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ROLE OF ICT AND MULTI-DISCIPLINARY APPROACHES TO ENHANCE QUALITY EDUCATION IN INDIA TO IMPLICATE BUSINESS CREATIONS

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Original Article

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Abstract

In the education system, ICT has become a part of human life. The trend to persist in the upcoming years will be anticipated. ICT literacy has become a functional requirement in people's lives. Multidisciplinary teaching, which provides heterogeneous training experiences for learners with ICT, can open learners' eyes to various dimensions, such as solving real-world problems from different perspectives with holistic education and enhancing collaborative skills that they had never considered before. Therefore, the Indian government aimed to transform the way children receive education by incorporating various educational policies into the Third Amendment Act of the Indian Constitution. The government introduces various changes and multidisciplinary approaches to enhance the quality of education in India. ICT adds value to teaching and learning by encouraging multidisciplinary education in accordance with our vision for the future. Integration of ICT (Information and Communication Technology), augmented-virtual reality (AVR), and artificial intelligence (AI) provided various opportunities for both rural and urban regions in both underdeveloped and developing countries. A final online survey was conducted, with the expectation that the results will inspire policymakers and learners to boost sustainable productivity through the promotion of ICT-digital technologies, thereby enhancing the quality of future education and assisting the youth in finding solutions.

Keywords: Artificial Intelligence; Augmented-Virtual Reality; Information and Communication Technology; Multidisciplinary Approach; National Education Policy; Quality Education

Introduction

In India, the right to education is the primary right of every citizen, whether a child is from an undeveloped, secluded village or a high-profile society [1]. According to the Indian Constitution, Article 45 says that every child up to the age of fourteen should possess fundamental primary education [2]. Comparing the pre- and post-independence eras reveals a significant improvement in the quality of education. Among 145 countries, India ranks 92nd in the field of education [3]. However, India needs to implement certain changes to improve the quality of education. As a result, the National Education Policy (NEP) 2020 has formulated various changes in the education system to develop a new India [4]. The main aim of higher education in the 21st century is to develop society through quality research and education [5]. In the 21st century, a transformation in HEIs' learning, evaluation, and teaching processes is possible only by innovating intelligent technologies [6].

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In the age of technology, everything and everyone seems to do something with communications and computers [7]. Today, our society is referred to as the information society. Therefore, ICT permeates every aspect of life. ICT finds application in various fields such as business, education, agriculture, administration, marketing, telecommunication, security, tourism, and homemaking [8]. Various electronic and engineering devices facilitate the use of ICT. It is an extended form of information technology (IT) [9]. The integration of computers, telecommunications, essential software, audio-visuals, and storage enables users to transmit, access, store, and manipulate information. ICT consists of any communication device, such as phones, network hardware, television, radio, and satellite systems [10].

To reform India into an information economy and digitally enabled society, the Government of India launched a program named "Digital India" in 2015 [11]. The primary goal of NEP 2020 is to improve and reframe the nation's educational infrastructure. In this connection, the government established the National Education Technology Forum (NETF), which is considered India's first education policy of the 21st century [12]. The major step in the policy is to make India a global knowledge centre. The policy has changed the education system in terms of equality and diversity, accessibility, and quality. The policy also aims at developing a global sustainable development goal (SDG) in higher education [13]. Therefore, the paper aims to answer how the introduced NEP 2020 on multidisciplinary learning approach is going to reform the education system in India and the integration of ICT in enhancing the quality of the education system, mainly in HEIs, which helps students to be splendiferous in various sectors.

Motivation

Various virtual environments in integrated technology and e-science, such as AVR, cloud computing, blockchain, the internet of things (IoT), and AI, serve as the most effective leading technologies and ICT platforms, facilitating quick, healthy, and effective interactions between facilitators and learners worldwide. Over the years, we haven't paid enough attention to major issues like the commercialization of higher education, the scarcity of teaching faculty, outdated infrastructure, industry rejections, insufficient competency development for new ventures, and the lack of a quality-focused vision. Therefore, the gaps are expanding in scope and intensity. Though the state and union governments should shoulder greater responsibility, it is highly desirable to enhance other stakeholders' participation in strengthening the system and eliminating its weaknesses.

Key Objectives

The key objectives are stated below:

- The authors aim to investigate two main objectives to enhance the quality of education, which are the integration of ICT into education and the execution of a multidisciplinary strategy by NEP 2020.
- They will explore the potential of higher education under NEP 2020 and how it can improve the quality of the educational system.
- The goal is to study how HEI (Higher Education Institution) is using ICT in the administration of campus and academics, establishing, training staff members and faculty, and adapting ICT-enabled education towards the 21st century.
- Through a high-quality survey, we aim to gather responses from diverse participants regarding the previously mentioned goals.

Literature Review

Jimmy et al. [14] established collaborative learning by promoting various technologies for the betterment of 21st century STEM (Science, Technology, Engineering, and Mathematics) subjects. Also included is teacher access to ICT education, software, and technology infrastructure for STEM subjects. The author mainly focused on integrating ICT.

STEM subjects have the potential to enhance the quality of the education system in Kenya. Mishra [15] summarized that the students and teachers used ICT tools to gather, search, transmit, and report important information. The most popular ICT tools suggested by the author on campus are the printer, computer, cell phone, and multimedia projector. Kumar et al. [16] explained the transformation of the education system using the proposed NEP 2020. The author gave a brief description of SDG4 of 2030, major interventions, challenges, and the teaching method during COVID-19. Singh et al. [17] presented a case study of online learning during the COVID-19 period in the Indian higher education system. The author stated that, during COVID-19, ICT, online learning, and e-learning are very helpful for both teachers and students. Nadar [18] gave a brief description of the major challenges and issues in the Indian education system.

Problem statement

The major issues and challenges in the Indian education system include a lack of quality education, improper value education, corruption in education, dissemblance in education, a lack of facilities, poor women's education, and a woebegone curriculum. Recently, the entire world faced a severe disease known as COVID-19, which prevented students and teachers from engaging in physical interaction or attending classes. At this juncture, ICT plays a major role [19]. The Department of School Education and Literacy and the Ministry of Human Resources Development (MHRD) have launched various government initiatives, including the Shiksha van, the National Repository of Open Educational Resources (NROER), the Swayam Prabha channel, E-Pathshala, and Diksha. However, the introduction of STEM subjects and ICT not only improves the quality of the education system, but also introduces a multidisciplinary approach that can enhance students' knowledge and skill power. This enables students to apply the same techniques to handle any situation in a collaborative environment.

Methodology

The study delves into the use of information and communication technology (ICT) by 21st century higher education institutions (HEIs) and proposes the National Education Policy (NEP 2020) as a means of enhancing school and higher education in India. NEP 2020 aims to encourage the use of a multidisciplinary approach to improve the Indian education system. The authors conducted a survey with various experienced people to gather reviews related to the integration of ICT in education. The survey aims to address questions related to improving the quality of the education system. The authors conducted an online survey with a total of 600 participants. The entire group of respondents held a Ph.D. degree and had at least 10 years of experience working in various industry firms in India. Both the male and female respondents include deans, engineers, scientists, vice chancellors, and research scholars. The respondents' questions included the demand and need for ICT in education, the scope and limitations of ICT, preparedness and awareness of the merits and demerits of digital tools and technology, and different ways to improve it.

Multidisciplinary approach in education system

Multidisciplinary approaches in the education system are a novel approach that allows students to explore themselves and learn a variety of curriculum or subjects from different domains. This exceptional education system in India has the potential to significantly transform the learning and teaching process. A multidisciplinary approach means that a student pursuing engineering can also choose subjects from the humanities to learn from and benefit from. The main benefit of a multidisciplinary approach is that it offers the students the opportunity to learn about their interests in subjects that they are passionate about along with mainstream education; it helps to improve the pragmatic attitude of the students; and it can enhance the collaborative teacher-student relationship, which can be accessible in any situation. There are both merits and demerits to the multidisciplinary education system. One of the advantages of having a multidisciplinary approach to education is that students can solve complex real-world problems in any area of interest. Teachers use holistic education as a method to demonstrate the social, emotional, ethical, and academic needs of students in an integrated learning environment. In holistic education, the main four pillars of learning are: learning to learn, learning to do, learning to leave together, and learning to be. The basic principles of holistic education include teaching for human development, honouring students as individuals, emphasizing the central role of experience, promoting holistic education, highlighting the new role of educators, promoting freedom of choice, preparing students for a participatory democracy, promoting global citizenship, promoting earth literacy, and fostering spirituality and education. The real-time benefits of holistic education are that it can enhance academic achievement, improve emotional and mental well-

being, increase problem-solving capacity, and reduce the impact of inequalities. This helps the learners be supportive in solving any challenges.

Prior to NEP implementation, the education system fully engaged students in their respective subjects. After the implementation of NEPs, STEM subjects gained prominence. They now introduce ICT integration into education to enhance its quality. Incipient is very profitable for beginners. Despite the introduction of new education system policies, future education policies should consider certain recommendations. Below, the authors outline the key features of NEP 2020 for higher education.

Scope for higher education

In India, multiple higher education regulators are going to connect with a single regulator, the Higher Education Commission of India (HECI). The National Certification Council (NAC) will replace certifications like NBA, NIRF, and NAAC. The National Research Foundation will provide innovation and research funding for higher education. The NEP encouraged a multidisciplinary education model for HEIs. The NEP has set a deadline of 2030 for HEIs to transition to a multidisciplinary model, aiming to accommodate 3000 students by 2040. The multidisciplinary institutes may be of three types: teaching-intensive universities, research-intensive universities, or autonomous colleges granting degrees. Additionally, there are high-research universities known as MERUs, such as IITs and NITs. NEP promotes holistic and multidisciplinary education, enabling students to pursue their preferred subjects at the undergraduate (UG) level. Additionally, the government is attempting to establish multidisciplinary education and research universities (MERUs) with globalized educational standards such as IITs and IIMs.

Benefits of NEP 2020 in education system

The NEP 2020 looks forward to filling the gap in India's education system. The NEP includes early childhood care and education (ECCE), which promotes better development, overall learning, and well-being. For children under the age of eight, the NCERT (National Council of Educational Research and Training) plans to generate a national curriculum and pedagogical architecture. It will use the cooperation of international communities and their experience to execute the challenges. It can provide multiple exit and entry options for students to continue their higher education after taking a small break from employment. This proposal will remodel the education system in India. NEP 2020 should consider some suggestions such as encouraging research, making the publication of research papers and patents compulsory during post-graduation courses, and making online contents like journals, patents, books, and papers freely available to all students registered in HEIs.

Integration of ICT in Multidisciplinary education system

ICT enhances the quality of education by enabling easier access to resources. Better access to ICT platforms and tools for everyone, most probably in low-income and remote communities, is a challenging task for both decision-makers and educational policymakers. Inventing a technology and becoming successful is possible if it is accessible and used by the majority of stakeholders in any country. The government has analysed the effectiveness of ICT tools and started to launch digital initiatives in which teachers and students can gather information from any part of the world. As smart phone and internet usage rises, we encourage the use of digital platforms like Microsoft Teams, Zoom, Google Classroom, and Zoom. When internet speeds drop, we optimize these platforms for remote learning. This allows students to avoid isolation and instead engage in social interactions.

The COVID-19 pandemic had a tremendous impact on India's education sector. When school-going children tend to sit at home, this leads to various opportunities for innovations. To reach students remotely, old technologies such as radio and television became more impactful. National digital platforms such as Nishtha, Diksha, and e-Pathshala, as well as the national teacher platform (NTP), have gained popularity among teachers. Teachers can overcome technological challenges by utilizing various teacher training modules. These online and digital platforms not only provide teachers with new skills, but they also help us grow as a community by sharing the best practices. These tools are designed to empower teachers to deliver high-quality education.

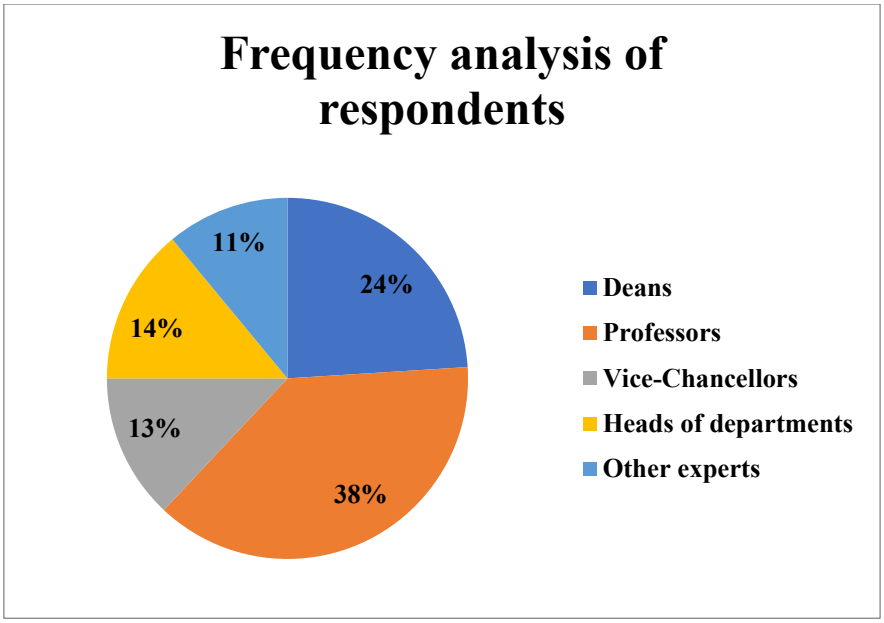
Importance of ICT in education

There are various benefits to integrating ICT into education. Some of the most important aspects of ICT in education include e-learning, or online learning; fostering inclusion, equality, and diversity; promoting higher-order thinking skills and conceptual understanding; providing flexibility and mobility for student choice; fostering collaboration; increasing GER (Gross Enrolment Ratio); and supporting regional language learners.

Discussion

The authors conducted an online survey with experienced and expert individuals to determine the advantages of ICT integration by HEIs in improving the quality of teaching and learning approaches. The section provides a brief description of the steps taken to conduct the survey. The major steps included in the survey are data collection, pre-processing, and classification. Figure 1 displays a frequency analysis of the respondents. The respondents consist of 78% males and 22% females, including deans, professors, vice chancellors, heads of departments, and other experts. The 600 experts selected to respond to the given questions are highly qualified, learned, and skilled. The respondents selected are not only from STEM but also from various domains such as engineering, mathematics, senior scientists, spirituality, and science.

Figure 1: Frequency Analysis of Respondents



Source: Collected by Author

Data collection

HEIs conducted a high-quality online survey to collect valuable insights and feedback on the integration of ICT in the education system. The survey consists of a questionnaire developed to gather details on integrating ICT into the education system for a successful future. Experts describe the questionnaire as a research instrument that consists of a set of questions designed to capture responses from top experts in a standardized manner. The questionnaire's quality is determined by various factors such as topics covered, format, content of questions, sequencing, and wording, all of which play an important role in the survey responses. The online survey asked a total of 24 questions.

Analysis of the responses

The respondents performed data pre-processing and then stored the pre-processed data for the online survey. The respondents answered all 24 questions with clarity. These questions provided a solution for HEIs to integrate ICT to improve the quality of the education system. The respondents' responses clearly explain the importance of implementing ICT, how it improves sustainable adaptability, and how it brings autonomy. The respondents addressed the fact that the integration of ICT in higher education provides more opportunities. ICT can help with effective learning. According to

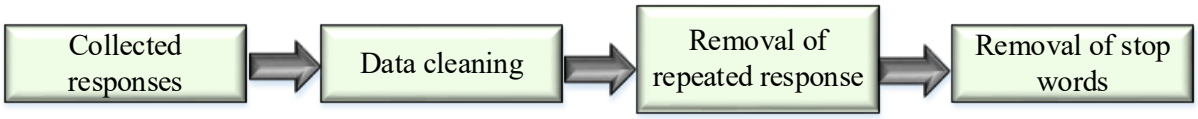
some experts, when integrating ICTs in education, certain measures should be taken into account. These measures include having a suitable degree of investment available in the place, having a good policy, providing adequate training, adopting a systematic approach, and carefully planning to achieve greater educational benefits. Does integrating ICTs into education improve learning outcomes? The experts replied that integration of ICT in education will make the students independent, provide problem-based learning, and foster critical thinking and creativity. They also stated that ICTs offer various approaches to enhance teaching and learning by transforming the environment into one where learners can engage and encourage deep learning.

ICT is a technological tool for making information available at the right time, in the right place, in the right form, and to the right user. In the past, individuals had to rely on newspapers to access global information. Smarter technology now allows individuals to access information from any location using smartphones and other gadgets. Currently, technology plays a critical role in developing the teaching and learning process in the school environment. In colleges and schools, information and communication technology significantly contribute to the learning process. People can use these similar strategies to enhance their business lives. They adopted the numerous available resources in a positive manner to foster a more prosperous society.

Response pre-processing

The response pre-processing steps include data transformation, data cleaning, and filtration of the gathered responses. Pre-processing the collected responses makes classification more accurate. Data cleaning is a technique that involves vanishing outliers, smoothing noisy data, correcting inconsistent data, and replacing missing values. Figure 2 illustrates the steps involved in data pre-processing.

Figure 2: Response Pre-processing

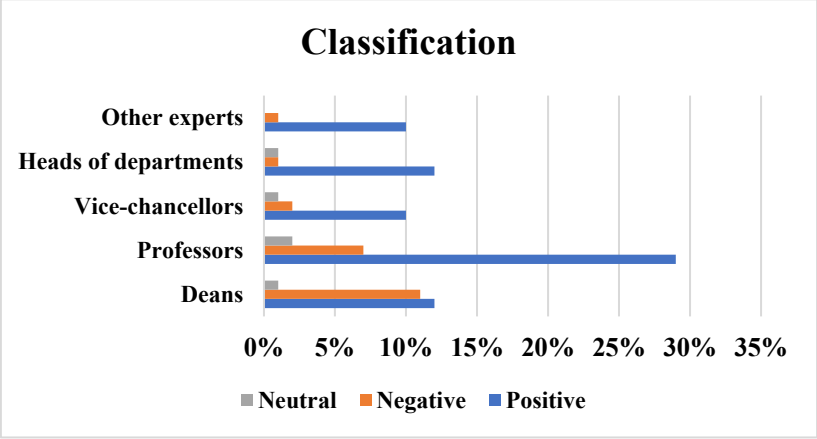


Source: Collected by Author

Classification

The authors categorize the complete replies from the respondents into three groups: positive, negative, and neutral. This method of classification will be very useful because ICT provides greater opportunities and challenges in the new education system. Figure 3 displays the classification results. According to the graph, the positive response is at a higher rate when compared to the other two classes, which shows that the integration of ICT in the education system can improve the quality of the education system in India.

Figure 3: Response Classification



Source: Collected by Author

Conclusion

The role of the ICT approach in multidisciplinary learning can ameliorate classroom learning and be an effective tool to provide quality education to all. The NEP 2020 conducted an analysis on the significance of quality education in India and presented a range of policies slated for implementation in the near future. Thus, the authors present a concise analysis that challenges the provision of high-quality education in India. The study's main contribution is to promote the role of a multidisciplinary approach and ICT integration in improving the quality of the education system. NEP 2020 guarantees the provision of quality education in India, encompassing both school-level and HEIs. At the school level, NEP aims to attain its goal of universal foundational numeracy and literacy among students by the year 2025 and to enhance the gross enrolment ratio (GER). The entire HEI should soon incorporate ICT and a multidisciplinary approach. Finally, they conduct and analyse an online survey to gather responses from various experts on the integration of ICT in the education system, providing evidence to support the use of ICT in education. ICT can be an elixir for education.

Conflict of Interests

The authors state that they do not have any personal conflicts of interest.

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