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USE OF INFORMATION COMMUNICATION TECHNOLOGY IN EDUCATION: AN ANALYSIS OF INDIAN PERSPECTIVE

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Abstract

Education is vital in any type of society for the conservation of lives of its associates and the preservation of the public formation. Prior studies carried out by researchers confirm that technology utilization and adoption in education undeniably helps teachers and learners in the teaching and learning process (Mustapha A, Mohammed A, Egigogo A, 2020). The rationale of this paper is not only to reveal the role of technology in education as a necessity considering the current situation but also to reveal the factors affecting the proper utilization and adoption of technology in education.

The survey method was adopted and the questionnaire used as the main data collection tool for the study. Non Probabilistic Convenient Sampling method has been used for data collection. Various statistical methods like graphs and percentage were used to determine results have been used for the purpose of analysis. The study mainly focused on the recent adaption by the faculties to teach their students through the Virtual classroom instead of physical classroom teaching. The final outcome of the research reveals the benefits and drawbacks of ICT in the opinion of faculties, students and parent's. The result revealed that ICT is advantageous to broaden student's knowledge paradigm and it helps in preparing teaching material. The major challenge identified is ICT infrastructure in the educational Institute is not yet ready to take challenge of virtual classes in India. Based on the findings and the conclusion, the recommendations were made.

1. INTRODUCTION

1.1 Education: Current Scenario

"No more pencils no more books/ No more teacher's dirty looks/ Out for summer/ Out till fall/ We might not come back at all/ School's out forever…/ School's out with fever"(Wattal, 2020) This lyrics of Alice Cooper is absolutely suitable to describe current scenario of education. Since the middle of March, millions of students have been out of school, because of the COVID- 19 lockdown. Till today it is difficult to predict when schools will restart. Presently, teaching and learning process has shifted from face to face learning into e-Learning. According to Lamba (2020), e-Learning generally refers to deliberate use of information and network communication technology in the learning process. Several terms refer to the same concept; they are online learning, distributed learning , web-based learning, blended learning etc. Basically, e-Learning is an educational process which utilizes information and communication technology (ICT) as a medium. ICT is used to share and have an access to data easily with the use of ICT tools such as computers, printers, internet, digital books, smart boards and many others.(Ajayi and Ekundayo,2009). While, there are many technologies available for use in teaching and learning at different levels of education, a good fit is always what is suitable in local contexts (Mishra and Panda, 2020). According to the report published in Indian Express in April 2020, "the technology may vary across schools and states but its implementation and reach to remote areas is the biggest challenge"

1.2 ICT in Education: A New Approach

A report by the World Economic Forum mentions that over a century ago, at the time of the Spanish Flu when people were isolating themselves, most Americans turned to telephone to get in touch with friends and family. The Spanish Flu underscored how essential the technology of telecom was to modern society. Possibly we are at same swing in time today (*How Tech Is Shaping Education*, 2020) Going forward, in the new normal, requires huge shift in mindset — both social and emotional. A new approach is needed to teach in this altered online paradigm. Across the globe, teaching and learning have undergone considerable transformation from the traditional classroom model to the current online and blended models, and developments in ICT hold the key to

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such transformation. More recently, during the COVID-19 crisis, when educational institutions faced lockdown, use of ICT in education sector has gone beyond imagination (Mishra and Panda 2020)

1.3 Role of the Teacher

The role of the teacher has been crucial during this crisis. Teachers can be compared with health workers because they are looking after the mental, emotional and social health of children at home. Within this new school/learning paradigm, it will have to be seen how best to engage the children not only in education but in socialising with their peers, creating safe zones to play, and, how to also provide meals and support families which are working. We need to ensure that teachers come back to work so that hands-on training can happen — since many of them may not be technologically adept. For many teachers, their entire world has changed: From traditional teaching tools to juggling with gadgets and software, they are relying only on their personal understanding (Wattal, 2020).

2. LITERATURE REVIEW

2.1 ICT in Education: Global Perspective

The concept of technology was linked to industry for around a century-and-a-half before it entered the world of education (Qaddumi et al., 2020). It took its roots into the education after the invention of the web in 1992, providing new approach towards teaching and learning using ICT tools (Harasim, 2000). This novel approach led to online collaboration breaking the traditional methods of teaching and learning (Paudyal, 2020). Different evolutionary stages of educational technology have been identified: (I) the age of instructional design: a focus on content; (II) the age of message design: a focus on format; (III) the age of simulation: a focus on interaction; and finally the *new age* of research in educational technology: a focus on learning environments and outcome (Bozkurt, 2020). Since the introduction of ICT in education, one of the most discussed policy questions has been its impact on educational outcomes i.e. learning outcomes. (Institut de statistique de l'Unesco, 2009). All existing data on outcome of ICT use in education are derived from sample-based international comparative assessment based on students, teachers and schools survey. These types of assessments began in the 1960s and have been focused mainly on core subjects, such as mathematics, science and reading. Over a time, in the late 1980s and early 1990s, assessments began to include the use of ICT in education, such as the "Computers in Education" (Pelgrum and Plomp, 1993, Institute de statistique Unesco, 2009)

With the use of computers in education, ICT was expected to lead to more productive learning. Yet, early studies on the impact of ICT on educational outcomes did not produce very consistent results. A study conducted by (Kulik, 2003; Cox and Abbot, 2004) indicated positive picture. Their research identified positive effects of specific ICT uses on pupil's educational attainment. The most substantial effects were observed when ICT was used in mathematics, science and English. This does not mean that the evidence for other subjects is negative; it is only an indication that not enough studies exist for other areas. The authors emphasize the notion of specific ICT uses and point out that the types of uses should match the pedagogical approach of teachers and that the significant effects were observed for teachers who used ICT in their courses for an extended period of time(Unesco, 2009). The report further stated that the proportion of teaching staff adapting their skills to an ICT-enabled instruction model is small in developing countries and the nature and intensity of ICT use in schools is very low.

A study on use of ICT by School teachers in Srilanka conducted by Gunasekera and Balasubramani (April, 2020) revealed that 70 percent of the teachers believe that ICT can have a positive impact on teaching and learning. Majority of the teachers were favourable about the advantages associated with ICT and generally disagreed with any negative statements. Many authors have given the reference of PISA study conducted by OECD (Chen X. & Hu J, 2020, Mickensy, 2020). As it is very comprehensive study on technology integration, its results has been briefly discussed by the researcher in the review. As per Mickensy Research (2020) , every three years, the Organisation for Economic Co-operation and Development (OECD) uses Programme for International Student Assessment (PISA) to test 15-year-olds around the world on math, reading, and science. In 2018, more than 340,000 students in 51 countries took the ICT survey done by PISA. Survey contains questions about technology use in schools, its impact on students outcome, amount of time spend using devices in the classroom and for homework. Five key findings from the PISA results suggest potential links between technology and student outcomes. The result of the study suggest that the type of device used, geography, intense use of technology, school system and use of technology by teachers than students gets higher score.

2.2 ICT in Education: Indian Perspective

ICT usage scenario in Indian education system is complex because of the lack of a proper policy on digital education, inadequate infrastructure and multiple languages (Pitroda, 2020) According to a 2017-18 all-India NSO survey, three-fourths of students in India did not have access to the internet at home (Jha, 2020). As many as 76% of students in India in the 5-35 age group did not know how to use a computer. 55% of students among the top 20% of households by monthly per capita expenditure (MPCE) knew how to use a computer and

internet while these proportions were only 9% and 10% among the bottom 20% (Jha, 2020). Lack of access to the internet and devices has also created a gap in digital literacy. In the past, Indian government took two bold initiatives to help digital education in the future: NOFN - National Optical Fibre Network (Now called Bharat Network) and NKN - National Knowledge Network (Pitroda, 2020). The purpose of NOFN was to connect all 2,50,000 panchayats at the cost of over Rs 40,000. For this, free 100 Mbps to 1Gbps bandwidth was planned at each panchayat. The NOFN is still not completely operational, after almost eight years because telecom operators did not want to serve due to lack of profitability. The Universal Service Obligation (USO) fund was used to build NOFN. The NKN was established as a high bandwidth to connect all knowledge-creating organisations comprising IITs, IIMs, universities, research labs and other e-governance institutions up to the district level. This network exists and is fully functional. However, only a few institution takes its full advantage because of a lack of understanding, local facilities, funding and technical expertise. The new policy makes no mention of leveraging this network effectively. In fact, the government's entire e-Gov programme works on the backbone of NKN. Pitroda (2020) opines that it is high time to use NOFN and NKN to connect all our schools and improve the digital education ecosystem in current situation and for future as well. In India, home-learning on a large scale will be a challenge, mainly because of unavailability of equipment and network-connectivity issues, and the fact that parents may not be in a position to facilitate home-learning (Wattal 2020 , Pitroda,2020, Jha 2020)

3 RESEARCH METHODOLOGY

3.1. Statement of Problem

On the basis of the review of literature, it is observed that few studies have been done to analyse the effectiveness of ICT considering the perception of teachers, students and parents in current situation from Indian perspective. Hence, this research is an attempt to reveal how effectively technology is playing a role in education considering the current situation but also to reveal the problems and barriers limiting the effectiveness and maximum utilization of ICT in education. This paper also has aims to check the impact of COVID 19 on Indian Education society in terms of promoting virtual study amongst the student .

3.2. Scope and Significance of the Study

This study helps to measure the effectiveness of technology integration on Indian Education Society. This paper will help the various stakeholders in this difficult time to design and effectively implement various policies for the students without hampering their study. The result of this research will be helpful to students, teachers fraternity, Education Ministry, Parents etc.

3.3. Objective of the Study

1. To study the effectiveness of ICT integration in students learning.
2. To study the perception of ICT integration in teaching
3. To identify the challenges in managing virtual classes
4. To provide suggestions to make ICT integration more effective in Indian Education system.

3.4. Area of Study:

The data was collected during the month of August 2020, when online education is going on in India due to COVID 19 and responses were collected from the Academician, Students and Parents and others across the nation.

3.5. Data Source:

The Primary data has been collected through structured questionnaire by asking open ended and close ended questions to the respondent as primary study data are more reliable and have direct relation with the happening of an event.

3.6. Variable of the Study:

Dependent Variable: Perception measuring criteria like " ICT integration for student's learning", "ICT integration in teaching", "ICT infrastructural challenges" and "teachers training"
Independent Variable: Demographic factors like "Age", Educational Qualification" and "occupation" .

3.7. Population of the Study:

In this study, the population covers the various stack holders like students, faculties, parents and career counsellor etc. across the country.

3.8. Sample Size:

209 responses have been collected from the Academician, Parent and Students, etc. across the Nation to check the effectiveness of ICT integration on Indian Education Society.

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3.9. Research Design:
Descriptive Research design have been used to identify the characteristics of the respondent for the study.

3.10. Sampling Design: Non Probabilistic Convenient Sampling has been used in this study as each variable has the equal opportunity for getting selection for the test.

4. DATA ANALYSIS AND FINDINGS

4.1 Demographic and professional characteristics of sample
Total 209 samples were surveyed. Table I provide the demographic and professional characteristics of the respondents according to the following variables: Age, Highest educational qualification and occupation

Table 1: Demographic and professional characteristics

FACTOR	DESCRIPTION	TOTAL RESPONDENT	PERCENTAGE OF RESPONDENT
Age	10-20 years	109	52%
	21-30 years	26	12%
	31-40 years	27	13%
	Above 40 years	44	21%
	Total	**209**	**100%**
Educational qualification	Schooling	57	27%
	undergraduate	53	25%
	graduate	25	12%
	Post graduate	51	24%
	doctorate	23	11%
	Total	**209**	**100**
Occupation	Student	122	58%
	Parent	9	4%
	academician	63	30%
	Others	15	8%
	Total	**209**	**100%**

Source: researcher's calculation

Table 4.1 reveals that 52 % respondents are between the age group 10-20 years, followed by above 40 years which is 21%, 31-40 years are 13% respondent and 21-30 are 12%. Under the Educational Qualification, Highest respondent are having qualification of schooling of 27%, Under Graduate is 25%, Post Graduates are 24 % and Doctorate are 11%. In occupation, Students are 58%, Academicians are 30%, Parents are 4% and other professionals are 8%.

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4.2 RESPONDENT'S EXPERIENCE WITH ICT

Chart 1 Respondents' ability to use ICT tools:

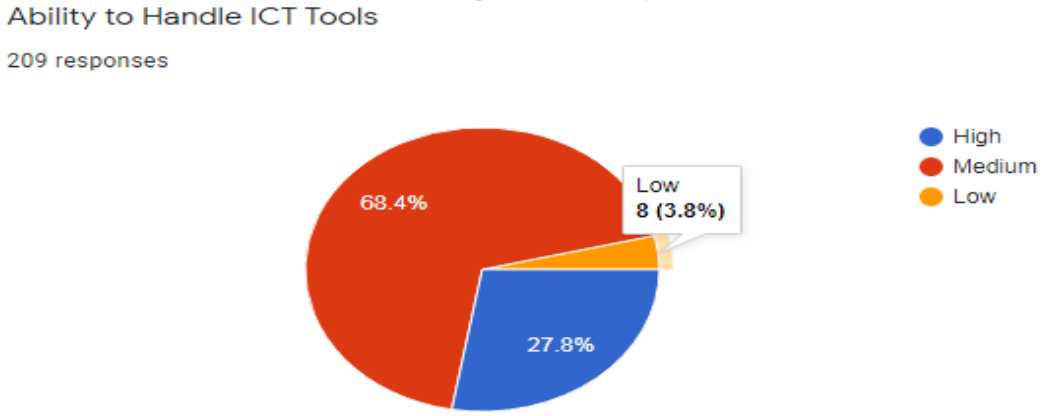

Chart 2: Time period for which respondent has been using ICT for academic purposes

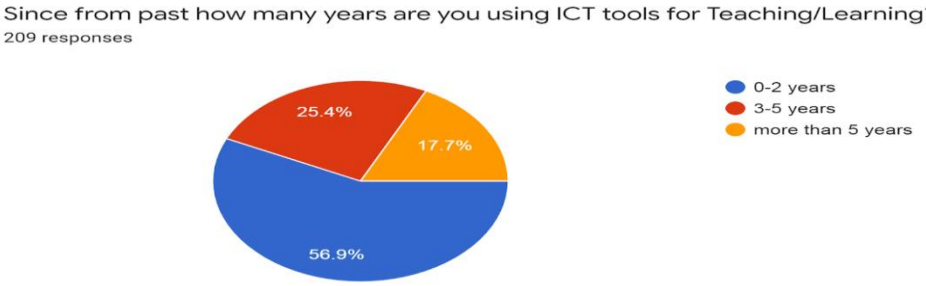

Chart 1 shows us the ability of respondents to use ICT tools in which the highest number of respondents i.e. 68% have suggested their ability is medium, followed by 27% suggesting they have high ability and 3% suggesting their ability is low.
chart 2, it can be inferred that, most of the respondents i.e. 57% have been using ICT only since the past 0-2 years, 25% have been using ICT since 3-5 years and 18% have been using for more than 5 years. It should be noted that there is no direct relation between the amount of time respondents have used ICT for and their ability to use it. Thus, ICT is user friendly.

4.3 USAGE OF ICT RESOURCES DURING CURRENT PANDEMIC SITUATION

chart 3: Platforms used by academicians to communicate with students

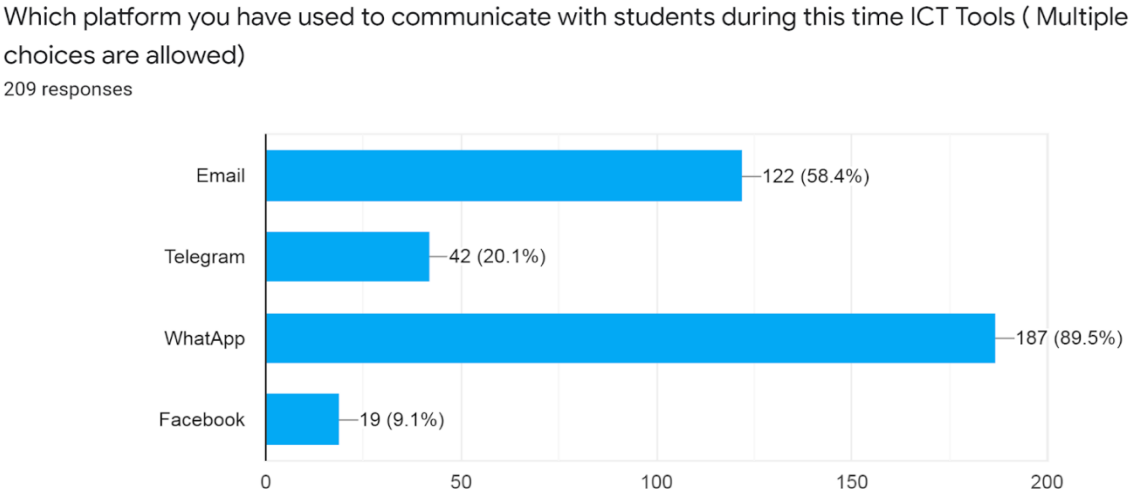

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Chart 4: ICT tools used by respondents:

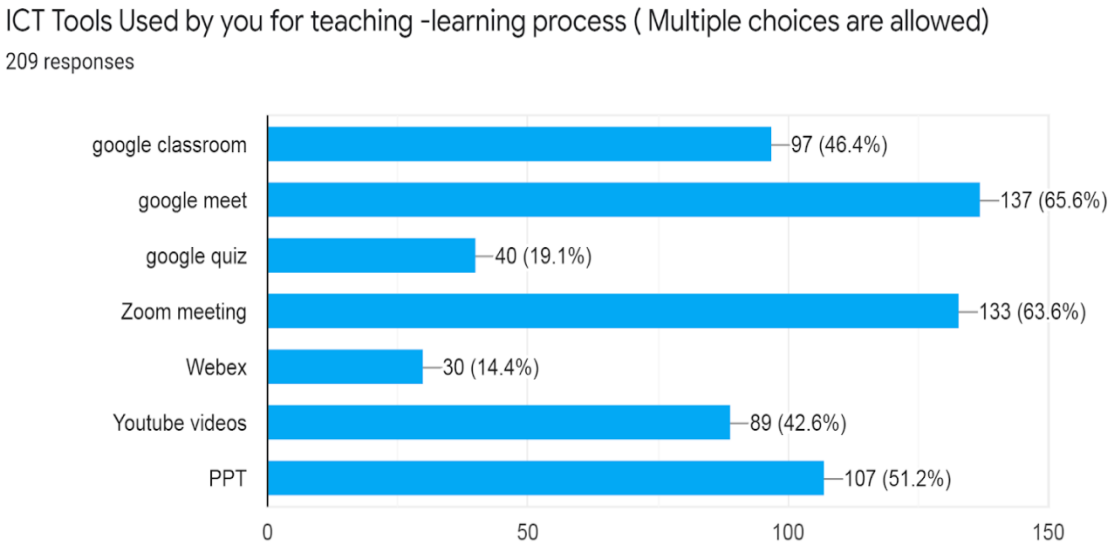
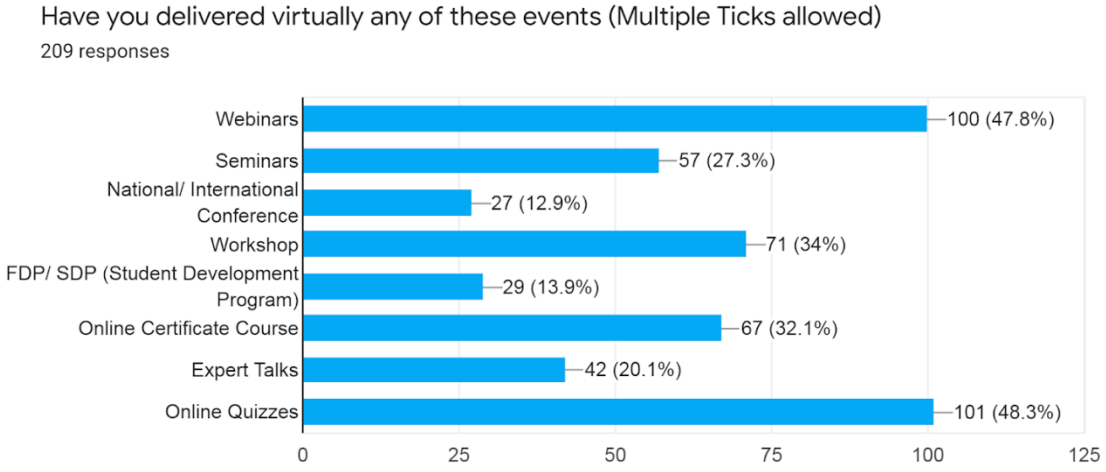


Chart 5: Usage of virtual events and technology



In order to get in depth analysis of ICT resources usage, the questionnaire asked how and to what extent respondents have made use of ICT tools and platforms. **Chart 3** shows that 89.5% of academicians have used Whats App to communicate with students. Email is on the second position with 58%**. Chart 4** shows the applications used for conducting classes in which google meet and zoom meeting have 65 % and 63% score respectively. It should be noted that Webex, despite having the same features is not widely used with only 14% respondents using it. **Chart 5**,has been taken to show how aware and active people are about the services ICT has to offer and how comfortable they are with it. Result shows that Online quizzes and webinars get highest score 48 %, followed by workshops and online certificate course having 34 % and 32 % weightage respectively.

4.4 RESPONDENTS PERCEPTION ANALYSIS

The attitude and perception of stakeholders in use of ICT and its application in the teaching and learning process is essential in order to provide ICT facilities effectively in academics. No progress could be attained unless the teachers and students are positive about the need of technology into the classroom. Therefore the present study examined the advantages and disadvantages related to implementing ICT. Respondents were asked to mention their agreement or disagreement with a series of positive (advantageous) or negative (disadvantageous) statements given in the questionnaire. Table 2 shows the results associated with ICT

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perception, where respondents were asked to rate their agreement/ disagreement on a Likert scale of 1-5, from 'Strongly Disagree' (1) to 'Strongly Agree' (5) for the given statements.

Table: 2 PERCEPTION ANALYSIS:

Effectiveness of ICT integration for student's learning	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**
ICT allows students to be more creative and imaginative	5%	11%	41%	35%	8%	100%
ICT encourages students to communicate more	8%	25%	32%	27%	8%	100%
ICT helps to broaden students' knowledge paradigm.	4%	12%	33%	**40%**	11%	100%
ICT helps to improve students' ability in reading, writing	8%	28%	29%	29%	7%	100%
Students' are more behaved and under control with the use of ICT	18%	43%	22%	14%	3%	100%
ICT promotes active and best learning experience	9%	23%	38%	21%	9%	100%
Your Perception of ICT integration in teaching	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**
Aware of ICT offers for effective teaching	7%	7%	40%	36%	10%	100%
ICT makes teaching more effective	5%	21%	44%	25%	6%	100%
ICT improves the quality of teaching	7%	24%	33%	30%	6%	100%
ICT helps to prepare teaching materials	4%	10%	27%	**44%**	15%	100%
Students' pay less attention when ICT is used in teaching.	5%	13%	34%	37%	10%	100%
Students' makes no effort for their lesson if ICT is used in teaching.	6%	27%	33%	29%	5%	100%
classroom management is out of control if ICT is used	11%	26%	38%	17%	9%	100%
ICT Infrastructure in the Education Institute is not yet ready to take challenge of virtual classes	3%	12%	36%	**34%**	15%	100%
Teachers should be taught and trained about use of technology	2%	6%	17%	21%	**54%**	100%

- The results from Table 2 indicate that the highest Effectiveness of ICT integration for student's learning was "ICT helps to broaden students' knowledge paradigm" with 40 % agreement. implying convergence amongst respondents. Secondly, "ICT allows students to be more creative and imaginative" was the next advantage, with35% score, followed by "ICT helps to improve students' ability in reading, writing" with 29 % agreement. The results confirm that ICT has positive effect in academics in new normal education system.
- Respondent's perception of ICT integration in teaching shows that " ICT helps to prepare teaching materials" with 44 percent agreement, followed by 36 % agreement with "ICT offers effective teaching", next is 30 per cent agreement with " ICT improves the quality of teaching" and 25 % agree that "ICT makes teaching more effective", The most significant disadvantage given by respondents in using ICT is "that students pay less attention when ICT is used in teaching" with 37 % agreement , 29 per cent agree

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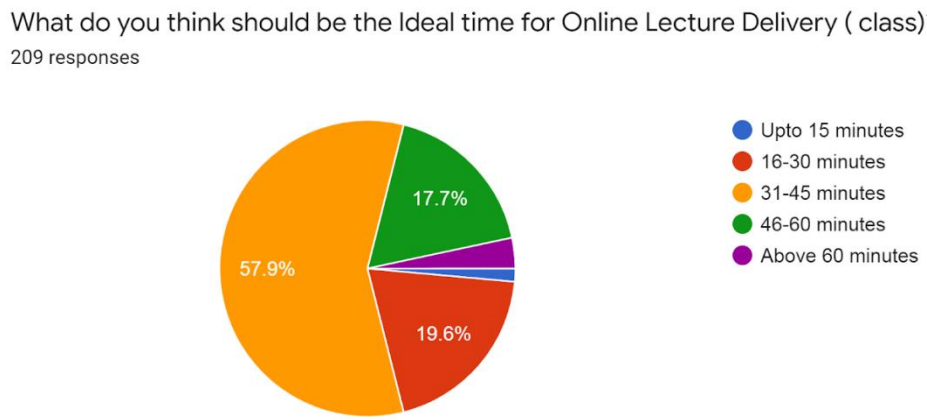
that students makes no efforts for their lesson if ICT is used in teaching, 17 per cent agree that "classroom management is out of control if ICT is used", implying a high level of divergence.

- 34 per cent respondents agree that "ICT infrastructure in the education Institute is not yet ready to take challenge of virtual classes in India".
- 54 per cent respondents strongly agree that "teachers should be taught and trained about use of technology".

Chart 6: Respondent's perception on ideal time for an online class



From chart 6, we know 58% people think online lectures should last from 31-45 minutes. 20% feel they should last for 16-30 minutes AND 18% feel they should last for 46-60 minutes.

4.5 CHALLENGES FACED

Chart 7: Issues faced while conducting and attending online classes

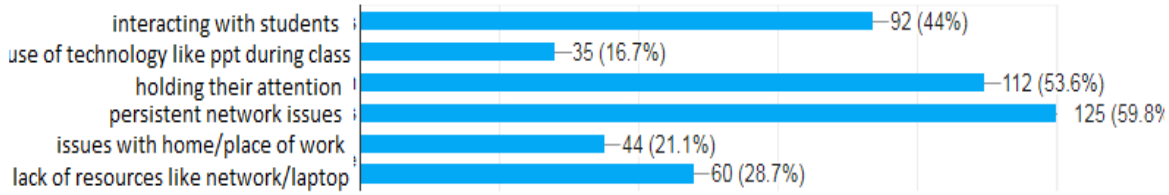


Chart 7 shows the issues respondents faced while using ICT tools in online classes. This is an integral criteria for suggesting improvements and analysis. Respondents were allowed to opt for more than one issue. The problem faced by 125 people i.e. 60% respondents is persistent network issues followed by 112 i.e. 54 % respondents saying holding attention of the students is an issue. Consequently, 92 (44%) academicians face problem while interacting with students. Least number of people 35 i.e.17% have faced problem with using technology like ppt. Some other problems addressed by respondents are mental stress, eye problems, frequent headaches and back pain, misuse of technology by students while teaching and lack of knowledge among parent and student about technology.

5. CONCLUSION

Result of the study conlcudes that 68 % of respondents have medium ability to use ICT, 58 % have been using ICT only since 0-2 years. It shows that there is no direct relation between the amount of time respondents have used ICT and their ability to use it. Thus, ICT is user friendly. To communicate with students 89.5% of teachers have used WhatsApp, followed by E mail 58% usage. The widely used application for virtual classes are Google meet and zoom meeting with 65 % and 63% score respectively, WebEx, despite having the same features is not used widely. Virtual events mostly attended by respondents are online quizzes and webinars. Majority of the

respondents agreed that ICT is advantageous to broaden students knowledge paradigm and it helps in preparing teaching material. The most noteworthy disadvantage felt by respondents in using ICT is that "students pay less attention when ICT is used in teaching". 34 per cent respondents agree that "ICT infrastructure in the education Institute is not yet ready to take challenge of virtual classes in India" and 54 per cent respondents strongly agree that "teachers should be taught and trained about use of technology. Respondents preferred timing for online classes is between 31-45 minutes. Respondents ranked persistent network issues as the most important challenge while attending online classes followed by holding students attention and ineraction with them. In the end, the learning output is in the form of learning media with Android-based applications. This is in line with what Liu, et. al (2020). He states that digital media has an important role in the development of new learning.

6. SUGGESTIONS

On the basis of above conclusions, following suggestions have been made:

- National Education Policy (NEP) approved recently talks about educational Institutes being ready for digital and online education, It emphasise on preventing drop-outs. If India has to focus on online learning, it would do well to ensure students have access to devices and internet connections (Jha, 2020).
- The government should perform an audit of ICT resources in schools to ensure that ICT facilities are available at a minimum standard at least across all schools in India . Thereafter, financial support should be targeted to those schools needing it most.
- The study also revealed that teachers require training for the proper use of ICT tools. Therefore it is being recommended that, the government should conduct training programmes on information search for teachers. This training should be continuous through seminars, workshops and in-service training programmes to enhance their skills in current trends in information retrieval.
- In addition, the government should grant study leave with pay to teachers who are willing to pursue programmes in information management since information is very vital to the work of teachers. It is further recommended that ICT should use as a subject and as an aid for teaching and learning in all teacher education programmes. Educational authorities should explore new strategies to enhance teachers' knowledge on ICT use for teaching purposes while understanding of the ways in which ICT should be implemented and to what extent it should be used in schools. The government should be ensured to provide more specialist advice and support for teachers in using ICT in teaching and learning (Gunasekera C and Balasubramani R , 2020)

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