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HUMAN CAPITAL FORMATION THROUGH VIRTUAL EDUCATION: CURRENT PRACTICES AND FUTURE OPPORTUNITIES

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Abstract

Purpose – This paper aims to represent the conceptual insights into how online education is utilized for human capital formation and critically evaluate the strength, weaknesses, opportunities, and challenges of virtual education for human capital formation in a country like India where many structural problems exist prevails.

Design/methodology/approach – The research methodology is based on the descriptive account of the contemporary situation in India with regard to virtual education for human capital formation. Various secondary sources, both published and unpublished works and data from SWAYAM Portal, have been used. In this paper, The SWOC analysis has been performed to evaluate virtual education's utilization for human capital formation critically.

Findings - The strengths and opportunities of virtual education such as accessibility, flexibility, adaptability, and affordability, increase the coverage of human capital formation and add to the stock of human capital in India. Although it has several weaknesses and challenges, but through increasing the reach of the internet and technical accessories to the common people and by proper implementation of technology in education, quality education can be provided to the people of India.

Research limitations/implications – This study focuses only on the role of virtual education for human capital formation. However, many other indicators play a prominent role in building a nation's human capital. Further, the researcher could empirically evaluate the importance of virtual education in human capital formation.

Originality/value –This paper is one of the first to perform SWOC analysis to critically evaluate the role of virtual education for human capital formation in India.

Keywords: human capital formation, online education, virtual education, e-learning, technology, innovation, digital divide, quality education.

1. INTRODUCTION

From the origin of humans, knowledge was the most prominent thing to the enhancement of the capability and capacity of human beings. Knowledge based education to human beings prepare and develop the better environment for their survival and livelihood. Education makes them aware for their physical and psychological weaknesses and making them more productive & sustainable for their economic and social development. Now, the whole world is moving towards digitalization with the advent of the internet and the education sector has also not remained untouched. At present, online education is considered a supplementary and alternative learning option for human capital formation in the world. Global adoption of technology procures the demand for a highly-skilled workforce, and an online education ecosystem helps to provide such a platform to compete with the world job market. Online learning is expected to be the future of education that provides quality education and enhances the technical capability of human beings. It increases the stock of human capital to derive economic, social, and cultural values. In the present era of education, virtual education or E-learning has become the most demanding teaching-learning method in many institutional organizations (Allen & Seaman, 2011; Ko & Rossen, 2017; Sawang et al., 2013). Online learning tools in education open the door of the ocean of knowledge to explore the information at very wide-range. Online education develops technical and societal skills among people, making them more capable for the virtual job market (Priyanka Singh, Shekhar saroj, 2020). A survey of education ministry officials of UNESCO, UNICEF, and World Bank revealed that online platforms, including television, have a prominent role in providing information in the Asian developing countries during the COVID-19 pandemic (ADB, 2020). In Asian countries, technical knowledge and support were provided during training for online learning and various information and communication technology related tools, and free internet connectivity to the teachers (UNESCO, UNICEF, and World Bank 2020). A study conducted by the UNESCO, UNICEF, reveals that online education is more effective, mostly in developed nations while it adversely affects underdeveloped countries where the economy faces many structural problems. Due to the technological revolution, digital education becomes necessary for all job markets except low-class physical labour work and entails the greater demand for high-skilled workers. According to World Development Report ("World Bank Annu. Rep. 2020," 2020), the employment participation of cognitive-skill intensive jobs has been increased from nineteen percent to twenty-three percent in developing nations and thirty-three percent to forty-one percent in developed countries since 2001. Moreover, the employment participation in the job needed only ordinary skills has been declined from fifty percent to forty-four percent in developing nations and forty-two percent to thirty-two percent in developed countries (World Development Report, ("World Bank Annu. Rep. 2020," 2020). Many traditional institutions of higher education are adopting more initiatives of e-learning to fulfil the citizen`s basic needs of quality education and adding to the India`s knowledge economy (Bhattacharya & Sharma, 2007).

Human capital formation (HCF)

Human capital formation is the transformation of casual physical labour to cognitive skilled labour through providing quality education. It is a lifelong process where people start learning from their childhood to the entire working life through primary, secondary, tertiary education, off or on-the-job training, etc. The education received by a person cannot be bought or sold and treated as wealth, considered human capital. Education is a form of capital that provides productive services of value to the economy and increases the national income as a consequence of addition to the stock of this form of capital (Schultz, 1960). Education is assumed as a prime indicator of human capital formation, which contributes to health & nutritional services and increases the productivity and quality of life of the working population (Gary S. Becker, 1994; Schultz, 1960). Human capital was formally introduced

by a group of economists of the University of Chicago. However, the idea for investing in education originated in the time of Adam Smith for a long-term socio-economic payoff to the individual and a society as a whole (Gary S. Becker, 1994; Mincer, 1984). Some economists also define human capital as the innate-abilities and knowledge & skill that individuals acquire in their entire life (Laroche et al., 1999). Increase in human capital stock through education is considered an indicator of growth in national income and social and political development. The Economist also proves that labour force human capital strongly influences economic growth (Barro, 2001; Gyimah-Brempong et al., 2006; Hanushek & Kimko, 2000).

Virtual education or E-learning

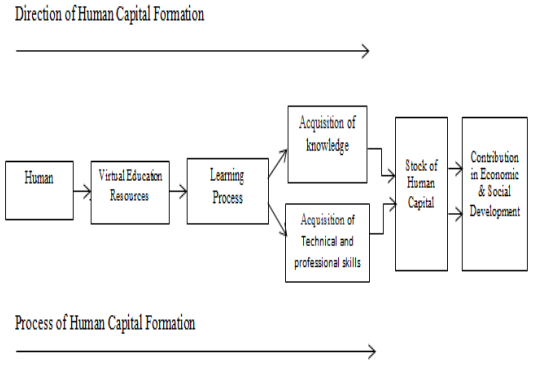
E-leaning is a process of acquiring and disseminating the educational knowledge through the virtual platform where teaching-learning process is being done in or out of the classrooms. It is a network-enabled transfer of skills and knowledge to a large extent of participants at the same or different times. In virtual education research, the researcher uses several terminologies such as E-learning, online learning, open learning, web-based learning, computer-mediated learning, m-learning, etc. This allows the researcher to acquire educational knowledge anytime, anywhere, in any rhythm (Cojocariu et al., 2014). Online learning is a more innovative tool that makes the teaching-learning process more flexible and student-centric. It provides a synchronous or asynchronous environment for the teaching-learning process using different technical devices (e.g., computers, laptops, mobile phones, etc.). Students learn and interact with educators and other students (Singh & Thurman, 2019). The synchronous learning environment is a real-time interaction between instructors and learners where students attend live lectures and get instant feedback. In contrast, an asynchronous learning environment is just the opposite of it. Here, educators-learners do not interact in live lectures or classes. Learning content is stored on a web-based platform or any other storage device. Instant feedback is not possible in this type of learning structure (Currie-Mueller & Littlefield, 2018). After reviewing the development of online education, (Linda Harasim, 2000) defines online learning as a new paradigm of education. Online learning provide freedom of access to online course to both instructor and student but it is more beneficial for students (Previtali & Scarozza, 2019).

This study provides the conceptual framework of human capital formation through virtual education. It also intends to critically evaluate the role of virtual education in human capital formation in India and try to bring into light the present and future challenges and opportunities of virtual education by using SWOC analysis.

Process of human capital formation (HCF) through virtual education

In the process of HCF, virtual education is not only the indicator; many other indicators are also being considered (e.g. traditional education, health, socio-cultural environment, etc.). But in this conceptual model, we focus only on the role of virtual education in HCF. Figure 1 explains the conceptual model of HCF using various virtual educational resources. People use virtual resources such as computers, the internet, mobiles, and various online learning platforms to acquire technical skills and quality education. This whole process is considered HCF; a person acquiring technical knowledge and skills is considered a stock of human capital that increases the economic, social, and cultural value and drives the nation on the path of development.

Fig.1. Conceptual model of human capital formation through virtual education and its outcomes:



Source: Author`s contribution

2. Present scenario of online learning and its contribution to human capital formation in India:

Table.1. *Online platforms and students' enrolment in various online courses*

Sr. No.	Online Portal Provided by Government of India	Number of Partnering institutes	Completed courses	Student Enrollment	Exam Registration	Successful Certification
1.	AICTE	7	131	280628	12030	10233
2.	NPTEL	26	3496	16008172	151599	931545
3.	UGC	133	263	284766	12310	9289
4.	CEC	19	587	1235001	14608	9691
5.	NCERT	8	112	234526	0	0
6.	NIOS	1	174	3132625	0	0
7.	IGNOU	3	111	226547	1908	1440
8.	IIMB	3	105	329250	4861	3383
9.	NITTTR	3	70	183997	1561	961

Source: SWAYAM Portal https://swayam.gov.in/

Table-1 tries to highlight the importance of virtual education on human capital formation and shows the strength of students getting quality education through online platforms provided by the government of India. Table-1 shows the online learning platforms of the Government of India at the official portal of SWAYAM. The table shows that NPTEL and UGC are the most demanding online portal for virtual education. In the table, around 203 partnering institutes are connected with the government online learning platform, providing more than 5000 online courses. So far, more than two crore students have been enrolled in several online courses through the portal provided by the government. Out of these, around one lakh students have got their certificates successfully.

3. Human capital formation through virtual education in India: A critical viewpoints

India is the second most populated country in the world, where most of them are working-age population. On the other hand, India is a developing country where many structural problems prevail. There is under-utilization of labour forces due to lack of innovation & technical knowledge, and unavailability of natural resources. India has a very complex society, where half of the population (female) are supposed to be housewives. Although the scenario has changed and 22.3 percent of the female workforce participate in economic activity (World Bank Estimates, 2021), it is not much satisfactory for the development of a nation. India also has a big curse of 'caste system,' which always works as an obstacle for social and economic development. In the caste system, the whole society is divided into Brahmana, Kshatriya, Vaishya, and Shudra. The first three castes are considered upper caste, and the last is the lower caste. Most of the wealth of country is still in the hand of the upper caste, and the lower caste is still fighting for their survival except few who are well educated and engaged in government employment. India faces the regional disparity on the geographical ground, making it more diverse. As a result, India has a large extent of unemployment, inequality, and poverty, which create the problem of accessibility and affordability of the internet and online educational platforms. It creates the "Digital Divide" among the society, where poor people are becoming more flawed due to the unavailability of digital platforms and rich people becoming richer because of the accessibility of digital learning platforms (Dhawan, 2020). The World Bank`s Human Capital Index (HCI) Update, (Banco Mundial, 2021) states that quality education is low in India, which is directly linked to human

productivity. Besides several obstacles, the online learning method has various advantages, which can be utilized by the people of India in human capital formation. The young generation of India can benefit greatly by adapting technology-based quality education. The huge working population of India can get more benefit when the process of human capital formation follows not only traditional education but also online-based education. In India, virtual education platforms can cover a large extent of population in one time, increasing the education enrolment and adding in the stock of human capital. Online learning is flexible in nature and does not follow the barriers of time and place; people can take education from anywhere according to their own time schedule, which increases the accessibility of education and contributes to human capital formation. (Khaitan, Ankur Shankhwar, Anmol Jeyanth, Nishant Kharbanda, Mankaran Dulipala, Nikhil Jhunjhunwala, 2017). The characteristics of the cost-effectiveness of online education make it more affordable to the people of India. It can also cover the students from the marginalized class and push them into the mainstream of human capital. Virtual education platforms break the regional disparity where people can enrol in education from remote areas and contribute to the economy. Online education provides the facility of repeat telecast of information which increases the understanding capacity of people. The information provided by the online learning platform also provides the asynchronous learning environment where knowledge management can be done for the future generation of India.

4. The SWOC analysis of virtual education for human capital formation

SWOC stands for Strengths, Weaknesses, Opportunities, and Challenges. Strength represents the strong point of virtual education which helps for HCF, and the weaknesses indicate the disadvantages of virtual education that learners face during accessibility of virtual platforms of education. Similarly, opportunities refer to the future scope of development that arises due to new technology adoption. Virtual platforms provide educational resources in accordance with the learner's needs. Challenges are those difficulties that learners face in the adoption of virtual education. It creates a lot of hurdles where virtual education is not much suitable due to several structural problems.

Fig.2. *SWOC analysis of virtual education for human capital formation*

Strength	**Weakness**
• Easy to access • Learners can join the class as his convenience. • Flexibility in leaning and freedom of navigation technology • Optimized and well structural learning sessions • Better and faster communication • Experiencing the global standard of education • More interesting from any other platform • People have learning independency	• Lack of face to face conversation. • Limitation in assessment and feedback of learner. • Dependence on internet connectivity • Expensive resources • Hardware and software incompatibility • Time limitation • Lack of practical session in technical subject
Opportunity	**Challenges**
• Easy to access • Flexibility in the scheduling of classes for teachers • Equal access of learning content to student • Understandable learning content • More options of courses at the same place • Work-life balance • Time saving and • Better cost efficiently for any level of the learner. • Education to all categories of pupil • Lower costs and reuse content for any online e-learning courses	• Lack of motivation • Reduce student engagement • Diminished teacher/student relation • Doubtable integrity and accreditation of virtual programs • Huge number of students (difficulty in engaging students online) • Lack of uniqueness and consistency • Lack of knowledge of technology • Security issues • Difficulty in the understanding of computer knowledge

Source: Author`s Contribution

4.1. Strength

Virtual education has many strong characteristics that provide quality education and strengthen skills and capability. According to Raspopovic, several studies have described the advantages of implementing e-learning technologies in education (Raspopovic et al., 2017). Online learning is easily accessible from any place and provides necessary education from across the boundary. It is also accessible to remote areas where traditional education is not possible or rare. One of the major strengths of online education, it is more flexible in nature. Learners can join the classes at any time, place, and rhythm according to their own feasibility. Most of the students enrolled in a virtual platform are housewives, working people, or engaged somewhere. This education platform helps them acquire the required skills and knowledge and makes them valuable human capital. The other strength of virtual education is time-saving and cost-effectiveness, which increases the affordability of quality education and helps add more stock of human capital. Most of the government of India runs courses that are either free or low-cost so that any student can enroll himself very easily. According to the research, most students agreed that online learning is a strength of saving time, convenient and flexible learning (Mishra et al., 2020). Another strength of Online Learning is screen sharing of the content facility, and cost reduction of commuting and transportation is also one of its strengths. In the time of crisis (e.g., natural or man-made disasters, pandemics like Covid-19, etc.), the closer of places and unsafe traveling can create problems but online learning facilitates the education at doorsteps. We may adjust our procedures and processes based on the demands of the learners using e-learning technologies. There are numerous online tools available, which are essential for a productive and efficient learning environment. With the help of E-Learning learning, learners can achieve their objectives in a very short time period with fewer efforts. The e-learning environment also encourages learners to rely on themselves; thus, instructors are no longer the sole source of knowledge but rather work as guides and mentors (Joshua et al., 2016). From the perspectives of learners or students, several researches have shown the positive effects of e-learning (Chang, 2016; Martínez-Caro et al., 2015; Rawashdeh et al., 2021). For disabled people, the implementation of e-learning works like an opportunity to advance their education from any place.

4.2. Weakness

Virtual learning has several weaknesses which hamper the communication between educators and learners. In the teaching-learning process, many technical difficulties arise which slow down its process (Favale et al., 2020). Although the characteristics of time and location flexibility have the strength of online learning, on the other hand, it creates a lot of problems for those who are not serious. Few researcher identified in their research that online learning plays significant role in developing of hard skills but it is less effective for improving of soft skills (Kamysbayeva, 2021). Even the degree of capabilities, confidence, and comfort with the online education system are different among students. And the student with a lack of self-regulation do not finish their work or assignment on time, or they do poor quality work or assignments. Some students feel uncomfortable while online learning and suffer from frustration and confusion. E-learning is less effective than contemporary offline education due to the absence of face-to-face teacher-learner interaction. This absence of interaction is the biggest drawback of online education (Islam et al., 2015). The online learning process fails to provide a good learning environment for student-student interaction and teacher-students interaction, which cannot develop the capability of working in groups (Gilbert et al., 2015). Bacao and Oliveira, focus on the disadvantages of online learning. According to them, cultural-barrier is one of the online learning weaknesses (Aparicio et al., 2016). Due to lack of motivation in the online learning process, students do not continue their education and drop out or withdraw their enrolment from courses (Raspopovic et al., 2017). The above-discussed weaknesses of online learning can adversely affect the learning process and human capital formation.

4.3. Opportunities

A complete education without technology can't be imagined in the modern era of education. Online learning makes many opportunities available for learners and educators in result, most academic institutions have switched to this education model. It was found in a study that online learning provide a good opportunities to acquisition of skills and knowledge that nurture independence and accountability of student (Kamysbayeva, 2021). Online learning doesn't need additional physical infrastructure for running new courses. As a result, institutions are running several new courses according to the demand of the job market and providing the technical knowledge and skills to the maximum number of students, adding in the stock of the nation's human capital. The online learning platform opens the opportunity to take good quality of education for those residing in remote areas or engaged with some other works.

Online learning platforms open the way of education for people of marginalized socio-economic backgrounds. People who were unable to access quality education due to the cost barrier, after coming into existence of online education platforms, can also enroll in technical and professional courses through online mode with the least cost. Even through online education, students can enroll themselves in various courses simultaneously and enrich their skills and knowledge for the required demand of the job market. The online learning platform also provides opportunities for the repetitive learning process, enhancing understanding knowledge and building more productive human capital for the nation. The biggest opportunity of online education is knowledge management, which can be stored in recordings for future generations and can be further utilized for human capital formation.

4.4. Challenges

E-learning has several advantages, but students often face many challenges that lead to adverse or restricted outcomes. For instance, Arkorful & Abaidoo (2015) outline in their study that E-Learning often suffers from the challenges of remoteness. The result is that the interaction of students with each other is almost zero. Among the primary barriers to e-learning development are the inability to maintain the high quality of education, slow development of technology and knowledge, lack of awareness among the learners, and rigid bureaucracy. There are many challenges in developing E-Learning systems in India, including creating awareness among people living in rural areas, lack of infrastructure, and poor Internet access. E-Learning providers also faced many challenges, such as literacy rates and differences in religion, culture, and gender. Some elements useful for courses may not be acceptable to certain society portions due to spiritual or religious differences. Geographical differences pose significant issues, particularly in Live Class, due to time zone differences. Institutions providing E-Learning also face challenges such as engaging learners and motivating them for participation. The actual challenge of E-Learning is quality. The government has no explicit stipulation regarding E-Learning programs in their educational policies. Most of the students enrolled in E-Learning either housewives or others, come from rural areas. All digital devices, good internet connection, or Wi-Fi are not available to most learners, so lack of proper learning tools and good speed of internet or Wi-Fi can create lots of problems to the learners; as a result, many learners miss out the learning opportunities. The above-discussed issues are the most significant challenges for utilizing virtual learning in human capital formation.

5. Conclusion and Recommendations

The above discussion reveals that virtual education is the next big thing that is user-oriented, appropriate and timely for India's young generation, which plays a significant role in human capital formation. The e-sphere covers almost the universe, with millions of opportunities that provide quality education and make the human capital for the domestic Indian job market and the international job market. Through virtual education, India can utilize its demographic dividend by providing

outsourcing services in the international market. The strengths and opportunities of virtual education such as accessibility, flexibility, adaptability, and affordability increase education coverage among people and add to the stock of human capital in India. Although it has several weaknesses and challenges, but through increasing the reach of internet and technical accessories to the common people and by proper implementation of technology in education, we can provide quality education to the peoples. To stay consistent on purpose and best utilization of technology in education for human capital formation in India, it is necessary to create an environment for virtual education. Accessibility of internet-based technology would be in reach of the ultimate common man of the society. Today, there is a huge competition in the world for each sector, to survive in the society, it is necessary that people would able to perform better in all the course of life. Education is the most prominent course of life which convert unskilled labour into human capital, so that advancement in education as uses of virtual education would be adopted by the society as soon as for creating a better environment for economic and social development. Education is the first priority of any government and for off-campus courses, Indian Governments still doing its best, but technological changes made a difference in traditional education and modern technology-based education, where Indian education system is lacking. So, there is an urgent need to restructure the whole education system with the uses of modern technology and it should be applicable from primary to higher education. There are several regions in India, totally unreached to internet and other basic technologies, which need to be updated as parralel to developed regions. Before Covid-19, most of Indian thought that online or virtual education cannot fulfil the all need of educational requirement but during covid-19, it is proved that providing education is possible and easier. Our brain always thinks according to present scenario but if we properly train our brain to think differently, it will do it. Virtual education work in a similar way where our mindsets not allowing to get benefit of virtual education, so there should be a compulsion to all the students that they will get half of their education through virtual mode, gradually each and every human will become familiar with it as traditional education. There are lots of other benefits, such as it will reduce the low cost of education, low transportation cost, low living cost etc. by which education will be in reach of poor people also. Nowdays, virtual education is very necessary to strengthen the people with knowledge and skill, which resulted into economic and social development of peoples. Economic and social development of any country make it more efficient and empowered which fix a repute of nation in the world. Education changes the life of generations and upgrade the living of individuals. Since India is developing country and education is one of the most important reasons behind it. Government education expenditure will also be reduced as virtual education cost will be low, so there should be a promotion for virtual education and it should be acceptable everywhere. The government should emphasize the legal aspects of the certification and acceptability of virtual education in the job market. In India, most employers still do not consider suitable to employees having degrees/certificates through virtual education for the organisation and avoid hiring higher employees in their organizations.

A lot of tools are available, teachers are required to choose the best tool and implement it to impart education to their students. Academic institutions can prepare a step-by-step guide that can guide the teachers and students on how to access and use various e-learning tools and how to cover major curriculum content via these technologies, thereby reducing digital illiteracy. Teachers can present the curriculum in various formats; they can use videos, audio, and texts. It is beneficial if educators complement their lectures with video chats, virtual meetings, and so on. From the above discussion, we can conclude that, in a developing country like India, virtual education plays a significant role in human capital formation, especially in the modern era of education.

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