



## A study of how well online teaching and learning methods work for students at universities and colleges

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### Abstract

More than a decade has passed since internationally recognized universities and colleges began using online teaching and learning methods to fulfill the needs of students who reside a long distance away from their places of higher education. Internet teaching and learning proved to be a lifesaver for many educational institutions and students during the COVID-19 outbreak in 2014. Students from universities and colleges around the country are participating in a poll to determine the success of online teaching and learning. An online survey will be conducted, and the findings will be made available to the community. It was decided to do this by developing a questionnaire circulated among college and university students. Approximately 500 students from various universities, engineering schools, and medical institutions participated in and submitted the survey results. In a study, it was discovered that the use of animation, digital collaboration with peers, video lectures by subject-matter experts, multiple-choice questions in online quizzes, student version software, a conducive learning environment at home, interactions by professors during lessons, and online materials provided by faculty could all help to improve online learning. Since they may all view PowerPoint presentations in front of them at any volume level, they wish while in an internet-based classroom, students no longer have to walk or drive to class when in an internet-based classroom.

**Keyword:** Education, critical thinking, online teaching, blended learning.

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### Introduction

According to the world declaration on higher education in the twenty-first century by Papanastasiou et al., students' critical thinking and creativity improve when taught using innovative approaches (2019). To motivate pupils to learn, we need new approaches to teaching and

learning. The teaching-learning process has three facets: instruction, digital means for communication, and creative teaching approaches. As a facilitator in the first vertex, the teacher aids pupils in acquiring new skills and knowledge. Using project-based learning, teachers and students can work together to learn about a particular



topic. Students become more self-sufficient in their thinking as a result of this process. Teachers must constantly be innovating to encourage global learning. It is conceivable when university professors and researchers are allowed to experiment with novel instructional methods in their fields of expertise. Compared to traditional classrooms, virtual classrooms allow for a wide range of innovative teaching methods. The use of ICT technologies to promote creative education is addressed in the second vertex. Teaching, learning, educational administration, testing, and assessment are all made easier with the help of learning management systems (LMS). Learning and knowledge management can benefit from and be expedited by using information and communication technologies (ICTs). The third vertex focuses on teaching and learning innovations to help teachers and students overcome their challenges. New aspects in the curriculum, creating a new product, and changes in the classroom all contribute to educational innovation. So that successful approaches can be adopted by all members of an institution's teaching and learning community, it is vital to conduct evaluations. Hearsay (2022) Naukri.com reports a fourfold increase for teaching professionals in the e-learning medium Pérez-Sanagustin et al. due to the pandemic (2022). In a post-covid era, the government's activities also emphasize online mode as a choice. In this case, Xu and Wang (2022). Educators are entrusted with leading the way as the world transforms and actively participating in the transformation, according to a famous learning experience design consultant. Two men, Balyer & Öz (2018). According to Weiss, a teacher's job is to spice up the lectures. Alaagib and others (2019).

This study presents a survey of modern

teaching and learning techniques and online teaching and learning tools and methodologies. It also contains the findings of a survey of online teaching and learning effectiveness. Effective online tool utilization, team-based collaborative learning, simulation, and animation-based learning are thoroughly investigated. The benefits and drawbacks of online education are discussed as well. The online teaching and learning tools, the survey questionnaire, and the survey findings are described in the following sections.

#### E-Learning and teaching resources

The usage of online teaching technologies is intended to improve communication between professors and students and student-to-student collaboration. Virtual classrooms, individual tasks, real-time assessments, and collaborative group work are the four cornerstones of online teaching, according to Tissenbaum & Slotta (2019). Tanis is a narrator (2020). Using online teaching tools can be a motivating factor for instructors if they are easy to use, have a high degree of satisfaction, are helpful, and have a high level of trust in their abilities. In the age of blended learning, Hilliard Holmes & Prieto-Rodriguez (2018) argue that both instructors and students require technical help and understanding to be successful. According to Duin & Tham (2020), using an LMS and a data analytics platform is critical to enhancing the quality of instruction and course design. Online technologies, including instructor-to-student delivery, student collaboration, tool training, and data analytics for the continual course and assessment technique improvement, are depicted in Figure 1, illustrating their performance.

#### Web-Based Learning Resources



Decision-makers face a difficult task when it comes to deciding which online teaching tools best meet the demands of a course. Different students' and institutions' use of devices is determined by their need for them, the cost, the ease of use, and the features they offer. Many educational institutions now provide students with the option of taking lessons online. Part-time students are more likely to take advantage of these opportunities. There is no longer a need to travel to campus because of this. Many, if not all, educational institutions have been compelled to transfer their courses online due to the current pandemic crisis. There are four pricing models available for SaaS-based learning management systems (LMS): per learner, per month, per learner, peruse, per course, and licensing charges for on-premises installation El Mhouti & Erradi (2018).

#### E-Learning Resources

A semester-long course may involve online teaching and learn as a classroom management tool. G Suite for Education (Legowo et al., 2019) was employed by schools and colleges during the COVID-19 outbreak to move regular classes online effectively. Microsoft Teams (Sahulata et al., 2022), Moodle Cloud Durak et al., Blackboard Neykova (2021), and Edmodo are additional popular LMSs utilized in blended learning (Rachmah et al., 2021). (2022). Online instruction has both advantages and disadvantages for both students and teachers, as outlined in Table 1. (Li, 2022).

The effectiveness of a course is directly related to the instruments used in its creation. This includes involving the students and changing the course design to fit different learning styles.

#### A Look at New Approaches to Education and Learning

To understand more about how students prefer to study online and other factors that could influence the teaching-learning process, an online questionnaire is often used. Different learner types, online learning benefits and drawbacks, and other considerations went into formulating the parameters. The purpose of questions 1–4 is to find out how the student like to learn. The efficiency of the teaching and evaluation medium is examined in questions 5–7. Questions 8–12 are designed to help students understand the many obstacles they face when attempting to learn online.

Because so many students now take their classes online and do so from the comfort of their own homes, surveys using this manner are popular among college students around the country. Most of the questions were enthusiastically responded to by students who took part in the survey. The only issue was finding a place where they could answer the survey in peace, as they were already swamped with online work. This poll included engineering and medical students from a variety of universities. They come from a variety of scientific and technological backgrounds. Students come from both public and private institutes of higher learning. Figure 2 depicts the responses by the institution. Students from universities, medical schools, and technical schools responded to this survey via Microsoft Teams and Google Meet platforms. This poll had a response rate of about 450 students.

Most responders came from VIT Vellore in Tamil Nadu, 23% from CMR Institute of Technology (CMRIT) in Bangalore, 15% were from medical schools, and 9%



were from other engineering universities in the state. It's not uncommon for students at Vijaya Institute of Technology (VIT) to be housed with parents from all over India during pandemics like this one. Tamil Nadu is home to a tiny population of college students. It's not uncommon for some pupils to live with their parents in other countries like Dubai or Oman. Bangalore, Karnataka, is home to some of the students of CMRIT Bangalore, while others live in smaller cities and villages throughout the state. Tamil Nadu's medical colleges and Andhra Pradesh's engineering

colleges are home to students from all around the state. Consequently, the survey covers a larger area.

A branch-by-branch breakdown of the survey results is shown in Figure 3. Mechanical/civil engineering has 158 students, according to the data. In addition to the 108 computer science and engineering students who answered the survey, 68 medical students and 58 electrical and electronic engineering students participated. Fifty-eight students are not majoring in engineering.

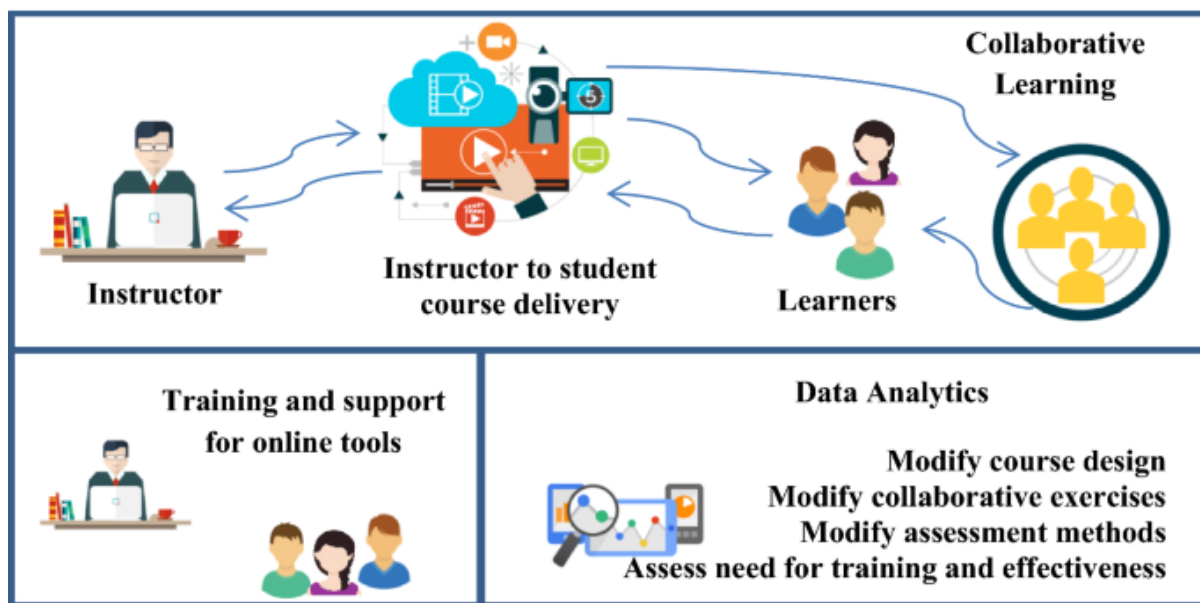


Fig. 1 Effective use of internet technologies includes a wide range of factors.

Table 1 Benefits and drawbacks of online education

	Learners	Trainers
Advantages	Versatility	
	Motivated	Enhanced communication channels Management of a course
	Independently pursuing one's goals	Design of the Curriculum
Hindrances	Personal connections	
	Misunderstanding what people expect	Creating a Plan
	Planned activity	Giving feedback

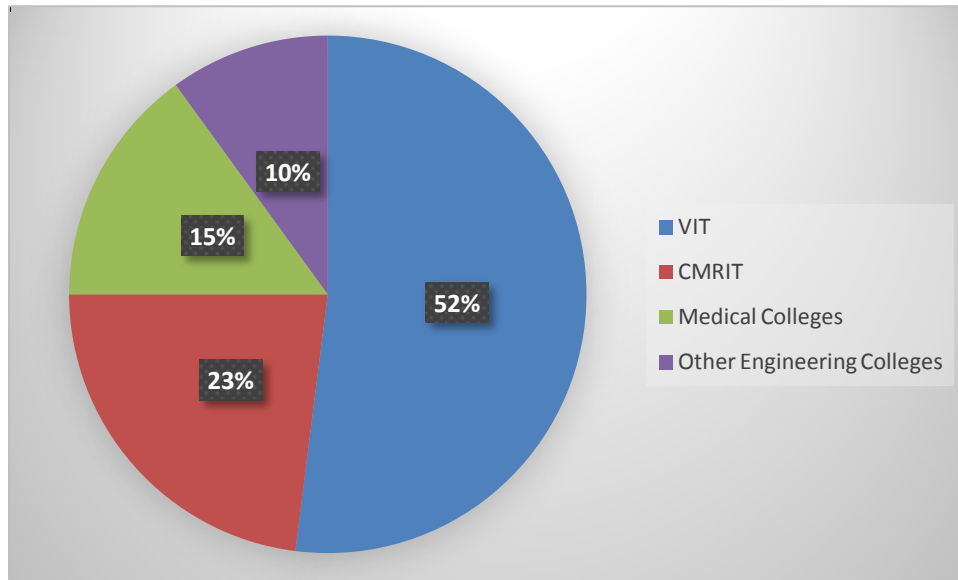


Fig. 2 Respondents from various types of institutions

Those who responded (Branch wise)

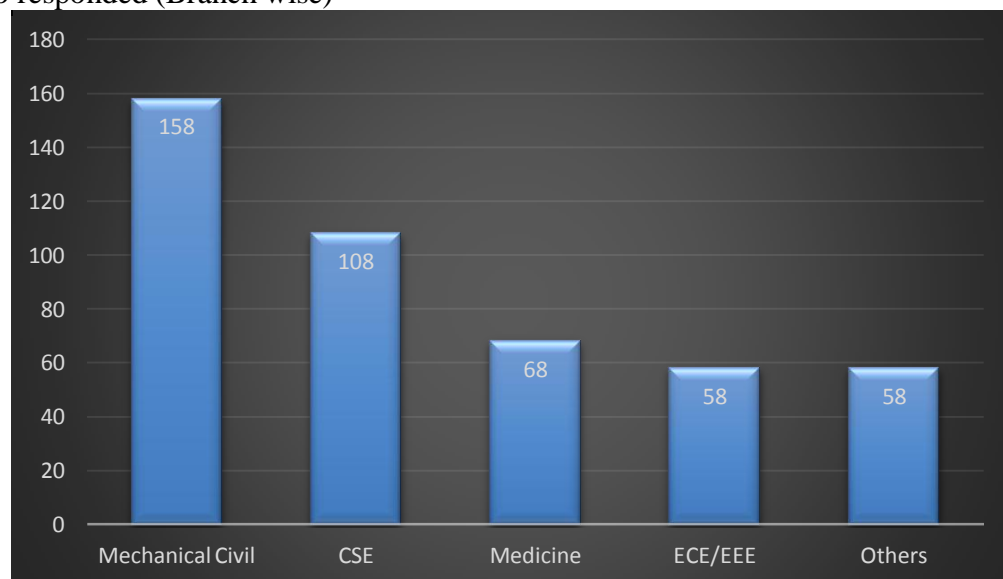


Fig. 3 Branch-specific responses

A survey is employed

Students were reassured that their information would be kept private and anonymous in the pamphlet. The following is a list of the survey questions.

Questionnaire:

Students from various engineering schools and medical schools, including B Tech and MBBS, are good examples of this demographic.

1. Which of these strategies most appeals to you in learning online?



- a. Assignments for each person
  - b. Work in a small group (no more than five pupils).
  - c. Working in a large group (at least ten pupils)
  - d. Learning through project-based activities
2. How well do you work on a specific digital collaboration task?
- a. a pair at a time (2 member team)
  - b. Groups of five students work together in a small group
  - c. The work of large groups (comprising at least ten pupils)
3. How would you want to learn if you used one of these digital methods?
- a. Animations
  - b. Whiteboard with a pen
  - c. The presentation is done in PowerPoint
  - d. Digital writing implements
4. What I've Learned Through Online Courses at Home
- a. I'm able to learn at my own pace, and I'm enjoying it.
  - b. My current set of circumstances isn't conducive to learning
  - c. I'd do better if I had constant access to the internet.
  - d. Home is where the distractions are, so I'm watching TV and conversing with family members.
5. When it comes to learning, which sort of recorded video lesson is the most effective?
- a. Presented by the members of my academic staff
  - b. Provided through NPTEL
  - c. Delivered by Reputable Foreign Universities
  - d. Unknown Professionals
6. Which form of the quiz is more successful at measuring comprehension?
- a. MCQs are still done the old-fashioned way using a pen and paper.
  - b. short answers using a pen and paper are the norm.
  - c. Online quiz—multiple choice questions
  - d. Online quiz—short answers
7. Students might benefit from downloading free student versions of software from the internet



- a. Agree on
- b. Disagree
- c. Not able to decide

8. When it comes to online education and training, it works because:

- a. All students can hear the lecture.
- b. Each student has access to PowerPoint presentations.
- c. Students do not have to be afraid to ask questions.
- d. Students don't have to walk long distances to get to school anymore.

9. When it comes to online education, which of the following isn't true?

- a. I'm able to focus on my online study without interruptions.
- b. Occasionally, one of my close friends, family members, roommates, or next-door neighbors irritates me.
- c. Regularly disturbing a friend, member of my family, a roommate, or a neighbor.

10. Is it challenging to keep up with all of your duties at your current residence?

- a. There aren't many duties that I'm accountable for.
- b. Despite my hectic schedule, I manage to squeeze in some time for online education.
- c. Taking an online course is not an option because I am too busy.

11. What is the best way to get answers to your questions about online learning?

- a. Ask a question during or after a presentation online.
- b. Involve your classmates in the solution to your problem by posting it in a class discussion thread.
- c. Look for extra information on the internet.

12. Who uses which of these gadgets for online learning?

- a. computer, laptop, or workstation. Tablet
- c. Cellular phoned. additional apparatuses

The results of the poll

According to this study, Fig. 4 shows that the students prefer to work in groups of five to engage in personal digital learning.

Fig. 5 illustrates how students can work more comfortably in small groups of five when using digital collaboration tools.

Fig. 6 shows that animations are the most effective digital method for inspiring kids to learn.



In Fig. 7, students' online learning experiences are depicted. According to most students, online learning allows them to progress at their own pace.

For the sake of this study, we will refer to the graph in Figure 8. Almost universally, students feel that the video lectures were given by their professors in class aid their understanding of the material being taught.

Fig. 9 shows that students prefer an online quiz with multiple-choice questions (MCQ) to check their knowledge of the subject.

Figure 10 illustrates the applicability of the internet-based student version of the software. Approximately 45.7% of students say it is beneficial to their education, while 45.2% are undecided. Others in the class don't think the student edition of the software is worthwhile.

Figure 11 illustrates the factors for the success of online teaching and learning. The majority of students believe that having PowerPoints in front of them makes it easier to follow along with the lecture. There is a lot of walking involved for students in universities that use a fully flexible credit system (FFCS). To get to their first-hour session, Day Scholars at universities and engineering colleges traveled a substantial distance. Because they don't have to move or travel as much, many students believe that online learning is more productive. If a professor's voice is weak, students in the last rows of the classroom may miss the lecture entirely. A virtual classroom can reach students; according to some students, thus online instruction is more effective. With no distractions, 50.3 percent of students say the online study is more productive. A few students feel friends, or family members occasionally interrupt their online learning time (Fig. 12).

Some 76% of respondents claimed that they have a moderate quantity of household duties, but they have enough time to devote to online education. Of those polled, 16.1% indicated that they have few responsibilities, while 7.0% claimed they are overburdened with domestic duties and have no time left over for online education. Figure 13 depicts a typical home study space.

Methods used to clear up ambiguity in online learning are shown in Figure 14. During online lectures, 43.2% of students ask the Professor a question and obtain an answer. About 25.5% of them ask questions in the forum and get answers from other users. 31.3 percent of those surveyed accessed extra information online to clear up any lingering questions they may have.

Students' online learning gadgets are shown in Figure 15. Notebook and desktop computers are used by most students, while the majority and tablets use smartphones are operated by a minority.

The chi-square test is used to see if replies 1 and 2 are related. Table 2 summarizes the





findings, showing the observed and predicted totals for each cell and the chi-square statistic for each. We may detect a correlation between several answers to different queries.

Responses 1b and 2b, which are both associated with a 5-member working group, have the most significant cell values, according to the results of this study. Cell 1c's response is the least connected with cell 2a's response. One example is response 1c, which shows a 10-person team at work, while response 2a shows a two-person group. The chi-squared number is 65.6025. The sample size is too tiny to draw meaningful conclusions. The discovery is notable at a 0.05 p-value.

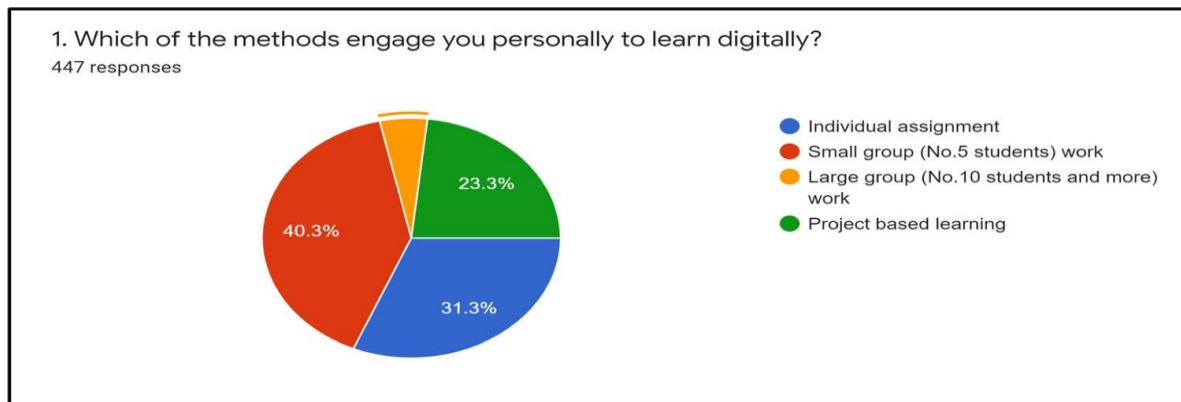


Fig. 4 Digital learning engagement

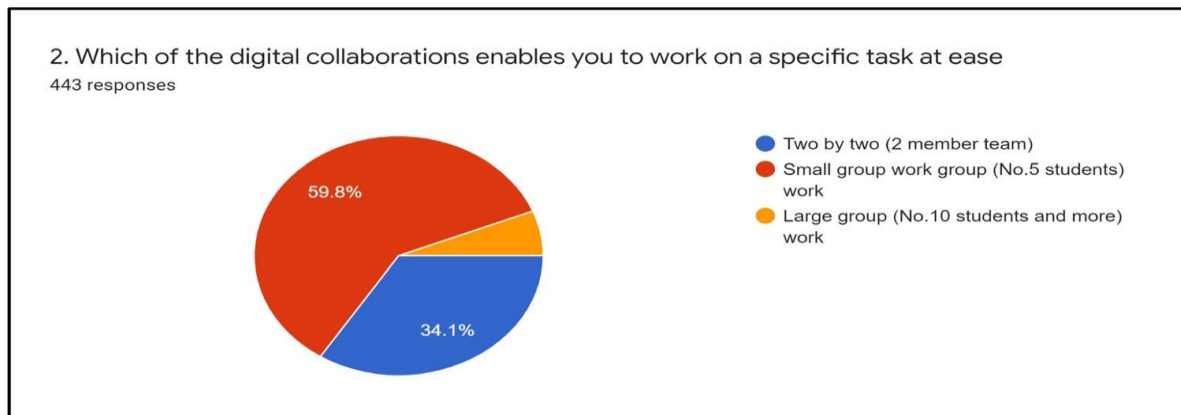


Fig. 5 The use of digital tools to facilitate student collaboration





Fig. 6 Methods for energizing students using technology

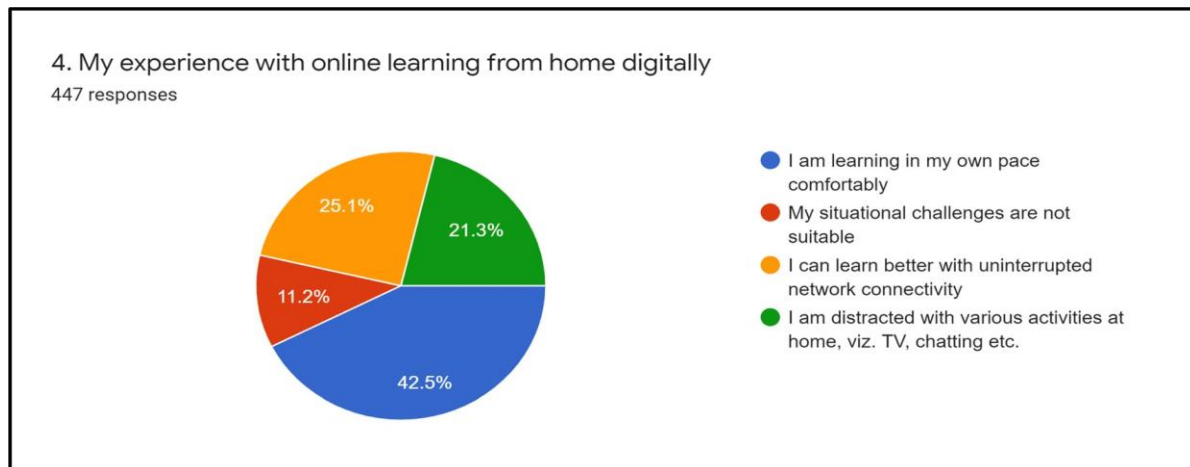


Fig. 7 Students' online educational experience

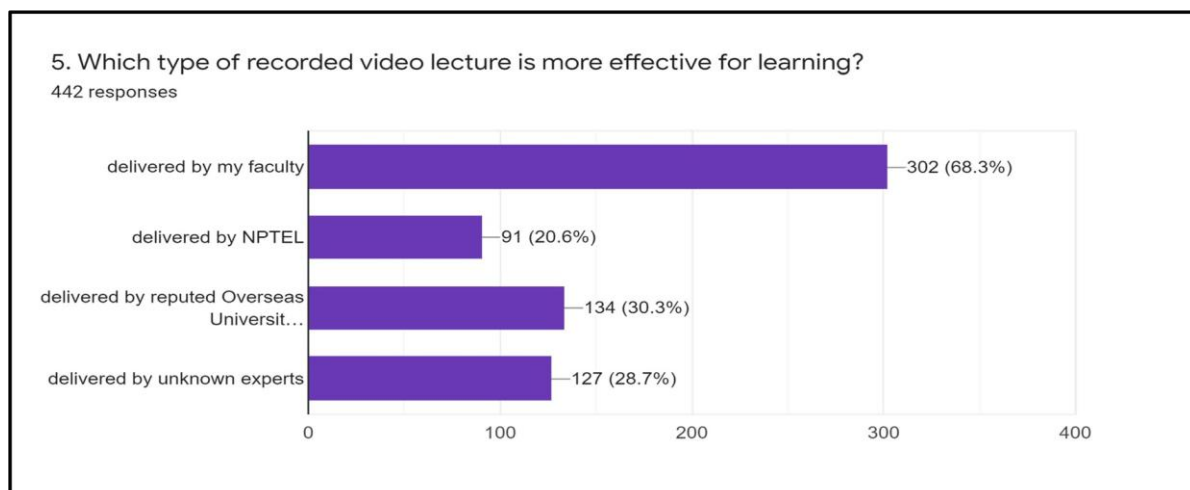


Fig. 8 Recorded video lectures are more effective than live lectures



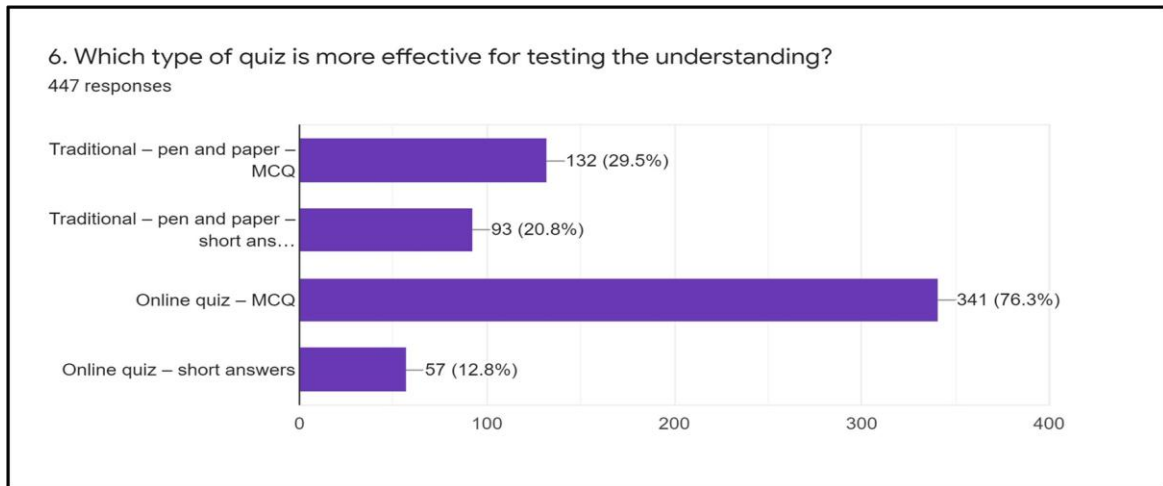


Fig. 9 Improved method of checking comprehension via a quiz

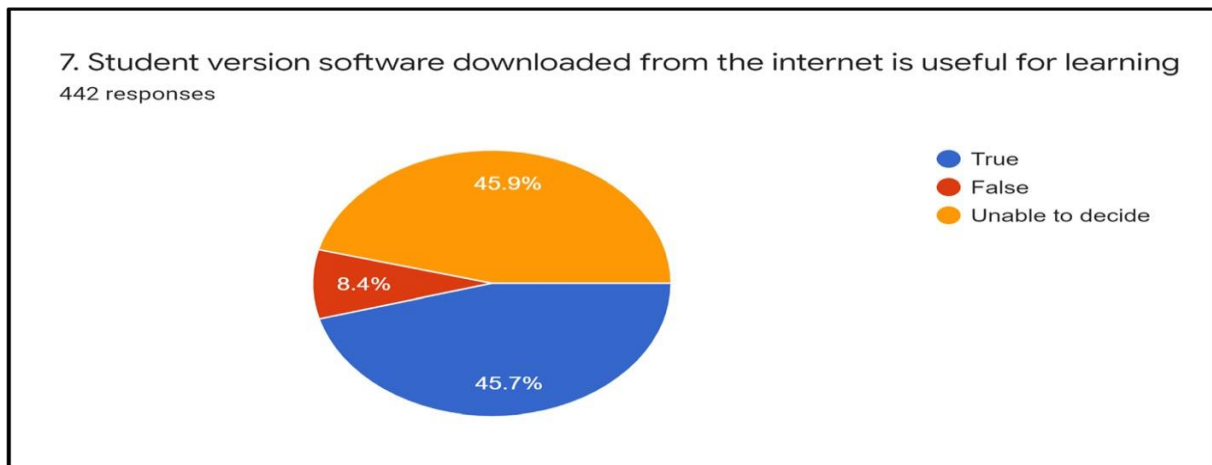


Fig. 10 Students can benefit greatly from the software's student edition

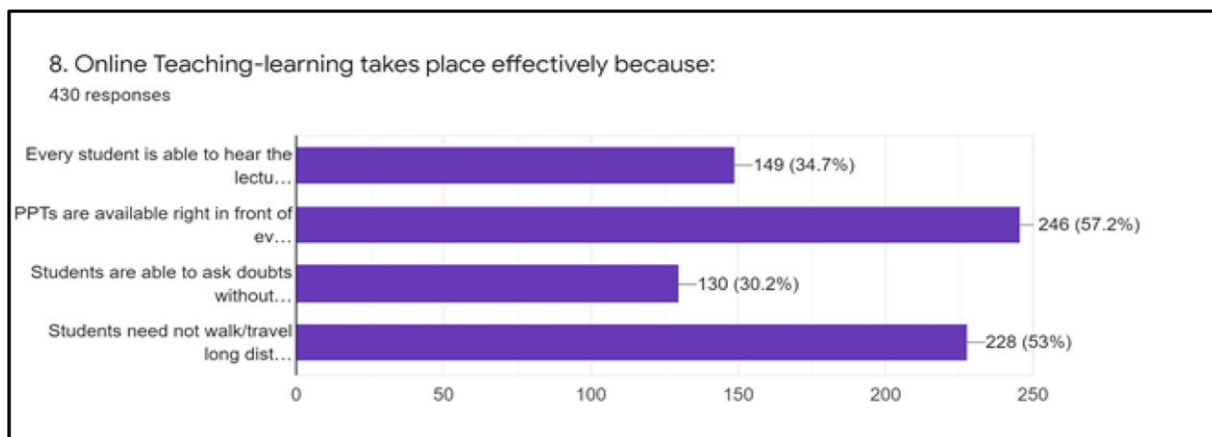


Fig. 11 Motivating factors for the success of online education and training



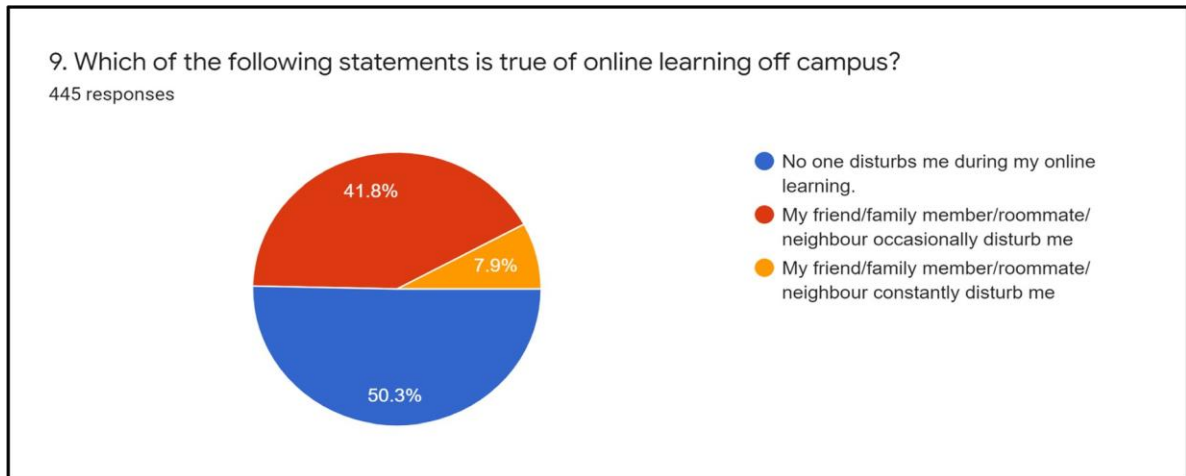


Fig. 12 Disruptions in online education

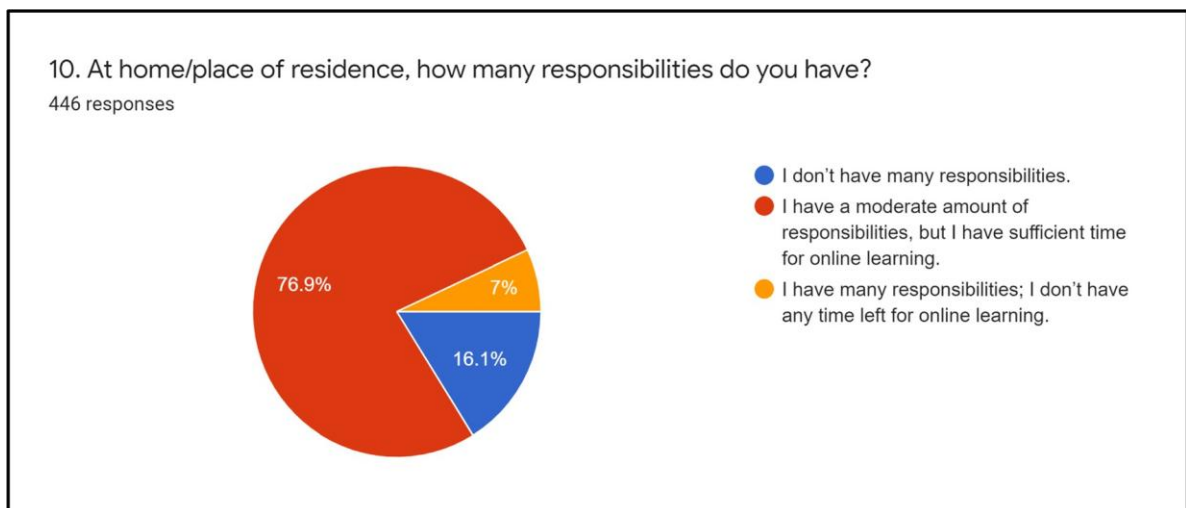


Fig. 13 The learning atmosphere in your own house



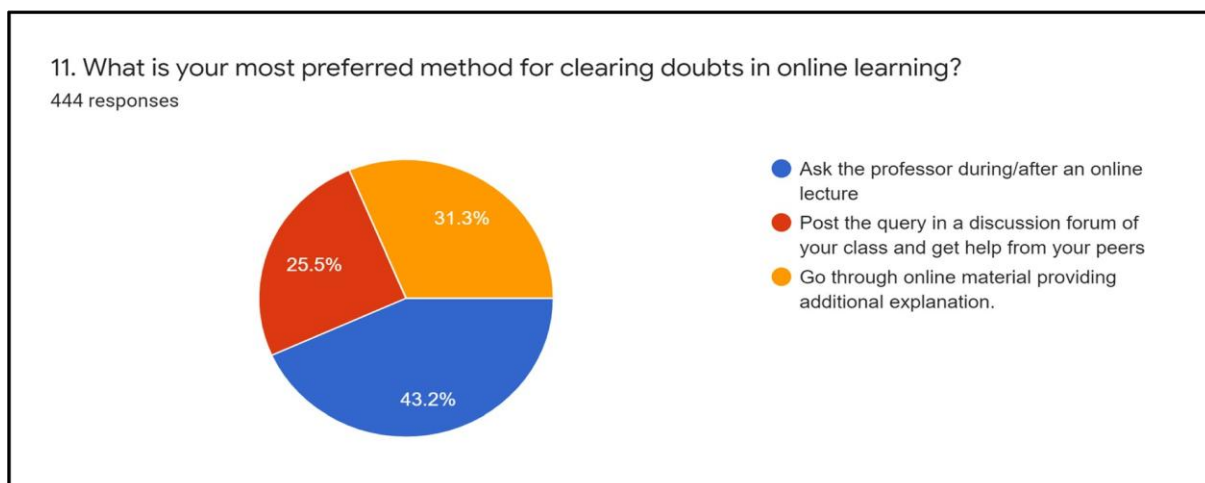


Fig. 14 Clearing up uncertainties in online education

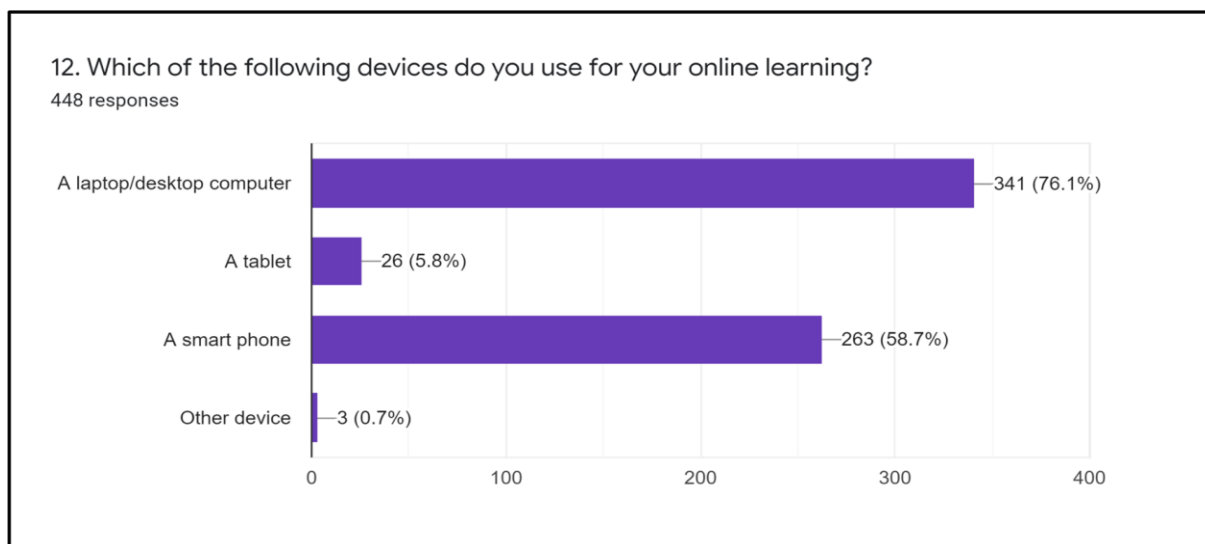


Fig. 15 Devices that are used to conduct online education

Table 2 Expected cell totals and chi-square statistics for each cell

Questions	1a	1b	1c	1d	Row totals
2a	66 (49.91) [5.19]	45 (64.17) [5.73]	2 (3.21) [0.46]	41 (36.72) [0.50]	154
2b	68 (84.91) [3.37]	133 (109.17) [5.20]	3 (5.46) [1.11]	58 (62.47) [0.32]	262
2c	6 (5.19) [0.13]	2 (6.67) [3.27]	4 (0.33) [40.33]	4 (3.81) [0.01]	16
Column totals	140	180	9	103	432



## Conclusion

There are findings from a survey on the effectiveness of advances in online teaching-learning Methods for college and university students. Poll results show that students from the VIT Vellore, CMRIT, and Medical Colleges have participated in the survey. A survey-taking questionnaire is provided. 65.6025 is the chi-squared statistic. The p-value is less than 0.00001 percent. At a p-value of 0.05, the finding is noteworthy. Answers to questions can be linked together in several ways. A poll was conducted to get a sense of how effective and problematic online education has been throughout the epidemic. This research will help instructors better understand the efficiency of online instruction. The survey results show that students are more engaged when courses are delivered online, and the findings support this.

Following are the results of the survey:

1. A group of five students would be ideal for pupils to collaborate and learn digitally.
2. It has been determined that two animations are the most effective digital method for learning.
3. Students can learn at their own pace and convenience when using online learning.
4. Video lectures by faculty members who specialize in a field are the preferred method of instruction for students at their schools. 4.

5. Students prefer online quizzes with multiple-choice questions (MCQs).
6. It's easier to learn with the software designed for students.
7. Lectures in online classes are more effective when PPTs are displayed in front of all students, allowing them to hear the speaker at a comfortable volume.
8. Learning is more efficient because students have no interruptions or distractions.
9. Students who have no or limited duties at home are better able to focus on their studies online since they are in a setting that is free of distractions.
10. Teachers and other faculty members are always available to help students with any questions.

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