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Assessment of learning environment through instructional tools during COVID-19

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Educational institutions have been using different instructional tools for the diffusion of knowledge. In fact, the present crisis has transformed the entire world's higher education system through videoconferencing based online learning since only the option to compensate for the compromised academic activities. This study aims at using the various kinds of instructional tools by students to engage effectively in the learning process, and constraints faced by them under different environments (Rural & Urban) during COVID. This research was carried by using an exploratory study conducted on 60 students, selected from one of the State Agricultural Universities. The questionnaire was prepared and modified into google form for data collection. The "Mann Whitney U" test was used to assess effectiveness of students by using instructional tools between the 2 groups', viz., Rural and Urban, which was computed based on p-values, analyzed by using IBM, SPSS version 25. To ascertain constraints, the content analysis, frequency and percentages were used. The knowledge, attitude and awareness showed urban students were more significant than rural expect extent of use of instructional tools. Constraints faced by the students who are from rural areas are internet connectivity and lack of infrastructure facilities and require more training compared to urban. It can be deduced that compared to rural, the students from urban learning environments were having more effectiveness in use of instructional tools during COVID.

Keywords: instructional tools, learning environment, COVID-19, knowledge, effectiveness

The COVID-19 has been avowed as a global pandemic by WHO a couple of months ago. It has created a huge impact on almost all domains of life. One of the most vulnerable sectors is education which has been forced to abruptly switch to the online mode of instruction at an exceptional scale (WHO, 2020; & Pasha, 2020). All the educational institutions were shut due to Coronavirus pandemic and created a difficult situation to conduct traditional classes with physical presence. During this condition, advancement of technology can be an appropriate solution in education, then ICT (Information & Communication Technology) can be used for sustenance of online learning processes. The University Grants commission (UGC) has been instructed all the educational institutes to continue classes through online mode according to their feasibility and engagement of ICT tools by the teachers to instruct and also by learners to learn. To endorse this effort, there are many open access tools available, which are already used by many universities and colleges to reach out to students located in remote areas. Many universities has been using different instructional tools, such as live online classes through Skype, ready made lectures through NPTEL, use of YouTube with recorded academic and class lectures and lectures also through Google Classroom, live online classes through Zoom, Piazza, MS Teams, Easy Class etc. the students were engaging effectively in using various online applications to attend online classes with the availability of mobile technology through high speed internet access states. Regardless of the fact that the attendance rate in the classes is not more than 80 per cent due to the problem in network connectivity, it restricts an ample number of students to avail of these opportunities (Khusaini et al., 2017; Dutta, 2020).

Learning environment which is possibly different from the traditional face-to-face method (Fortune, 2011). There is a variation in management of digital learning systems (DLS) compared to traditional systems. DLS requires the existence of infrastructure viz., internet access, computers, interactive videos, CD/DVD ROMs, televisions etc. According to Rohman et al. (2020), now-a-days there are various types of platforms or media used in online learning. Based on a survey conducted, the 44.6 percent used Google Classroom as e-learning media followed by Moodle (26%), WhatsApp Group (23%) and Edmodo (6.4%).Now-a-days there is a rapid development and dissemination of digital technology based learning throughout the world. To arouse desire and increase interest in education and learning, many countries, universities and experts were using technology which supports quality of education. The software will enable instructional designers to collaborate with content specialists to package digital learning material (Fansury et al., 2020).

The training is essential with the recent changes in development of technology and the requirements of the current labor market. The training centers have been developing training methods and employing modern electronic techniques, including remote training, to enhance their skills (Kamal et al., 2016; Radif & Mohammed, 2019).

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As per the rules and regulations restricted by the government the students were revert to their respective residencies and attended the classes through online. They are from urban and also from rural learning environments, therefore there will be a variation in way of learning by using different instructional tools with internet access. With this motive the present study has been conceded to assess the effectiveness of students according to their different learning environments by using modern instructional tools with following objectives, viz., to assess rural and urban students learning effectiveness during COVID. The constraints faced by students during COVID under different learning environments were also ascertained in the present work.

Method

Participants and data collection

This research was an exploratory study with a survey method about assessment of a student's learning environment through instructional tools conducted during the COVID-19 pandemic. This research was conducted on 60 students from State Agricultural University. For measuring students' assessment under two environments (Concrete & Abstract), several indicators were used. The concrete environment includes infrastructure facilities and abstract environment includes Knowledge, Awareness, Attitude and Extent of use of Instruction tools. The questionnaire was prepared for collection of data which was further modified into Google form and distributed to all students.

Statistical analysis and procedure

The “Mann Whitney U” test was used to assess the effectiveness of students' learning environment during COVID between the 2 groups' viz., Rural and Urban, which was computed based on p-values less than 0.10 and 0.05 per cent level of significance. The statistical analysis was performed using IBM, SPSS version 25. Content analysis also used to assess constraints faced by students during COVID while usage of tools and analyzed by frequency and percentage.

Results and discussion

To assess effectiveness of learning environment through instructional tools during COVID few parameters were selected viz., knowledge, Infrastructure facilities, Attitude, Awareness, Extent of use, Training needs related to Instructional tools and analyzed between two groups were mentioned below:

Knowledge

The students were grown and brought up under different learning environments, so there was a variation in level of knowledge on application of ET tools. Compared to rural (Mean rank = 27.09), the students from urban (Mean rank = 31.85) learning environment were having more knowledge regarding application of instructional tools during COVID. They were statistically significant (U=307.5, p=0.03) at 5 % level (Table 1). According to Zare et al. (2016), Kuntaro (2017), and Siagian et al. (2020), compared to face to face learning, the learning through technology can improve students' knowledge, promote new experiences and increase their creativity in thinking. Therefore the results concluded that whether students from rural learning environments were having less knowledge regarding online processes, but due to this pandemic situation there may be a gradual increase among them.

Table 1

Learning environment wise distribution of students according to knowledge

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	27.09	307.5	460.5	0.03
Urban	17	31.85			

Infrastructure facilities

Due to the outburst of COVID, the colleges were shut down, which forced students to leave their hostels and revert to their homes. They have attended the classes online which were conducted by the university. The availability of infrastructure facilities viz., Personal digital assistant (mobile), laptops, Computer, Tablet, internet facilities etc., was ample among urban (Mean Rank =31.23) students compared to students from rural learning environments (Mean Rank = 28.65). Therefore, the urban students were more significant (U=31.23, p=0.06) than rural at 10% level of significance (Table 2). According to Ikemelu (2015), and Bello and Bello (2018), the ICT tools and gadgets embrace different types such as hardware, software, phones, computer, internet etc. Students can carry out the learning process anywhere and anytime by using a smart phone, compared to other devices. It is a flexible and portable device (Fansury et al., 2020).

Table 2

Learning environment wise distribution of students according to infrastructure facilities

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	28.65	334.0	487.0	0.06
Urban	17	31.23			

Attitude towards instructional tools

Attitude is considered as one of the major determining factors of a person's intention to perform a precise behavior. Depending on different learning environments, there may be a deviation in attitude towards application of tools during COVID. The students from urban (Mean Rank=36.88) learning environment were having more positive attitudes towards the use of instructional tools for the educational purpose. According to Table 3, compared to rural, the students from urban areas were statistically significant (U=257.0, p=0.07) at 10% level. Wu and Chen (2017); Beri and Sharma (2019); and Atabek (2020) indicate that the attitude towards using technology was one of the strongest influencing factors to adopt/use technology.

Table 3
Learning environment wise distribution of students according to attitude towards instructional tools

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	27.98	257.0	503.0	0.07
Urban	17	36.88			

Awareness about instruction tools

The students had more awareness regarding appropriate instructional tools, viz., hardware (mobile, laptops etc), software (google applications, zoom, MS teams, etc) were more among students from urban (Mean Rank=31.06) learning environment compared to rural (Mean Rank=29.09). They also revealed that the students from urban (U=341.5, p=0.06) were more significant than rural at 10% level (Table 4). Therefore the results deduced that the awareness of students from rural areas can be increased through creating interest by motivating them regarding the use of infrastructure related to digital learning systems (Fansury et al., 2020).

Table 4
Learning environment wise distribution of students according to awareness about instruction tools

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	29.09	341.5	494.5	0.06
Urban	17	31.06			

Mass media exposure

Due to COVID pandemic the students were forced to use technology for learning purposes. So, for using different instructional tools the students should have exposure related to different mass media viz., television, internet, computer, movies/news channel, reading newspapers, magazines etc. The students from urban learning environments (Mean Rank=33.07) had more mass media exposure compared to rural students (Mean Rank=24.00). This reveals that the urban students were statistically more significant at 10% level (Table 5). Orifah et al. (2017) stated that media is an integral part of a student's life today. They are appropriate and well comfortable of using mass media both for communication and information seeking.

Table 5
Learning environment wise distribution of students according to mass media exposure

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	24.00	255.0	408.0	0.06
Urban	17	33.07			

Extent of use of instructional tools

Everyone were enforced to stay at home and use telecommunication network to convey the actions, decisions and results by using different instructional tools, viz., Material (Slides, Printed material, Programmed instruction), Hardware (mobile, Computer, Laptop, Tablet) and software (Gmail, Google Forms, Google Hangouts, Google Classroom, Zoom, Google Meet, Open Board Software, Microsoft Teams, etc. The extent of use of above mentioned instructional tools was equal among both urban and rural learning environment students because the present situation made all the students attend classes online from their homes as a distance mode to avoid physical interaction among them. The results revealed that urban students were non-significant from rural (U=363.0, p=0.96). The mobile technology or mobile devices are useful tools and a way to access current events regarding academics and also creates new opportunities to improve their learning at all levels of education (Calimag et al., 2014; Dwiaji, 2016; Fansury et al., 2020).

Table 6
Learning environment wise distribution of students according to extent of use of instructional tools

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	30.44	363.0	509.0	0.96
Urban	17	30.65			

Training needs related to instructional tools

According to Table 7, the students from rural learning environments (Mean Rank=31.21) need training compared to urban (Mean Rank=30.22). Therefore the students from rural areas were statistically significant at 10% level (U=353.5; p=0.08). The training was more required for rural compared to urban because the urban students were more aware and used different instructional tools effectively. The researchers witnessed many innovative changes in the education system due to the pandemic situation, engaging modern electronic methods including remote training, to enhance their e-learning which involves training especially for rural students compared to urban students (Radif & Mohammed, 2019).

Table 7
Learning environment wise distribution of students according to training needs

Learning Environment	N	Mean Rank	Mann-Whitney(U)	Wilcoxon(W)	Asymp. Sig.
Rural	43	31.21	353.5	699.5	0.08
Urban	17	30.22			

Constraints faced by students

The constraints faced by the students during online classes which were conducted by the university mentioned in Table 7 revealed that the internet connectivity problem (41.2%) and lack of infrastructure facilities (10.0%) in rural areas. Most of the students prefer traditional classes compared to online classes (25.0%) followed by provision of training regarding usage of instructional tools (16.6%) because due to lack of proper knowledge it's difficult for students to use instructional tools and the university should maintain web portal along with a mobile app which consists of study material in the form of PPT, PDF/Doc. formats and videos (6.6%). According to Rude and Miller (2017), and Tremmel (2020), the students from rural localities faced major challenges such as broadband connectivity challenges.

Table 8
Constraints faced by students during COVID

Sr.No.	Constraints	Frequency	Percentage
1	Internet connectivity problem in rural areas	25	41.2
2	Lack of infrastructure facilities in rural areas	6	10.0
3	Provision of training regarding usage of instructional tools	10	16.6
4	The university should maintain a web portal along with a mobile app which consists of study material in the form of PPT, PDF/Doc. formats and videos.	4	6.6
5	Traditional classes were preferable compared to online classes	15	25.0

Conclusion

Online learning in India is a new concept and has led to various experiments during this pandemic phase. It had observed that there were shifts in the traditional educational paradigm in India to evolve. This situation created a wake up call in the academic process of the higher education sector in India. Application of instructional/ technological/ICT tools in learning creates enthusiasm and arouses critical thinking for conceptual understanding of different concepts, which can satisfy their information needs and influence their behavior in a desirable way. But, the students from rural learning environments were facing constraints like internet connectivity issues, lack of infrastructure facilities, awareness, etc. Therefore, collaboration between technology and public policy is necessary to enhance technology based education.

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