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Title: Role and Effectiveness of IOT in E-Learning: A Digital Approach for Higher Education

Author (s): Attra Ali³, Muhammad Ayoub Kamal^{1,2}, Laiq Muhammad Khan³

¹DHA Suffa University, Karachi, Pakistan

Affiliation (s): ²Malaysian Institute of Information Technology (MIIT), Malaysia

³Institute of Business Management, Karachi, Pakistan

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Role and Effectiveness of IOT in E-Learning: A Digital Approach for Higher Education

Attria Ali³, Muhammad Ayoub Kamal^{1,*} and Laiq Muhammad Khan³

¹DHA Suffa University, Karachi, Pakistan

²Malaysian Institute of Information Technology (MIIT), University Kuala Lumpur, Malaysia

³Institute of Business Management, Karachi, Pakistan

ABSTRACT Internet of things (IOT) is an emerging technology, which has facilitated the abiding connection of real and virtual objects. Its developmental influence has caused a predictable impact on higher education, especially E-learning. Previous studies indicated that the prime aim of IOT is to transform traditional education into a flexible and effective learning approach by creating a digital or virtual learning environment. Consequently, the current study aims to evaluate the effective role of e-learning in higher educational institutions by investigating faculty's overall interactions with this new learning platform. A comprehensive questionnaire was used for data collection from faculty members of several local universities to assess how instructors see E-learning. The analysis and presentation of the data have all employed tables, graphs, and other pertinent visual representations of the data. Data analysis of teachers' response displayed that viability, abundant material, affordability, mobility, and enhanced concentration are keys features of e-learning that attract teachers. Thus, teachers believe/see e-learning as an adaptable dynamic change to meet educational needs in challenging times. Additionally, teachers also highlighted certain issues that they face while adapting e-learning such as inadequate internet connectivity, limited access, insufficient internet speed in remote areas, online real-world subjects are harder to understand, and cyber security problems. These problems need to be addressed at large to improve the efficiency and potential of e-learning in Pakistan.

INDEX TERMS Digital learning, e-learning, higher education, IOT, online learning, traditional education

* Corresponding Author: ayoub.kamal@iobm.edu.pk

I. INTRODUCTION

Internet of Things (IoT) has received greater attention and appreciation in recent years, due to its effective and dynamic changes. IoT is just another illustration of how technological advances have always amazed us. The arrival of this emerging technology has created personal computers (PC) and networked devices, which have enabled internet-connected networks. Thereby, the influence of IOT has brought huge changes in the 21st century by facilitating the healthcare and various industrial sectors [1]. Numerous technological devices might connect to one another globally thanks to the internet, enabling quick access and information exchange anywhere [2]. Use of IOT has not only benefitted various industries but also has become a key component of education sector too as it has provided instant access to unlimited resources of knowledge and numerous new teaching tools. Concept of distance learning and e-learning has been there for quite some time. However, the significance of e-learning has increased many folds in recent years especially after the emergence of Novel Corona Virus. Since e-learning offers comfort and ease while requiring less work and more information, it has become an almost indispensable aspect of daily life in the post-covid age [3]. E-learning has replaced the traditional teaching methods with the digital teaching methods. Children/Students, as well as educational officials, have benefited from this effective learning strategy.

Despite all these advantages of online learning, there are also drawbacks, such as people's dislike of traditional face-to-face classroom settings and the assumption that not everybody is technologically proficient. Some people also contend that different generations are being forced to

adopt a single new worldview. Further, efficacy of delivery modes, such as engagement, interaction, and knowledge assessment of students are also concerns for some people. Additionally, a considerable portion of the population in developing nations' rural areas lives below the poverty line, making the cost of electronic gadgets for them a major barrier. Here are some of the main issues preventing widespread acceptance of e-learning [4] [5]. Examining each of these concerns allows for the determination of the level of educational advancement required to suit home educated pupils [6]. A new system needs to be developed that provides educators with a variety of new tools and serves as a portal to a dynamic and engaging e-learning experience. To that aim, there are various smart technologies on the market that might be used to make everyone's trip through e-learning reasonably easy to understand [7]. Use of these automated tools may alleviate some of the appointment challenges and environmental concerns.

Among these, some of the e-learning educators are Zoom, Teams, Google Meet, and Skype. These educating tools were useful because of their simple, easy to use and interactive interface for both teachers and students. Flexibility and interaction in a virtual learning environment provides e-learning platforms for the educators [8]. Video conferencing, file sharing, live messaging, and recording were all facilities provided by these educating apps. All these characteristics were considered, which made the virtual classroom procedure clearer and more convenient for both the students and their educators. Additionally, features like recording the classroom made things considerably easier for the educators since they could record a class for future reference or for later future

revisions. In a likewise manner, live messaging was a great addition in these apps, which provided students a questioning and discussion-based forum to raise their concerns by communicating with other participants and their educator. Moreover, this technology assists teachers in posting homework and extra lessons for their students by using file sharing to ensure their knowledge is not compromised [9].

Subsequently, these tools were a popular solution to all of the problems, which people were facing with this emerging e-learning system, however, some individuals are still confronting issues and were unable to manage them properly [10]. It can either be their mistake/misconception regarding the advanced technological features, or the audience, which overlooked it. In order to address such issues, it imperative to perform appropriate surveys, and seek their feedback and recommendations which might be very helpful in eradicating such concerns [11].

We have so much to be grateful for as a result of the continual advancements in technology, but they should never be stopped. E-learning has provided an escape from the traditional learning approach to the digital learning approach [12] especially in highly challenging days such as isolation periods and lockdowns during an pandemic. Therefore, determining methods to guarantee ongoing platform improvement through recurring customer feedback is crucial. Since each educator has their unique style of teaching, the variety of techniques would enable more features and attributes to be introduced to these instruments [13].

II. LITERATURE REVIEW

In industrial/developed countries, e-learning has transformed traditional education into a more flexible and effective digital learning environment.

However, e-learning is still an unemployed in developing countries because of its recent development. Therefore, understanding the crucial elements and influencing the acquisition and adoption of technology is of utmost importance in the emerging nations. The study [14] recommended that Internet of Things (IoT)enabled e-learning system and uses electroencephalography (EEG) and IoT to analyse students' levels of attentiveness and engagement during the online lectures. The EEG equipment was used to track the brain activity of students who were taking online courses. Our findings showed that the proposed technique may be used to distinguish between a user's level of focus and the necessary level of instructional strategies. Collection of student attentiveness data sets. Effectively foresee students' memories BiLSTM networks are capable of accurately predicting the preferred learning styles of pupils. The proposed method's prediction accuracy is 97.16%. Academic performance is improved via an IoT-enabled e-learning system.

By developing an E-Learning-based IoT adoption Model, the research study [15] explores the influencing elements that are crucial for the IoT acceptance of E-Learning in HLIs in developing nations. These influencing variables are divided into sections related to people, organisations, the environment, and technology. To decide which aspects should be prioritised for effective IoT-based E-Learning at HEIs, a comparative study of these contributing factors is

provided in a full description. The findings will be useful in helping government officials and university policymakers solve the issues and choose wisely whether to utilise IoT for e-learning. Students and teaching staff will be supported and encouraged to use these tools in their learning. There will be excellent educational achievements as a result.

IoT significance was examined in this study [16], with a focus on E-learning in particular field of higher education. Among the beginnings of the behavioural intention towards IoT technology, social influence was determined to be the most important predictor. Additionally, this study also assessed the impact of gender and various other factors, which were affecting the academics' behavioural intention towards IoT that filled an apparent gap in the present literature. Thereby, the results revealed that the gender of participants substantially affected the performance expectancy negatively impacted behaviour intentions. Experience additionally moderated the impact of all other BI-influencing elements.

This research [17] examined the working methods employed in the e-learning classes as well as the technical problems that institution teachers faced, while delivering the e-learning courses. A number of 100 professors from a private institution in West Jakarta participated in an internet-based survey to collect the answers. Subsequently, the findings were analysed quantitatively and informally to ascertain participants perception regarding the emerging challenge of online learning. According to the gathered data, there are three areas in which technical problems that instructors experience, which is divided as connection, instructing technology, and engagement. They need a

faster internet connection, increased involvement with certain technology, pedagogical and technical training, and other factors to promote their efficiency.

A quantitative analysis was carried out in this study [18] by employing an online questionnaire of 570 Indian students enrolled in higher education. The collected results enabled the suggested model to validate and describe the 56.2% variation of the actual usage. Moreover, it demonstrated the direct and indirect effects of the three external variables, which are personal creativeness, social circumstances, and consciousness. The results of the study were important for higher educational organization, management, e-learning system designers, marketers, and researchers because they would help in creating a more targeted and personalized learning solutions, which would increase the efficiency of e-learning.

This research [19] was conducted to discover how instructors and students see online learning. Thereby, primary data was gathered using structured questionnaires, which was divided into two sets and secondary sources, which were used as required. Standard deviation, percentages, graphs, mean, tables, and other figures were used to analyse and understand the data. Teachers and students both responded favourably towards online learning because of its viability, abundant material, affordability, mobility, and enhanced concentration. Additionally, they observed it as a modern-day learning opportunity. However, it has a number of difficulties, including inadequate internet connectivity, limited access to affordable internet, and internet speed in remote regions, language barriers, and difficulty in comprehending practical subjects on the internet. The study's [20] objective was to

look at how e-learning affects accounting students' performance in Bahraini universities. For this purpose, employees and students in accounting received a questionnaire. The findings showed that e-learning significantly improved student's performance and employability. The findings of this study suggested that higher education institutions in Bahrain have broadened the horizon of online learning and introduced students towards accounting career.

The [21] study looked at the obstacles, which prevented the industry from successfully implementing e-learning. Additionally, it offered critical advice to academics to create and use e-learning as an educating technique to promote digital learning. Using Peter Senge's Five Disciplines for Learning Management, educational leaders may deliberately encourage and allow e-learning at the organizational and individual levels (1990). Personal mastery, mental models, shared visions, collaborative learning, and system thinking are essential components of learning organizations. Systems thinking integrated these five disciplines so that they may complement and strengthen one another. This paper's [22] objective was to critically assess whether using an educational management system for effective e-learning at tertiary institutions in Bangladesh is feasible and significant or not. The data was gathered from students and the instructors of the relevant courses at a private higher education institution in Bangladesh using survey questions and in-depth interviews. The results of this study showed that most of the students have adopted e-learning successfully mainly because it has been seen that they spend a lot of time on the Platform watching class videos, reviewing course materials, and reading forum

postings from other students. However, there are restrictions because of the poor design of the learning materials, which limits the amount of interaction between students and lecturers.

The Pakistan E-Learning Acceptance Framework has placed their perspective of higher education in this respective study [23]. The Virtual University of Pakistan acquired data from 354 students, and employed structural equation modelling to assess the study assumptions. The empirical investigation found that perceived usefulness is greatly predicted by system characteristics, while reported ease/cases considerably predicted computer identity, Internet experience, enjoyment, and system features. This research results had practical applications for developing successful e-learning systems for decision leaders, users, and programmers. A phenomenological technique was used in University of Warwick study [24] which examined participants' impressions via a number of academics, focused on groups, and one-on-one interviews. Infrastructure inside the institution, staff attitudes and abilities, and anticipated learner expectations were all identified, which had an impact on the adoption of e-learning. Therefore, the participants raised successful implementation of an institutional approach by emphasizing the provision of enough funding and direction for successful implications. This strategy has to be supported by a varied staff training programme and opportunities for colleagues to exchange best practises.

This study [25] examined students' opinions regarding the usage of mobile devices and e-learning programs for learning. Majority of students, according to this research, own multiple mobile devices, which may be utilised to speed up

the learning process. Consequently, it was advised that HEIs in emerging countries make efficient usage of innovative portable computing solutions that are relevant to their local locales in order to increase the dissemination and usability of online educational materials in resource-constrained settings. This article [26] examined the ideas, advantages, and difficulties of e-learning in Nigerian universities. In order to offer lectures to students regarding the effective use of e-learning technologies, the study suggested that authorities at all stages, non-governmental institutions, and the business sector work together to ensemble university e-learning centres with recent model equipment's.

III. METHODOLOGY

The current research aimed to examine the influence of e-learning on university students and lecturers to conduct and attend lessons without face-to-face interactions. To do this, an approach referred to as participatory research was employed for this purpose, exploratory method was deployed to gather and interpret the data.

A. OBJECTIVES

1. Determine the performance of e-learning in higher education.
2. To understand how educators, think about online education.
3. To discover e-learning as an emerging educator in higher education.
4. To identifying the efficacy of e-learning in higher education.

In this study authors make questionnaire of 14 questions with respect to objectives. Questions are given below:

1. Which mode of study you prefer?

2. Which mode of teaching you prefer more challenging?
3. Do you think switching to online classes from physical classes are beneficial for students?
4. Which online platform you prefer for online teaching?
5. Which online platform is more user friendly for teaching?
6. Do you have sufficient knowledge for conducting online classes?
7. What kind of pedagogy you used for conducting online class?
8. What activities you prefer for students during online classes?
9. Does student respond on given assignments during online class?
10. Do you think lack of face-to-face interaction with students affects class progress?
11. How many students shows positive emotions when taking online class?
12. How many students shows negative attitude when taking online class?
13. Is class management being a challenge you face during online classes?
14. While delivering lecture do you face internet connectivity issues?

B. DATA COLLECTION

This empirical study relies on the information gathered from respondents who filled and submitted questionnaires.

C. SAMPLE TECHNIQUE

The responses were gathered by using a purposeful sampling technique. Google forms links were emailed to faculty at several colleges, in order to gather data [24].

D. SIZE OF THE SAMPLE

A number of 70 instructors were selected as study population for this study. To get a definite picture of e learning in each

question teachers from all streams have been requested to give their responses.

E. STATISTICAL INSTRUMENTS

For the statistical analysis, a straightforward percentage technique, bar charts, and graph representations were employed.

F. LIMITATIONS

The scope of the study was confined and narrowed due to certain time constraints. Therefore, only the responses, which provided by the respondents were used for the further analysis and to draw conclusion.

IV. RESULTS AND DISCUSSION

The prime concern of this recent work was to calculate the effect of online learning in education specifically in higher education. Online learning became more important in COVID-19 pandemic; however, earlier only physical learning was considered as an effective way to educate people. Online education is regarded as a significant way to continue working and studying from home. It has been used in other countries, such as the United States and the United Kingdom, but it has gained more traction in Pakistan since the Covid-19 crisis, when all universities, colleges, and schools were forced to close on the spot. At first, the situation seemed difficult to handle, but our committed professors from schools, colleges, and universities worked hard to help students learn and began taking classes online. Different professors used

various programmes for delivering lectures online; some recorded their lectures first and then posted them on email or LMS; others used online sessions through Google Hangouts, Zoom, Skype, and many other platforms. Online learning is considering as a task for mostly students here in Pakistan as well as for faculties too, to learn and digest the online platform queries. Effect of online learning has not only affected our education system but it has also played a vital role in the adoption of online learning.

Primarily, our education system is divided into three major parts such as school, college, and university, however, this research only look at the higher educational level at universities. For this purpose, the data was collected from faculties of different universities and a questioner was made based on the challenges faced by these faculty members during online leaning. This questioner consists of 10-12 questions, which represent their own experiences and challenges. A number of 70 responses were collected in which 62% was male faculty and 38% was female faculty, who were from different universities of Pakistan. Faculty who diligently participated in this survey were lecturers, senior lecturers, assistant professors, associate Professors, and visiting faculty members. The selected questions and their responses are given below.

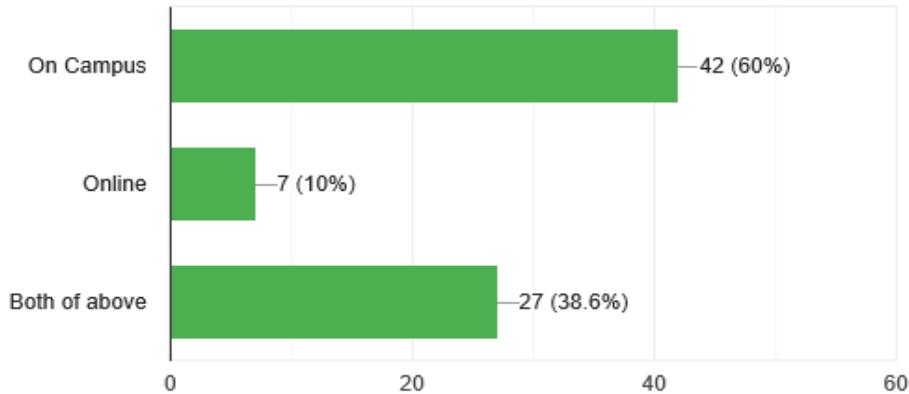


FIGURE 1. Which mode of study you prefer?

Three alternatives were available: online, on campus, and hybrid. In response to the above question of questionnaire, 60% of faculty members were in favour of on campus teaching, whereas 10% faculty members considered online teaching methodology, and 39% faculty members choose to teach in hybrid mode, which

means that they were in favour of both online and on campus teachings. Additionally, it was observed that most of the faculty members preferred on campus or physical mode of study as it was more suitable and students were in favour of traditional teaching methodology.

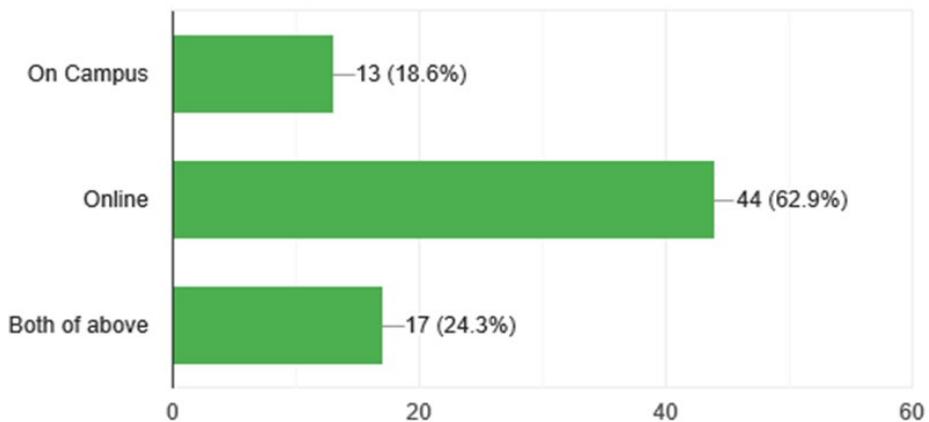


FIGURE 2. Which mode of teaching you prefer more challenging?

The above question has again three options one was on campus, second was online, and third and last option was choosing both teaching methodologies. By analysing the response of respondents, it

was identified that 62% of faculty members were in favour of online teaching mode, 18% were in favour of on campus classes, and 24% choose both teaching modes (hybrid mode). When it is about

challenge in teaching it is about how much you can connect and smoothly continue your class or lecture, while delivering lecture there are many aspects that could make your lecture either good or bad. In

teaching good or bad means, if you are capable of explaining the exact idea of your theory or methods that would be consider as good vice versa for bad.

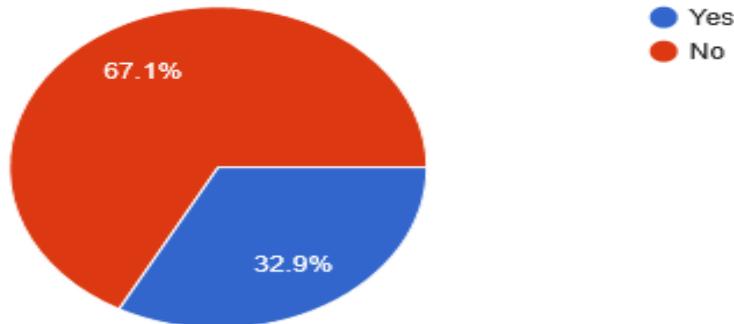


FIGURE 3. Do you think switching to online classes from physical classes are beneficial for students?

It was observed that 67% of the faculty members considered that it is beneficial to switch between both online classes or on campus class. However, 33% of the faculty members completely denied because they considered it as non-beneficial. As many of the respondent believed that online classes are more beneficial for students because they believed students can take whole lecture and due to online classes, they can come

online from anywhere either they are inside or outside home, or if they are out of the city or out of the country their lecture will not be missed by any chance. However, 33% of professors disagree with this position since they believe that because of the virtual session, students can just check in to the lecture and cannot remain engaged in it the entire time or can choose to walk the room instead of listening to it.

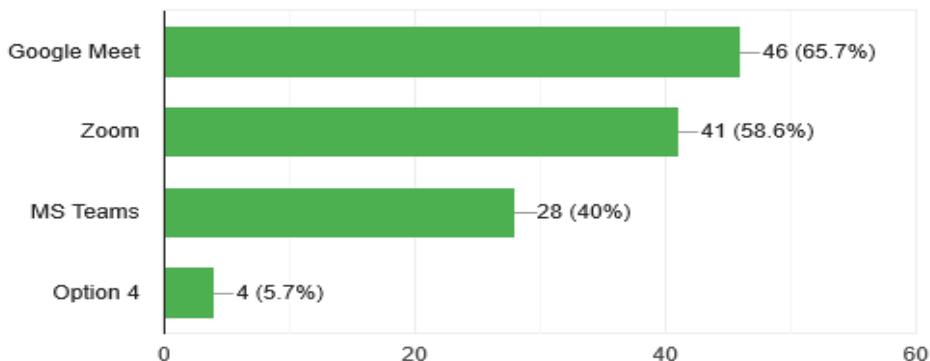


FIGURE 4. Which online platform you prefer for online teaching?

There are different applications, which helps to conduct online classes, though all these applications have their own positive and negative features. There were just a few answers for well-known programmes that teachers frequently use for online classrooms, such as Zoom, Google Meetings, MS Team, and other initiatives, in reply to this question. It was noticed that 66% of the faculty members were

using google meet to conduct their online classes, while 41% of the faculty members were using zoom application, and 28% of the faculty members were using MS Teams for online classes, whereas only 5.7% faculty members used any other application for their classes. Hence, by analysing the results it was concluded that faculty members were using google meet, and zoom to take their online lectures.

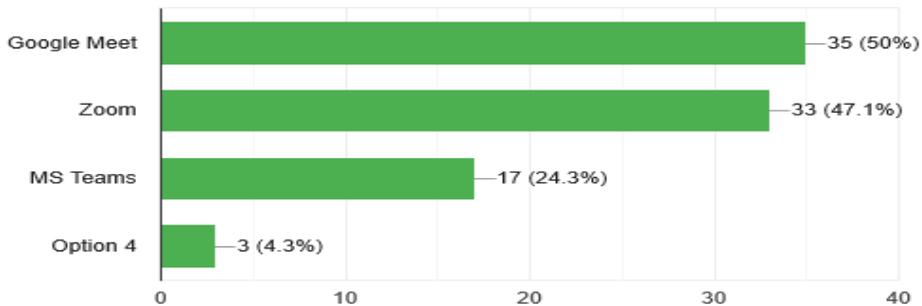


FIGURE 5. Which online platform is more user friendly for teaching?

User-friendly word can be considered as one of the most suitable applications for teachers. There were just a handful names of applications: MS Team, Google Meet. It is clearly seen from the above graph or Fig 5 that Google meet is more user friendly for teachers as compared to zoom, There was a little discrepancy in instructors' opinions; it appears that 50% of teachers preferred Google Meetings and 47% preferred Zoom. One drawback of not like Zoom as opposed to Google Meet is that there is a 40-minute break between

meetings, and students must re-join the session. This may have led to a decrease in the number of teachers who preferred Zoom over Google Meet. It was also noticed, that 40% of the teachers choose MS Team and 5.7% choose other applications for taking their online classes. One major positive aspect, which was shared by the faculty members regarding Google meet is that after taking an online recorded class teachers get the recorded lecture in their google drives.

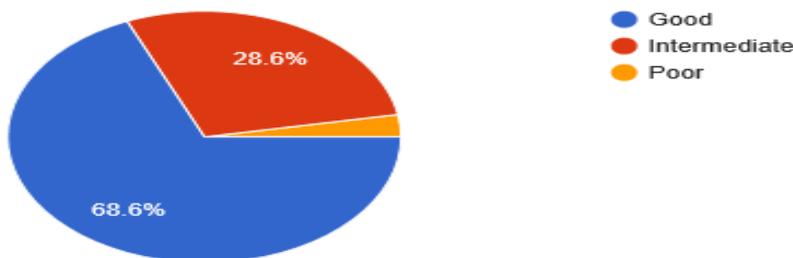


FIGURE 6. Do you have sufficient knowledge for conducting online classes?

Conducting online classes is not a difficult task for teachers, though many teachers require online training. This question of questionnaire inquiries about the general idea about faculty members and teachers who have expertise in conducting online classes. From the above graph, it can be noticeable that 68.6% of teachers are good at the basic knowledge for conducting online classes; whereas 28.6% teachers' said, they have intermediate knowledge for conducting online classes, and only a few teachers said they have poor knowledge for conducting online classes. It is

encouraging to discover that most teachers are knowledgeable about leading and participating in online classes since it is crucial for an instructor to have a foundational understanding of leading classes during online sessions. Today's majority of instructors also pursue higher education and research, therefore they must be well-versed in managing apps, managing online sessions, managing recorded lectures, exchanging files during online sessions, sharing videos, and other connections related to course content..

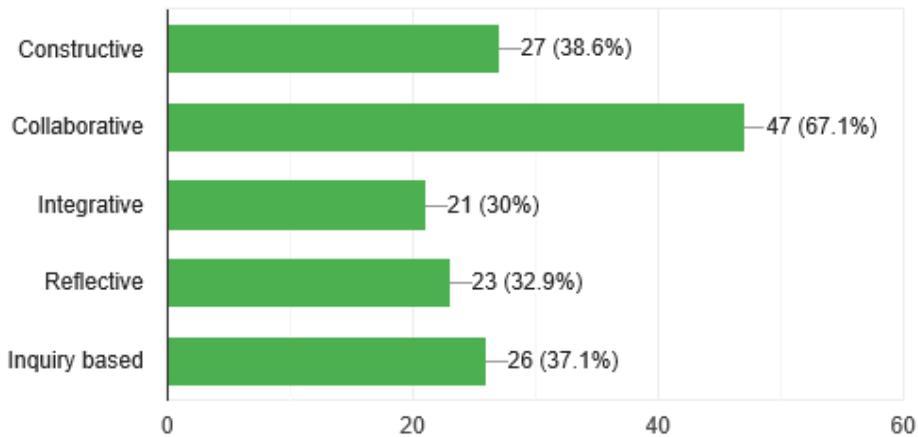


FIGURE 7. What kind of pedagogy you used for conducting online class?

The process of learning delivering knowledge to the students effectively is considered a pedagogy. Initially, 38.6% of teachers preferred a constructive approach to pedagogy, meaning they enabled students to participate in class, listen to lectures, and demonstrate their attention in class. Secondly, 67.1% teachers used collaborative approach of pedagogy in which they divided students into groups to debate various points of view about the lecture, and collectively they might create new ideas. This practise is more fruitful than individual study. Thirdly, 30% of the teachers used

integrative approach of pedagogy to conduct online classes because they believed that an individual can perform more efficiently if he digs himself and considering the syllabus exercise and problems he faced, will be easy for him if he focused and learnt by himself like self-study. Still, 32.9% of teachers used the reflective pedagogy approach to help students adopt other learning strategies and patterns to comprehend the course syllabus. Reflective pedagogy is regarded as one of the best pedagogical approaches because it allows students to observe how teachers and their classmates learn, solve

problems, create mathematical models, and many other things. Lastly, some used inquiry based approach of teaching, which allowed students to inquire about the lecture. 37.1% of teachers used this strategy in online classes; while a topic was clarified later, the teacher gave students time to develop questions in accordance with the lecture they had just heard, and the teacher would then explain

it. It is likely that they could develop different scenarios pertinent to the topic and ask their teachers if there was any way they could possibly solve this problem. Furthermore, it was noticed that collaborative approach is can be used by most of the teachers along with the collaborative approach of pedagogy for online classes , which is more useful than the other approaches.

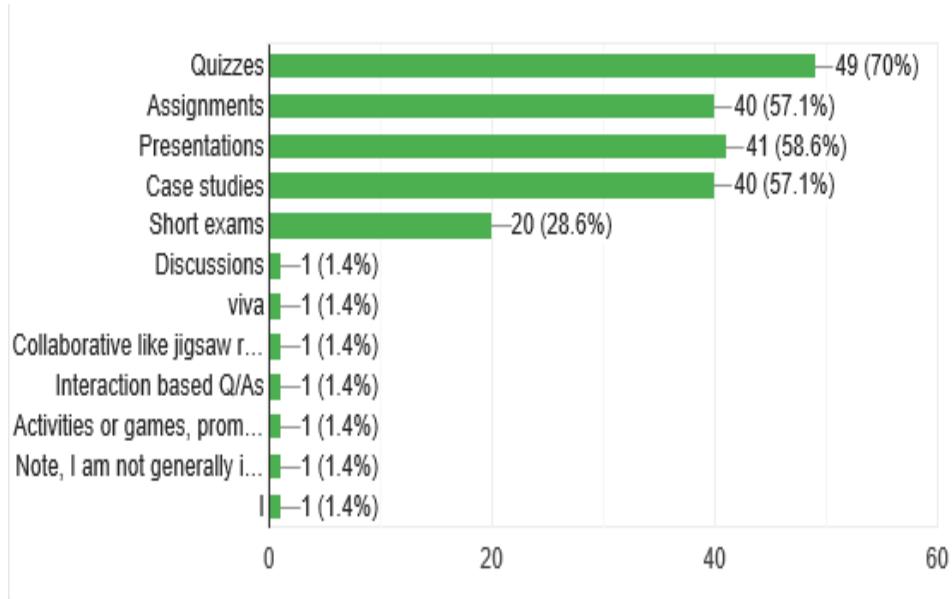


FIGURE 8. What activities you prefer for students during online classes?

During online session it is more important for a teacher to engage students in class. For this purpose, teachers need conduct different activities. Teachers wanted to know what kinds of internet activities their students preferred in this inquiry. To get students engaged in class, it has been observed that 70% of teachers administer quizzes, 57.1% of teachers assign homework, 58.6% of teachers require presentations from students, and 57.1% of

teachers use case studies. Only 20% of teachers administer short exams. Furthermore, it has been noticed that few teachers choose different options to engage their students like taking surprise viva, assigning them class discussion based topics, collaborative like jigsaw reading, interactive tools like pad let, near pod, and others. However, other few teachers used activities like games and prompt that leads to group discussions

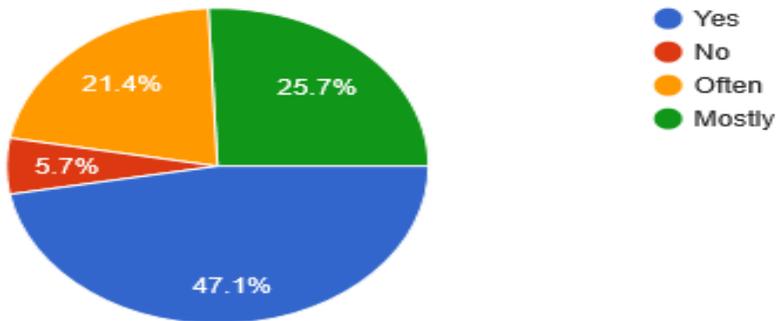


FIGURE 9. Does student respond on given assignments during online class?

Keeping in view the aforementioned question it was observed that 47.1% teachers said that students do attempt an assignment during online class, 25.7% teachers said mostly students do submit or at least try their best to submit their assignment. However, 21.4% teachers said students rarely respond to their posted activity of an assignment, which showed

students' careless behaviour towards their online class. Moreover, 5.7% teachers said that students do not participate in any class-based activity and identified them as backbenchers. Generally, as a whole 73% of the students do actively participate in class discussions and submitted their assignments on due date.

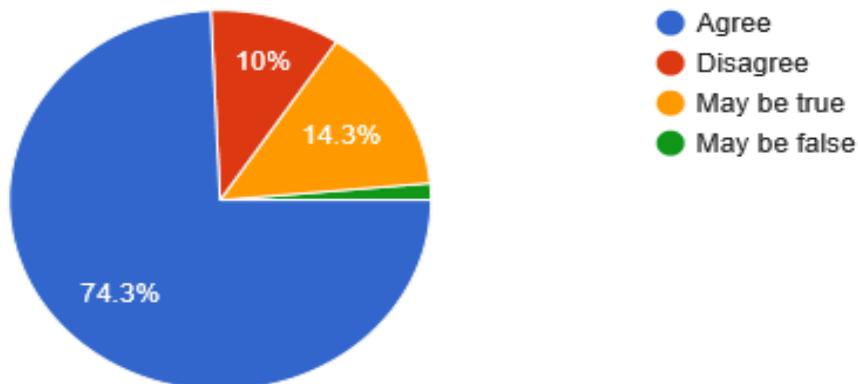


FIGURE 10. Do you think lack of face-to-face interaction with students affects class progress?

Physical classes/online classes both are a kind of virtual studying methods, and physical lessons are more practical for both teachers and students. Do you believe

that the distinction among physical or direct contact between students and teachers impacts class results or class progress? Teachers were asked this

question, and the results are shown in Figure 10. The majority of teachers—74.3%—agreed that it does affect students and class progress, while 14.3% expressed uncertainty and said that it might affect but weren't sure. 10% of respondents disagree with the claim that it hinders pupils' growth. Overall, teachers agreed to the

statement that face-to-face interactions with students are more reliable to clear their queries. However, 14% of the teachers thought that it is not important to present physically in front of the students and online class can replace physical class without any affect.

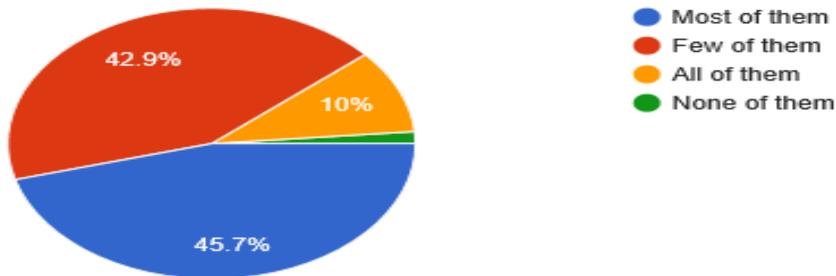


FIGURE 11. How many students showed positive feelings when taking online class?

Positive feelings indicate that students are participating in class, responding to instructor inquiries, and, if given an assignment, completing it on time. Each student's emotions are a reflection of how calmly and actively he is handling the class. In response majority of the teachers agreed to this point that most of the students showed positive emotions during online learning, 42.9% teachers said a few of them showed positive emotions when taking online class, and only 10% teachers said all of them showed positive emotions during online session; whereas a few teachers said that 3% showed positive emotions. Teachers are working hard to

keep up with students and trying their best to explain everything to students through online sessions because online learning/online teaching is new for both students and teachers because it's been decay tradition that teachers were taking physical classes and for that teachers only need good subject knowledge and a board marker and white board but with time it is transferring to online classes, now despite of subject knowledge Teachers want favourable feedback from their students through their output results, such as assignments and quizzes, after grappling with a lot of things for online lectures.

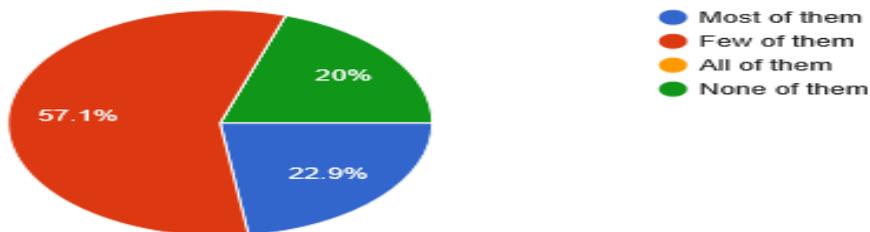


FIGURE 12. How many students shows negative attitude when taking online class?

Attitude of students present how they feel in a class. Since attitude predicts students emotions towards an act, in class environment teachers always try to take control either it is online class or physical any class. However, student's careless behaviour and attitude may affect their learning capability and vice versa. Students' behaviour may be divided into two categories. 1. Positive, 2. Negative, where positive behaviour has been discussed in more information, now a negative mindset or conduct towards online class occurs when students make noise throughout online class, do disrupt teacher repeatedly without letting teachers

finish their topic, intentionally show connectivity issues, disturb the entire class by lame questions, and waste teacher time by asking unimportant questions, all of which are considered to be negative. Figure 12 shows the result regarding teacher's opinion by highlighting that 57.1% teachers said that a few of students showed negative attitude during online class and 22.9% said most of the students showed negative attitude during online class. This indicated a positive impact of online classes on students in which 77.1% were not showing any negative attitude during online classes.

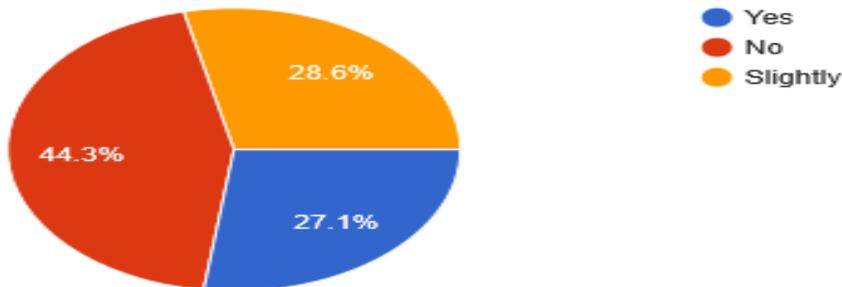


FIGURE 13. Is class management being a challenge you face during online classes?

Management means well organized, When talking about class management, this refers to setting up the classroom in a way that encourages good student conduct. Class management was an easy task when classes were physical but when it switches to online classes it became difficult to manage class, but teacher by their hard work efforts proved that class could be manage even if it is online. Here the question was about the challenges face during online classes, from figure 13, it is more privilege to say most of the teachers

about 44% said they didn't face any challenge to manage class during online session whereas 28.6% teachers felt slightly challenge in managing class during online session and only 27.1% said Yes, they felt challenges in managing online session. Class management challenges are to organize class in such a manner that students can easily digest the lesson without any quires and students can perform well in quizzes and if it is about discussion then teacher needs to provide feasible environment.

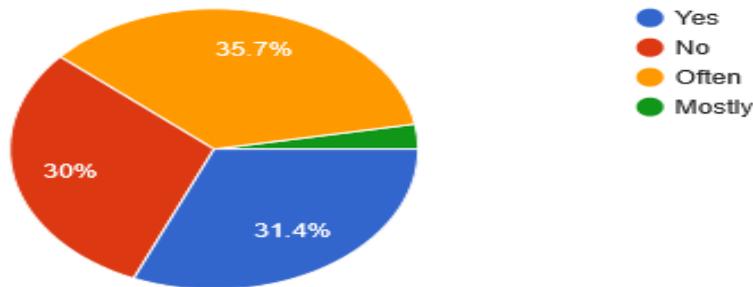


FIGURE 14. While delivering lecture do you face internet connectivity issues?

Strong internet connection is a must for online learning, especially people residing in Pakistan face a lot of connectivity issues, which could be due to several reasons. The above questionnaire observed four prime options according to the respondents in which mostly 35.7% teachers said that they often face internet connectivity issues, 31.4% teachers said no internet connectivity issues were faced during online class, whereas 30% said they face internet connectivity issues quite often. Hence, it was considered that teachers who did not face any internet connectivity issues might belong to posh areas. The title should be typed in the bold and "Capital Caps" forms in the 20 pt. Garamond, which font, centring it. After the final line, there has to be a paragraph space of 18 points.

A. RECOMMENDATIONS

It has been suggested that steps be done to ensure hassle-free internet connectivity, increased internet accessible in remote regions, and continuation of the teacher-student relationship similar to conventional teaching.

V. CONCLUSION

E-learning has aided people in both urban and rural areas in increasing their literacy rates. Developing countries must

effectively deploy e-learning systems. One can draw the conclusion from the discussion above that it is past time for policymakers to reevaluate and reconstruct the educational system in terms of its shipment, scope, assessment, and results. It is necessary to give up the old rote learning approach since it has increased the gap between what is learnt and what might be taught. The exponential growth of knowledge ought to be appropriately regulated, regardless of how knowledge was acquired. According to the findings, infrastructure must be modernised and technical preparations are necessary before e-learning can take place. The practical repercussions include managerial decision-making, curriculum improvement, and increased instructor-level criteria on numerous specific topics, such as funds and activities.

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