ARTIFICIAL INTELLIGENCE DRIVEN EDUCATION FOR GIRLS: A LEAP TOWARDS SDGs

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INTRODUCTION

The sustainable development goals aim at Education for all. The term 'All' is inclusive with exclusion of nil segment of the society. Girls comprising a significant proportion in any society need to be educated without any circumstantial constraints.

Artificial Intelligence is the technology which simulates human intelligence through machines. It is not vulnerable to adverse environments and thus is capable to execute challenging and assumingly difficult tasks. In fact, if coded properly, it delivers unimaginable degree of preciseness, correctness with high speed.

With the above premise in mind, the present paper attempts to explore the role and contextuality of Artificial Intelligence with reference to education to all particularly to girls.

The paper starts with underlining the significance of girls' education along with reviewing its status particularly in context of India. Thereafter, it divulges the concept and relevance of Artificial Intelligence. Lastly, it elaborately analyses the role of Artificial Intelligence in effectively promoting the girls' education – one of important goals under SDGs. The paper concludes with assertions that Artificial Intelligence, if used prudently, may prove to bring forth miraculous results in the resource deficient field of education of girls.

GIRLS' EDUCATION

"One of the factors a country's economy depends on is human capital. If you don't provide women with adequate access to EDUCATION, health care and employment, you lose at least half of your potential. So, gender equality and women empowerment bring huge economic benefit"- Michelle Bachelet, President of Chile said once.

For any societal change and development, education is considered to be the most powerful instrument. There too, the education of women can never be overemphasized particularly considering the fact that half of the population of any country consist of women. Therefore, the true development of any country can take place only after educating women or to say, girls. In fact, if the literacy rate of women is increased, then there is tremendous change in the quality of life at home as well as outside home. To achieve this, we must promote and educate children education particularly the education of girls. A reduced mortality rate also must be ensured.

STATUS OF GIRLS' EDUCATION IN INDIA

There is an African saying, "If you educate a man you educate an individual but if you educate a woman you educate an entire nation". During 2015 only, as many as 3.7 million girls in India did not attend the school. In rural areas the situation was worse as the girls received less than four years of education on an average in the same year. In India, women constitute approximately 48.72% of the entire population. Thus, they form a very valuable portion of the entire human capital of the country and therefore if we want to develop the country, the education of women population or girl population cannot be ignored at all. Only then there will be a sustainable development in the long term.

Although during the last 70 years or so after independence in 1947 there has been a substantial and remarkable increase in the literacy rate among women due to the sincere efforts on the part of state and the central governments, various agencies, NGOs and private sector operators, the situation is still an enigma particularly in rural areas. As per the census of 2011, the literacy rate among women in India was 65.46% against the literacy rate among men of 82.14% and against the national average of 74.04%. India is ranked 105 amongst 128 countries as per Education for All Development Index. This needs to be improved substantially.

The real challenge in the context of girl education is the completion of their school education to the fullest. It has been experienced that even after taking admission to the school, many of the girls dropout particularly at the secondary level. The dropout rate is also higher among girls as compared to boys.

As pe the NCPCR report, 2018, around 39.4 percent of school going girls in the 15 to18 age group do not attend any educational institution, and a significant majority — around 65%— of them are "engaged in household activities, are dependents, or, are engaged in….". Similarly, according to the eleventh Annual Status of Education Report (ASER 2016) released by Pratham Education Foundation in New Delhi on January 18, 2017, the proportion of girls (age group 11to14) remaining out-of-school greater than 8 percent in some of the states in India.

Nevertheless, it is worth mentioning here that after independence the literacy rate among female has increased at a faster rate than the male literacy rate during post-independence period. In fact, the growth is almost 8 times as compared to 3 times in case of male literacy. To be exact, the female literacy rate which was 7.9 percent in 1951 increased to 29.75% in 1981, further to 39.29% in 1991 and to 54.16 percent in 2001. As per the census report of 2011 it was as high as 65.46%.

Similarly, the enrollment of the girl students at the school level is increasing substantially. Currently it is attaining new targets and that is why in some of the departments and faculties nowadays more girls are visible than boys.

Thus, although the situation in India in context of female education appears to be not highly satisfactory but it is steadily improving with the passage of time. Definitely in the near future the female education in India would attain remarkably new heights.

IMPORTANCE OF GIRLS' EDUCATION IN INDIA

Girls education in countries like India cannot be overemphasized mainly due to its multifacet benefits it renders. The biggest advantage is the change in their mindset which motivates them to go out of their home and even seek for the jobs. it brings forth higher degree of self-confidence and self-esteem. It has the economic implications also which helps in reducing poverty and upbringing of their children in a better way and in a better environment.

THE ROOT CAUSES OF WOMEN ILLITERACY IN INDIA

Women illiteracy in India can be attributed to many factors in fact no single factor can be held responsible for this situation. These factors include administrative, demographic, political, educational, culture, economic, social and many others. When translated into real terms, these factors indicate to the problem of greater distance between school and the home, lack of support from the family, poor sanitation facilities in educational institutions and so on.

INITIATIVES BY GOVERNMENT OF INDIA TO IMPROVE EDUCATION AMONG GIRLS

The Government of India recently has taken innumerable initiatives to encourage and promote education among girls within the country. In 2015 a scheme called "Beti Bachao Beti Padhao" was launched with the twin objectives of saving the girl child and educating the girl child. "Sukanya Samriddhi Yojana" scheme was also initiated in 2015 with the purpose of financing the higher education and marriage related expenses of girl child (Ministry of Women and Child Development Report, 2015). Government of India has also assumed responsibility to build washrooms / toilets for girls in every school for mitigating dropout rate in the schools, since according to the Annual Status of Education Report (2014) "at middle and high schools, there is a correlation between the lack of toilets and drop-out rates". To support and promote technical education among girls, a scholarship namely Pragati, has also been launched by the government.

ARTIFICIAL INTELLIGENCE – CONCEPT AND APPLICABILITY

AI is not a new concept. Most of its conceptual and operational intricacies were developed over the last 70 years or so by eminent computer experts and scientists like Alan Turing, Marvin Minsky and John McCarthy. In fact, artificial intelligence had already existed to some extent in many of the organisations and the sectors - private, semi-private as well as government. it is only due to the recent technological and computation advancement that artificial intelligence has gained much of popularity and space in the literature as well as in the practice. Now with the increasing exposure of the organisations to the technology, the artificial intelligence is growing exponentially.

AI may be defined as a combination of various technologies which make the machines capable to behave as near as possible to the human capability of comprehension, sensing and responding. The computer systems through various softwares are enabled to process and analyse and finally infer various data inputs received through images, speeches, sounds etc. The machines also learn

from experiences as they store data inputs within them which are utilised in future to decide about their actions and responses. Due to the diversified advantages of AI, its application in various fields is increasing tremendously.

In scientific terms, AI is "a backend algorithm that programs machines to emulate and extend human behaviour and actions".

Despite losing 16% of jobs in the US to advanced technology, 13.6 million were created last year owing to the same reason. It is, therefore, imperative that educators understand that the human element in teaching is to stay, provided we can reinvent ourselves with the changing times. According to Market Research Future, there will be 38% growth in the education market in the next five years. The institutions therefore should incorporate AI –related tools and technologies – Data science, Machine Learning, Deep Learning and programming languages – to attract the bright minds in the sector.

ARTIFICIAL INTELLIGENCE DRIVES GIRLS' EDUCATION

As mentioned earlier also, the status of male and female in the society will not get equated unless and utill there are differences between the education levels of men and women. Further, it has to be appreciated that attending the school is one thing, and getting the quality education there is another. As per the estimation by 2010 report conducted by the National Council for Teacher Education (India), "an additional 1.2 million teachers were needed to fulfil the RTE Act, India requirements and merely 5% of government schools complied with all the basic standards and infrastructure set by the Act". Moreover, 40% of classrooms had occupancy of more than 30 students. More than 60% didn't have any electricity and more than 21% of the teachers were not trained professionally. In case of government schools particularly Indian ones – which are characterized by overcrowded classrooms, unhygienic surroundings, inadequate number of teachers and so on - the parents may be compelled to decide that it is not worth their child, especially girl child sending to school. Despite many measures have been taken by the respective agencies to improve and expand the state of education in India, a long way is still to go for attaining standards and parameters comparable even to other developing nations.

In these circumstances, AI emerges as one of the effective tools to overcome the deficiency in girls' education particularly in India. In fact, the Internet and technology-based IA really is a game changer within the education sector. According to surveys, even "75% of teachers in USA believe printed books will entirely be replaced by digital learning tools".

In India, especially, the significance of a well-developed education sector equipped with AI is magnified by an amazingly huge young population. Estimates indicate that currently "over half the population of the country is below the age of 25". As the momentum of adopting and adapting digital means of collecting data is increasing fast, it is pertinent that AI through these

technologically advanced digital methods and devices are effectively leveraged to impart better teaching-learning pedagogies.

AI's ability to transform the education sector in India particularly the education of girls is five-pronged as discussed below.

1. AI tutors would supplement the support for girl students

Many a times, teachers as human beings are not able to decide which pedagogy will match the frequency of the majority of their students, due to mainly their incapability to gauge it fully. AI can make or help make these decisions with reduced flaws and errors than human beings.

Nevertheless, the machines, howsoever sophisticated these may be, are machines only and cannot replace human beings. These machines with high-ended programs can teach the students concepts, theory and fundamentals but can help little the students in learning high-order innovation, thinking, visualization, imagination and creativity, something that only real-world teachers can provide and facilitate.

Yet the likelihood of AI teachers being able to execute these tasks in the future cannot be ruled out. The future would witness increasing number of students being taught by digital teachers, rather than by human teachers. Some artificial intelligence-based tutorial programs already are in existence and are in vogue. These can assist or at least supplement girl students effectively through elementary reading, writing, and other related subjects.

2. AI is useful for evaluation and assessments

Till now, it was almost impossible to assess a student objectively in terms of how well he / she had understood the topic or the subject because of limitation of human intelligence and acumen. The current practices focus on assessing the student on overall performance basis which is largely examination based. In the ongoing classroom lecture, whether the student is able to sense and grasp the topic or not is fully dependent on teacher's experience to judge it which may not be accurate always. Assessment should be in terms of the diagnose and not in terms of evaluation. Moreover, not understanding a topic cannot be construed as absence or nullification of intelligence on the part of the student.

AI allows diversity that is difficult for teachers, who are entrusted with several students in a class, to otherwise accommodate. It will soon be possible for a machine to read a student's facial expression to determine if they are struggling to grasp a topic and accordingly modify or slow down a lesson to make it easy to understand.

3. AI reduces time spent on grading and marking

While AI may not fully be able to replace marks awarded by human teachers, it is getting closer. Currently, teachers have to spend a lot of time simply on marking assignments and papers instead of evolving modalities and ways to make teaching-learning a more engaging experience in conjunction with the real-world happenings. Through AI, automated or machine-based marking will be possible particularly in objective or multiple choice-based examinations. Even softwares are being developed to evaluate descriptive or essay-based answers rendering more time availability for human teachers to focus more on student centric activities and their development.

AI can reduce wastage of time and resources at the grading stage because it allows every student to learn how he / she is performing in real-time from both the lens of proficiency level as well as expertise. This critical information can motivate students to try harder throughout, rather than at the end when they see a final grade and it becomes too late to do anything.

4. AI lends itself to personalized education

For generations, educators and trainers have struggled to design a course or teach a skill that resonates with everyone because all of us have varying degrees and different forms of intelligence. The permutations and combinations of teaching mediums to use—audio, visual, kina esthetic—is endless. In short, customizing education for each student is a mammoth task that requires immense time and human resources, which is impossible. However, AI is a tool that can make these barriers a thing of the past.

AI can help not only in evolving and customizing course contents as per the needs and requirements of the students and teachers, but once implemented can also help in providing feedback about the degree of failure or success in terms of the goals of the course. Feedback may be created from the point of view of various stakeholders viz., students, teachers, management and so on. AI can also be effectively used to monitor and regulate the student progression and performance during the currency and after the completion of the course.

5. AI sifts through cluttered content and can point out gaps where course improvement is needed

AI is ideal for filtering the excess information available around. It will help the students use the contents most relevant to them.

It is not practically possible on the part of the teachers to be always aware of gaps in their lectures because the contents of the lectures need frequent adaptation on the basis of the target student groups. Same contents and educational materials may render some group of students confused. Artificial intelligence offers a way to solve that problem. AI can make excellent recommendations after evaluating content at multiple check-points and also redirect students to free learning resources. This type of system helps fill the gaps that can emerge in contents. It also helps ensure that all students, even a heterogeneous group of students, build on the same conceptual clarity and foundation.

6. AI shapes the learning curve

With AI as a virtual teacher, the bias of teacher's judgements is significantly reduced and the system is programmed to judge children in the most egalitarian way. It makes students increasingly confident and eager about learning.

Several learning apps and websites are integrating AI into their systems focusing on concept-based learning with a window for evaluation and feedback.

These apps curriculum is designed for problem-solving to avoid unnecessary learning. Once the problems are solved, AI evaluates the performance at every step before proceeding further. This ensures that students understand basic concepts at the same level.

7. AI streamlines University Education

AI is also instrumental in streamlining university education for girls. For example, if a girl student submits a research paper, the AI-enabled programme evaluates the paper on the covered topics and creates a learning curve profile for her. This helps to understand areas of improvement for the student. This could be especially effective in scoring and evaluating, where AI could assist these girl students in preparing for different exams.

8. AI focusing Girls' Education creates women leaders for AI products

As per a research conducted at Lucerne University of Applied Sciences and Arts, Switzerland women are in a better position to lead an AI team as females follow a more collaborative leadership style. It would be possible only if we use AI effectively for imparting education to girls who once educated will act team leaders for AI products.

INDIA IN ACTION FOR AI

So much importance has been attached with Artificial Intelligence in Indian Education sector that Central Board of Secondary Education (CBSE) of India – a premier Education Board in school education - has decided that artificial intelligence be a part of their syllabi for students. This is a milestone in the Indian education system with an aim to make students conversant with rapidly growing and highly demanding technologies of today's world. The introduction of AI in the education sector, particularly at the school level, has helped ease out the administrative load along with the transformation in the pedagogy of teaching.

Similarly, Indian Institute of Technology (IIT), Ropar has launched five new courses in the BTech and M.Tech programs. These courses have been launched keeping in view the changing technology requirement of the industry. Those enrolling in M.Tech in Computer Science and Engineering will get to specialize in Artificial Intelligence (AI). The course also offers basic and advanced courses on machine learning, AI and Math.

Further, beGalileo, a software uses AI to teach Math in a personalized and interactive form to high school students. A student enrolling in beGalileo goes through an IA-based assessment test called MIDAS. The results of MIDAS are used by the inbuilt intelligence of the system to trail the student's individualised learning curve based on the strengths, weaknesses, interests and knowledge level.

The 'Future Ready Business: Assessing Asia Pacific's growth Potential Through AI' observes that at least one-third of Indian organisations have satrted using AI technologies. They are also expecting to enhance their competitiveness level by 2.3 times by the year 2021.

SIGNIFICANCE OF THE PAPER

The paper analyses the possibility of incorporation of AI in Indian education system particularly for girls. Its significance lies in the fact that once it is done many of the constraints – like lack of teachers, long distances to cover to reach the school, rigid time frame and so on - Indian system in education is facing will be overcome effectively. The women empowerment will really be a reality. It will also generate employment in the field of AI related technology and skill.

CONCLUSION

The paper concludes with the observation that AI with its inherent technological advantages plays a very significant role in enhancing girls' education in developing countries particularly in India, though monitoring personalized and customized learning in the classroom will need many structured and well defined parameters so that it may really be productive, supplementary, secured and direction-based. Finding the perfect balance between traditional, linear learning and complex, non-linear personalized learning is something educators and policy makers will have to keep tweaking as we move forward to greater girls' education.

As very much desirable, the AI also emphasises the need for cultural changes and redefining and repositioning skilling of workforces in newly emerging technologies. It also needs to build upon investment and data to accelerate the AI journey. Further, AI currently cannot replace the power of interpretation a human brain has and it is an area where future research potential lies.

Once all these issues are addressed appropriately and effectively, a high rate of girls' education will definitely be a dream come true very near to SDGs.