ADOPTION OF DIGITAL INFRASTRUCTURE IN TEACHING AND LEARNING DURING COVID-19

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Abstract

It is probably a first for India to experiment with the education system and make a paradigm shift to the virtual world, blending classrooms with online learning. The pandemic has been working as a catalyst for educational institutions to grow and opt for platforms and techniques, they haven't used before. Digital infrastructure becomes a boon for education. Adoption of Digital Infrastructure in education has become a requirement in the process of teaching and learning due to COVID-19. Digital infrastructure is services that are necessary to the information technology capabilities of a region or organization. High-speed internet and supporting devices such as desktop, laptop, tablet, or mobile phones are some of the digital infrastructures which are adopted for teaching and learning in the study area. Data were collected from the Educators and Learners by simple random sampling method from five Arts and Science Colleges situated in Vilavancode Taluk of Kanyakumari district. Learners opined that problems related to Internet connectivity are the major problem in the process of learning during the covid-19 pandemic. Lack of Digital Resources, inconsistent power supply, and slower internet speed were the major challenges encountered by the educators which lead to stress and anxiety. The Provision of adequate internet services and power supply enhances the academic performance of learners.

Keywords: COVID-19, Digital Infrastructure, Teaching and Learning, online classes

INTRODUCTION

The outbreak of the coronavirus pandemic has created immediate and unexpected challenges for the first time in the field of education. The Lockdown of colleges and universities has disrupted learning and academic assessments, forcing the institutes to look for alternative ways and means to maintain learning continuity. Education has changed suddenly during the lockdown of covid-19. This situation demand adoption of virtual learning methods that are faster, easier, and accessible to every student without the need to be physically present for enrollments, classroom training, assignments, and assessments. Thus, Digital infrastructure becomes a boon for education. Adoption of Digital Infrastructure in education has become a requirement in the process of teaching and learning due to COVID-19.

Any transformation or change is a challenge. It is not easy to move away from comfortable approaches and adopt new and unknown methods. But this digital transformation during Covid -19 is a necessity. It will not only help education continuity and accessibility but also empower learners with the ability to learn anywhere and anytime without compromising on the quality of learning under any adverse situation.

Infrastructure is basic facilities, structures, equipment, technologies, and services that act as the foundation for economic activity and quality of life. Digital infrastructure is services that are necessary to the information technology capabilities of a nation, region, city, or organization. It includes Internet, Fixed Broadband, mobile telecommunications, a communication satellite, Wi-Fi networks, platforms, systems, applications, and end-user devices such as mobile phones and laptops. High-speed internet and supporting devices such as desktop, laptop, tablet, or mobile phones are some of the digital infrastructures which are adopted for teaching and learning is common in the study area. With the current pandemic, the opportunities to improve digital infrastructures like smart classrooms, Internet connection, and up skilling of Educators across the higher education sectors for teaching and learning have risen.

REVIEW OF LITERATURE

Bogdandy, Tamas, Toth(2020), The survey was focused on the experience, feelings, and overall expression of the learners, regarding digital education and recent changes. The learners enjoyed the digital education and half of them are willing to continue it in the future. In addition, learners would prefer to use their own devices during tutorials. Some learners had technical issues which may be caused by the heterogeneous software environment and can be solved with support material. Digital transformation was considered successful.

Kapasia N, Roy, Saha, Zaveri, Mallick, Barman, Das, and Chouhan (2020), During the lockdown period, around 70% of learners were involved in e-learning. Learners have been facing various problems related to depression anxiety, poor internet connectivity, an unfavorable study environment at home. Strategies are urgently needed to build a resilient education system that will ensure to development of the skill for employability and the productivity of young minds.

Luis, Arrabal and Cristina,(2020), Considering the impact on the right to education from a global perspective, this article discusses how COVID-19 has exacerbated inequalities and pre-existing problems in education systems around the world. Three categories of analysis were established: infrastructure and

equipment, both basic and computer-based, as well as internet access of schools; preparation and means of Educators to develop distance learning; and implemented measures and resources to continue educational processes. It is essential to articulate educational policies that support strengthening the government response capacity to address the sustainability of education.

Wadim Strielkowski, (2020), Due to the crisis induced by the coronavirus epidemic, innovations in academia and higher education that would have normally taken several years due to the various contradictory administrative regulations are now introduced promptly in a matter of days. This is a clear example of the Schumpeterian 'creative destruction' in making that will forever change the status quo in academia and higher education.

STATEMENT OF THE PROBLEM

Online educations have been widely adopted by higher education institutions during the lockdown period of COVID-19. Virtual learning has not just changed learners learning, but also altered the methods deployed by Educators. The infrastructure challenges in online education have rendered unprivileged learners helpless. While for many parents, the effort was to keep children away from screens, suddenly everyone was dependent on the screens – TV, laptop, desktop, and mobile. Learners, Educators, and parents are struggling to adopt the new online regime.

One big barrier that stands in the way of virtual learning is Digital Infrastructure. The lack of digital infrastructure in the rural areas and the inability of the learner to adopt the new facilities   have posed implementation challenges. Digital education can only be successfully implemented with the availability of basic amenities like internet connectivity, availability and affordability of online systems, Personal Computers, laptops, and mobile phones. Infrastructural issues in the form of internet access as well as smartphone and personal computers/ laptops, owing to the lack of affordability has proved to be a major roadblock in the adoption of online learning in Vilavancode Taluk of Kanyakumari District.

Learners and educators held unpleasant experiences in online classes due to poor digital infrastructure. The problem of interpersonal relationships between learners and Educators exists and they both face enormous challenges in e-learning due to poor infrastructure. A substantial proportion of learners could not attend online classes. All these prompted the presented study to explore the Adoption of Digital Infrastructure in Teaching and Learning during Covid-19.

OBJECTIVES

The adoption of technology in education has led to the transformation from teacher-centric education towards student-centric education. Virtual classrooms and various online tools enhance the engagement between the teacher and learners as close to the classroom-type experience if it is supported by good digital infrastructure. The study is focused –

- To reveal the various digital infrastructure used in the process of online teaching-learning.
- To examine the challenges faced by the Educators and Learners in adopting digital infrastructure.

RESEARCH METHODOLOGY

The researcher used both primary and secondary data to study the Adoption of Digital Infrastructure in Teaching and Learning during Covid-19 in the selected higher education institutions in Vilavancode Taluk of Kanyakumari District. Primary Data has been collected using a Questionnaire. The researcher developed two questionnaires to study the Digital Infrastructure adoption by the Educators and Learners for online teaching-learning. Secondary data has been collected using websites and from e-Journals

SAMPLE DESIGN

Data were collected from the Educators and Learners by simple random sampling method. The sample consists of 125 respondents. Out of these 125 respondents, 75 samples are learners and 50 samples are educators from five Arts and Science Colleges situated in Vilavancode Taluk of Kanyakumari district.

CHALLENGES IN ADOPTING DIGITAL INFRASTRUCTURE

Lack of digital resources and its difficulty to use

- Digital inequalities exist as there is no internet accessibility in the areas where few educators and learners are settled.

- Unavailability of computers, laptops, tablets, and mobile phone facilities for learners for connecting themselves to the online mode. Some educators were also affected by these inadequacies.

- Lack of adequate training on the requirements of online teaching for both learners and lecturers. Many lecturers and learners grappled with how to function effectively using the new technologies.

- The inability to make use of lab or fieldwork because of social distancing for courses that required the use of lab, fieldwork, or practical exercises.

Poor national infrastructure

- Slower internet speed at home due to sudden and unprecedented internet traffic and the lack of preparedness of internet providers for the sudden enormous demands on their services.

- Unlike the developed countries, India is yet to guarantee a stable power supply as there are occasions of power cuts during the delivery of lectures, affecting both learners and lecturers.

Course delivery problems

- **Reduced student–teacher engagement**: learners no longer engage in-class discussion as they do in the traditional face-to-face class and it is often little or no feedback when questions are asked. As a result, some online classes become long and sometimes stressful.
- **Slow and extended work**: Learners are unable to submit assignments when due and Educators are unable to keep up with their schedules because of either power-cuts or internet problems.

- **Compromise with a deadline:** Educators and Learners were unable to use technological tools to get work done on time, they were compromising with deadlines and even with the standard expected of their delivery because of some technological constraining factors they are confronted with.

- Limited opportunity for monitoring assessments, which has restricted many Educators to the use of multiple-choice questions.

- **Malpractices:** With the online method of testing and the realities of many learners' inability to utilise video services during some live class exercises and tests because of the limitation of

the technological devices, learners could receive assistance from members of the family and possibility for malpractices are more.

Problems faced by Learners

- **Inflexibility:** Learners who were accustomed to the traditional face-to-face method of teaching found the online method burdensome, with some becoming rude and impolite to lecturers because of the stress experienced as a result of adjusting to online education.

- **Domestic affairs:** The online delivery mode forced many learners to be working at home where they are under enormous distractions and other domestic issues and so most learners found it challenging to focus during online teaching.

- **Mental health**: Fear and anxiety among the learners emerged as a result of the sudden change. Due to learners' inability to cope with the combination of their academic and domestic challenges, depression, and mental issues were some of the conversations that were encountered during this pandemic.

DATA ANALYSIS

The section below is the presentation and analysis of data from the responses obtained from the distributed questionnaires. As shown in Figure: 1 below 59% of the learners are Male while 41% are Female. Based on this analysis it could be concluded that the majority of the respondents are male learners.
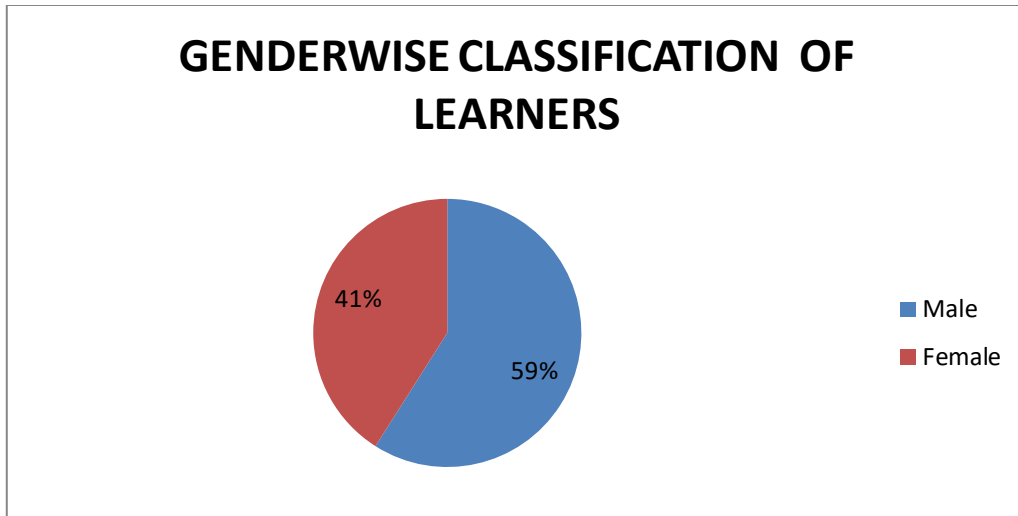
GENDERWISE CLASSIFICATION OF LEARNERS

Figure: 1   Distribution of Respondents according to Gender

Figure:2 shows the distribution of the Educators' designation. It revealed that (68%) of the respondents were Assistant Professors and (32%) of the respondents were Associate Professors.
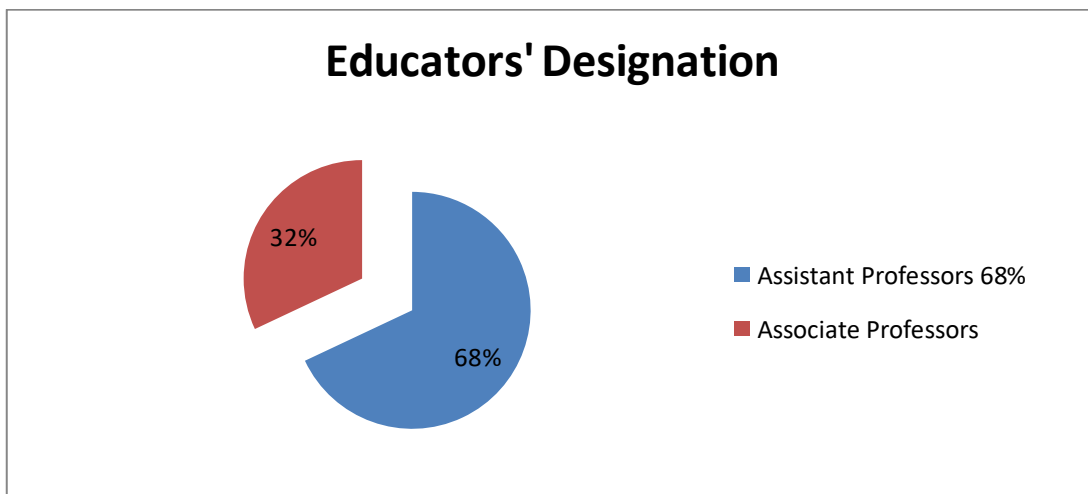
Educators' Designation

Figure: 2. Distribution of respondents according to Designation of Educators

Table: 1

GADGETS USED FOR ATTENDING ONLINE CLASSES BY THE LEARNERS

Type of Gadgets	No. of Learners	Percentage
Android mobile	62	82.7%
Laptop or Computer	13	17.3%
Total	75	100%

The respondents have indicated the Digital Infrastructure adoption and their capability to use the learning platform during Ccvid-19. The responses so received show that 82.7% of the respondents use Android mobile for attending online classes and 17.3% of the respondents depend on their laptop or computer for learning.

Table: 2

DIGITAL INFRASTRUCTURE USED BY EDUCATORS FOR ONLINE CLASSES, MATERIALS SHARING, AND EVALUATION

Online classes			Materials sharing			Evaluation		
	No. of Educators	%		No. of Educators	%		No. of Educators	%
Google classroom	19	38%	WhatsApp group	20	40%	WhatsApp group	15	30%
Zoom app	8	16%	Google classroom	19	38%	Google classroom	16	32%
Google meet	20	40%	Zoom app	6	12%	Google form	9	18%
You tube	3	6%	YouTube live/ Video	5	10%	E-Mail	10	20%

The analysis of Table: 2 depict that through digital infrastructure the educators handle online classes, share the educational material and also evaluate the learners during the lockdown period of covid-19. The Majority of the Educators (40%) in the study area use google meet for the online classes followed by Google classroom (38%). 16% of the respondents are familiar with Zoom App.

For sharing the material 40% of the educators depends on the WhatsApp group and 30% share the material in the classroom itself. The evaluation process is also done through Google classroom (32%) and 30% by the WhatsApp group.

Table: 3

DIGITAL INFRASTRUCTURE PROBLEMS FACED BY THE RESPONDENTS

	Educators		Learners	
	No. of Respondents	Percentage	No. of Respondents	Percentage
Feeling of stress, depression, and anxieties	28	56%	11	14.7%
Do not have gadgets	2	4%	15	20%
Do not have a favorable environment to teach / learn at home	8	16%	10	13.3%
Problems related to Internet connectivity	12	24%	39	52%
Total	50	100%	75	100%

In terms of digital infrastructure problems faced during teaching and learning the results show that 56 % of educators have indicated the factor," Feeling of stress, depression, and anxieties" as the major problem during the online classes followed by the problems related to the internet connectivity (24%). Thus, it can be concluded that the respondents are under huge stress and anxiety due to poor internet connectivity and the unfavorable home environment.

52 % of the sample respondents of learners opined that problems related to Internet connectivity is the major problem in the process of learning during the covid-19 pandemic. The second highest response rate was 20% concerning gadgets. A fewer number doesn't possess gadgets. They have to borrow from their friends or family members.

Table: 4

CHALLENGES FACED BY THE EDUCATOR DURING ONLINE CLASSES

Sl. No.	Challenges faced by the Educator during online classes	Mean score	Ranks
1	Lack of Digital Resources and its Difficulty to Use	7.6	1
2	Slower internet speed	7.4	3
3	Inconsistent power supply	7.5	2
4	Reduced student–teacher engagement	4.1	8
5	Slow and extended work	6.1	7
6	Compromise with deadlines	6.2	6
7	Malpractices	2.8	10
8	Learners' inflexibility	6.3	5
9	Distractions and other domestic issues	6.6	4
10	Mental health challenges	2.9	9

The researchers sought to determine the challenges faced by the educators during online classes. It was found that Lack of Digital Resources and its Difficulty to Use takes up the first position followed by Inconsistent power supply and slower internet speed occupies the second and third position respectively. The least score is awarded to Malpractices and other problems occupy their position as in Table. This shows that lack of Digital Resources, inconsistent power supply, and slower internet speed were the major challenges encountered by the educators which ultimately lead to stress and anxiety.

FINDINGS

- The outbreak of the Covid-19 pandemic forced Educators to use the virtual medium. Teaching models have become more hybrid.
- 82.7% of the respondents use Android mobile for attending online classes and 17.3% of the respondents depend on their laptop or computer for learning.

- Majority of the Educators (40%) in the study area use Google meet for the online classes followed by Google classroom (38%).

- For sharing the material 40% of the educators depends on WhatsApp group

- The evaluation process is done through Google classroom (32%)

- 56 % of educators have indicated the factor," Feeling of stress, depression, and anxieties" as the major problem during the online classes followed by the problems related to internet connectivity 24%.

- 52 % of the sample respondents of learners opined that problems related to Internet connectivity are the major problem in the process of learning during the covid-19 pandemic. The second highest response rate was 20% about gadgets.

- Lack of Digital Resources, inconsistent power supply, and slower internet speed was the major challenges encountered by the educators which lead to stress and anxiety.

SUGGESTION

- A sound investment in Digital infrastructure should be made by the educational institutions to make the online learning process more efficient.

- For effective use of online classes, learners need to be provided access to digital infrastructure - a device and good connectivity.

- There is a need for the institution and Universities to embark on an awareness programme that encourages the learners to take the advantages derived from the use of online classes for academic growth and career.

- Institutions that offer online classes during lockdown should provide incentives to faculty to redesign digital infrastructure which suits the online environment. It is a motivating factor for Educators.

- Schedules for teaching, tests, and assignments should be made bearable with the benefits of educator and learner and it is recommended to reduce anxiety and stress.

CONCLUSION

The lockdown amidst COVID-19 has made significant disruptions in academic activities. With the pandemic spoiling everywhere, everyone is asked to stay indoors. The home environment may not be suitable for learning because of family engagements. The study reveals that the lack of digital infrastructure

was the challenge the educators and learners encountered. Therefore, the provision of adequate internet services and power supply enhance the academic performance of learners.

The need to make the transition to online education should be slow and steady to reduce tension and stress. Digital infrastructure in colleges, basic devices for learners to access online education through personal computers, laptops, and mobile phones as well as uninterrupted internet connectivity, is the need of the hour. Despite some challenges, learners could adapt new learning methods. This current COVID-19 pandemic changed the utilization of technology in education and pedagogy in the future.

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