

Opportunities and Challenges–Artificial Intelligence (AI) in Education

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Abstract: *Now a days Artificial Intelligence is a booming domain which is capable of altering every aspect of our social interactions. AI has introducing new teaching and learning solutions that are now undergoing testing under different context. This paper collects examples of the introduction of AI in education basically in developing countries. It will strive for equitable quality education for all. AI can be used to improve learning outcomes with presenting of examples of how AI technology can help education systems to improve educational quality and equity using educational data. This paper will address some challenges, possibilities and risk of introducing AI in education and preparing the students for an AI-powered context. Educational institutions are rethinking and revising the educational programs to prepare learners for the increasing presence of AI in all aspects of human activity. AI in education is one of the emerging fields in education technology. This paper analyses how AI can used to improve learning outcomes, how to use educational data for improving equity and quality in education.*

Keywords: Artificial Intelligence, education, Opportunities, Challenges, quality, learning outcomes

I. INTRODUCTION

The era is fourth industrial revolution, which brings extensive changes in human life by transforming machinery operations and altering thought processes. In the place of education, AI is recognized as a crucial element in enhancing both teaching and learning procedures through individual experience and adding teachers. Artificial Intelligence is the technological future that happens to make live of human beings a lot easier. AI is booming technology of alliterating every aspect of our social interactions. AI will certainly change the way higher education works. Artificial Intelligence is the technological future that happens to make lives of human beings better. Basically AI requires advanced infrastructure with ecosystem of thriving innovators. With concern to education AI will add value to the quality of training to students with lot of arguments for AI as now AI has more potential to change the education than any other technological advancement. Bates [2] have listed the following goals for AI in Education:

- increase Outcomes
- increase access
- increase retention
- lower cost
- decrease time to completion

This paper will help to outline opportunities and challenges of introducing artificial intelligence in education.

II. LITERATURE REVIEW

AI in Education:

Artificial intelligence is widespread use in some areas of education but not with its direct impact on education. Zuboff [12] provide a good review of different areas in which AI is being applied in education also some research areas also focused by researchers. He identifies four keys application in teaching and learning:

- profiling and prediction
- intelligent tutoring systems
- assessment and evaluation
- adaptive systems and personalization

Artificial Intelligence is currently processing with high speed and it had already impact on the nature of service provision within education. For example universities already use an incipient form of artificial intelligence, IBM's supercomputer- 'Watson'. According to experts, the use of AI in education is expected to grow by 43% in period of 2018-2022, although Horizon Report 2019 Higher Education [3] predicated that AI applications related to teaching and learning are projected to grow even more significantly.

There are currently some major breakthrough in the application of 'modern' AI to teaching and learning in education, with exception of learning analytics.

Implication to Knowledge:

From last two decades much more efforts made for promote, develop and update the digital skills of instructors, researchers and administrators. In the last few years AI has been the expansion of new interfaces [2]. They extend far beyond the keyboard and mouse, allowing users (especially non-expert) to interact with AI simply by voice or image recognition. This makes the interaction with advanced systems more transparent and creates possibilities for users with low level of skills to benefit.

Pearson Group:

AI is used to enhance foreign language teaching in January 2018, Microsoft Asia Research signed a strategic cooperation agreement with Pearson Group for the cooperation between AI and English education [12]. The AI-Cyber software assists organizations in ensuring the integrity of exam sessions on a large scale and how it works to capture different compromising events, which set out to highlight problems during session and ensure that forensic dashboards, etc. are provided [12].

Washington State University:

This university has a partnership with edtech startup 'Cialfo' to extend it recruiting reach and directly engage with more than a quarter of a million international high school students using Cialfo's AI driven explore platform.

Georgia State University:

This university adopted AI to decrease the number of students who accept offers of admissions but subsequently do not show up for fall enrolment. This commonly referred as 'summer melt' [1]. To address this issue GSU developed "Pounce", an AI chatbot to answer students frequently asked questions. The chatbox answers the questions at any time of the day or night, allowing students to ask as many questions as they need their freedom. This makes students a comfortable and familiar interface.

Rensselaer Polytechnic Institute – China:

This institute provides a lab featuring a 360 degree projection onto 15 feet wall transporting students to the streets of Beijing, China. The system allows students to participate "practice conversational skills, improve their vocabulary, pronunciation and cultural knowledge" with AI characters. Furthermore system are used to monitor student participation and expressions using face recognition technology in classrooms, which are displayed to the teacher on a dashboard.

III. OPPORTUNITIES OF AI IN EDUCATION

Smart Campus:

The university experiences faces overwhelming especially for new and international students who have to navigate a whole set of questions and sources of information. Chatbots utilizing the Microsoft bot framework which helps the students to get their questions answered quickly. Griffith University's 'Sam' helps students to get their information what they are looking for. University of Sydney's 'FinBot' helps students with their university finance department rapidly to questions regarding POs and other related issues.

Research:

A key challenge to every researcher is explosion of knowledge creation, with number of academic papers. Microsoft Academic (MA) is a Microsoft Research project which assist academics in conducting scientific research by leveraging the computer's cognitive power. MA uses NLP techniques to give each paper discovered by Bing crawler a semantic label. By analyzing 230 million papers, MA has built a graph of 710K+ semantic labels derived using self-supervised learning.

Teacher and AI collaboration:

AI can help in driving efficiency, personalization and streamline administrative tasks to give teachers more time and freedom to provide understanding and adaptability of human capabilities. AI and teachers both will work in the interest of students. At this point, it is important that our educational institutions expose students to its possibilities and actively use the available technology.

Differentiated and individualized learning [11]:

Adjusting learning based on individual students particular need a priority for educators for years, but AI will provide a level of differentiation that is currently impossible for teachers who have to manage thirty students in each class. Several companies, such as Content Technologies and Carnegie Learning are developing intelligent instruction design and digital platforms that use AI to provide learning, testing and feedback to students with identifying gaps in their knowledge and directing them to a new challenges. The idea of customizing the curriculum for every student's individual needs is not viable today, but for AI it will be possible.

Universal access for all students:

Artificial intelligence tools can help make global classrooms to all as it is accessed worldwide including different languages & environments. One free plugin Presentation Translator is for PowerPoint that creates subtitles in real time for that which teacher is saying. This will be great opportunity for students who are not able to attend institution due to illness or who require some different which is not available at their institution. Here AI will help break down silos between institution and traditional grade levels.

Automated administrative tasks:

A teacher spends a tremendous amount of time marking home and tests. Here AI will help one step ahead by making all these tasks, while at the same time offering recommendations to address learning gaps. So AI steps to automate administrative tasks, it gives teachers more time to spend with each student. With the help of AI enrolment and admission processes can be better as of current traditional methods.

IV. CHALLENGES OF AI IN EDUCATION

Adverse outcomes:

After the use of AI in education one of the biggest perils is adverse outcomes. As the intention was good but there will be negative unintended consequences. So to avoid the adverse outcome we have to consider the data these tools draw upon. The data may vary in quality, it may be old or outdated, or may be drawn from subset of the population that may

not align with targeted for students. An AI learning system has been tested for particular university may not have the same accuracy and output for other university.

Accuracy:

Here institution face issue of accuracy because AI models are based on correlation; they are not reflective of causality. This point where AI tools and models is to show less intuitive, more attenuated correlations and patterns. It is difficult to separate which correlations and patterns are accurate and which are noisy.

Output:

The output of adverse outcome is a factor which is to be overlooked as developer's decisions to shape how the insights of AI systems offer are instructed and interpreted. Some of them provide detailed information on various elements of student learning or behavior that instructors and administrators can act upon it. Here other observations are not useful in informing interventions. Just example, one predictive analytics tool estimated that 80 per cent of the students in a subject would not complete the semester. This was not news to the professors, who still wondered what to do. So it is important to understand in advance what you want to do with the information these AI tools provide [11].

Implementation:

To use the AI systems responsibly, teachers and staff must understand not only their benefits but also their limitations. At the same time, institution need to create a very clear protocol for what employees should do when algorithmic evaluations or recommendations do not align with their professional judgment. They must have clear vision about when it is appropriate to follow or override computer generated insights to prevent unfair inconsistencies.

Inclusiveness:

It concerns with data having variety of students as recently in terms of facial recognition. Scholars looking at the use of facial recognition by companies like Google, IBM, and Microsoft have shown that, in many cases, these AI tools have been developed using proprietary data or internal data based on employees. The tools are much more accurate for light skinned men than light skinned women or darker skinned men. In one study, the facial recognition tools had nearly 100 per cent accuracy for light skinned men but only 65 per cent for dark skinned women [9].

V. CONCLUSION

AI applications for teaching and learning are likely to emerge from within mainstream education. After a look of above highlights the main question comes that weather technology should aim to replace teachers through automation or the technology this technology should be used to empower not only teachers but also students. Some countries are taking advantage of educational data which is coming with advent of new technology. They had started mining the insights from the large mass of data to provide more personalized learning experiences. Education systems have been actively reforming themselves ensuring students are acquiring the skills required by an AI-enabled future workspace. The process of rethinking and redeveloping educational programmers in response to AI will become now a regular and continuous process.

We will require more information in current circumstances where countries are moving forward in this uncertain and constantly changing territory to promote the discussion and the relevance of adoption of AI in education. AI must support teaching process, not replace it. Education institutions may use standardized AI models which will accepted for learning by students. This will put quality of education to a new level, transitioning from theory to practice.

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