepare students for challenges outside the class, develops them to acquire critical thinking, problem

solving and collaborative skills, increase student's engagement and innovative skills, encourage deeper understanding and application of knowledge.

By using authentic assessments methods, educational instructors can create better learning experiences that could be more useful and engaging, which could also serve as effective tools for preparing students for success in their future endeavors both within and outside the classroom.

Diagnostics Assessment

As posited by Education Advice, (2024) and Miles (2022), diagnostic assessment is that assessments that takes place before any learning activity takes place. This assessment informs the teacher of their previous knowledge of the learner and prepares and equips him for any challenge ahead. This is done by presenting a set of written or oral questions to the students that are capable of eliciting responses from the student's education, Advice identified some of the tools for this kind of assessment, they include, journals, quiz, tests, conference, interview, posters, performance tasks, students survey etc. it helps to identify student's strength, opportunities, weakness, treats, knowledge gaps and learning needs. It is used to determine students' prior knowledge, inform the instruction gaps and monitor progress.

Diagnostics instructions is relevant because it's aims to tailor instructions to meet individuals needs and set realistic goals targets, it is also aimed at developing targeted instructions, interventions and supports that will enhance the monitoring of students, progress and adjust instructions that is capable of enhancing students learning outcomes.

Formative Assessment

Students learning and instructions cannot be complete without formative assessment, it is the kind of assessment that takes place while the process of teaching and learning is taking place. During this process, questions are asked by both the teacher and the learners and answers are given to the questions asked, informing them of areas of lack and requires better attention, the teacher advances further to apply techniques in his assessments model in other to get the best out of the students. This type of assessments also monitors students' progress, identify areas of improvement, inform instruction as well as enable teachers to adjust teaching strategies and methods.

The use of formative assessment enables teachers to refine their teaching strategies, provide timely feedback and support, encourage student reflection, assessments as well as infuse growth mindset and continuous learning attitude.

Some of the identified examples of formative assessment include, students peer conference or one on one meeting within themselves and with their teacher, class discussion, impromptu test, assignments, observation and correction of students behavior etc.

Summative Assessments

As the names implies, summative assessments is the evaluation of the sum total of learning outcomes of students and their academic accomplishments at the end of a particular educational programme, summative assessment happens after learning activity, at this point, the teacher sums up all the assessments that have occurred within a giving period. It also evaluates students' performance, measure student's achievement, determines students grades and levels as well as certify mastery. Other areas of concern are, summative assessment determines student's readiness or advancement identify areas for curriculum improvement, provide accountability and transparency and encourage competence in students

Ipsative assessment

Another notable assessment is the ipsative assessment, the functionality of the ipsative assessment is the comparison of one's previous results, the essence of which serve as a great motivator to enable one to try harder in order to do better than one's previous attempts, this will make students set goals and targets for themselves that is aimed at improving their intellect and skills. It also helps student learn from their previous mistakes which encourages them to do better. It measures progress, growth and improvement over time. This type of assessment is mostly exemplified by i, personal learning plans, ii, self-assessment iii, rubrics learning journal, iv, progress portfolios, v, individual goals setting.

Confirmative assessment

The name confirmative means re-examining a particular process or training in order to determine if its efficiency is capable of meeting up expectations to a large extent, it is an advanced summative assessment. This type of assessment seeks to know if students' performance has improved or not, as it relates to students acquiring the expected knowledge and skills.

Specifically, confirmative assessment is used to verify learning outcomes, certify competence, accountability and programme evaluation, some of the areas where confirmative assessment are mostly used are examination results and tests and assessments, seminar presentations, practical, projects, theses and dissertations, professional certifications etc. The objective of the confirmative assessment is to confirm if students have met the expected standards/outcomes or not.

Self-Assessment

This type of assessment enhances the students to self-evaluate themselves with a view of assessing their abilities, capabilities, strengths and weaknesses and consequently making efforts to improve on the identified weakness to enable them accomplish their academic goals successfully.

Self-assessment involves goal setting for oneself and establishing personal objectives and targets, encouraging self-directed learning and taking ownership of learning, improved self-awareness and being conscious of your environment and peculiarities, reflection on previous studies as well as self-evaluation of past questionnaires etc. this approach of self-assessment enables the student to take control and be in charge of their studies, giving them the opportunities to easily identify their areas of weakness and improving on them swiftly (Smowltech, 2024).

Purpose of Educational Assessment

As a process of evaluating the progress made by students during and within the period of their learning while in school, and achievements made in the educational setting, educational assessment has a number of purposes which include:

- i. To provide evidence and confirmation of programme outcomes
- ii. To identify learner engagement that delivery is hitting the marks, highlight potential issues and mitigate the risk of disengagement.
- iii. To identify baseline skills and the level of competencies across these learners, gain can be measured.
- iv. To ensure applicants can accommodate programme demands (FutureLearn, nd).

Dappa, (2018) opined that, some of the purposes of assessment are:

- a. **Assessment to improves learning:** Learning outcomes are being improved because there is assessment and evaluation that always reveals performance of students

to them, giving them the opportunity and space to put in more effort to improve on their previous learning outcomes.

b. Informing instructions: Assessment of students work and performance informs teachers of the next discussion they are to take in the areas of teaching. It guides instructors on when and how to adjust the curriculum as well as how to improve on their instruction pattern.

c. Students placement and promotion: The only and surest means of determining students' performance that guarantees their placement to the next level is assessment. It set up criteria and grading modalities as well as standards set for upgrading, placement and promotion and all these processes are made possible through assessment.

d. Enhancing student's motivation: the very outcomes of assessment are heavy source of motivations to students. This is so because, when students see their performance after assessment and saw that it was good, it spurs them to do more in order to improve on the present standard. Similarly, promotion and placement of students is a huge source of motivation which results in self-directed and informed learning.

e. Supporting student's self-assessment: This is another important purpose of assessment, it is to enable students develop the ability to assess their performance by themselves through self-reflection, this enhances personal growth.

f. Certification and accountability: Assessment confirms the student's competencies and subsequent recommendations for a deserving placement which is being represented by certification which serves as statement of accountability and a testimonial that will speak for the students in their absence.

g. Identifying areas for improvement: Assessment is directly purposed to identifying areas of improvement, it is like a fact-finding mission, and assessment identifies certain areas of improvement like identifying knowledge gap, skill deficiencies areas needing additional support and so on. All these are areas that assessment seeks to improve.

h. Evaluate student's achievements: Students achievement is key to the educational system and one best way the educational system can evaluate student's achievement is through assessment. Through assessment in the school can measure students' progress, level of achievement and mastery of learning objectives

Artificial Intelligence in educational assessment

The introduction of artificial intelligence (Ai) into the school system is a credible intervention towards educational development in the areas of assessment and pedagogical advancement, students and teachers have also benefitted immensely from this development. As argued by Bassy (2024), AI offers enormous benefits to students and teachers by facilitating personalized learning, with the aid of the introduction of artificial intelligence. Students can be able to personalize and customize their learning process, it has enabled students to learn on their own with little or no aid from the teacher, students can be able to use the internet system to source for any material of their choice that are capable of solving whatever problems they may wish to solve. Some of the artificial intelligence tools frequently used by students include but not limited to the following,

1. **Virtual assistants** that is a software programme that uses artificial intelligence to perform tasks, provide information and assists with various activities, it can perform a wide range of functions including schedule of appointments and calendar management, sending and receiving messages, emails, notifications etc, personalized videos, conference video and audio calls, setting reminders and alarms, translating languages as well as generating texts and materials. These are made possible through the effective use of Amazon Alexa, Google Assistance, Apple Siri, Microsoft Cortana, Facebook Portal etc.

2. **Content generation**, this is the process of creating and producing content like audio, text, images and videos using various AI tools, techniques and technologies to create contents writing where human writers create original content like blogs, posts, articles, websites copy etc. These are very important Ai tools usually used by students for educating and training themselves, it also enables them develop effective communication and public relation skills. It's constant usage increases efficacy and productivity, improve consistency, accuracy and quality as well as invoke data driven insights and effective decision-making ability.

3. **Image and video analysis** represents the process of extracting information, meaning and insights from visual data like images and videos which are transmitted through social media and online platforms. However, some of the benefits include, enhanced accuracy and precision. improved efficiency and productivity as well as better decision making and insights. Even though time and space may not allow the writer to mention all the numerous AI tools as new ones are developed on a daily and weekly basis, it is official that the application of artificial intelligence engenders instant feedbacks by answering nearly all the unanswered questions as well as improve efficiency in the assessment processes of students works. AI is used to create

tutorials and interactive visual assistant systems that can be used to answer questions, provide additional explanations and guide students in the real time learning process. AI also automate many time-consuming administrative tools in teaching and learning which are used in assessing, evaluating and grading students works, they also provide feedbacks and detects plagiarism. Artificial Intelligence algorithms are used to recognize patterns and evaluate students' responses in various subjects, this allow teachers to receive smart and comprehensive assessed information on students' performance that will enable the teachers swiftly intervene in the individual needs of the students and collectively so (Mahendra, 2023).

Another interesting fact about Artificial Intelligence and educational assessment is the fact that teachers easily adapt to the learning processes introduced by AI to access the students' performance by collecting and analyzing data about students' progress in schools and using the same method to work towards improving their performance.

Artificial Intelligence integration into the educational sector have no doubt revolutionaries the school system particularly in the domain educational assessment. As promptly noted by Huseyn, (2024), the generalized teaching of every student in the same pattern and style is becoming obsolete, therefore AI driven adaptive assessments are now enabling schools to adapt individualized students specific teaching to address the peculiar learning needs of every student by fostering a more engaging and effective learning journeys, as a result and in appraisal of the effectiveness of artificial intelligence in educational assessment, instructors have begun to see it as a pedagogical instrument rather than a replacement of pedagogy itself. AI in educational assessment is also seen as a tool to provide real time feedback and better understand their student's confidence and motivation.

Huseyn further asserts that, AI doesn't get tired in its application or frustrated no matter how long it takes for a teacher to use it or a student to understand its concept, it is available at whenever or wherever you want it or it is needed. AI is seeing to be facilitate and encouraging personalized learning pathways that cater for each students individual and specific requirement, thus, reshaping education assessment to provide more tailored and effective assessment methods for both students and teachers. It is also believed that the intervention artificial intelligence in educational assessment has great and immense potentials in the academic sector that are considered plausible, it not out of place to mention that, one major obstacle that will face AI is the incomplete or lack of digitalization of the learning and assessment process in school setting as well as digital literacy of educators and learners.

Some AI tools used for Educational Assessment

Writing any article on artificial intelligence in education and educational assessment requires some expositions on artificial intelligence tools used for assessments of students work as it concerns assignments, tests, seminars, exams etc. This gives rise to highlights on some of the AI assessment tools.

Amidst several views, Clickup, (2024) and Neendoor, S. (2024) revealed some of the AI tools used for educational assessment which include:

i. Gradescope

As AI assessment tool, grade scope is specifically designed to streamline the grading process for instructors and provide valuable feedbacks for students on where they did well and where they didn't do well and needs corrections. Grade scope assessment tool tries to improve the grading system for instructors to enable them improve their assessment methods and patterns and key into modern and trending assessment models which will enhance efficacy in the business of assessment and engender faster grading in students' tests, assignments, examinations, seminars etc.

ii. Huric digital

Huric digital is a pioneer digital assessment tool that provides a robust online monitoring and evaluation for teachers. This assessment tool is mostly used by most education providers. The platform provides quality AI grading system, online assessment creation and delivery for educators and trainers, this AI tool can also be used to develop custom test on the platform.

iii. Turnitn

Turnitin is a special educational assessment software developed to detect plagiarism in the educational system, it is often used by educators and higher graduate students to prevent and control academic fraud. Again, Turnitin assessment tool is also good in the areas of accessing features like PeerMark, Rubrics and Feedback studio that enhances classical assessment approaches.

iv. Question mark

This assessment tool is mostly used by organizations to create, deliver and analyse online assessment. It also powered AI assessment offer options for item banking, test delivery and outcome evaluation. Teachers can use these predictive analytics to

identify areas that need corrections to enable them effect such corrections on time and with precision.

v. Gradescope

Gradescope is one of the known assessment tools that allows teachers to grade assignments, tests, exams and projects with customizable rubrics, it uses AI to read handwriting, spot patterns and deliver immediate feedbacks. This assessment tool is highly advanced, its features ensure quick grading and assessment uniformity.

Conclusion

Assessment is a process of properly determining or ascertaining quality and real value of something, when narrowed down to the educational sector, it is seen as the valuation or evaluation of students work in order to grade their performance and make recommendations for improvements where necessary, this process have made several inroads over time and has advanced optimal and meaningful progress in the education sector through improved students' performance.

Suggestions

The integration of artificial intelligence in educational assessment have brought about significant breakthrough in the education sector across the globe in the areas of student's content and students' performance, teachers teaching and assessment skills have also recorded significant improvement. It is therefore of the view of the author that, the application of artificial intelligence in educational assessment should be encouraged by the government and educational managers to engender academic development.

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