READDRESSING THE PROSPECTS OF ARTIFICIAL INTELLIGENCE IN TEACHING-LEARNING EXPERIENCE: A STUDY

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ABSTRACT

Artificial intelligence (AI) is one of the leading trends in modern day education system. The prospect of AI in modern day education system is very much important and significant. This paper deals with the different prospects of artificial intelligence (AI) in terms of education process. In this present scenario, AI is being used for the development and progress of teaching learning process which also makes the education easy accessible and effective. Learners are becoming more interested in the use of AI oriented education process. The researcher has also tried to study the future prospects of AI in education system. How the global education system is gradually becoming dependable on the use of AI is also the area of study. Till now AI aren't capable of replacing teachers but in the upcoming future education sector will be of no use without AI. The present study addresses some genuine and potential aspects of AI in the field teaching learning. The present study is designed in the form of scheduled interview where samples were randomly selected from various schools of West Bengal. The reports of the interviews are studied and understood in the form of case study.

KEYWORDS: Artificial intelligence (AI), machine learning (ML), deep learning (DL), personalized learning (PL), Teaching and Learning, Technology, Case Study.

INTRODUCTION:
In the last few decades, technology has occupied a commanding position almost in the every aspect of human life. We cannot imagine a single day without technological interference. This ever-growing need of technology based life propels us to readdress the importance and relevance of the same. Artificial Intelligence has emerged as an important field of modern technological wonders. Emergence of artificial intelligence (AI) brings new possibilities as well as new challenges to the teaching-learning process. AI is presently advancing in an accelerated speed and it has already impacted the field of higher education. The origin of artificial intelligence can be marked dates back but it was officially founded in 1956 at a conference at Dartmouth College in Hanover, New Hampshire (Lewis 2014). The term 'artificial intelligence' is also coined at this conference. It is generally considered by all that the 'Logic Theorist' which was a program that can copy the problem solving ability of human being introduced by Allen Newell, Cliff Shaw and Herbert Simon was the first ever program dealing with artificial intelligence (AI). It was presented at the Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI) organized by John McCarthy and Marvin Minsky in the year 1956 (Anyoha 2017).

Defining Artificial Intelligence:
Artificial intelligence (AI) is a kind of simulation of the human intelligence in a machine that has the ability to think and perform activities like the human beings. And this simulation is performed in computer-oriented devices. One of the first and most influential definitions of artificial intelligence (AI) was earlier propagated by John McCarthy: "The study of artificial intelligence is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to stimulate it." (Russel and Norvig 2010). John McCarthy is one of the most important and influential figures in the field of artificial intelligence (AI). He devoted most of his life in the field of AI. He also proposed a new and alternative term for AI i.e., 'computational rationality' (Kulkarni & Joshi 2019). AI is now expanding itself in all the spheres of our day to day life. Thus it has become one of the recent topics of discussion. According to Frankenfield (2020), "Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving."

AI is a big umbrella term on whose shade there are several other terms which are directly related to it. They give proper shape to AI. According to Baker and Smith (2019), AI is "computers which perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving" (p. 10). They also said that AI is not a single technology rather a wide range of technologies such as machine learning, deep learning, natural language processing, neural networks etc. Machine Learning (MI) emerged in the field of AI that gave importance to learning through algorithms. Machine learning is everywhere in different fields of media like Netflix, YouTube, Google, Baidu, Facebook, Twitter, Spotify, Alexa and so on. Deep learning is a kind of sub-branch of ML. It was first introduced in the field of neural networks by Alan Turing. It gave rise to the concept of machines' thinking ability. It is a complex attempt to introduce the ability of 'per-

ception and cognition' in machines (Goksel & Bozkurt 2019).

LITERATURE REVIEW:
Goskel and Bozkurt (2019) conducted a study on "Artificial Intelligence in Education: Current Insights and Future Perspectives" to study the various opportunities of AI in the field of education. The purpose of this research was to identify the basic aspects of AI and also to identify the future perspectives of AI in the field of education. They took 393 research papers which were published between 1970 and 2018, among them 210 were conference proceedings, 173 were research articles published in various journals and remaining 10 were book chapters. For this research data analysis and data mining were performed. And apart from these, social network analysis (SNA) was also done for the better understanding of the research findings. The result showed that adaptive learning and implementation of AI in education provides enough opportunities to the learners to mitigate their needs. It also showed that AI orientation in education provides the learners 24/7 support to enhance and uplift their level of education.

Popenici and Kerr (2017) performed a detailed study on "Exploring the impact of artificial intelligence on teaching and learning in higher education". They have explored the different uses of AI in the teaching learning process in higher education. They also discussed about the various implications of emerging AI oriented technologies in the field of education. These new and innovative technologies made the higher education more advanced and effective. These technology orientations have made the teaching learning process much easier and much interesting for both the teachers and the learners. They have also discussed about the various challenges and limitations in recent times and in upcoming years which serve as barriers in the development of teaching learning process in higher education. They also provided some important directions for further research in the same field.

Edwards et. al. (2018) has undergone a study on "I, teacher: using artificial intelligence (AI) and social robots in communication and instruction" that dealt with the communication through the use of AI in the field of teaching and learning. They have mainly discussed two interaction processes that are linked with AI, such as Human-machine communication (HMC) and Human-robot interaction (HRI). HMC has evolved as an innovative and new trend in the field of education and it will rule the field of education in near future. And in HRI the robots is now offering personalized instructions to the learners which alters the role of teachers in the teaching learning process. Robots are now providing instructions, monitoring students' progress and also providing adequate support to the learners. They generated an argument regarding the role of machine agents outside the traditional real life classroom situation.

Zawacki-Richter et al. (2019) has conducted a systematic review titled "Systematic review of research on artificial intelligence applications in higher education – where are the educators?" they have used systemic review technique to provide a general overview of research study regarding AI in the field of higher education. They have initially selected 2656 research publications which were published between 2007 and 2018. But for the final result they have taken into consideration only 146 research articles. The results show that the researchers of

these articles are mainly belonged to Computer Science and STEM field and most of them have used quantitative data analysis technique for their empirical study. The results of this study provided four applications of AI in the field of education such as a) profiling and prediction, b) assessment and evaluation, c) adaptive systems and personalization, and d) intelligent tutoring systems. At the end they also looked into the challenges and weaknesses of the use of AI in the field of education.

Roll and Wylie (2016) has conducted a study on "Evolution and Revolution in Artificial Intelligence in Education" to identify the strengths and future opportunities of artificial intelligence in education (AIED). They have taken 47 research papers dealing with artificial intelligence in education from 3 different years of three respective decades (1994, 2004, and 2014) as sample of their study. They have discussed the present scenario of AI in the field of education. The result showed two related strands of research that would rule the field in the next future years. The first is the evolutionary process of AI in the field of teaching learning and the second is the revolutionary process of AI where the main argument is about the significance of technologies in the day-to-day life of the students. So the present evolution and the future revolution of AI in the field of education is the main area of study in this research article.

OBJECTIVES OF THE STUDY:
Keeping all these important and potential aspects of Artificial Intelligence, the investigator has the following objectives to address:

1) To understand the potential aspects of Artificial Intelligence in broader field of education.

2) To explore the promises of Artificial Intelligence in the field of teaching learning.

3) To address the fact if Artificial Intelligence can assure quality of teaching learning in classroom context.

4) To identify the promising niches if Artificial Intelligence can help in easing the level of comfort in teaching learning

Research Questions:
To conceptualize the problem better, the investigator put this matter in the form of research questions.

a) Does Artificial Intelligence help in content building in the field of education?

b) Does Artificial Intelligence ease our content delivery labour in classroom scenario?

c) Can Artificial Intelligence make teaching learning effective and time saving?

d) Can Artificial Intelligence transform our online classroom level teaching learning experience ever?

e) Does Artificial Intelligence help the learner to build their personal universe being cut from the rest of the world?

f) Can Artificial Intelligence inculcate value among the learners?

g) Can Artificial Intelligence invite community feeling among the learners?

Research Design:
The present study aims to proceed in the form of case study. The case study is conducted on two different phases. In the first phase, two teachers were interviewed who were regular users of AI and two other teachers were interviewed who were the infrequent users of AI. They were approached with some pre-scheduled interview questions with some stipulated time frame. In the second phase, two students were interviewed who were AI habituated learners in their regular classroom setup and two other students were interviewed who were infrequent users or occasional visitors of AI. They were also approached with pre-scheduled interview questions. Their responses were recorded and analyzed in the preceding sections.

Putting the Matrix of AI in the Context of Educational Application:
AI has uplifted the quality of teaching and learning in the field of education. The improvement of education process can generally be categorized into basic four dimensions, a) content building, b) content delivery, c) quality learning and d) long term memorization. Among these four dimensions first two are teacher oriented and the last two are learner oriented. And also the content delivery process i.e. teaching process becomes burden free and more interesting for the teachers. They get more pleasure in technology oriented classroom than on the traditional classroom. Thus it becomes important and significant in the teaching process. On the other hand the learners also find more pleasure in the process of learning through technology orientation. Their concentration becomes very high in the AI oriented classroom rather than traditional classroom. And they keep the lesson in

mind for longer period of time as it catches more number of sensory organs. Thus it makes the learning process more effective and target oriented which results in long term learning for the learners.

To measure the effectiveness and implications of AI and other AI oriented applications in the teaching learning process, the researcher has interviewed some teachers who use AI in their content building and content delivery and some teachers who don't have access to AI in their content building and content delivery process. The researcher also interviewed some students who can access AI oriented teaching and some students who don't have such access. This comparative case study has made the effectiveness of AI application in the field of education crystal clear.

1. **Case Study of AI User Teachers:**
a) A teacher from DAV Public School, Pandveswar was personally interviewed over telephone. He gave positive response towards technology in terms of both content building and content delivery. He said that technology becomes a great help to the teachers in modern days. He always used to take the help of technology to prepare the teaching content for the teaching learning process. Besides taking the help of the books and other printed materials he is now using technological devices and internet to make his teaching content more effective and helpful. He also opined that it him in the teaching process too. Use of technology reduces the burden of teaching a lot. He now couldn't have to memorize minute details of the content. The smart classroom helps him in this regard. Thus he is in favor of using technology in the teaching learning process.

b) A teacher from Loreto College, Kolkata was interviewed about the use of technology in her college. She opined that now-a-days technology is a great help for the teachers. She can collect external information very easily with the help of technology and internet. This is how the content for the lesson will be stronger and well organized. It gives more pleasure for building content for the lesson. The content could be made more interesting through technology. Books along with other printed materials and online sources all are effective sources for building teaching content. Nothing can be ignored. She also said that traditional classroom and smart classroom can co-exist. If there is any problem in technology then it could be a bit problematic to continue the class through smart classroom on the other hand traditional class room is always easy to manage. But smart class room will be more effective because of its visual compactness.

2. **Case Study of Non-AI User Teachers:**
a) A teacher from Gopinathpur Primary School was personally interviewed for his opinion regarding the use of technology in the teaching learning process. He said that use of technology for building content for a lesson is easier than pen and paper. But the government schools lack this facility. Pen and paper gives little pleasure to the students and there is no scope for creating an attractive teaching content. But there is much opportunity for building interesting teaching content with the help of technology. Generally he use books and printed materials for building teaching content. It is very easy to use as a source. Sometimes he accesses online sources with the help of internet. He and other teachers of his school are not accustomed in using smart classroom for delivering our teaching. He always prefers traditional classroom. Though the infrastructure for smart classroom is unavailable in their government school. Most of the students of our state are not habituated to learn a lesson in a smart classroom. It will be very effective for the learners if they use smart classroom. But they have to use traditional classroom in their situation. The students only learn their lesson in traditional classroom. It fails to engage their mind for longer period of time.

b) A teacher from Parulia Vivekananda Sikshayatan High School was interviewed over telephone and was asked some questions regarding the use of technology in the field of education. He said that use of pen and paper is always easy for him for building teaching content. But in the classroom there is no scope of using technology. Thus he prefers pen and paper for preparing teaching content. But use of technology is always pleasurable for him. He also thinks that books and other printed materials are easy accessible and authentic. He questions the authenticity of the online resources. He has heard about smart classroom and other technology oriented applications but considering the infrastructure of his school he opined in favor of the traditional classroom rather than technology oriented classroom.

3. **Case Study of AI Habituated Learners:**
a) **Rural area:** A student from St. Thomas Public School, Kamarpukur was interviewed whom the researcher personally knows. He was asked some questions regarding the usefulness of technological use in the teaching learning process. He said that there is a particular schedule of taking class in the smart classroom for the teachers in their school. To him this type of class is very much interesting and enjoyable. There remains a joyous atmosphere in the smart class. The teacher shows different video and pictures to them and they learn easily. He is more interested in learning in a smart classroom. He can learn better with the help of technology in the class. Apart from all these he also uses technological devices at home for doing his homework, projects and assignments.

b) **Urban area:** A student from Loreto Day School, Sealdah was interviewed and was asked some questions regarding the use of technology in her school. She also gave positive response towards technological use in the teaching learning process. The teachers of her school also use technological devices for their teaching learning process. The teachers provide study materials through online mode. The school authority also provides information through the help of internet. The teachers use projectors in the classroom. She takes much pleasure in the technology oriented teaching.

4. Case Study of AI Non-habituated Learners (Traditional Learners):

a) **Rural area:** A 12th standard student from Tajpur R.C. High School was interviewed and was asked some questions regarding the usefulness of technology in the learning process. She opined that she personally uses technological devices at home for any quarry regarding her studies but there is no scope of technological use in her school. But she is of the opinion that technology will help the learners a lot in their learning process. She often uses internet as the source of her study with the help of smartphone. She also said that she heard about the technology oriented teaching from one of her cousins but she doesn't have any firsthand experience of it.

b) **Urban area:** An 11th standard student from Burdwan Municipal High School was interviewed over telephone and asked his opinion regarding technological use in the learning process. He strongly supported the use of technology in the learning process. He always takes help from internet for learning a lesson at home. Though there is no scope of technological use in his school, he talked in favor of it. He said that he uses YouTube, Google as the source of his information for performing a task. Now he finds it more easy and enjoyable to use technology for learning a lesson. He also remarked that internet helps him to hold concentration for longer period of time and it never bored him. Thus, he can invest more times on his studies.

MAJOR FINDINGS OF THE STUDY:
The major findings of the present study are mentioned below:

1. AI user teacher from urban area is using technology in his teaching learning process. He prefers technology oriented teaching over traditional teaching. He shows positive attitude towards AI oriented education.

2. AI user teacher from urban area gives equal preference to technology oriented education and traditional education system. To her, technology functions as an extra support for the teachers in the teaching learning process.

3. Non-AI user teacher from rural area shows eagerness to use technology in the teaching learning process. But he doesn't have such scope in his institution. He personally always tries to use it in his teaching process with his own effort. Thus, he is very much optimistic about the innovation of his teaching learning process with technology.

4. Non-AI user teacher from rural area is in favor of traditional method of teaching rather than technology oriented teaching. He even questions the authenticity of the online resources. He has little experience about technology oriented teaching. Thus, he is somehow against technology oriented teaching.

5. AI habituated learner from rural area has scheduled access to technology oriented teaching learning in his school atmosphere and he is quite accustomed to it. He enjoys such teaching rather than traditional teaching. Technology also helps him in the better understanding of the lesson.

6. AI habituated learner from urban area has regular access to technology in her school. Both the teachers and the learners are much accustomed to technology oriented classroom situation. Even the teachers use technology for providing study materials to the learners.

7. AI non-habituated learner from rural area doesn't have access to technology in her school but she sometimes uses technology at home for educational purposes. She is very much interested towards technology oriented learning.

8. AI non-habituated learner from urban area also doesn't have access to technology in his school but he is regularly in contact with technology for his educational purposes. He finds it more interesting and enjoyable. Thus, he is hoping for technology oriented teaching at his school environment.

LIMITATIONS AND FUTURE THREATS OF AI IN EDUCATION:
There are enough evidences that AI presented a lot of opportunities in the field of education but yet it is not ready enough to replace teachers in real life situation. In some perspectives AI is more useful than teachers, but as a whole AI is not sufficient enough for the teaching learning process. AI provides both opportunities as well as risks. AI helps teachers by providing lots of opportunities to innovate their lessons and research work in a unique way. Barack Obama, the former US President has offered his valuable opinion regarding AI in the report of "National Artificial Intelligence Research and Development Strategic Plan," in October 2016: "the walls between humans and AI systems are slowly beginning to erode, with AI systems augmenting and enhancing human capabilities. Fundamental research is needed to develop effective methods for human-AI interaction and collaboration" (U.S. National Science and Technology Council 2016).

Though AI is an innovative medium of teaching learning process but it needs skilled teachers for the smooth ongoing of the process. Most of the school and college curricula are not prepared to use AI in education (Karsenti 2019). The implementation of AI is very much costly. Thus, it will act as a barrier in the field of education. It will also reduce the bond between the teacher and the learner. Thus, the teacher-student relationship will be in great threat. The students will become static and mechanical. Apart from all these excessive use of AI in education sector will bring unemployment to the educators. But Lynch (2018) opined "not to worry, teachers; the robots aren't coming for your job, they are just here to make it a lot easier." In spite of so many challenges and threats of AI in education, the future prospect of AI is very bright. E-learning, distance education and AI education are the dominant aspects of AI networks in the education sector (Goksel & Bozkurt 2019). The implementation of AI in education sector brings a remarkable development not only in the theory but also in the practice in this present millennium (Roll & Wylie 2016).

CONCLUSION:
Artificial intelligence (AI) is one of the most important and significant innovations of modern day education process. It has widened the scope of education for all the people with adequate amount of knowledge-thirst. It is an undeniable fact that AI and AI oriented technologies have made the education process much easier and easy accessible. With the advancement of technological growth human beings will be guided by AI and other technological aspects in near future. The learners will rely more on technology than on teachers. Personalized learning (PL), virtual communication will become the key to teaching learning process. The future is waiting for more advancement and improvement in the field of education by the hands of artificial intelligence. But the ethical aspects should be in proper guidance otherwise it will bring moral destruction among the young learners which is not at least expected in the society. In the upcoming future AI will not only rule the education sector but also the whole world. A time will come when human teachers will be replaced by AI oriented technologies; classroom teaching will be replaced by virtual and online learning; and real classroom situation will be replaced by virtual classroom. But with these advancements in technologies human being will have to become very much aware of their roots, otherwise human beings will be replaced by technologies in the near future as it is shown in science fiction.

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