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# APPLICATION OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A REVIEW

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***Abstract:***

*Within education, Artificial Intelligence is anexpeditiously growing field and there is a powerful prospective for AI to considerably prolong and intensify teaching and learning in tertiary education. Artificial Intelligence (AI) is a rapidly growing matter in education, and it has the capability to significantly enlarge and upgradethe classroom learning environment in higher education (Crompton et al., 2020).Data and information that emerged in this paper are gathered from the several publications and articles published by national and international journals on the applications of artificial intelligence in education. The results of the study indicates that Intelligent tutoring systems, Personalized learning, Adaptive assessment, Virtual reality, Natural Language Processing (NLP), Educational chatbots and other platforms of Artificial Intelligenceoffersa more effective wayin learning of pupils in communal or reciprocal domain.It is also found that resistance to change, problems regarding accessibility, teacher training and security etc. are some serious barriers in successful integration of Artificial Intelligence in higher education.*

***Keywords:*** *Artificial Intelligence, Higher education*

## 1.0 INTRODUCTION:

Along with usual internet applications, smartphones and other household gadgets, Artificial Intelligence (AI) is increasingly permeating our everyday lives. Artificial intelligence has grown prominent in people's lives and is being regarded as a technology th at may improve and progress every aspect of human existence. Artificial Intelligence (AI) is a rapidly growing matter in education, and it has the capability to significantly enlarge and upgrade the classroom learning environment in higher education (Crompton et al., 2020). AI can be defined as computer applications that can carry out human-like tasks like learning, adjusting, synthesizing, self-correction, and use of data for complex operating tasks (Popenici & Kerr, 2017). Higher education's future is intrinsically connected to advancements in new technologies and the computational power

of advanced computers. In higher education, Artificial intelligence (AI) advancements convey both together the new possibilities and difficultiesin teaching and learning, and these have the potential to drastically amend institutional governance and internal design (Popenici& Kerr, 2017). Interest in HE has increased due to the use of AI, which is greatly impacted by the advancement of information and communication technology (Alajmi et al., 2020). AI is applied across topic fields, including language learning, engineering education, mathematics education, and medical education.

## 2.0 OBJECTIVES OF THE STUDY:

To review the application of Artificial Intelligence (AI) in the field of higher education.

To analyze the challenges in integrating artificial intelligence at higher education level.

## 3.0 METHODOLOGY:

Data and information that emerged in this paper are gathered from the several publications and articles published by national and international journals on the applications of artificial intelligence in education.Additionally, some information is gathered from reputable websites, newspapers, and other sources.

## 4.0 RESULTS OF THE STUDY:

After reviewing related studies and various papers concerning the use of artificial intelligence in higher education, the investigator categorized the results into two significant heads as:

### 4.1 Applications of artificial intelligence in higher education:

**Intelligent tutoring system:**

Intelligent tutoring systems is an educational software incorporated with an artificial-intelligence component. As the name implies, an AI intelligent tutoring system is a computer-based learning system that use artificial intelligence to deliver human-like lessons in the absence of a human teacher. With the help of AI intelligent tutoring systems, one can develop a customized learning environment that, often without any demand for human participation, gives students rapid guidance and feedback. At every educational domain and in many common academic fields, it is generally established that properly-designed ITS could successfully supplement and replace existing teaching approaches (Ma et al. 2014). As reported by Neto & Nascimento (2012) With the use of an intelligent tutoring system that provides high-quality feedback, students were able to increase their understanding of problem solutions based on the mistakes made by their previous cohorts. The intelligent tutoring systems that are implemented in a variety of educational settings have a major impact on raising most students' academic performance, particularly for university students. They also motivate students to study independently and serve as a valuable source of information and encourage them to do so (Alrakhaw et al., 2023).

**Personalized learning platforms:**

A pedagogical strategy called personalised learning adjusts the learning path to each student's

unique needs, skills, and interests (Iqbal 2023). It understands that no two learners are similar and, thus, seeks to give each student with an individualised instruction path. It's clear that using AI to individualised learning is seen as a huge potential. Teachers are unable to provide one-on-one instruction to every student due to time and attention constraints. This is not a constraint on AI. This makes it possible for an AI to better align instruction with students' preferences. The student progresses through the curriculum at his or her own pace and level as a consequence, and the instructor is better equipped to concentrate on "difficult students." Task automation will advance gradually.

One prominent example of personalized content delivery is the Khan Academy, which offers personalized learning paths for mathematics students. The platform's AI algorithms continually assess each student's progress and adjust the difficulty of exercises accordingly, ensuring that learners receive an optimal level of challenge.Coursera, a leading online learning site that integrated AI to provide personalized course suggestions. By assessing the student's interests, job aspirations, and past coursework, Coursera proposes appropriate courses, producing a personalised learning path.AI is used by the well-known language learning app Duolingo to provide individualised language instruction. The platform adjusts to the learner's ability level, altering the complexity of exercises and quizzes in real-time. The success of Duolingo shows how useful artificial intelligence can be in language learning.

**Adaptive assessments and feedback:**

Adaptive assessment, another crucial aspect of AI in education, represents a departure from traditional, fixed-form tests. These assessments dynamically adjust their content and difficulty based on the student's responses. As the student progresses through the assessment, the system adapts by presenting questions that match their skill level. This technique optimizes the assessment's efficiency by guaranteeing that every question offers significant insights into the students' understanding. One notable example is the Graduate Record Examinations (GRE) adaptive test. In the GRE, the difficulty of questions varies based on the test-taker's previous responses, allowing for a more precise evaluation of their abilities. The GRE, GMAT, and MCAT are examples of standardized tests that employ adaptive testing to provide a more accurate assessment of test-takers' abilities.

**Virtual and augmented reality:**

Virtual reality enables the user to engage with a computer-generated world supported by computer graphics systems by means of a variety of display and interaction devices. Augmented reality experiences can take a number of shapes. Technology that overlays computer-generated material over the actual world to improve the user's sense of reality is called as augmented reality. Augmented Reality (AR) has drawn interest in education because of its capacity to provide engaging and lively learning environments. Webcam-based augmented reality uses a computer camera to

capture a physical real-world location and present an augmentation on a screen, such as a projector or computer desktop, so that users may easily control augmented reality information with their hands.

It is found that students using virtual reality to learn engineering were strongly motivated by the assignments and continued to work even during their leisure time(Floyd et al, 2017).Studies have indicated that knowledge acquired via augmented reality experiences is more effectively retained in memory compared to non-augmented reality experiences (Diegmann, et al. 2015).With the use of augmented reality (AR) technology, students can study more effectively in a dynamic setting that fosters social communication.In a real-world setting, augmented reality technology improves the efficacy of the learning environment for students by introducing a new class of automated applications (Weng et al., 2016). AR has the potential to be a very effective teaching tool, reducing time for training as well as for master a task. However, in order to do this, the proper situations must be chosen, and learning experiences must be created that are suitable.

**Natural Language Processing (NLP):**

Natural language processing (NLP) is the branch of AI that examines the relationship between computers and human language. Natural language processing (NLP) is being used in education to develop intelligent tutoring systems that can comprehend and reply in natural language to questions and comments from students. NLP may also be used to examine large amounts of textual content, including textbooks and academic papers, extracting pertinent information and producing insights or suggestions for more reading. These technologies can give students with personalised guidance, allowing them to better comprehend challenging ideas and enhance their academic achievement. Natural language processing offers solutions for different types of issues concerned with the social and cultural background of language acquisition. It is a useful strategy for helping educators, writers, students, and instructors with writing, analysis, and assessment processes (Alhawiti, 2014).

NLP models are important in higher education because they may help students learn in several ways. NLP models are quickly gaining relevance in the field of higher education, since these have the ability to alter teaching-learning process by providing personalised learning experiences, desired help, and other novel techniques. These models may be used to analyse and process large volumes of textual content, including textbooks and academic papers, and other course materials, allowing pupils to get personalised suggestions for future study based on their learning needs and requirements. Additionally, NLP models may be utilised to create chatbots and virtual assistants that provide students with desired support and guidance, allowing them to access help and information as needed.

**Educational chatbots and virtual assistants:**

Chatbots are being utilised to give students with 24-hour support, particularly for administrative activities such as answering inquiries regarding university regulations and course of action, and advising on educational programmes and occupational alternatives. Chatbots can be employed to improve interaction between students and professors, giving a suitable environment for students to solve their quarries and get prompt feedback from their teachers. Duolingo is one of the most popular chatbots in education. Duolingo is a programme that employs artificial intelligence-integrated chatbots to assist students in languagelearning. The chatbots give users with personalised feedback and coaching based on their learning style and speed.

**4.2 Possible Challenges in Integrating AI in Higher Education:**

While AI holds great promise in higher education, several challenges must be overcome for its effective integration.

**Resistance to Change:**

Highly ingrained customs and behaviours are common in educational institutions. Students, teachers, and administrators used to old techniques may be resistant to implementing AI-driven reforms.

**Accessibility and Equity:**

Artificial intelligence (AI)-driven learning resources and platforms may unintentionally widen the gap. Not every student has access to a reliable internet connection or the required technology. It is crucial to guarantee fair access to AI-driven education.

**Training and Professional Development:**

Educators may lack the skills and training needed to effectively use AI-powered tools in the classroom. Professional development and support are crucial to bridge this gap.

**Data Privacy:**

Data Privacy is another major issue confronting successful integration of Artificial Intelligence in the field of higher education. The integration of AI in the sphere of higher education mostly requires collection and analysis of personal information of students, such as their academic achievement and behavioural trends which are very sensitive. AI integrated higher education institutions must guarantee that the information collected are utilising for its intended objectives and are notmanipulated or shared with other members wthiout their consent.

**Employment:**

Integration of artificial intelligence in higher education may result in job displacement for institutions, raising ethical issues about the effects on the academic workforce. It is critical to address these ethical considerations when implementing AI in higher education to ensure its appropriate and fair application.

## 5.0 CONCLUSION:

From the above discussion, it can be concluded that Artificial Intelligence (AI) is a rapidly growing matter in education, and it has the capability to significantly enlarge and upgrade the classroom learning environment in higher education. It helps in making learning easy and less stressful for stakeholders of higher education. It is free from any limited time boundaries and provides individual attention. Therefore,it can teach each and every student individually. At the same time, it also offers a more effective way in learning of pupils in communal or reciprocal domain.Each student can learn at his/her own style, pace, and choices in a AI-integratededucational environment. By meeting their unique requirements, this individualised approach promotes more effective learning for pupils.But there are some barriers in successful integration of AI in education like resistance to change, problems regarding accessibility, teacher training and technological problems etc.

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