



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2023; 12(5): 3532-3536  
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Received: 13-03-2023

Accepted: 22-04-2023

#### C Vara Prasad

Assistant Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

#### K Natarajan

Associate Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

#### Shely Mary Koshy

Assistant Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

#### M Balarubini

Assistant Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

#### Dhanusha Balakrishnan

Assistant Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

#### Corresponding Author:

##### C Vara Prasad

Assistant Professor, School of Agricultural Sciences, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu, India

## E-learning during COVID-19 pandemic: Identification and prioritization of challenges among undergraduate students in the southern states of India

C Vara Prasad, K Natarajan, Shely Mary Koshy, M Balarubini and Dhanusha Balakrishnan

#### Abstract

The World Health Organization has declared Covid-19 as a pandemic that has posed a contemporary series of threats to humanity that has ever seen in this century. This pandemic has forced the global shutdown affecting all public activities, including education. As a result, the mode of education has changed dramatically, and there was a distinctive rise in e-learning and online classes across the country and the knowledge is delivered to students remotely through various digital learning platforms. Against this backdrop, the present study was coiled to identify and prioritize the challenges faced by undergraduate students in attending online classes. This study was conducted among the first-year agriculture undergraduate students of Karunya Institute of Technology and Sciences, Coimbatore who are attending online classes in southern states of the India *i.e.*, Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Telangana. Two hundred and twenty students from these states were selected randomly for the present study and these respondents were interviewed through a pre-tested, structured interview schedule developed to identify the challenges in attending the online classes with the help of Google Forms. The obtained data were processed with the help of statistical tools like frequency, percentage, mean, standard deviation and Rank Based Quotient (RBQ). The challenges identified were: 'Poor/unstable internet connectivity' (71.23%), 'High cost of ICT tools' (58.77%), 'Lack of sufficient knowledge and skill in the use of e-learning' (58.09%), 'Irregular power supply' (57.64%), 'Online classes leading to stress and eye-problems' (57.27%), 'High internet charges' (52.23%), 'Lack of proper training before using e-learning platform' (51.14%), 'Lack of confidence and shyness from learning online' (51.09%), 'Online classes make me feel alone' (46.68%), 'Home environment will not allow to concentrate on classes' (45.86%).

**Keywords:** Constraints in e-learning, online classes, undergraduate Agri students

#### Introduction

COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11, 2020, due to its rapid spread across multiple countries and continents, posing a severe threat to public health worldwide. The impact of COVID-19 has been profound, causing millions of deaths and disrupting daily life globally with lockdowns and travel restrictions. As a consequence of the COVID-19 pandemic, educational institutions worldwide were unexpectedly and suddenly shut down. In response, school and college authorities recommended using alternative learning techniques during crises to ensure students continue learning and prevent the epidemic's spread. During the COVID-19 outbreak, e-learning through virtual classrooms took the role of traditional educational approaches as the preferred medium of instruction. Maintaining social isolation was challenging because social gatherings at educational institutions were viewed as potential places for the virus to proliferate. E-learning is the best option to stop the spread of diseases, despite the issues and data analysis that indicate students are less likely to benefit from this type of education (Lizcano *et al.* 2020) [9].

The use of Information and Communication Technologies (ICTs) offers exceptional educational and training prospects for students and organizations. This is achieved by enhancing teaching and learning through innovative and unique approaches. The National Education Policy (NEP) curriculum, which was introduced in 2020, places a strong emphasis on the value of technology in enhancing students' learning experiences and effective models of blended and integrated learning.

In order to address the present and future demands for digital content, it is necessary to optimise and broaden the current digital platforms and ongoing ICT based educational efforts. This will ensure that everyone has access to high-quality education. Moreover, incorporating ICTs and blended learning in education policy formulation can foster the development of creative and innovative learning environments within educational institutions. Consequently, there is a great deal of emphasis on activities and experiences related to this form of education, with many universities in developing nations adopting this technology. Educational institutions generate a substantial amount of potentially valuable data related to learning processes regularly, and there are numerous learning-related activities in educational settings. These data can be used to extract information and gain a better understanding of learning-related processes. (Abdullah, 2019; Altawaty, *et al.*, 2020; Selim, 2007; Aljawarneh, 2020; Lara *et al.*, 2020; Lizcano *et al.*, 2020) [1, 4, 15, 3, 6, 9].

Several e-learning researchers have highlighted the absence of crucial interpersonal interaction in e-learning, not only between teachers and students but also among peers (Somayeh *et al.*, 2016) [16]. However, developing countries face numerous challenges in implementing e-learning, including inadequate internet connectivity, limited expertise in utilizing information and communication technology, and poor content production, in contrast to developed countries (Aung & Khaing, 2015) [5]. Against this backdrop, the current study, "e-Learning during the Covid-19 pandemic," aims to recognize and prioritize the challenges that undergraduate agriculture students in the southern states of India encounter.

## Materials and Methods

The purpose of this study was to identify and prioritize the challenges faced by agriculture undergraduate students attending online classes during the 2020-21 academic year. A total of 220 respondents were selected from the list of agriculture students using an *ex-post facto* research design. An questionnaire was administered *via* e-mail to the respondents and a pre-tested structured interview schedule was used to conduct the interviews. The interview questions covered a range of factors including age, gender, location, state, experience, device, internet source, and attitude towards online classes. The data collected were analysed using statistical tools such as frequency, percentage, mean, and standard deviation, as well as the Rank Based Quotient (RBQ) method for ranking the problems identified. The findings of the study provide valuable insights into the challenges that students face while attending online classes and can be used to improve the quality of online education for agriculture undergraduate students. The chronological age of the respondent was operationalized as the actual age of the respondent at the time of the investigation. The number of years obtained by the respondent is rounded to the next whole number in this study, and the investigation is completed at that time. The total responses were then divided into three groups based on the mean and standard deviation, i.e. young, middle-aged, and old. The formula: Mean  $\pm$  0.425 SD. was used to categorize the variable age into these three categories.

## Preferential ranking technique

Unlike other simple ranking systems, this method takes into account the average impacted area as well as the percentage of limitations as assessed by respondents in order to prioritise constraints based on their total magnitude value. The following steps are involved in constraint analysis using the Preferential Ranking Technique: (Sabrathnam, 1988).

1. Identifying key informants (KI): The first step is to identify key informants who are experienced with e-learning and ICT tools. Individually, these key informants are asked to indicate any obstacles they may have encountered while taking classes online. The common challenges are then divided into eleven categories.
2. Identification of respondents: Respondents were chosen at random from a list of first-year undergraduate students in the Department of Agriculture at Karunya Institute of Science and Technology in Coimbatore for this study.
3. Data quantification: The Rank Based Quotient (RBQ) is generated using the method for each constraint mentioned by the respondents

$$\text{Rank Based Quotient (RBQ)} = \left[ \sum f_i \frac{(n+1-i)}{Nn} \right] \times 100$$

Where,

$f_i$  = Frequency of students for  $i^{\text{th}}$  rank

$i$  = Concerned ranks,

$N$  = Number of respondents

$n$  = Number of ranks

## Results and Discussion

### Personal Profile of the Respondents

Table 1 reveals that the majority of the agriculture undergraduate students belong to the age group of 17-18 years (55.90%) followed by the age group of 19-20 years (43.18%) and 21-22 years (0.91%) and it is observed that more than half of the respondents are girls *i.e.*, 112 (50.9%) followed by boys *i.e.*, 108 (49.1%). The location details of the students revealed that the majority of them 96 (43.5%) are from villages, followed by 69 (31.4%) from Block/Taluka level, followed by 42 (19.2%) from State capitals/Cities and lastly 13 (5.9%) from District headquarter covering across the southern states *i.e.*, Tamil Nadu 180 (81.8%), Kerala 25 (11.4%), Andhra Pradesh & Telangana 8 (3.6%), Puducherry 5 (2.3%) and Karnataka (0.9%).

When it comes to students' experience in using Information & communication technology tools, half of them posing a low level of experience *i.e.*, 109 (50%) and a high level of experience 84 (38%), and 27 (12%) had a medium level of experience. It is also observed that the majority of the students were using Laptop 127 (57.7%), Smartphones 83 (37.7%), Computers 8 (3.6%) and Tab/iPad 2 (0.9%) for attending the online classes and were accessing the internet from Smartphone 103 (46.8%), Hotspot from smartphone 76 (30.5) and through Wifi router 50 (22.7%). The majority of the students (37.3%) were posing a high level of attitude towards online classes, followed by low (37.3%) and medium (24.1%).

**Table 1:** Personal Profile of the Respondents

S. No	Category	Frequency	Percent	
	<b>Age</b>			Range =17-21
	17-18 Years	123	55.91	Mean =18.40
	19-20 Years	95	43.18	SD=0.90
	21-22 Years	2	0.91	
1.	<b>Gender</b>			
	Male	108	49.1	Range =1-2 SD =0.50
	Female	112	50.9	
	<b>Place</b>			
	Village	96	43.6	Range = 1-4 Mean = 2.00 SD= 1.12
	Block/Taluka	69	31.4	
	District Headquarters	13	5.9	
	State Capital/City	42	19.1	
2.	<b>State</b>			
	Andhra Pradesh	8	3.6	Range =1-5 Mean = 4.5 SD= 0.98
	Karnataka	2	0.9	
	Kerala	25	11.4	
	Puducherry	5	2.3	
	Tamil Nadu	180	81.8	
	<b>Experience</b>			Range =1-10
	Low (1-2 Years)	109	50	Mean =3.39
	Medium (3 Years)	27	12	SD=2.30
	High (3-10 Year)	84	38	
	<b>Device</b>			Range =1-6
	Computer	8	3.6	Mean =2.23
	Laptop	127	57.7	SD=1.74
	Smart Phone	83	37.7	
	Tab/iPad	2	0.9	
3.	<b>Source of Internet</b>			
	Hotspot from Smart Phone	67	30.5	Range =1-3 Mean =3.39 SD=2.30
	Mobile network	103	46.8	
	Wifi Router	50	22.7	
4.	<b>Attitude towards online classes</b>			
	Low (<103)	82	37.3	Range =20-244 Mean =130 SD=64.00
	Medium (104-157)	53	24.1	
	High (>158)	85	38.6	

### Prioritization of Student Challenges

The obtained data were processed with the help of statistical tools like frequency, percentage, mean, standard deviation and Rank Based Quotient (RBQ). The challenges identified were, 'Poor internet connectivity' (71.23%), 'High cost of ICTs tools' (58.77%), 'Lack of sufficient knowledge and skill in the use of e-learning' (58.09%), 'Irregular power supply' (57.64%), 'Online classes leading to stress and eye problems' (57.27%), 'Cost of internet charges is high' (52.23%), 'Lack of proper training before using e-learning platform' (51.14%), 'Lack confidence and shyness from learning online' (51.09%), 'Online classes make me feel alone' (46.68%),

'Home environment will not allow to concentrate on classes' (45.86%).

The constraints identified were, 'lack of training and practical exposure towards ICTs' (64.8%), followed by 'high cost of ICT tools (64.55%), 'insufficient local language information' (62%), 'low network connectivity' (60.90%), 'unavailability of different ICT tools' (60.60%), 'lack of skill in handling ICTs' (58.65%), 'lack of confidence in operating ICTs' (55.40%), 'high cost of repairing for ICT devices' (49.40%), 'irregular power supply' (37.95%), and 'lack of awareness of benefits of ICTs' (36.40%).

**Table 2:** RBQ and Ranks

RBQ	Ranks										%	Ranks
	1	2	3	4	5	6	7	8	9	10		
Unstable/Poor internet connectivity	98	21	11	12	14	7	7	10	9	31	71.23	I
High cost of ICTs tools (Laptop/Computers/Smart Phone]	10	12	23	14	83	38	15	11	8	6	58.77	II
Lack of sufficient knowledge and skill in the use of e-learning	9	9	73	19	19	17	13	31	16	14	58.09	III
Lack of proper training before using the e-learning platform	3	82	12	13	10	13	9	17	40	21	57.64	IV
Online classes lead to stress and eye problems	73	19	13	9	5	4	3	11	14	69	57.27	V
The cost of internet charges is high	9	20	12	30	19	15	76	15	11	13	52.23	VI
Irregular power supply (Electricity)	4	5	8	22	40	80	29	11	12	9	51.14	VII
Lack of confidence and shyness from learning online	1	5	12	70	15	25	38	22	18	14	51.09	VIII
Online classes make me feel alone	4	15	32	15	9	17	17	78	17	16	46.68	IX
Home environment will not allow concentrating on classes	9	32	24	16	6	4	13	14	75	27	45.86	X

**Unstable/ Poor internet connectivity**

Dealing with weak or unstable network connectivity is one of the most disagreeable aspects of online classes. Despite the fact that the number of phone users in India increased to 1,203.47 million by April 2021, many individuals, particularly those in rural areas, face the challenge of poor signal strength caused by network congestion. Among all respondents, the RBQ value for this constraint is found to be 71.23 percent, earning it a rank of I.

**High cost of ICTs tools (Laptop/Computers/Smart Phone)**

One of the major challenges of attending online classes is the expensive nature of ICT tools. Although the cost of these tools has decreased in recent years, a study shows that individuals in rural communities still face financial obstacles. In the study area, the "high cost of ICT tool" with 58.77 percent is recognized as the second most critical limitation for e-learning of undergraduate students. These findings are similar to those of Prasad and Pradhan (2023) <sup>[11]</sup>.

**Lack of sufficient knowledge and skill in the use of e-learning**

Lack of sufficient knowledge and skill in the use of e-learning tools can be a significant obstacle for students. E-learning has become an essential part of modern education, and its adoption has accelerated due to the COVID-19 pandemic. However, not everyone is familiar with the different e-learning tools available, and this can make it challenging to navigate through the various platforms, software, and applications. In the present study, it was found that students lack knowledge and skill as the third most critical limitation in attending online classes. Similar findings were identified by Maatuk (2022) <sup>[10]</sup>.

**Lack of proper training before using the e-learning platform**

The lack of proper training before using an e-learning platform can have significant consequences on the learning process. The learners may not understand how to navigate the platform, access course materials, or interact with instructors. These findings are similar to the study done by Raksha *et al.* (2015) <sup>[12]</sup> and Sunil Rajoria *et al.* (2022) <sup>[18]</sup> which stated that 'Lack of training on ICTs' had a high magnitude with the RBQ of 58.09 percent.

**Online classes lead to stress and eye problems**

Online classes have been associated with increased stress levels due to factors such as a lack of structure and difficulty in staying motivated (Sahu & Gupta 2020) <sup>[14]</sup>. Additionally, extended screen time can lead to eye strain, headaches, and other vision problems. In the study area, "online classes lead to stress and eye problems" is recognized as the fifth most critical limitation for undergraduate students with an RBQ of 57.27 percent.

**The cost of internet charges is high**

Many individuals around the world, especially in some parts of India, are concerned about the price of internet costs. Even though the price of internet access might vary depending on region and service provider, some people may find it to be unaffordable, especially for the lower income group. This might be the reason that high internet charges were found to be the limitation in accessing the internet among the users with

the RBQ of 52.23 percent.

**Irregular power supply (Electricity)**

To operate, all of the ICT tools required either a direct power supply or the charge of an internal battery. When compared to the other constraints in the study, the magnitude of this restriction is shown to be small. The most likely reason is that current smart gadgets have internal batteries that can be charged and operated even when there is no power supply. The RBQ value of this limitation is 51.14 percent, which is ranked VII, among the total responders. Sumi and Singh also discovered similar results (2018).

**Lack of confidence and shyness from learning online**

The users' lack of confidence in operating ICTs also hampered their utilization of ICT tools (Agwu *et al.*, 2008) <sup>[2]</sup>. The RBQ value of this limitation is found to be 51.09 percent among all responders, ranking VIII. Many of the respondents are aware of the benefits of ICT tools, but because they were not well equipped in accessing these technologies during the time of the pandemic, they experienced a lack of confidence in operating ICT tools during the initial phase of online classes, according to the findings of the study.

**Online classes make me feel alone**

Online courses may give students the impression that they are physically alone and isolated, especially if there is no proper interaction between peers or teachers. But in the present study students expressed that this constraint was found to be the least effective with the RBQ of 46.68 percent in the ninth rank. Similar findings were reported by Liu *et al.*, 2021 & Lee & Choi, 2021 <sup>[8,7]</sup>.

**Home environment will not allow to concentrate on classes**

The home environment can impact students' ability to concentrate during online classes. Facilities like study space, effective time management, and minimizing distractions, will help the students to maintain their focus on the class during online classes. In the present study, it is evident that these facilities were well taken care. That was the reason for the statement to get the least RBQ of 45.86 percent.

**Conclusion**

COVID-19 compelled educational institutions across the world to move to e-learning mode of curriculum delivery. E-learning has its own attendant issues as perceived by the students. This study empirically enumerated and ranked the challenges faced by the students and their attitude towards e-learning to the benefit of educators to plan efficient curriculum delivery. The students' learning constraints varied based on students' geographical location, socioeconomic status, age and access to technology. The challenges ranked in their order of magnitude included: unstable internet connectivity, high cost of ICT tools, lack of sufficient knowledge and skills in e-learning, lack of proper training, and stress and eye problems due to prolonged screen time, etc. The cost of internet charges, irregular power supply, lack of confidence in learning online, and feeling alone during online classes are other challenges faced by students. These point to the urgent steps to be taken by educational institutions and the Ministry of Higher Education in the government to take appropriate measures to each of the above constraints to enhance the efficiency of student learning during the

pandemic period in particular and at any online platform in general.

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