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Innovative Technology in Higher Education: Opportunities and Challenges

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ABSTRACT

The rapid rate of technological progress has been a critical aspect of Human History since the advent of the Industrial Revolution. Information Technology has enabled a large amount of flow of Information, ideas, thoughts, goods, and services across the region in a very short time. Higher education is a field that determines the average productivity of Labour, level of innovation, citizenship, and humane qualities in society. Some thinkers contend that the use of Information Technology is highly harmful while some dream of a technological utopia. The paper puts forward the view that reality is situated between extreme viewpoints. This paper discusses the potential of innovative technology in ensuring vast access to data among students; improving the knowledge of students regarding wise use of the Internet; increasing the interaction between teachers and students through Online Platforms; creating scope for greater flexibility as demanded by New Education Policy; increasing the interest of students through the use of Audio-Visual Technology and facilitating education even in times of Corona Pandemic. The paper also brings to light the challenges and limitations in using innovative technology is like a mirage of data reductionism; the paucity of emotional dividends of education; lack of face-to-face interactions among students and teachers; the probability of data banks becoming so static as to be unable to deal with transformations across disciplines,

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and prejudice against past achievements. Finally, the paper points out that as machines cannot substitute Humanity, Teaching equipment cannot replace the teacher.

Keywords: Information Technology, Mirage of Data Reductionism, Infotainment, Democratic Education, Information Overload, Internet Addiction, Emotional Dividends, Zero Marginal Cost Society

INTRODUCTION

This is an era of rapid technological transformation. After the advent of the Industrial Revolution, many inventions and innovations have changed the course of daily lives in different countries. These changes have altered the social, economic, cultural, political, and geographic aspects in many ways. The human population has also grown tremendously in the past 200 years as it has increased from 1 billion in 1830 to more than 7.5 billion in the present time. The total global economy has also expanded exponentially in 200 years.

Information Revolution has been a significant development in the last 30 years. The Internet's invention and expansion have enabled the rapid flow of massive amounts of data, goods, and services among different regions of the World in less time. The penetration of Information and Communication Technology (ICT) has dramatically transformed the space-time matrix as World has become a small place regarding different activities in this World. The concept of *the Global Village* given by Marshall McLuhan is fundamental to grasping the new dimensions of Globalization (Dixon: 2009). Globalization has induced different forms of homogeneities while it has provided a platform to regional sensitivities. This is a crucial phenomenon of this age. Homogeneity refers to the uniformity in various attitudes, practices, preferences, tastes, and consumer behaviours across different countries in the World. The process is called Homogenisation. The tendency of a given place or culture to retain its beliefs, practices, ideas, and norms is stated under the term Localization. Additionally, Globalization has allowed local rules to assume a global following as there has been a massive movement of people across the countries, and Information Technology has enabled people to retain touch with their local places. Information Technology has its challenges amidst a sea of opportunities.

Higher education is an essential aspect of the cumulative potential of any given country. Higher education involves not just the transmission of crucial concepts, ideas, thoughts and practical knowledge in different branches of study. Still, it is also a process that plays a pivotal role in developing good citizens. The skills and capabilities developed among students ensure good economic returns and technological progress in society. The democratic framework also demands greater awareness among students regarding the problems faced by the community and the country and their interest in solving such issues. The students themselves become voters as they cross 18 years. They can act as great vehicles in the diffusion of the latest technological practices and discussion of different dimensions of severe issues along with their possible solutions among members of society. The overall performance of students in Higher Education can become a good yardstick for students in primary, middle and secondary classes.

The impact of advanced Technology on Education is a significant development in contemporary times. Technology has dramatically impacted the structure of knowledge generation, transmission, and diffusion. Some thinkers are overwhelmed by the potential of technological applications, while Conservatives sincerely doubt the benefits of Technology in Education. The paper contends that Technology is a balanced blessing as it also has some critical problems and challenges. Technology has significant advantages which can be efficiently reaped only if we are aware and conscious of its deficiencies and strive to reduce the demerits to great extent. On the other hand, there is no point in isolating ourselves from technological advancements. It has been contended that Technology must aid and assist the teacher but must not substitute the teacher, as Machines cannot substitute Humanity.

APPROACHES TOWARDS EDUCATION

Any analysis of Technological Impact on Education can only be completed with an understanding of critical approaches related to education. The Idealistic approach contends that the development of a student's character is the essential function of education. This viewpoint was emphasized by Plato, who claimed that the entire material World is just a replica of concepts. This approach prefers Ideas over Material Realities. Mahatma Gandhi and Swami Vivekanand were also supporters of this approach. Under the modern context, this

approach criticizes Modern Education for ignoring students' character development. It views Modern Education as only related to the theoretical knowledge of students. Character building implies the development of traits like honesty, truthfulness, simplicity, patience, appropriate control and regulation of one's desires, respect for the opposite gender, and consideration for human beings without identity biases. Character Building ensures that an individual can perform his role correctly for his family, society, and country. It will also lead to the solution of many socio-cultural problems (Vivekanand: 2008).

Another approach towards education is related to enhancing Vocational Skills among students. This approach believes that Educational System must enable students to earn their living by learning essential crafts. This was supported by Mahatma Gandhi who was also a great advocate of Moral Education (Mishra: 2015). This approach is related to students' employability as most students fail to get employment since the theoretical aspect needs to be more emphasized in education. Employability refers to the potential in an individual that will enable him to find a job suited to their skills. The Government policy related to Skill India is an affirmation of this approach.

The naturalistic approach emphasizes that education can prosper best in the vicinity of nature. It contends that nature is the best teacher, as human beings are greatly influenced by their experiences of nature. Tagore was a great supporter of this approach (Roy: 2017). The natural process shapes education as per the students' natural environment. Most modern education appears difficult for students as they need help to appropriately relate to the concepts taught to them. The grasping power of students is more in fields related to their environmental settings. This approach supports the scientific aspects of education as it believes in close observation and analysis of nature as integral ingredients of education. It is quite correct in criticizing the artificiality of Modern Civilization and aims to bring a natural aspect of human thought to the forefront. This is also important in light of environmental degradation as anthropogenic activities have deteriorated the physical, chemical and biological properties of Air, Water, Soil, Rivers and Seas. Humanity's very existence has been endangered by global warming; deforestation; non-biodegradable waste; desertification; extinction, and endangerment of animal species.

The liberal approach contends that education must aim to develop the spirit of freedom among the people. Education must never be reduced to rote learning but must enhance the capability of students to understand and analyze an event, phenomenon, concept or idea. Education must improve the Rational aspects of human nature so that he is able to struggle against superstitions, mindless rituals, and irrational beliefs. Finally, education must improve the people's capability to engage in civic engagement. John Henry Newman, Thomas Huxley and J. S. Mill were great supporters of this approach.

John Dewey was a great advocate of democratic education, which implies universal access to education (Palmer: 2001). This aspect is highly significant in the case of democratic societies. It is different from the Elitist approach, which contends that education must be confined to the few worthy sections of society. Many countries, including India, have accepted this aspect. They aim to provide universal education to all till secondary classes and set their target of a high Gross Enrolment Ratio in Higher Education. Democratization of Education can improve the learning capabilities of a more significant section of society and enable people to perform their roles more effectively, efficiently, and consciously in the democratic structure.

BENEFITS OF INNOVATIVE TECHNOLOGY

Innovative Technology is an effective means of improving the overall quality and efficiency of higher education. Firstly, it enables the setting up *data banks* in different courses of study. The students can refer to data banks relevant to their allotted subjects and other fields in which they are interested. The excellent quality of knowledge ensured under proper direction, supervision, regulation, necessary corrections, and amendments can ensure that students do not feel the great divide that has historically been present among different regions of the country. The data bank can act as a great supplement to routine teaching practices. The importance of a data bank is that knowledge, articulation, and explanation of educational content prepared by field experts are well preserved and made accessible to all students in the country.

Secondly, the students can be encouraged to use the Internet properly, which is not only an ocean of knowledge but also has substantial harmful materials that can mislead and misguide

students. The problems of Information Overload and Internet Addiction have become grave that need to be seriously addressed. Information Overload implies that the massive amount of Information available on the Internet can prevent a person from efficiently referring to only desired, limited, relevant Information related to a given topic. He may waste his efforts and energy and spend a lot of time on Information that is not useful to him. He may also need clarification due to the overloading of Information. There is a tendency towards more effective heuristics rather than systematic information processing (Hong: 2020). Internet Addiction is the tendency to spend a lot of time doing different activities on the Internet. This can hurt the eyesight of individuals, cause a lack of physical activities by individuals, lead to sleeping problems and the problem of indigestion, along with a greater risk of lifestyle diseases like diabetes, high blood pressure etc. Internet addiction is related to an increase in anxiety and depression among students (Kumar et al.: 2018). It is only through a proper discussion on the Internet in classrooms that the students can be expected to benefit from their teachers' more significant and fruitful experiences.

Thirdly, adopting Innovative Technology can increase curriculum flexibility as the New Education Policy is also desired. The removal of barriers among different courses of study will enable students to embrace the interdisciplinary approach. It will also reduce the Psychological Complexities of superiority and inferiority among students of other branches in the current educational framework. The interconnection and interdependence of subjects are so important that proper dialogue and discussion must be developed among students of different fields. Removing a rigid separation between Sciences and Humanities will enable the specialists of sciences to critically understand the social, economic and cultural aspects of Science and Technology. At the same time, the experts of Humanity can become more aware of Scientific and Technological Advancements. This will enrich the perspective of adherents of both branches.

Fourthly, using Online Platforms like Google Meet and Zoom has helped the educational system continue teaching activities even in the harsh, challenging circumstances of COVID-19. This has protected the health of students and teachers while allowing them to make fruitful use of time. The Online Platform has helped interactions between students and

teachers as some shy, hesitant students can ask questions and express their opinions through Chats. There is ample scope for sharing the vast amount of educational data through Online Social Groups especially created for this purpose. The Online Platform is new, and challenges are inherent in any new technology as adjustment demands time. The effective command teachers have in an offline class ensures discipline and increased concentration among students. This needs to be more present in Online teaching. The Online Platform can be mixed with the Offline Platform in Post COVID period with great benefits as the advantages of both Platforms can be adequately reaped.

Fifthly, using smart classrooms can enable students to learn much from valuable documentaries, lectures, and online events. Collective learning can be a great exercise in the field of *Infotainment*. This is aptly mixing the content of informative values with entertainment aspects. The students enjoy watching something in groups and will learn under the guidance and direction of their teachers (Gaille: 2018).

The disadvantage of the Traditional Method is the need for more use of audio-visual techniques. Such plans are necessary to avoid boredom among many students. Smart classes also increase the technological awareness of both teachers and students, enabling them to become tech-savvy. In this era of tectonic technological shifts, everyone needs to develop curiosity and will to learn, adopt and adapt to new technological developments. It has been found by the study that the use of digital technology has a positive impact on the learning outcome of students (Lin: 2017).

COST OF INNOVATIVE TECHNOLOGY

The cost of innovative Technology is an essential aspect related to the practical application of Innovation Technology in our country. This is because India is still a lower-middle-income economy. Though our economy is estimated to have grown more than 7 times from 1995 to 2020 (from around 0.36 trillion dollars to about 2.7 trillion dollars in 2020), our per capita income is just above 2000 Dollars. Our expenditure on education is still a relatively small part of our Budget. It is proposed to be around 38,000 crores Rupees which is just above 1 per cent of the total expenditure proposed in the Budget. Therefore, the total amount spent on

Innovative techniques is minimal. Welfare expenditure is essential for the requirements of poor people in the country. Countries with high per capita income have greater flexibility and scope in utilizing Innovative Technology. For instance, China has greater scope in applying such Technology as their economy is about 5 times larger than the Indian economy. Expensive devices with limited penetration must be avoided. Information Technology has become cheaper, and total users of Smartphones have grown tremendously in the past 5 years or so. The cost of data has also been reduced to a great extent, and unlimited data consumption in India is one of the cheapest in the World.

The concept of Zero Marginal Cost Society given by Jeremy Rifkins is applicable to an extent for Internet Data in India. Rifkins contends that tremendous technological inventions and innovations tend to reduce the cost of the product to such an extent that the Marginal cost almost becomes Zero (Rifkins: 2014). When the cost is reduced to such an extent, the price is also significantly reduced, and almost everyone can then purchase the product without much difficulty. The approach of Rifkins is critical to analyze the shifts in the digital divide in the country. The extreme reduction in price through Private and Government efforts can help in the near-universal penetration of data in our country as the poor people with low purchasing power can also access Technology in case of a significant price reduction.

A few scholars contended that the use of Technology only tends to increase the total cost as the additional cost is over the existing cost related to the salary of teachers and establishment staff. However, this view is erroneous because the per capita student cost is effectively reduced if the penetration of Technology is to a large number of students. This is due to the operation of the Law of Economic Scale. Moreover, the enhancement of students' skills can go a long way in setting up a proper Start-up Ecosystem that can give much larger returns to society. Furthermore, learning skills will increase average labour productivity, which will also prove advantageous for the country's economy.

LIMITATIONS OF INNOVATIVE TECHNOLOGY

Although innovative technology has great potential to positively impact students' overall education, it has certain limitations. The most critical limitation is related to the phenomenon

that can be termed *the Mirage of Data Reductionism*. This refers to the fake confidence that every important aspect of human activity can be written in the form of data and can be mechanically transferred across the people in society. The reality is that subjectivity is an essential ingredient of Human Life. The personal narration of one's experiences, perceptions, perspectives, knowledge, and cultural attitudes is too rich to be aptly stated in some data codes. Teaching is an activity where students are not just mechanically fed with important Information, concepts and facts related to their fields but also learn a lot from the speaking style, teaching behaviour, personality, and personal experience of their teachers. The teachers have a significant role in protecting, preserving, and enriching the cultural specificities of a given region. Textbooks are supposed to emphasize only some of the practical aspects of students' problems in different life fields. Still, teachers can teach a lot about life's challenges realistically and interestingly. Higher education is aimed at developing the critical faculties of students where strong personal and emotional connections between teachers and students can play a significant role.

Secondly, Innovative Technology, if overused, can lead to a scarcity of Emotional Dividends of Education. Emotional Dividends refer to gains attained by an individual, family, social group, society, and country through the proper development of emotional aspects in students' behaviour through the Educational Process. The aim of education is not related to the mere development of the cognitive faculties of students but also their Emotional Development. Emotion has been rated as an essential component of Intelligence in *Emotional Intelligence*. The traditional educational system must be credited for developing an excellent interaction between teachers and students on one level and a very close relationship among the students who developed their own friend circles. This is important not only for developing the students' personalities but also ensures that they may play an essential role in social coordination and cooperation. The mechanical approach might seem beneficial in the short term but is harmful in the long run. Lack of personal interactions may prevent the development of empathy and emotional considerations among both students and teachers.

Thirdly, Innovative Technology must maintain the face-to-face interactions among the students. This is because face-to-face interaction develops confidence among the students

and leads to greater trust. This leads to more knowledge sharing and discussion of ideas and thoughts that further enhance the skills of all students. With all the discourses related to Intellectual Property Rights, knowledge has never been an atomistic and alienated phenomenon. On the contrary, knowledge prospers among knowledge-hungry people and personal interactions developed in classrooms have played an essential part in this regard. Fourthly, education is a highly dynamic phenomenon in contemporary times. To maintain the dynamism, new development related to fields must be incorporated into the syllabus of different subjects. The traditional static approach related to syllabus has already caused great harm to Academic Development and Research in our country. Therefore, there is an additional need for teacher keeps themselves well aware of the recent developments and distills the knowledge related to them among their students. This is also necessities a necessary precaution regarding the creation of Data Banks. They must be thoroughly updated, and the teachers must ensure that they stay active.

Last but not least, education often becomes biased towards the novel use of Technology. It tends to ignore past generations' potential and achievements based on the absence of technology. It must be emphasized that time is a flowing Reality, and the present is significantly related to the past in terms of both continuities and breaks. Therefore, the gift must never exaggerate the technological deficiencies of the past efforts lest the future ignores it for its Technological Obsolescence. The Medium must never be allowed to substitute the Substance as any effort in this direction will bring the downfall of educational standards. Another challenge for Innovative education is that it must be kept from harming the cultural specialities of a region. The 'One Size Fit All' approach must be avoided, and enough space must be given to the cultural sensibilities of the people of the area. It must be ensured that language does not become a barrier in implementing innovative education. The different tools must be tailored to maintain respect for the incredible diversity in our country.

CONCLUSION

Innovative Technology is critical in modernizing and updating educational practices in our country. The role of a teacher in adequately handling and utilizing this Technology for the full development of students is crucial. Technology can play a significant role in the equitable

diffusion of knowledge and Information across regions in the country. India, having a rich demographic dividend, can make proper use of technological transformations as incredibly enlightened and capable youths will tremendously improve the average factor productivity of crores of people. This may generate a high economic growth rate for many years. The Chinese economy has started to mature. Their economic growth rate just before COVID was 6%, much lower than the economic growth of more than 9% that it experienced in 2010. Even Chinese policymakers have accepted in an official document presented in November 2020 that their target for the next 15 years is an average growth rate of about 4.5%, enabling them to double their economy in 2035 from the level of 2020. Experts have predicted that the Chinese economy will grow even slower. If India makes rapid progress, it may reduce the economic gap with China to a great extent. Higher education can play a significant role in this regard as it can increase students' skills and capacities to a great extent. However, the technologies cannot replace the experience and teaching skills of teachers who enrich the students with practical examples. The need of the hour is Blended teaching which will allow the proper use of online and offline platforms. The country's great culture can be preserved and promoted by sufficient human involvement as cultural attitudes, beliefs, practises, and preferences cannot be all reduced into data sets. The Technology will increase students' and teachers' awareness and consciousness levels regarding new developments, enabling them to learn new skills and make proper adjustments and modifications accordingly.

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