

TO STUDY THE FACTORS INFLUENCING TECHNOLOGY PENETRATION IN EDUCATION SECTOR LEADING TO SUSTAINABLE DEVELOPMENT

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ABSTRACT

Technology is seen as a tool to improve the effectiveness of teaching – learning processes. These days' smart technologies are seen as key components to bring massive changes in the education sector right from primary education in schools to higher educational institutions. The penetration of technology is leading the educational industry in evolving to benefit both learners as well as educators. Considering the benefits of technology usage in the educational industry, the governing body All India Council for Technical Education (AICTE) is also taking various initiatives to bring technology into education. This aims to facilitate the quality of education to learners so as to make them industry ready with required skills. The technological evolution taking place from the last fifteen to twenty years is a smooth process resulting in changing needs of the business economy. The information technology and digital media development has led to subsequent stages to the concept from Education 1.0 to Education 4.0.

This research paper focuses on developments in the education sector right from Education 1.0 to Education 4.0 along with changing trends in industry leading to Industrial Revolution 4.0 as on date. This research work also discusses the factors contributing to the development of the Education 4.0 environment for sustainable development of skilled workforce required by the industry.

Keywords: Education 4.0, Industrial Revolution 4.0, Sustainable Development, AICTE, Technology

Introduction

The emergence of the internet and IT in the education sector has changed the mode of concept delivery, facilitating a technology platform in the learning environment. Education has evolved over the years in India with an objective of providing competent employees to the corporate. Ciolacu et al., (2017) stated that adoption of new technologies in education institutions is increasing day by day. Gill & Lashine (2003) in their study stated that it is responsible for changing dynamics of education leading to the rise of the edtech market globally.

The first industrial revolution (IR1.0) took place around the year 1712 when "Steam engine" was invented with the aim to mechanize the production. With this, the concept of the classroom was born (Education 1.0). Here, the knowledge dissemination used to take place only by the means of a teacher instructed in classrooms. Chandra & Lloyd (2008) stated that the second industrial revolution (IR 2.0) used electric power for mass production. Its impact was also visible in the educational shift (Education 2.0) leading to standardization, rote learning as well as mass education in large classes for the industrialized system. The third industrial revolution (IR 3.0) used electronics and information technology to automate production and create global supply chains. It brought mainframe computing, personal computing, and, ultimately, the Internet and the Web—the digital revolution. Sony & Naik (2019) stated that Education 3.0 is a student centered approach, wherein student is researching, self- learning and classical style classroom no longer exists. Motta Reis et al., (2020) stated that the fourth industrial revolution (IR 4.0) conceptualizes rapid change to technology due to increasing interconnectivity and smart automation. It is revolutionizing the way companies manufacture, improve and distribute their products. Manufacturers are integrating new technologies, including Internet of Things (IoT), cloud computing and analytics, and AI and machine learning into their production facilities and throughout their operations. Mahajan & Agrawal (2014) in their studies stated that smart factories are equipped with advanced sensors, embedded software and robotics that collect and analyze data and allow for better decision making.

Literature Review

Wallner & Wagner (2016) in their study stated that growth of the online learning market in India will be driven by various factors such as engaging course materials, innovative ways of delivering courses and extensive reach out to distant locations those have limited educational infrastructure.

Qureshi et al., (2021) in their study stated that driven by globalization the social, public and business organizations in India also had to embark on many changes in their management structure and operating practices. Schrand (2008) in his study stated that educational programs had undergone noticeable changes in the

curricula, content, methodology and coverage Ghobakhloo (2020) in his study found that the combination of Artificial Intelligence (AI), robotics, big data and the internet of things is supposed to impact the way of knowledge dissemination and its relevant tasks in the very near future.

Jha & Kumar (2012) in their study found that technological influence is also expected to lead the industry revolution in which the nature as well as roles and responsibilities of jobs will be dramatically transformed. John & Panchanatham (2011) stated that future learners would be provided greater flexibility in choosing their mode of engagement. For example, the balanced mix of campus-based and distance learning on a module-by-module basis may result in better knowledge acquisition by the learner.

Kumar & Dash (2011) in their studies found that sometimes, online lectures may lead to reduced student engagement when lecture is made available online and it is no longer necessary to attend lectures in person. Dhillon (2009) in his study stated that learning analytics would play a very important and major role in helping tutors to develop a holistic view of learners' engagement and progress.

Edwin (2015) in his study stated that changing work culture will need a large proportion of future students to look for flexible approaches to learning because of their work commitments and technology will play a vital role in enabling this change. Hussin (2018) in his study stated that education 4.0 is a technique of learning that is connected with the fourth industrial revolution and focuses on transforming the future of education through advanced technology and automation. Smart technology, artificial intelligence and robotics are part of this industrial revolution.

Objectives

1. To understand the environment of Education 4.0
2. To understand the need for the development of digital learning platform
3. To study the factors associated with the development of digital learning platform

Research Methodology

Research methodology adopted here is a Exploratory & Mixed method (Qualitative as well as Quantitative). Exploratory research is a primary way that leads to qualitative research. It helps to understand and answer the questions of "why" and other factors that have yet to be clearly defined. Exploratory research as a tool also helps to understand an issue or a concept more thoroughly, before attempting to quantify mass responses into statistically inferable data.

Digital Learning Platform

The aim behind the development of digital learning platforms is to focus on availability of more choices of skills development for learners, affordability, and inclusion of education in the formal economy. The GoI is also taking steps forward as recently All India Council for Technical Education (AICTE) has implemented the National Educational Alliance for Technology (NEAT) that will act as a bridge between edtech companies, academic institutions and students.

Here, the idea is to develop a digital infrastructure to expand the e- learning ecosystem. Both the learner and educator will utilize the same platform to be digitally visible and to continue with teaching / learning processes. The purpose of this platform is to enable all the educational institutions under one roof and to be discoverable to all the learners. It will enable discovery of all available courses, enrolling, execution, completion and post completion formalities to be carried out smoothly without mandating learners and educators to come to the same platform at the same time.

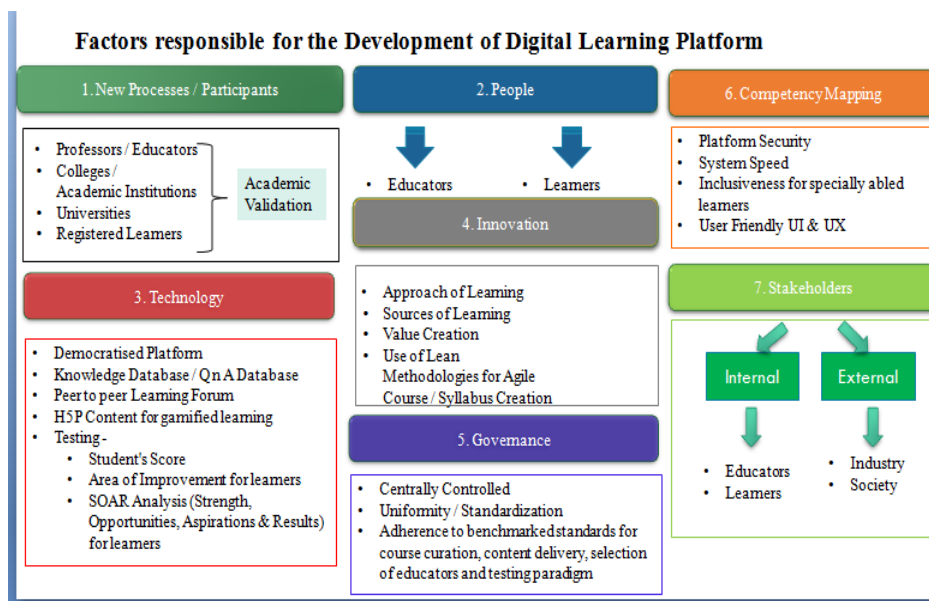


Figure 1: Factors responsible for Development of Digital Learning Platform

Following factors are explained in detail in the context of the development of the above suggested platform.

I. PROCESSES

- Learners willing to opt for higher education in management will have to register to this platform for the first time after completion of degree. On successful registration, learners will be given a Unique Learner Number (ULN) which will be used throughout the process till the time postgraduate degree is awarded.
- Once the registration is done, learners will be given login details to login into the system. Once the learner becomes a member of this platform, he/she will be able to see /surf all the available educational institutions providing various courses / subjects of different disciplines / specializations. Learners need not take admission into a particular institute as it is done now, but he / she can choose the courses of his / her choice from different educational institutes at a time for the completion of his / her higher education. Different courses may have different credits. Learners need to ensure that he / she earns the required number of credits in order to get a postgraduate degree. Learners will get the liberty of choosing different subjects from different educational institutes and they can run in parallel. Learners will have freedom to choose their area of specialization and time duration for course completion. Each chosen subject may have different credits as well as different costs. Learners need to add shortlisted subjects into the cart and complete them either one by one or in parallel within stipulated time. During the execution of a particular subject / course the learner will be evaluated on the basis of different parameters as per the requirements of chosen course.
- From the viewpoint of educational institutions, they have to motivate and train their educators to develop interactive, interesting and value-added courses / subjects which will attract more and more students. The pricing of the developed content may be directly or indirectly related to the difficulty level of the course, ratings of the educator, grading of the educational institution etc.

II. PEOPLE

- The beauty here is from top B-Schools to individual tutors, this platform can be open for all. They need to follow the guidelines while developing the course contents prescribed by the higher authorities belonging to this platform. The course content will be scrutinized and if it is up to the mark then only the course will be activated on the platform. The educator also needs to get registered on this platform. This will help to keep a quality check, authenticity and standardization of the content which will ultimately help to raise the value of the course.
- Learners willing to complete their higher education in management can connect to this open platform and be a part of it. A basic entry level criterion needs to be set for learners willing to register to this platform.
- To minimize the industry – academia gap, various courses from the industry along with hands-on training will also be developed. This will help learners to get a better understanding of skills required at the workplace and prepare themselves accordingly.

III. TECHNOLOGY

1. The success of the entire idea discussed above heavily depends on the type of technology and its execution.
2. First of all an open platform needs to be developed which will have 3 basic views. Learner's view, Educator's view and the backend of the platform.
 - a. The first view will be the learner's view. Initially, learners will get themselves registered on this platform by submitting basic details like full name, educational qualification; marks obtained in CET examination, identity details etc. After successful verification from the backend of the system, a student will be issued a ULN and then only his / her account will get activated. After this the learner will be able to choose his / her area of interest and can view all the available courses / subjects in the chosen discipline. While selecting a particular course / subject, the learner will have freedom to view the ratings of particular course content, educational institute as well as the popularity of individual educators. Students will be provided with basic rules and regulations regarding Number of credit points to be earned for completion of a postgraduate degree, duration of completion, basic work experience requirements etc. Learners can pay online for each course / subject independently, individual receipts of which will be generated by the platform and will be issued to learners. As and when a learner completes the course / subject in all aspects, the credit points assigned to it will be credited to learner's account. After receiving the required credits for the completion of post graduate program, a degree will be awarded to the learner.
 - b. The second view will be the educator's view. Each educational institution / individual learner initially will have to get them registered to this platform. The scrutiny of basic requirements, affiliations etc. will be done by the platform authority and those fulfilling the criteria will be issued their login details same as that of individual learners. Each type of educator (institute or individual tutor) will have to go through the quality check process periodically to ensure the quality of content and its authenticity is maintained throughout. Each educator will be placed based on various criteria like – Number of courses available with them, individual rating of course they have, ratings achieved by their tutors etc. Distribution of affiliation certificates, grading of courses, payments etc. will be taken care of by the backend systems of the platform.
 - c. The third and most crucial area is the backend of the platform. The entire success of this idea is heavily dependent on how efficiently we can manage the backend with multiple processes working concurrently. Its main responsibilities include verification processes of each individual learner as well as educator. Issuing each learner with unique ULN and login details post successful verification of details within stipulated time duration, scrutiny of each educator who applies on the platform and providing each one of them with unique login details on successful completion of verification etc. Data for each learner in terms of number of courses chosen, availed, completed etc. Amount paid credits received etc. will be minutely observed and maintained at the backend. Similarly, in the case of educators the relevant data will be updated and maintained at the backend of the platform.

IV. INNOVATION, GOVERNANCE & COMPETENCY MAPPING

1. This entire idea will bring all the colleges, universities and other educational institutions along with individual tutors on a single platform.
2. Learners will be exposed to a wide range of courses / subjects to select from different institutes / universities which will help to foster required skill sets and global competencies among them.
3. Each type of educator will have to adopt Total Quality Management as well as Continuous Improvement practices to sustain in the competitive environment.
4. For successful execution of this idea careful selection and implementation of technology is of utmost importance.
5. The new governing body needs to be established to control all the activities carried out at learner's end as well as at educator's end.
6. This will lead to a development of a higher educational ecosystem wherein all the stakeholders will be an active part of it. Industrialists may provide updates on changing business trends, educators may develop the courses accordingly and learners will develop themselves according to the changing needs of the industry. The entire process will create a sense of competition among each stakeholder at each level which will ultimately lead to higher management education at different levels and very soon India will become top global competitor in the higher educational sector.

Conclusion

To summarize, we were able to chart out all the macro and micro sub factors that affect the education system and all its participants. A coherent and inclusive education system should have all the above mentioned factors and should dwell upon improvising them through use of new age technological resources like RPA, big data, data analytics which will help us understand the needs of the end user in a granular manner. Based on this analysis, every country- developed or developing can customize their learning programs for better learner engagement.

Future Scope and Limitations

Though the present study is important for policy implementation which is witnessing transition and gearing itself for the next level in education, future study can be diversified in the context of different types of education institutions situated in different geographic areas. Since, Education 4.0 might be at different phases of adoption and implementation in different educational institutions, establishment of linkage between performance management and productivity enhancement on the basis of different parameters will be partial.

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