RESEARCH ARTICLE :

Online learning for agricultural courses during COVID 19 : Students' perceptions about its effectiveness

■ N. Mridula, Smitha Baby and S. Helen

SUMMARY : The coronavirus pandemic has imperilled the teaching-learning process, forcing to adapt to online modes from kindergarten to the tertiary level, globally. In this setting, a study was conducted among randomly selected 120 undergraduate agricultural science students of Kerala Agricultural University regarding their experience based perceptions on the online learning effectiveness for their courses. As per the results, online learning was considered effective in terms of learning material supply, ease of taking exams, cost-effectiveness, doubt clearance and learning flexibility while it was considered ineffective with regard to team feeling and motivation. Connectivity issues, technical problems and lack of interaction have negatively affected the interest and the attention span of the students. The social science subjects (Agricultural Extension and Home Science) were recorded as easier to study online, though the conceptual clarity was negatively impacted in Agricultural Economics and Statistics. Plant Pathology, Agricultural Entomology and Plant Breeding were counted as hard to learn online. This study tries to call for change management in the online teaching-learning process in agricultural education system so that the prevailing uncertainties due to pandemic can be overcome and the teaching-learning activities can be resumed with quality and effectiveness.

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BACKGROUND AND OBJECTIVES

The novel coronavirus disease 2019 (COVID-19) has disrupted the day-to-day human life globally. Apart from having negative impacts on the life and health it has big knock-on effects on the economy, society and higher education from kindergarten to the tertiary level. As Favale *et al.* (2020) have rightly put it, "online learning, remote working and e-collaborations have exploded during Coronavirus crisis". The pandemic has shuttered educational institutions sine die and necessitated changed instructional patterns and modes of learning. Resultantly, both teachers and students have to embrace the digital academic experience as the summum bonum of the teaching-learning process (Lederman, 2020), as it is the safest and most practical pro-tem instructional mode.

As per Nguyen (2015), there is robust evidence to suggest online learning is generally at least as effective as the traditional format. Lederman (2020) stated that online pedagogy

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has the advantages of accessibility, affordability, flexibility, cost-effectiveness enabling life-long learning which can increase the learning potential of the students. In this context, this study was conducted to assess the experience based perceptions of agricultural students about the effectiveness of online learning. The results call for a linkage between change management process and online teaching-learning process in agricultural education system, and thus the prevailing uncertainties can be nullified and effective teaching-learning activities can be resumed.

RESOURCES AND METHODS

This study intended to understand the agricultural science students' experience based perceptions about online learning effectiveness for their courses. It was conducted among 120 randomly selected undergraduate agricultural science students of Kerala Agricultural University. Permission was sought and obtained from the Director of Extension, Kerala Agricultural University for the same. A semi-structured interview schedule prepared to get the students' opinions, perceptions and suggestions on online learning was administered online. The consolidated responses were analysed using the descriptive statistics for quantitative data and content analysis for qualitative data.

The pivotal factors for the academic online learning effectiveness were identified by extensive review of literature. Eighteen factors were identified as follows: (i) Meeting Learning Objectives (ii) Motivation (iii) Conceptual Clarity (iv) Learning Flexibility (v) Convenience (vi) Ease of Access (vii) Ease of Paying Attention (viii) Communication (ix) Team Feeling (x) Interaction (xi) Participation (xii) Convenience of Recording Information (xiii) Supplement of Learning Materials (xiv) Cost Effectiveness (xv) Quick Response (xvi) Doubt Clearance (xvii) Ease of Taking Exams (xviii) Feedback Provision.

In order to compute the Effectiveness Indices (EIs) the respondents were asked to give score to each of the eighteen items based on their experience, ranging from 0 to 3; viz, highly effective (score 3), effective (score 2), somewhat effective (score 1) and not effective (score 0).The effectiveness indices were calculated from these scores using the formula given below:

$$\text{Effectiveness index (EI)} = \frac{\text{Total obtained score}}{\text{Maximum possible score}} \times 100$$

OBSERVATIONS AND ANALYSIS

The findings of the present study as well as relevant discussion have been summerized under following heads:

Basic details:

The instructional methods employed in the online learning of the academic agricultural courses included live classes via Apps like Google Meet, live streaming via YouTube and WhatsApp. Besides, the learning management system MOODLE was utilised for the course material provision, assignments and quizzes.

All the sample respondents were undergoing eight to ten courses through online mode and they actively responded to the questionnaire. Out of the 120 respondents, 77 per cent were females and the rest were males. The respondents belonged to the age group of 19-22 years and all of them were accessing online classes from their homes. Seventy three students informed they were using smart phones to access the online classes, 21 reported of using laptops or desktops for the same, the remaining respondents didn't mention the type of device. Forty four per cent of them reported that eight to ten hours have to be spent weekly for attending the online classes. The rest informed that online presence of more than ten hours is required to complete all the course related assignments.

Perceptions on online learning effectiveness :

As studied by Huang et al. (2020), sufficient availability of information communication technology infrastructure, learning tools, digital learning resources in the form of massive open online courses, e-books, e-notes etc. are the tools for online education which are of utmost importance. All respondents showed favourable attitude towards online learning. Integrating online content to the traditional methods of instruction in agriculture in the post COVID period was welcomed by 93 per cent of the respondents, the remaining students didn't specify their view.

The effectiveness indices obtained for the identified 18 factors are shown in Table 1. It is noted that only five factors secured effectiveness indices more than the mean EI of 50.00. These included supplement of learning materials, ease of taking exams, cost effectiveness, doubt clearance and learning flexibility.

The Online Learning Management System (Online LMS) used for online course delivery was MOODLE,

Table 1: Effectiveness indices for the identified 18 factors of online learning (n=120)

Sr. No.	Factors determining online learning effectiveness	Effectiveness Indices (EI) (Mean EI=50.00)
1.	Meeting learning objectives	40.83
2.	Motivation	33.33
3.	Conceptual clarity	39.72
4.	Learning flexibility	50.55
5.	Convenience	42.78
6.	Ease of access	43.06
7.	Ease of paying attention	42.22
8.	Communication	45.56
9.	Team feeling	29.44
10.	Interaction	37.78
11.	Participation	37.50
12.	Convenience of recording information	47.50
13.	Supplement of learning materials	76.11
14.	Cost effectiveness	56.94
15.	Quick response	41.94
16.	Doubt clearing	50.56
17.	Ease of taking exams	56.94
18.	Feedback provision	49.44

expanded as Modular Object-Oriented Dynamic Learning Environment, founded in 2002. MOODLE facilitates student-centered, anytime-anywhere learning. It provides instant feedback in quizzes, enable uploading and sharing of information and learning materials, and help the learners to participate in learning activities as per their convenience. Thus it promotes flexible learning improving the effectiveness and efficiency of the higher education. It also makes course administration easier leading to cost effectiveness and timely delivery of instruction (Devi *et. al.,* 2020; Suppasetseree and Dennis, 2010; Smart and Cappel, 2006). Instant doubt clearing was also enabled by live sessions and via WhatsApp. Though ease of access is a key benefit of online learning, in this study it has secured an EI of only 43.06, which may be due to the technical reasons like connectivity problems or unavailability of the suitable device.

The two components that secured the least effectiveness indices were team feeling and motivation (EIs 29.44 and 33.33 respectively). Though online learning helps in recording the classes, the participation and interaction scored low EIs. Humans being social animals, the absence of face-to-face interaction and physical presence can spur anxiety and loneliness in the online learning environments. Hence "humanising the learning material and introducing mechanisms to provide students with their peers' views" are essential for effective online learning (Croft *et. al.,* 2015). Several studies have proved that motivated students are more likely to learn and achieve. Individual level care is an important motivational factor for adult learners. Regular feedback and enquiring if their learning needs are met are important steps of caring that in turn help to develop the conceptual clarity. Online learning doesn't take into consideration the different teaching or learning styles. Hence more creativity and flexibility is to be introduced for quality teaching-learning process. For conceptual clarity more interaction, quick and regular feedback, individualised care and monitoring are to be practiced in the online environment. Lack of community and difficulty in understanding instructional goals can hinder effective online learning. (Song *et al.,* 2004). Learning process can't reach its expected potential until learners are allowed to practice the theoretical concepts introduced to them. It has already been found that the postgraduate agricultural students belonging to life science and social science streams favoured active learning methods like discussions, practical sessions, demonstrations and field visits (Mridula, 2015).

The below average effectiveness indices observed for the other components can be attributed to the fact that when the unexpected pandemic and the abrupt declaration of lockdown had compelled switching to the completely online mode of teaching-learning process, majority of the agents involved in the traditional methods were complacent and stuck with those modes. This might have prevented them from exploring the immense possibilities of online learning and following it efficiently. Parkes *et al.* (2015) have already observed that the students with low level preparedness for academic type e-learning competencies and usage of Learning Management Systems (LMSs) would find it very challenging. As time passes, innovative solutions can be explored and utilised to keep the doors of learning open in crisis periods.

The easiest subjects to study online were ranked according to the choice frequency recorded by the respondents, as shown in Table 2 below.

The social science subjects (Agricultural Extension and Home Science) as well as the theory part of other subjects were recorded as easier to study online, but the

Table 2 : Ranking of subjects based on the easiness to study online, as reported by the respondents

Subject	Rank
Agricultural Extension	1st
Home Science	2nd
Biotechnology (theory)	3rd
Horticulture (theory)	4th
Agronomy (theory)	5th
Crop Physiology	6th
Soil Science and Soil Chemistry (theory)	7th
Agricultural economics	8th
Statistics	9th
Plant breeding	10th
Agricultural entomology	11th
Pathology	12th

(Rank 1 denotes the easiest subject for online study and rank 12 denotes the toughest subject)

courses like Plant Pathology, Agricultural Entomology, Plant Breeding and those which needed practical sessions and hands-on experiences were counted as difficult. The students also reported difficulty in following the concepts in Agricultural Economics and Statistics through online classes. The lack of interaction with the tutor and the peers might also make this graver. More elaborate content on practical sessions and demonstrations will help in better understanding of the subjects.

Challenges and way-out:

Instruction, content, motivation, relationships, and mental health are the five important things that an educator must keep in mind while imparting online education (Martin, 2020). In this study, 92 per cent of the respondents reported that network and connectivity issues are the most important hindrances to the online classes. According to Muthuprasad *et al.* (2020) broadband connectivity issues in rural areas is a challenge for students to make use of online learning initiatives. Besides, technical problems like audio-video obscurity was also another problem. These issues put forth by the online learning environment calls for increased technological competency for both givers and takers, as well as ensuring accessibility to internet with affordable rates. As a solution the recorded versions can be distributed to the students which is as impactful as the live sessions and can be accessed anytime. It has already been observed that students preferred recorded classes with quiz at the end of each class to improve the effectiveness of learning (Muthuprasad *et al.,* 2020).

Another problem recorded was the lack of face to interaction with the instructor and peers. The direct interactions should be curtailed as much as possible due to the pandemic, but peer communication and teacher-student communication can be strengthened which would act as a motivator to participate and engage more effectively. In such cases social networks can be used as communication tools for class-related issues, maintaining the professional interaction. Martinez-Caro (2011) suggests that interaction with right mixture of human and technology is crucial for getting successful outcomes in online learning.

Conclusion:

Agriculture is a practical oriented science subject which needs hands-on sessions, discussions and demonstrations to get a good grasp of the topic. This study tries to bring out the perceptions of the agricultural students regarding the effectiveness of learning agricultural courses online as necessitated by the COVID 19 pandemic. The results of this study indicated that though the online learning can be considered effective in terms of supplement of learning materials, ease of taking exams, cost effectiveness, doubt clearance and learning flexibility, it was ineffective with regard to team feeling and motivation. Connectivity issues, technical problems and lack of interaction have affected the interest and attention span of students compelling them to stray away from the online learning environment. Hence accessibility to fast internet connection, increased technological competency for both teachers and students, increased interaction and personal care together with integration of more elaborate online content to make up for the loss of practical sessions are to be ensured to make the online learning experience a successful and meaningful activity. Like any other educational sector, agricultural education system should also be resilient to reshape itself exploring new modes and approaches of teaching–learning processes like blended learning to cope with the calamities and pandemics.

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