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CASE STUDY

INFORMATION SCIENCE

Digital Education Initiatives on Higher Education Systems in India: With a Case Study on SWAYAM

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ABSTRACT

Digital Education is a very important part of the modern education system. The main objective of Digital Education is to expand education by using various types of technology. Digital Education plays an important role in making education accessible to all of the learners by utilizing various basic technologies and emerging technologies. Digital Education provides the opportunity to study any subject from anywhere, at any time. Various Government and private organizations are taken different initiatives to implement Digital Education for the learning of the students. Digital Education can be utilized to give education to a large number of learners at a time. It can also utilized for the skill development and training purposes. Various Organizations and departments under Government of India have taken various initiatives to promote this Digital Education. The purpose of this paper is to know about the concept of Digital Education and Massive Open Online Course - MOOC. The paper discussed about various Digital Education Initiatives in India. The paper make a case study on SWAYAM as the MOOC initiative. Different Opportunities and Challenges to implement Digital Education are also discussed in this paper.

Keywords: Digital Education, Digital India, MOOC, SWAYAM, e-Learning, Online Learning

The method of teaching with the help of technology is called Digital Education. Digital Education has become much more attractive to people because teaching is done using various types of digital electronic

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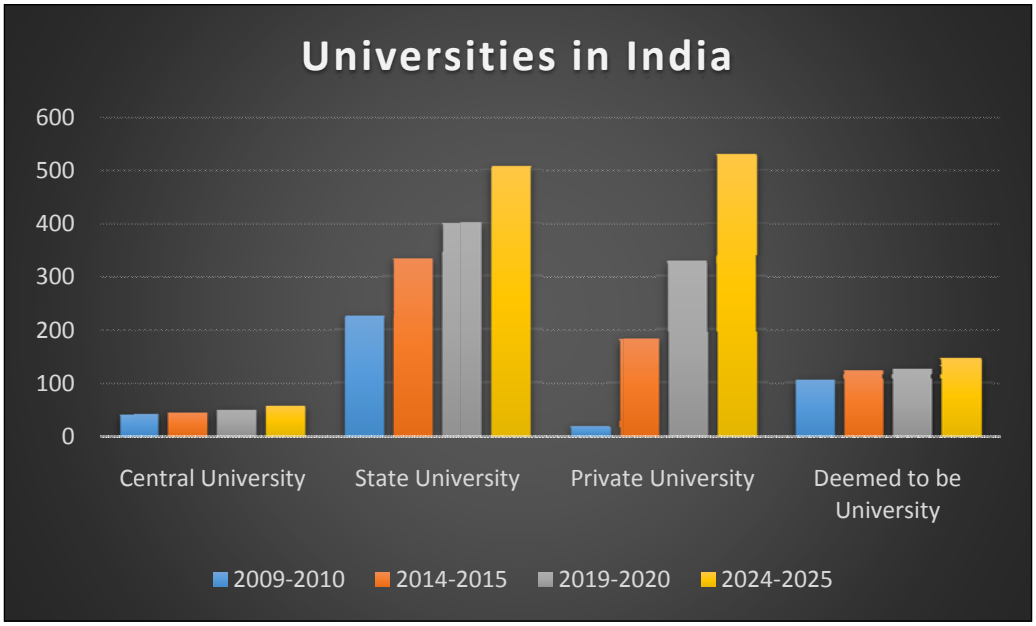
devices in the classroom. In Digital Education, teaching is done through the internet. Digital Education offers students to learn any subject at any time from any place. Massive open online course (MOOC) is a teaching method that can teach many students at the same time at a very low cost. It is possible to provide education using digital platforms through various government and private initiatives. Students can learn any subjects of their choice at a very low cost through various internet-based digital platforms. As on 18th September, 2025 India has total 1243 number of Universities. Table 1 shows the number of Universities in India.

Table 1: Universities in India

Sl. No.	Types of University	Number of University
1	Central University	57
2	State University	508
3	Private University	531
4	Deemed to be University	147
Total		**1243**

Source: https://www.ugc.gov.in/

It has been noticed that the number of universities is constantly increasing in India. That means the need for Digital Education in various educational institutions is increasing. The number of different types of universities in India is gradually increasing. Therefore, various universities are building Digital Education infrastructure for the benefit of students. Fig. 1 shows the growth of different types of Universities in India.



Source: https://www.ugc.gov.in/

Fig. 1: Shows the growth of different types of Universities in India

Related works

Digital Education plays a vital role to ensuring learners' development. Various MOOC initiatives are available for the learners. To study various Digital Educational initiatives, it is necessary to previous works in this topic. Various Digital Educational opportunities are available for the learners. So different opportunities are also necessary to study for study further. Some related previous studies are discussed here.

Biswas, A.K. (2021)[2] made a descriptive analysis of the dependence on online education during the COVID-19 period. The study describes various Digital India initiatives in education and uses secondary data for analytical investigation. The work analyzed the challenges faced by students during COVID-19 and discussed government initiatives for promoting online education. The study explored the implementation of the 'Shagun' Scheme and various Digital Education initiatives such as NROER, DIKSHA, and e-Pathshala, along with SWAYAM, SWAYAM Prabha, National Academic Depository, National Digital Library, and Virtual Labs.

Gond, R. & Gupta, R. (2017)[16] performed a descriptive study on the scope and challenges of Digital Education within India and highlighting its various components with stakeholder-oriented benefits. The study focused on the scope of Digital Education with its application in the Indian scenario. The study also explored some challenges associated with Digital Education implementation and discussed the issues like- resource constraints, weak internet access, lack of trained teachers, content and language barriers, infrastructure limitations and inadequate financial support. The study reviewed some earlier studies in similar contexts to develop a better understanding of the subject.

Khanapurkar *et al.* (2020)[22] performed a case study exploring the development of the online education ecosystem in India by analyzing Maharashtra's five-year digital transformation of government schools. The study presented statistical data on internet and mobile use in India with a case study on rural Maharashtra's digital government schools. It analyzed government resolutions and circulars through tabular representation. The study conducted an interview based on respondents' designation, school type, teaching experience, subjects currently taught and classes taught. It proposed a theoretical framework for developing measurement metrics and a contextualized model. The research examined digital equipment usage, technologically skilled teachers, digital content, funding and highlighted AAC guideline implementation.

Kumar and Mahendraprabu (2021)[25] conducted a study based on survey methods to analyze research scholars' engagement with open educational practices in the SWAYAM programme. The study reviewed various related papers and listed them in tabular form, along with a survey conducted across 300 state universities in Tamil Nadu, India. The study analyzed different variables like- gender, subject, locality, family structure, income, parental education with tested different null hypotheses and studied perceptions regarding SWAYAM.

Mazoue, J.G. (2013)[28] conducted a study to identify challenges in the traditional education system and discussed the MOOC model. The study discussed the fundamental concept of MOOCs with previous research and highlighted their significance for ensuring educational quality. The study highlighted the role of MOOCs in designing course ware and introduced a new business model based on the MOOC framework. The study conducted a comparative analysis with the post-industrial model of teaching and learning.

Pursel *et al.* (2016)[37] performed a study based on survey methods to examine motivations and behavioral trends related to the MOOC concept among students of different institutions. The study followed an exploratory design to identify key understanding factors associated with learning analytics based on MOOC data. The study reviewed literature from multiple perspectives like the concept of MOOCs, learning analytics, student engagement and tried to identify the differences between MOOCs with conventional online courses. The study discussed various features of MOOC courses with their purpose, student participation levels, course structure, content delivery and assessment mechanisms. The research analyzed descriptive statistics in tabular form for both overall and pre-course survey samples and explored correlations among the survey variables. The study used logistic regression to identify factors influencing course completion, presented the results in tables, and drew conclusions from survey findings regarding the future prospects of MOOCs.

Objectives

Modern generation learning systems greatly depend on technology-based learning. To get better understanding about Digital Education, it is important to study various initiatives in the Indian context. The primary objectives of this study are as follows:

- To know about basic concepts of Digital Education and Massive Open Online Course - MOOC.
- To discussed about Digital Education Initiatives in India.
- To make a case study on SWAYAM as the MOOC initiative.
- To learn about Opportunities and Challenges to implement Digital Education.

Methodology Adopted

The paper titled- "Digital Education Initiatives on Higher Education Systems in India- With A Case Study on SWAYAM" is a theoretical study. It tries to study different Digital Education initiatives available for the students for their higher study. Various secondary and tertiary data sources were used in the preparation of the paper. The study aims to explore various Digital India initiatives in higher education and also conducts a case study on SWAYAM, a government-supported MOOC initiative in collaboration with leading Indian institutions. The study is interdisciplinary in nature and it studied various subjects and topics to conduct the work. The study attempts to create a link between Information Technology, Information and Communication Technology, Information Science, Education, Statistics, Sociology, Educational Management, Educational Technology, Public Policy, e-learning and other related fields and topics.

RESULTS

Digital Education

The method of learning using technology is called Digital Education. Different types of technology are used in Digital Education. The application of technology makes it much more attractive. With the use of the internet, Digital Education can be provided to a large number of people[6]. Also, without using it,

Digital Education is also used in classroom teaching with the help of various types of digital devices[24]. In the case of Digital Education, students get digital learning materials. Learning materials can be in different formats such as audio, video, live class, free recording, video, interactive presentation, document file, protected document file, etc. Digital Education provides various benefits to students. Using Digital Education, students can study any subject of their choice. Digital Education systems can be accessed from anywhere at any time. As a result, it is possible to learn from anywhere beyond the boundaries of geography. In the Digital Education system, students can receive education using various modes of education without physically coming to the campus. Students have to pay a very small fee to receive education through Digital Education. As a result, students can receive any type of education at a very low cost and can get a certificate at the end of their education. Digital Education is a flexible learning system for learners[47]. Students can study the subjects of their choice at their own time. They can even receive education through life interactive classes and recorded videos. Digital Education has made the education system much more joyful, interesting and attractive. Different types of technology are used in the classroom - such as projectors, smart boards, interactive panel, smart pens, speakers, computer laptops, smartphones and various types of electronics equipment. As a result of the use of digital technology, it plays a special role in receiving a lot of education both through the use of the internet and without the use of the internet.

Digital Education is a field of study[5]. Various institutions run various types of degree courses, diplomas, etc. programs on Digital Education or similar nomenclature. It has a specific structural curriculum which is interdisciplinary in nature. Various types of institutions apply Digital Education in their education delivery.

Massive Open Online Course - MOOC

Massive Open Online Courses or MOOCs are platforms that provide education to a large number of people at a very low cost. Through the application of technology, it is possible to educate many students at a time. Accessing MOOC initiatives costs very little. Students can enroll and learn in the subjects of their choice. Here, students can learn in any subject. There is no limitation on the subject. Students can learn at a flexible time. Students can access MOOC platforms for theit study from anywhere. Therefore, students can learn anything using MOOC platforms from anywhere in the world. Using internet technology, students can access the study materials of the MOOC system at any time. The main purpose of the MOOC system is to provide education to a large number of people at a very low cost at their flexible time. MOOC platform is an automated learning management system. It provides students with specific structural learning materials through live interactive classes and transforms it into a better system by receiving feedback[32]. Students can receive a valid certificate by taking education through the MOOC platform. MOOC is a technology-based learning platform that has opened a new window for students to take education[26]. MOOC has opened a new horizon in the education system that provides various advantages to students in getting education.

Digital Education Initiatives in India

Digital Education is the most popular form of modern education. Digital Education refers to the learning that is done by using the electronic system or digital system. The Digital Education of the Digital India initiative has become very popular. MOOC is an online course which has unlimited participation and open

access via the internet. Various types of Digital initiative taken by the Government of India to implement MOOC concept[29]. Digital Education is a powerful media to give education to a large number of population at a time with very low cost. Many institutions and organizations are taken different initiative to promote Digital Education[34]. Government and Private both type of organizations have develop different types of Digital Education portals[14]. The Digital Learning platforms are very easy to access and having a very easy interface[33]. The learners can access any types of contents with very easy navigation. Some of the Digital Education initiatives taken by different departments or organizations under Government of India are shown in the Table 2.

Table 2: Digital Education initiatives in India

Sl. No.	Portal / Initiative Name	Designed By / Department	Year of Development / Launch	URL
1	Digital Repository (Samagra Shiksha Good Practices)	Ministry of Education under Samagra Shiksha scheme (repository.education.gov.in)		https://repository.education.gov.in/
2	DIKSHA (Digital Infrastructure for Knowledge Sharing)	NCERT under Ministry of Education, Govt. of India (Diksha)	2017	https://diksha.gov.in/
4	e-Pathshala	NCERT / CIET (Centre for Educational Technology), under Ministry of Education (formerly HRD) (ClearTax)	November 2015	https://epathshala.nic.in/
5	Learning Management System (LMS) under Digital India	Digital India / National e-Governance Division, MeitY (Ministry of Electronics & Information Technology) (Digital India)	2015	https://lms.gov.in/home.aspx
6	National Digital Library of India (NDLI)	Developed by IIT Kharagpur under the Ministry of Education through the National Mission on Education through Information and Communication Technology (NMEICT) (project.ndl.gov.in)	Official launch on 19 June 2018,	https://ndl.iitkgp.ac.in or https://ndl.gov.in/
7	National e-Governance LMS (NeGD LMS)	National e-Governance Division, MeitY (vc.lms.gov.in)	2015	https://vc.lms.gov.in/default_new.aspx
8	National Repository of Open Educational Resources (NROER)	CIET (Centre for ICT in Education), NCERT & Ministry of Education	13 August 2013	http://nroer.gov.in/
9	PM eVIDYA	Ministry of Education, Govt. of India	2020	https://pmevidya.education.gov.in
10	Samagra Shiksha	Ministry of Education (GoI) (Samagra Education)	As a scheme, restructured in Union Budget 2018-19	https://samagra.education.gov.in/
11	Saransh (CBSE portal)	Central Board of Secondary Education (CBSE), Govt. of India (Wikipedia)	7 November 2015	http://saransh.nic.in/

12	Saransh Portal	CBSE (Central Board of Secondary Education)	7 November 2015	http://saransh.nic.in/
13	SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds)	Ministry of Education (MHRD then) (Wikipedia)	9 July 2017	https://SWAYAM.gov.in/
14	SWAYAM PRABHA	Ministry of Education, content providers like NPTEL, NCERT, UGC; maintained through INFLIBNET Centre etc. (PM e-Vidya)	7 July 2017	https://SWAYAMprabha.gov.in/
15	Vidya Lakshmi Portal	NSDL e-Governance Infrastructure Ltd under Department of Financial Services & Department of Higher Education, IBA, Govt. of India	15 August 2015	https://www.vidyalakshmi.co.in/
16	Vikaspedia	Department of Electronics & Information Technology, Govt. of India (Wikipedia)	18 February 2014	https://vikaspedia.in

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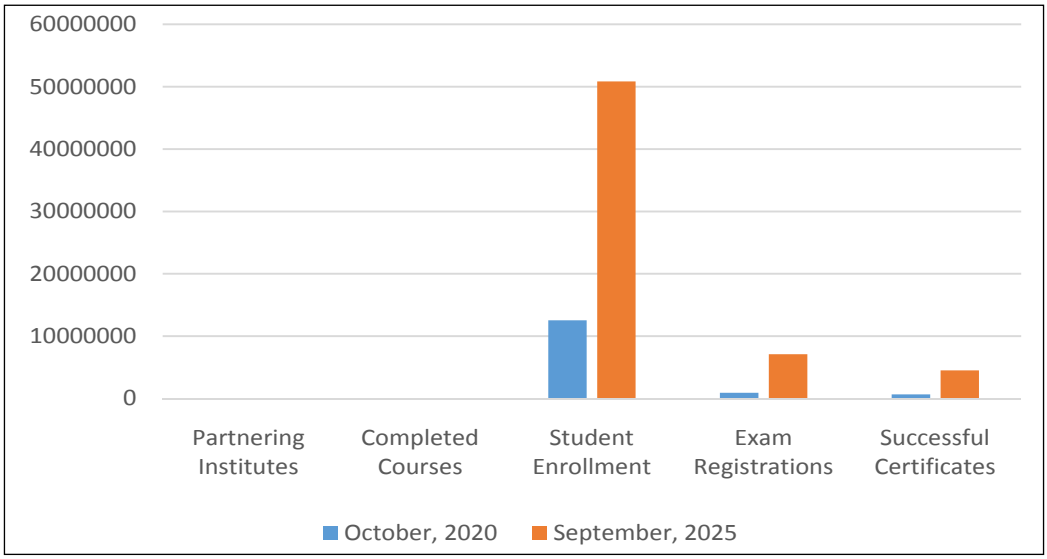
SWAYAM –the MOOC initiative

The meaning of SWAYAM is 'Self". SWAYAM stands for "Study Webs of Active-Learning for Young Aspiring Minds". It is an online platform where a student can learn online to any topic free of cost. It provides integrated platform and portal for online courses using ICT. It is an e-learning program of Ministry of Human Resource Development, Government of India. Eminent faculties and professor of several pioneer institutes in India are part of the online program. It offers courses to school level to graduate level to post graduate level, even its offers different skill training program also. The contents of SWAYAM are very rich in manner and designed and teach by the professors and faculty of different centrally funded institutes like IITs, IIMs, IISERs, etc. Some key features are Partnering Institutes, Completed Courses, Student Enrollment, Exam Registrations, Successful Certificates. Table 3 shows year wise comparison of different features and figure 2 shows year wise growth of different features. It is designed to achieve 3 cardinal principle of education policy as Access, Equality and Quality. Figure 3 shows three cardinal principle of SWAYAM.

Table 3: Year wise comparison of different features.

	Partnering Institutes	**Completed Courses**	**Student Enrollment**	**Exam Registrations**	**Successful Certificates**
October, 2020	203	2748	1,25,41,992	9,15,538	6,54,664
September, 2025	205	14843	5,08,38,609	71,09,587	4524144

Source: https://SWAYAM.gov.in



Source: https://SWAYAM.gov.in

Fig. 2: Year wise growth of different features

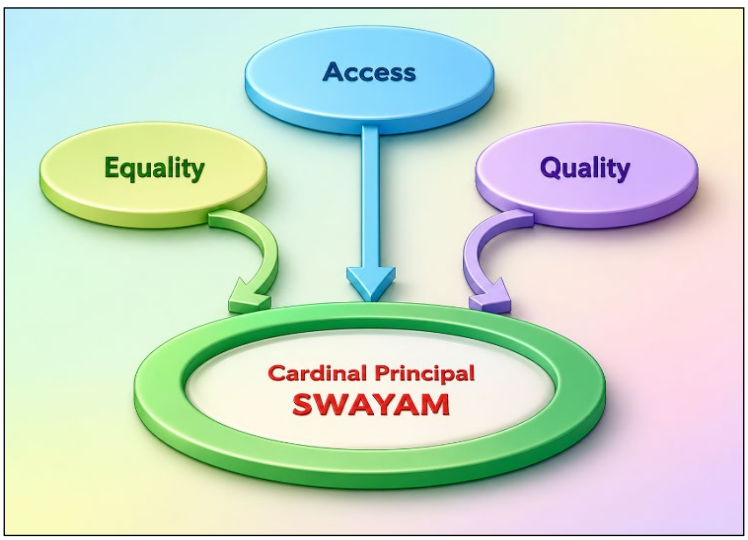


Fig. 3: Three cardinal principle of SWAYAM

Features and Characteristics of SWAYAM:

SWAYAM Portal is very helpful for learners. Learners can gather any kind of knowledge from this portal with no cost investment. The only thing required is a thirst for knowledge. One of the important features of SWAYAM is that it provides online content to learners. It is a one-stop web- and mobile-based interactive e-content platform for all courses from high school to university level. The contents are also

available in regional languages. Regional language-based content helps learners clear their doubts easily. It provides a high-quality learning experience to learners. It offers a high-quality learning experience using multimedia on an anytime, anywhere basis. It is a state-of-the-art system that allows easy access for enrollment and certification. To get a certificate, it charges a very nominal cost. It is possible to have peer group interaction using online mode. Peer group interaction and the discussion forum help clarify learners' doubts. The learning system follows a hybrid model. The hybrid model of delivery adds to the quality of classroom teaching. It has the facility for credit transfer, and the course credit can be recognized by the authority.

SWAYAM learning system has many special characteristics. It has a well-structured course format. SWAYAM courses are available on the SWAYAM.gov.in website. It is categorized into four quadrants: video lectures, specially prepared reading materials that can be downloaded and printed, self-assessment through tests and quizzes, and an online discussion forum for clearing doubts. It includes different renowned national coordinators. The coordinators are among the topmost, well-established, top-tier institutions in India. To ensure the best quality content, ten national coordinators have been appointed. They are NPTEL for engineering, UGC for postgraduate education, CEC for undergraduate education, NCERT and NIOS for school education, IGNOU for out-of-school students, and IIMB for management studies, and so on.Figure 5shows the National Coordinators of SWAYAM.

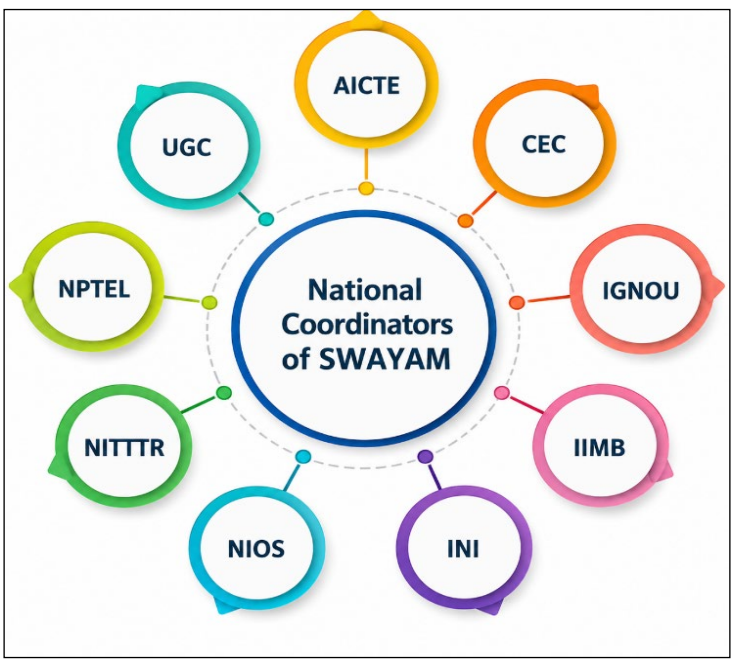


Fig. 5: Some National Coordinators of SWAYAM

One of the important characteristics of SWAYAM is that it is very cost-effective. To study any course, it does not charge any cost. SWAYAM aims to provide interactive courses prepared by the best teachers in the country, and they are available free of cost to the residents of India[44]. Over 1,000 specially chosen teachers from across the country have participated in preparing SWAYAM courses. SWAYAM courses are available free of cost to learners. At the end of the program, learners have the facility to get certification.

Students wanting SWAYAM certifications need to register. They are offered a certificate on successful completion of the course and are charged a nominal fee.

4.3 The Four Quadrant Approach

The courses hosted on SWAYAM are in four quadrants. The quadrants are —

- ***Quadrant I:*** It can be considered as *e-Tutorial*. It should have different types of video lectures on various topics.
- ***Quadrant II:***It can have different types of *e-Contents***.** The e-contents are structured reading resources that can be easily downloaded and printed based on individual requirements. It includes approximately 3500 words of e-content that can have PDFs, text-based materials, e-books, illustrations, documents and provides web resources like related links, Wikipedia, and open content.
- ***Quadrant III:*** It provides a well-structured *web resources* to the learners. It also offers self-assessment opportunities through tests and quizzes. The assessment components are like- problem-solving exercises, MCQs, short-answer type questions, quizzes and assignments.
- ***Quadrant IV:*** It offers an open *discussion forum* for all that gives the opportunity to the learners to discuss about any problems and get solutions from peers and subject experts. In addition to the four quadrants, each course includes transcriptions of video tutorials to enhance understanding and facilitate translation into various Indian languages along with discussion forums for clarifying doubts and questions. Figure 4 shows four Quadrants of SWAYAM.

Quadrant	Guideline 2017
I	e-Tutorial
II	e-Content
III	Web Recourse
IV	Discussion Forum

Fig. 4: Four Quadrants of SWAYAM

Different National Coordinators of SWAYAM

In order to ensure that best quality content is produced and delivered some National Coordinators have been appointed. Table 4 shows some National Coordinators of SWAYAM.

Table 4: National Coordinators of SWAYAM

Sl. No.	Type of Education	Organization	Full Name of the Organization	Role
1	School Education	NIOS	National Institute of Open Schooling	Academic Courses
		NCERT	National Council of Educational Research and Training	Teacher Training programme
2	Out-of-School Education	IGNOU	Indira Gandhi National Open University	Unenrolled Learners
		NITTTR	National Institute of Technical Teachers Training and Research	Teacher Training programme
3	Under-Graduate Education	NPTEL	National Programme on Technology Enhanced Learning	Engineering Studies
		AICTE	All India Council for Technical Education	Personalized learning and global courses
		CEC	Consortium for Educational Communication	ICT based Education
		IIMB	Indian Institute of Management, Bangalore	Management studies
4	Post-Graduate Education	NPTEL	National Programme on Technology Enhanced Learning	Engineering Studies
		AICTE	All India Council for Technical Education	Personalized learning and global courses
		IIMB	Indian Institute of Management, Bangalore	Management studies
		UGC	University Grants Commission	Non-technical and Post-graduation education
5	Non-Technical	INI	Institutes of National Importance	Non-Technical Courses

Some projects and working affairs

SWAYAM platform has used for many purposes. Some of the current projects and working appears are discussed below —

- ❒ It plays a key role in the development and planning of SWAYAM that is created by MHRD on 21st March 2016 by merging education with technology.
- ❒ It is responsible for developing the SWAYAM platform to address multi-party involvement in education by blending expertise from multiple domains and making effective use of state-of-the-art technology, audio, video, and multimedia.
- ❒ It is responsible for ensuring the availability of necessary resources for the uninterrupted and efficient functioning of the SWAYAM platform.
- ❒ It is responsible for enabling transformative change in India's educational outcomes by extending the necessary reach and access to quality education at competitive economies of scale.
- ❒ It is responsible for providing a maximum number of online courses to students from Class IX to graduate level free of cost, except for a token fee charged for certification upon successful completion of the course.

- It is responsible for achieving the vision of hosting 10,000 online courses for 30 million learners.
- Amity University provides access to its MOOC platform for one lakh students.

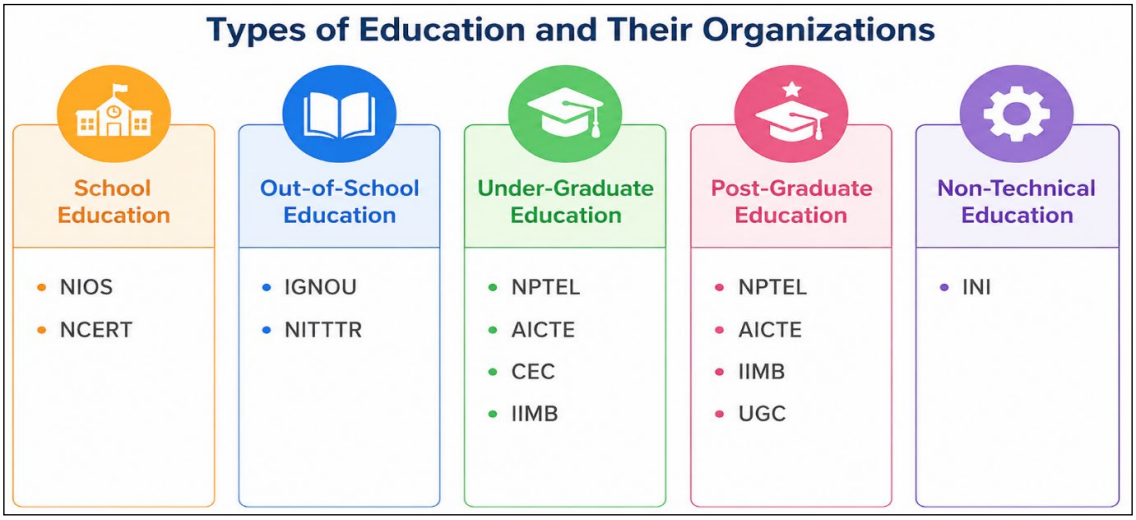


Fig. 6: Institutions works with SWAYAM

Course Offered by SWAYAM and General Registration Model

SWAYAM offers different types of courses to different level of students from School level to Post Graduate level, even it offer material for various research topics also. Its deals with different subjects and different stream also. The courses offered by the SWAYAM platform are shown in Table 5.

Table 5: Different Courses offered by SWAYAM

Sl. No.	National Coordinators	Courses published
1	CEC (UG & PG Non Engineering)	178
2	NPTEL (UG & PG Engineering)	925
3	IGNOU (Certificate & Diploma Courses)	263
4	IIM B	128
5	UGC	9
6	NITTTR	77
7	Aligarh Muslim University, Banaras Hindu University	53 63
Total		**1696**

Source: https://docs.google.com/spreadsheets/d/e/2PACX-1vSK9VpDK7F6RT61S1a2j96sJXpj_W8fs1NTtgcN-vrqrqqRH9sqKwt0UDAnVvSQDHIseFy2vC9a5sA4/pubhtml

The registration process in SWAYAM is very easy. The learner can enroll in any course as per their choice and after successful completion of the course if they wish they can get the certificate. General Registration model of SWAYAM is shown in the Fig. 7.

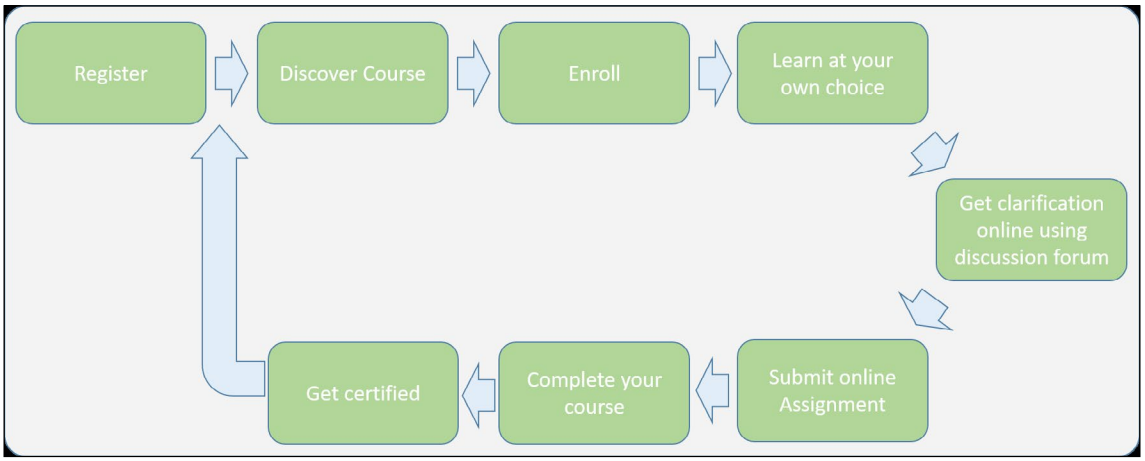


Fig. 7: General Registration Model

Advantages of SWAYAM

SWAYAM is a very modern educational portal. It has many advantages in society[35]. One of the important advantages of SWAYAM is that it is very cost effective. The student can access study materials and video tutorials at no cost. After registering and successful completion of assessment, the learners can get a certificate at a very nominal cost. The value of the certificate is quite satisfactory because the system is promoted by the Government of India[46]. SWAYAM gives the opportunity to get access to various renowned professors from renowned universities. It gives a great exposure to the learners. SWAYAM offers easy accessibility of knowledge to the learner. There is vast and diverse study material available for the learners which can be learned at any time as per their convenience. There is no time bound to access the SWAYAM platform. The portal is available 24/7. It also offers learner performance monitoring. As SWAYAM is a government initiative with structured curriculum design, both professors and learners get the opportunity to access world-class study material. It helps the teachers to improve pedagogical techniques with technological knowledge sharing. SWAYAM also offers a blended learning program. The student can access default blended learning tools for their learning. It helps to access more information beyond classroom knowledge. It has diversity in course selection. The courses are from different subjects and different topics. It has a variety of courses available for the learners. Many of the courses can be accessed by the learner without any registration or with no fees. Lots of video tutorials are available for the learners free of cost. The courses are open access in nature. All the courses are open for all. There is no eligibility restriction to access the study materials and courses. It also offers an open discussion forum that is helpful for the doubt clearance of the students. SWAYAM also offers a systematic evaluation process. For the registered student, it is necessary to submit assignments on due time to finish the courses. The peer learning concept is very helpful for the learners. The learners get benefited from their peer learners. The SWAYAM portal encourages technology learning and updates the skills of learners regularly[40]. One of the important objectives of SWAYAM is to offer lifelong learning opportunities for the learners.

Challenges to implement SWAYAM

SWAYAM has lots of advantages but still it has face many challenges. Interactiveness is one of the big challenges of SWAYAM. There is very less chance to interact directly with teachers at the time of lecture. In on-campus based face-to-face mode of class, it is possible to interact with the teacher directly at the time of lecture, but in this case it is not possible to access the eminent professor during their lecture. SWAYAM does not provide customized learning material to the learners. There is common study material uploaded on the website and based on the requirement the student can download it and read it. It is also not possible to get personal attention from the teacher[30]. There is no scope to get personal assistance from the website. It is also very difficult to maintain student involvement in the study. On the basis of self-motivation of the learners, they have to submit their assignment on time. There is no special option for the learners with special disabilities and the children with special needs (CWSN). They do not get special attention or direct benefit from the SWAYAM portal. There is a lack of video tutorials in local languages. Though the study materials are available in some local languages, the video tutorials are not available in local languages. The whole system is technology dependent, so it is very difficult to access with low-speed internet. To access the contents, especially the videos, it is necessary to have uninterrupted high-speed internet connectivity. The internet plans are also a constraint for access to the video tutorials. To access the videos it needs sufficient internet access plans, which are quite costly to recharge and need a financial investment for technology purposes.

DISCUSSION

Opportunities to implement Digital Education

Physical education has gained a lot of popularity among people because the teaching method can be improved a lot by using various digital devices in the classroom. Digital Education, in a word, is improving the quality of teaching and learning by using advanced technology[1]. Digital Education is much more flexible because students can learn from anywhere at any time using various types of technology. In this method, students can learn any subject according to their needs. The main component of Digital Education is the internet[45]. Massive open online courses are a learning method through which students can take secondary education of a course at a very low cost. Students can acquire their education in various subjects based on the internet at a very low cost. Education is provided using secondary digital platforms of various government and private enterprises.

Students can also learn through online classes, video lectures, interactive content and gamified learning[41]. Students from remote areas and students with disabilities have paved the way for their education through digital Khan. Digital Education can mainly be imparted through smart classroom learning management systems and these tools. A special advantage of Digital Education is that it has the facility of chat board. Students can clear their doubts through live chatting. Even through online classes, students can exchange their views with the teacher and clear their doubts. The advantage of Digital Education is that it provides an interactive or participatory method of study[39]. Digital Education members can exchange their views together, which is a special medium for exchanging ideas among classmates. Students can also clarify their ideas by watching videos recorded before the class. Even students can express their opinions through chatting. Digital Education gives the idea of peer education if students can exchange ideas with the principal parties. Digital Education is a very affordable education method because they can enroll

in a course at a very low cost. In some cases, Digital Education is also provided free of cost. Digital Education also reduces the need to travel to a specific campus, which saves students both time and travel costs associated with the traditional education method. Digital Education expands the scope of learning. Students can communicate with any teacher located anywhere in the world. It is possible to communicate with a teacher located anywhere in the world. Since it provides a multilingual learning environment, the system is able to convert any language into any understandable language for the student. With the help of this system, the student can also communicate with the teacher in any language.

Another advantage of Digital Education is that it provides an active, enjoyable and independent learning experience. Digital Education encourages self-study based learning. Students can utilize their time properly. There is no obligation to study. Learning is completely dependent on the needs of the student. There are no geographical restrictions for students. Only a high-speed internet connection is required to use the materials. Since the materials are spread over the network, it is available 24/7. Students can learn anything at any time. Students can choose the time according to their convenience. One of the advantages of Digital Education is that it is more convenient and flexible for the student. Students can use any material from any place[8]. A student can attend any live class from a remote location using the internet. Students can even watch any recorded class. Pre-recorded videos of the class are very helpful for students. Students can watch the videos whenever they need. Teachers use various types of electronic devices to explain any concept easily. With the help of various types of digital devices, teachers can explain any concept more easily. Opportunities for implementing Digital Education

Digital Education is a scientific method-based education[9]. It has many benefits for students. Digital Education is an extension of classroom-based education. It makes classroom education more organized and enjoyable. Various types of electronic devices used in Digital Education are very helpful in the context of the traditional classroom. This education system is web-based online education. Therefore, a strong, stable and high-speed internet connection is required to use this education system. It provides learning materials in various formats. It provides text documents, PDF documents, Word documents, PowerPoint presentation documents, image formats, audio formats, video formats, etc. E-learning is also available in multilingual formats. Language cannot be a barrier in using e-learning system[3]. It encourages education in regional languages. It is capable of converting study materials into different languages with the help of artificial intelligence and natural language processing systems. E-learning is a part of Digital Education[4]. E-learning is gaining popularity among students[31]. Learning becomes more enjoyable for the student through the use of various types of electronic devices. Various types of digital devices help students achieve e-learning[7]. It enhances the learning potential in the classroom. It creates a greater opportunity for the student. Since all students are different, their learning needs are also different. The system automatically creates customized learning materials for them according to the student's needs. It also encourages automated assessment methods. There is a human bias while assessing any student, but it can be reduced with the help of technology. Digital Education encourages artificial intelligence-based education systems. This advanced education system identifies various learning difficulties of the student and suggests remedies based on those difficulties. One of the advantages of Digital Education is that it is very easy to use. Its user interface is very user-friendly. Students can understand it easily. Its content is well-organized and written in very easy-to-understand language. The teaching materials are concise in nature. It also provides customized or need-based learning materials.

Challenges to implement Digital Education

To implement Digital Education in practical scenario, it is quite difficult and its faces many barriers in real life implementation[48]. Digital Education implementation requires huge financial investment. Digital Education requires huge financial investment to create infrastructure. Financial investment is required to purchase computers, laptops, digital blackboards, digital pens, projectors, cameras, microphones, speakers, networking devices and many more. The user also has to pay for internet connection. The user has to pay the internet service provider as per the requirement. In order to continuously improve the system, it is also necessary to invest money to adopt the technologies used in the system[42]. A suitable technical team is also required to implement Digital Education[43]. The resource person will be responsible for the creation, implementation and maintenance of the system. Money is also required to pay salaries to teachers, staff, administrators, technical team members and other people. Proper training of teachers and staff is also required to run the system smoothly. Money has to be invested to train all the stakeholders. There are many benefits of Digital Education, but it is very difficult to create a proper Digital Education platform[38]. Therefore, one of the most important challenges in creating a proper Digital Education platform is high financial and economic investment[36]. All the challenges must be overcome for the successful implementation of the Digital Education system.

Implementing Digital Education in real life is quite challenging. It is very difficult to install digital devices in existing classrooms. Implementing digital devices in classrooms requires some changes to the existing classrooms. A suitable system is required to install digital devices in classrooms. Implementing Digital Education in traditional campus-based classrooms requires infrastructural investment, technological investment and financial investment. A challenging part of Digital Education is that it requires strong technical support. Digital Education must incorporate various technologies. Various types of basic technologies and emerging technologies are used in Digital Education. Information technology and information and communication technology play a vital role in implementing Digital Education in real life. Adoption of various types of emerging technologies is also required to enhance the potential of Digital Education. Cloud computing, big data analytics, Internet of Things (IoT), blockchain technology, cybersecurity, artificial intelligence, machine learning, deep learning and many other technologies are playing an important role in Digital Education[15,19]. Integrating emerging technologies with the existing system is very challenging[17]. It is very difficult to convert the existing system into a smart system. It is also very challenging to integrate the new system with the existing system[26]. As the data are stored in a third party server in a remote location, so it is very difficult to ensure the security and the reliability of the data. It is also very challenging task to adopt the modern technologies and update the whole system accordingly.

To get the maximum benefit from Digital Education, it is necessary to create awareness among students, teachers, non-teaching staff, administrators, parents and others[18]. Students should have a computer or mobile phone with proper internet connection to access e-learning portals and MOOC systems[11]. Students are not familiar with the various emerging technologies used in Digital Education[21]. Teachers also face the same problem during online classes. Teachers are not familiar with the best digital teaching methods. Therefore, teachers are also facing some problems during digital based teaching and learning. Digital based education system also requires storage and maintenance of various types of information. It is very difficult for the staff to handle the huge amount of data. Proper training is required to all the stakeholders of the Digital Education system to use and implement the system properly.

Setting up infrastructure is one of the essential things for implementing Digital Education[12]. Setting up infrastructure for Digital Education requires huge investment[23]. The entire campus should be properly connected to a stable network. The campus should have proper internet connectivity along with adequate number of computers and other devices. Since the entire system is completely dependent on the network, it requires a stable and high-speed internet connection. To run the Digital Education system smoothly, proper training of teachers and staff is also required[20]. Money has to be invested to train all the stakeholders. There are many benefits of Digital Education, but creating a proper Digital Education platform is very difficult[13]. Therefore, one of the most important challenges in creating a proper Digital Education platform is the high financial and economic investment. All the challenges must be overcome for the successful implementation of the Digital Education system.

CONCLUSION

Digital Education is very useful for the modern generation learning. It is necessary to get the benefits of Technology to learn anything at anytime and from anywhere. Different institutions and organizations are tried to offers various types of educational service through Digital Education mode. SWAYAM is a very useful online learning portal. All the courses offered by SWAYAM are recognized by the government of India. UGC has announced"Credit Framework for Online Learning Courses through SWAYAM" Regulations, 2016 in the Gazette of India on July 19, 2016 where credit transfer for SWAYAM courses is defined. The UGC regulation requires Universities to make changes in their rules and regulation to incorporate provision for credit mobility and MOOC courses under the SWAYAM platform. SWAYAM has lots of advantages but still it is not popular among the majority of the students of India. Though the value of the certificates are quite impressive but still it is not get the property value with compare to the regular full time courses. It charges little bit of fees for the certificate thus lots of students do not get the certificate at the end of the courses. Availability of the study material is very low in local language. Thus this portal needs to add more contents and video lectures in local languages. SWAYAM is a very powerful and enriched e learning portal which is one of the best friend, philosopher and guide to a student.

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