

Implementation Of Digital Initiatives In Higher Education Institutions (HEIs): An Exploratory Study On The Perceptions Of University Teachers

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Abstract:

There is a need for technological integration for teaching, learning, and administrative purposes. NEP 2020 recognizes the role of ICT at all levels of education to improve learning experiences and outcomes. The sense of responsibility from the teachers and the learners has resulted in meeting the demands of global educational reforms. The present paper focuses on the growing trends in higher education. The present research used a mixed-method approach using quantitative and qualitative data. It focused on digital facilities in HEIs from 2020 to 2024. It also elicited responses regarding the online courses for learners and teachers through the SWAYAM platform. The analysis of digital classrooms reveals strengths in inclusivity but highlights pressing challenges in faculty training, digital literacy, and support systems.

Background:

Materials and Methods: The questionnaire was administered to 84 faculty members teaching in Higher Education Institutions (HEIs). The respondents were randomly selected from top institutions such as IITs, Central Universities, Deemed to be Universities and State Universities located in Telangana state. A structured questionnaire was administered to elicit responses on the effective integration of technology in Higher Education Institutions (HEIs) to enhance student learning and engage faculty participation. The data was tabulated and analyzed quantitatively. The engagement of learners and the teachers' perceptions of MOOC courses through the SWAYAM platform were presented using a qualitative approach.

Results: Data was analyzed using SPSS software. A two-way chi-squared test is used to determine if there is a significant association between two categorical variables. The result showed a statistically significant relationship between both variables. The level $P < 0.05$ was considered as the cutoff value or significance. The Chi square result showed as 78.4417 with Degree of Freedom as 32 and significance level as $p < 0.0001$. The perceptions about SWAYAM courses were elicited from the respondents. Data was obtained from the initiatives taken by Ministry of Education by implementing SWAYAM courses. The present research collected the enrollment rate of students and teachers' offering SWAYAM courses from 2019 to 2024.

Conclusion: NEP 2020's focus on integrating ICT into education reflects a forward-looking approach that aims to enhance learning, streamline administrative processes, and bridge educational gaps. However, addressing challenges such as the digital divide and data security is crucial for achieving the policy's goals and ensuring that the benefits of technology are widely and equitably distributed.

Key Word: ICT integration, HEIs, Digital facilities, SWAYAM Platform, Teacher's Perceptions.

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I. Introduction

The National Education Policy (NEP) 2020 of India signifies a significant transformation in the educational sector, shifting from the conventional existing system to a more inclusive, flexible, and technology-driven one. One of the critical areas that NEP 2020 focuses on is the contemporary need to integrate Information and Communication Technology (ICT) in education. One of the fundamental principles for benefiting the education system at large is the "extensive use of technology in the teaching and learning process." (Principles of NEP Policy, NEP 2020.)

NEP 2020 recognizes the role of ICT at all levels of education in improving learning experiences and outcomes. Technological integration is needed for teaching, learning, and administrative purposes.

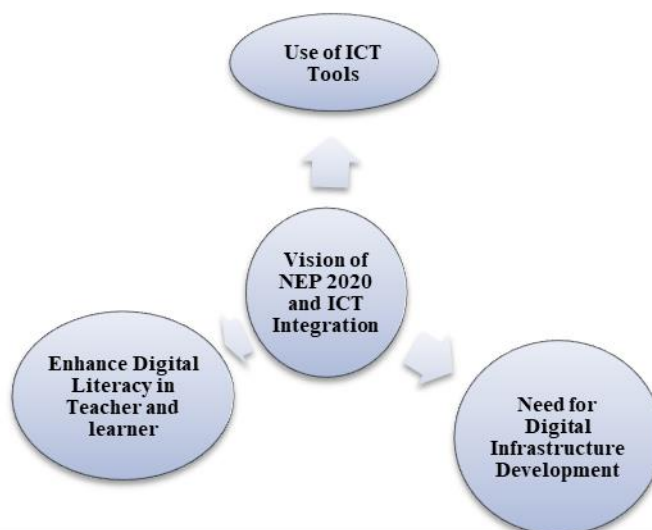


Fig. 1: Vision of NEP 2020 and ICT Integration

As shown in Fig. 1, some of the dimensions NEP 2020 envisions for the integration of ICT are

a. The use of ICT Tools: According to Anderson, ICT is an “all-encompassing term that includes the full gamut of electronic tools using which we gather, record and store information, and utilizing which we exchange and distribute information to others” (Anderson, 2005).

The emergence of technology-enabled instruction has paved the way for different learning environments. Synchronous and asynchronous learning platforms, hybrid and virtual classrooms, and flipped classroom techniques have impacted the learners’ academic performance, even those learning from remote places.

The sense of responsibility from the teachers and the learners has resulted in meeting the demands of global educational reforms. The learning environment using conventional and contemporary materials such as textbooks, tablets, desktops, smart phones, and Web 2.0 tools enhanced collaborative work, group participation, and discussion threads. This has resulted in a flexible learning environment demonstrating creativity, innovation, and spontaneity. This has also paved the way for digital and smart classrooms.

b. Need for Digital Infrastructure Development: The emergence of Web tools has resulted in positive reinforcement among the teachers and the learners. However, the digital infrastructure developments across the HEIs need a detailed study. According to the Survey Report on Online Education 2021, “*more than 50 percent of the sampled universities are not fully equipped with a smart classroom. The survey also reported that 36.8 percent of institutions have less than 50 percent of the classrooms equipped with smart features. Further analysis suggests that only 22 percent of government universities and 45.5 percent of Private universities are fully equipped with Smart Classrooms. The status of a private university is relatively better than the Government (Public) institutions.*”

The analysis on the smart classroom reported that 52% of government universities consist of less than 50% smart classrooms, 66.5% of universities need to be fully equipped with digital smart classroom features, and 6.5% of universities do not have smart classroom facilities. The report justifies the urgent need to develop digital infrastructure. University funding policy should concentrate on the infrastructural requirements to equip the institutions with digital features and meet the demands of NEP 2020 technology-driven educational reforms.

c. Enhance Digital Literacy in Teachers and Learners: To meet the needs of digital classrooms, it is necessary to enhance digital literacy in teachers and learners. "Digital skills" and "digital literacy" are often interchanged but are not interchangeable. Digital skills focus on ‘what and how’ and digital literacy focuses on ‘why, when, who, and for whom’. According to the European Commission (2006), digital competence has been identified as “one of the eight key life skills along with communication in the mother tongue, communication in foreign languages, mathematical competence and basic competencies in science and technology, learning to learn, social and civic competences, sense of initiative and entrepreneurship.” According to UNESCO (2018), digital literacy can access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies for employment, decent jobs, and entrepreneurship.”

A recent survey entitled “The Use of Technology in Teaching and Learning in Indian Higher Education Institutions,” conducted by Schoolguru Eduserve (Education Desk, The Indian Express, September 8, 2020) revealed that the University teachers’ acceptance of digital education is a bothering factor to meet the demands of NEP 2020 ICT integrated education system. The survey considered 1200 respondents which revealed that 89.92% of faculty members had never used technology in their classroom; 83% had never delivered an online lecture; 82% of college teachers have expressed deep concern for lacking any professional training on how to use AI learning tools in the classroom; Approx. 50% of university teachers expressed discomfort with online teaching itself; 17.48% of the teachers expressed that their institutions encourage teachers to participate in ICT-related training programs; 4.2 % had attended training programs on using digital tools for teaching purposes and only 3% of the respondents could develop online teaching content.

The primary reason is the skill gap among teachers (Education Times, Times of India, September 14, 2020). NEP 2020 underscores the importance of training teachers in ICT tools. This involves professional development programs on integrating technology into pedagogy and enhancing digital literacy. The Scheme of Pandit Madan Mohan Malviya National Mission on Teachers and Teaching introduced in 2014 dedicated towards educational reforms, teacher training programs and capacity building activities for teachers. Hence, the acceptance of ICT integration in the classroom by the teachers, learners, and administrators and adapting to the changing conditions, is vital. The attitudes of stakeholders need a paradigm shift to maximize the use of ICT.

The Progress Index

According to the recent statistical report of the All-India Survey of Higher Education (AISHE) report released by The Ministry of Education of India (MEI), “India has the world’s second-largest higher education system with over 58,000 higher education institutions. Nearly 2,400 higher education institutions were added during 2021-22. There are now 43.3 million students enrolled in higher education, up by nearly 2 million in just one year. Nearly 79 percent of students are enrolled in undergraduate courses with 12 percent at the postgraduate (master’s) level.” The report also mentions an increase in the intake of teachers by 46,618 from 2021-22 to 2020-21.

The AISHE report has shown the growing trends in higher education. This implies a positive drive toward reaching a knowledge society through improved pedagogic policy decisions, skill development, and technological innovations.

In the present study, focus on digital literacy among the teachers becomes vital as ‘*Digital literacy is not just understanding technology but utilizing it decisively and appropriately*’. The technological implementation significantly impacts the academic and professional domains for autonomous and independent learning styles necessary for the 21st-century knowledge society. Pelgrum and Voojt (2009) suggested the integration of ICT in the educational sector could pave the way for new pedagogy from a teacher-centered to a learner-centered approach. The studies conducted by Condie & Munro, 2007; Friedman & Coates, 2009; Fu, 2013; Gallagher, Shear, Patel, & Miller, 2011 suggested that the use of ICT in the educational sector has a positive reinforcement on the learners’ increased motivation, learner autonomy, creativity skills, and classroom engagement. The studies also suggested the development of higher-order critical thinking skills and problem-solving strategies with collaborative learning among the learners. Such studies increase the responsibility of other stakeholders, especially faculty academic staff, and technical staff.

National Mission on Education through ICT (NMEICT)

National Mission on Education through ICT (NMEICT), established in 2009, is a major initiative of the Ministry of Human Resource Development (MHRD) to ‘infuse digital education solutions to improve contents and also to improve the learning outcomes’. The main objective of NMEICT is ‘to provide the opportunity for all the teachers and experts in the country to pool their collective wisdom for the benefit of every Indian learner and, thereby, reducing the digital divide’. (<https://mhrd.gov.in/>) The major ongoing initiatives like SWAYAM, SWAYAM Prabha, National Digital Library (NDL), e-Yantra, FOSSE, Spoken Tutorials, and Virtual Labs address the digital divide.

The correspondence between NMEICT and all Universities governed under this mission (<https://www.education.gov.in/ict-letters>) provides credit framework through SWAYAM courses, guidelines for teachers to develop SWAYAM courses, financial assistance for online classes and other related ICT innovations. The teachers who aim to design online courses have been provided detailed guidelines (https://www.education.gov.in/sites/upload_files/mhrd/files/upload_document/Guidelines_SWAYAM.pdf) on how to offer a course and other prerequisite conditions.

II. Material And Methods

The present research used a mixed-method approach focusing on quantitative and qualitative data. The questionnaire was administered to 84 faculty members teaching in Higher Education Institutions (HEIs). The

respondents were randomly selected from top institutions such as IITs, Central Universities, Deemed to be Universities and State Universities located in Telangana state. A structured questionnaire was administered to elicit responses on the effective integration of technology in Higher Education Institutions (HEIs) to enhance student learning and engage faculty participation. The data was tabulated and analyzed quantitatively. The engagement of learners and the teachers' perceptions of MOOC courses through the SWAYAM platform were presented using a qualitative approach.

Study Design: The study was designed to find out

- a. the effective integration of technology in Higher Education Institutions (HEIs) to enhance student learning and engage faculty participation.
- b. the engagement of learners and the teachers' perceptions of MOOC courses through the SWAYAM platform.

Study Location: The respondents were randomly selected from top institutions such as IITs, Central Universities, Deemed to be Universities and State Universities.

Study Duration September 2024 to November 2024.

Sample size: 86 teachers.

Sample size calculation: The sample size was calculated based on the number of permanent faculty members present in IITs, Central Universities, Deemed to be Universities and State Universities. The respondents were randomly selected and a questionnaire was populated using a Google Form. The questionnaire was targeted for 100 teachers but it could reach 86 respondents.

Subjects & selection method: The study population was drawn from faculty members working at IITs, Central Universities, Deemed to be Universities and State Universities. It was focused at the Universities located mostly in Telangana state, South India.

Inclusion criteria:

1. Teachers working as Assistant Professors, Associate Professors and Professors
2. Teacher teaching at Undergraduate and Postgraduate levels
3. Teacher teaching courses for B. Tech., BBA, B.Com, B. Sc, B. Pharmacy, and BA courses
4. Teachers teaching courses for M.A., MBA, and M. Tech. students
5. Either sex
6. Aged ≥ 28 years,
7. The participants have substantial exposure to ICT enabled instruction, and experience in engaging students in Hybrid learning environment.

Exclusion criteria:

1. Not included Northern states, India
2. Not included Western states, India
3. Not included Eastern states, India
4. Not included school teachers
5. Not included teachers teaching at intermediate level

Procedure methodology

The present research elicited the responses from the teachers based on the following research questions:

1. To what extent are the procedures for well-connected digital facilities available for teachers to implement NMEICT's mission?
2. Is there any improvement in accepting the implementation levels of digital facilities in HEIs from 2020 to 2024?
3. How far have digital initiatives such as SWAYAM courses fruitfully engaged the learners?
4. What are their perceptions of creating MOOC courses for the SWAYAM platform that align with the Career Advancement Scheme (CAS)?

Statistical analysis

The Use and Implementation levels of digital facilities

Data was analyzed using SPSS software. A two-way chi-squared test is used to determine if there is a significant association between two categorical variables. The result showed a statistically significant

relationship between both variables. The level $P < 0.05$ was considered as the cutoff value or significance. The Chi square result showed as 78.4417 with Degree of Freedom as 32 and significance level as $p < 0.0001$.

The survey was administered to 100 teachers out of which 86 responded to the questionnaire. The questionnaire elicited responses on the Use and Implementation levels of digital facilities. Category A represented the following items:

Funding facilities

1. Student engagement and motivation
2. Integration with existing systems
3. Accessibility and inclusivity
4. Content quality and relevance
5. Student digital literacy
6. Faculty training
7. Continuous support and maintenance
8. Infrastructure facilities

Category B represented the Likert scale model with Excellent, Very good, Good, Poor, and Very poor as the response options points were used to collect the data from the respondents.

Perceptions of the teachers on SWAYAM Courses

Tremendous progress in the enrollment ratio for SWAYAM courses by the learners and the courses offered by the teachers have increased significantly. The data was obtained from the initiatives taken by Ministry of Education by implementing SWAYAM courses. The present research collected the enrollment rate of students and teachers’ offering SWAYAM courses from 2019 to 2024.

III. Result

It took three months to acquire and interpret the data from the faculty members working at IITs, Central Universities, Deemed to be Universities and State Universities. It was focused at the Universities located mostly in Telangana state, South India.

Table no 1: Shows Implementation of Digital Facilities in Higher Education Institutions

Implementation of Digital Facilities in Higher Education Institutions					
Category A	Category B				
	Excellent	Very good	Good	Poor	Very poor
Funding facilities	12	21	26	17	8
Student engagement and motivation	10	18	31	15	10
Integration with existing systems	9	18	27	16	14
Accessibility and inclusivity	9	20	39	9	7
Content quality and relevance	19	32	23	8	2
Student digital literacy	11	16	20	18	19
Faculty training	8	12	21	28	15
Continuous support and maintenance	7	13	26	17	21
Infrastructure	14	20	20	21	9

Table no2: Shows the details of SWAYAM Courses offered and enrolled between 2019 and 2024

Details of SWAYAM Courses: 2019-2024		
Year	2019	2024
No. of courses offered	2200	more than 13150
Student’s enrollment	10,00,000	more than 4, 60,00000

IV. Discussion

It was observed that larger proportions are either positively inclined or perceive adequate funding facilities for digital classrooms for effective student learning outcomes. Nonetheless, approximately one quarter indicated that the related facilities were poor or very poor based on this subset of responses indicating that there is still a need to advance in this sphere. The inconsistencies in the allocation of funds need to be addressed by procuring essential resources and infrastructure. A sizeable proportion, (36.90%) described that student engagement and motivation are good in the digital context. As many as 21.43% of the respondents rated it as very good, while 11.90% described it as excellent. Respondents rated as either poor or very poor at 17.86% and 11.90% respectively.

The demand for interactive interfaces for student engagement is the need of the hour. Factors like digitalized content, gamified learning environments, collaborative discussions, and live chats may reduce digital

fatigue and encourage learner engagement. 64% of the respondents thought that integration of ICT with the existing traditional classroom environment was good, very good or excellent. However, more than 30% mentioned it as 'Poor' or 'Very Poor' which shows that there is no complete denial of the concerns on how the digital class system can be implemented in the traditional learning systems.

There is a great shift in accessibility and inclusivity. Internet resources have been part of the existing system. However, frequent disruptions in connectivity issues especially in rural environments need to be focused. There is a high rating for content availability through multiple resources. The designing of courses, accessibility to digital materials, web resources, application-based interactive activities, worksheets, and exercises positively engage the learners. However, there needs to be a check on the quality. Expert suggestions, scrutiny, and approvals would provide authentic materials for better academic engagement.

Digital literacy shows a significant difference in learner's preparedness. The concern is about navigating through various digital tools for academic purposes. There is a need for implementing digital literacy programs at the foundation level. The HEIs incorporate user-friendly platforms and Learning Management Systems (LMS) for easy accessibility. Considering professional engagement, there is a dire need for faculty engagement in educating the students. This perhaps, is linked to rigorous faculty training programmes. The data, indicating 43 responses as Poor/Very Poor reveals the necessity of preparing for digital pedagogy among the faculty members. There is already a step forward in conducting training programs, and workshops on digital teaching tools and providing certifications, Career Advancement Schemes, and incentives to excel in digital competencies for faculty members.

Maintenance and support systems require urgent attention. Many HEIs struggle with technical glitches, buffering problems, and bandwidth issues. Instead of documenting demographic figures and technical utilities, uninterrupted networking 24/7, and continuous monitoring by the experienced technical staff is highly recommended. There is a mixed response to infrastructural facilities. There have to be frequent checks on updating relevant software, digital infrastructure, and networking facilities. The need for monitoring, auditing, and modifying to meet digital demands will upgrade the smart classroom mechanism.

SWAYAM - India's Indigenous MOOC platform

The research surveyed the enrollment ratio of 'Study Webs of Active Learning for Young Aspiring Minds' (SWAYAM) courses in 2019. SWAYAM is India's indigenous MOOC platform that offers online courses from IX standard to post-graduation in technical, nontechnical, Humanities and Social Sciences, Management, and other professional domains. The courses are tailor-made by the teachers based on the learners' requirements to reach all corners of the country, build inclusive education for all sections of the learners, and address the digital divide in India. Its main objectives were to offer online teaching using audio-visual aids, and multimedia technology; accessibility to download authentic material; submission of online quizzes, assignments, and self-assessment tests; and exchange of opinions through online discussion forums. SWAYAM has ten National Coordinators from top institutions for maintaining quality, reliability, and state-of-the-art pedagogy.

SWAYAM Plus was recently initiated to expand SWAYAM's objectives to achieve a 50% Gross Enrolment Ratio (GER) in higher education by 2035 and 65% by 2047 with an additional intake of 37 million and 66 million learners respectively. This platform has included courses related to Energy, Teacher Education, Healthcare, Manufacturing, Hospitality & Tourism, Indian Knowledge Systems, Media, and Communication aligned with employment and job opportunities.

NMEICT has also released Financial Norms for the Development of MOOCs. It has aligned with the Career Advancement Scheme (CAS) by creating or training through MOOCs. UGC-approved Annual Refresher Programme in Teaching (ARPIT) courses delivered on SWAYAM are equivalent to one Refresher course for Career Advancement. A detailed document about financial assistance (https://swayam.inflibnet.ac.in/home_assets/download/Financial_norms_for_swayam_MOOCs.pdf) released by NMEICT offers a lucrative reward for the faculty members.

Similarly, SWAYAM certification has been linked with 'earning academic credit points online by the students in India'. University Grants Commission (UGC) has previously issued a Credit Framework for online learning courses through SWAYAM Regulation 2016, which encourages universities to identify courses eligible for credit transfers onto students' academic records for those completed via SWAYAM. Additionally, the AICTE released a gazette notification in 2016 and has made further announcements to promote these courses for credit transfer.

Perceptions of the teachers on SWAYAM Courses

According to the National Mission on Education through ICT (NMEICT) report on Digital Initiatives in Higher Education released in 2019, "To date, about 2200 Courses have been offered through SWAYAM in which about 500 courses are on offer for the January 2019 semester. More than 50 Lakh students have

registered on the SWAYAM platform and there are more than 1 crore enrollments in various courses.” As shown in Table 2, more than 13150 courses are offered in SWAYAM platform and the total enrolments are more than 4.6 crores in 2024.

Tremendous progress in the enrollment ratio for SWAYAM courses by the learners and the courses offered by the teachers have increased significantly. However, there are issues with infrastructure facilities and connectivity issues, especially in rural areas. Since the credits are aligned with academic certification, the teachers opined that the learners get stressed out. Some students believe that the course materials are outdated and that quality content raises the standards of HEIs. The pedagogy seems monotonous, thus making the learners get de-motivated and discouraged from attending the courses. It was also opined there have to be wider options for students to choose more courses on domain-specific genres. The examination centers are another issue. The SWAYAM management team could identify examination centers in the HEIs and nominate invigilators to avoid the cumbersome process of navigating to the far-way examination centers.

The teachers also expressed that though the SWAYAM platform offers a lucrative package for those involved in preparing the content, and offering the courses, the whole process is hectic and tedious. It was observed that despite clear guidelines, the hands-on experience and practice of such courses need to be mentored by the subject experts. There should be frequent monitoring by the national Coordinators in every institution regarding the participation and performance rate of the learners and teachers. The Indian Institutes of Technology (IIT) offers the majority of courses. A large pool of eminent faculty members from other universities could be encouraged and provided opportunities.

It was also observed that online engagement may focus on popularity rather than quality content. The teachers opined that the low enrollment ratio is due to a complicated approval process, design and upload issues, and lack of proper guidance.

V. Conclusion

The analysis of digital classrooms reveals strengths in inclusivity but highlights pressing challenges in faculty training, digital literacy, and support systems. Addressing these issues through targeted interventions will improve student learning outcomes in digital environments. Similarly, the SWAYAM platform linked with student credit transfer and faculty CAS needs much more focus, analyzing every aspect in detail. There is a challenging demand for strict adherence to quality engagement by the learner and the teacher to make the online platform even more innovative.

In summary, NEP 2020’s focus on integrating ICT into education reflects a forward-looking approach that aims to enhance learning, streamline administrative processes, and bridge educational gaps. However, addressing challenges such as the digital divide and data security is crucial for achieving the policy’s goals and ensuring that the benefits of technology are widely and equitably distributed.

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