

A Study to Mitigate Remote Learning and Teaching Challenges among Rural and Urban Students and Teachers in Karnataka

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Abstract

Online learning and teaching are becoming the new normal around the world after the Covid-19 pandemic. However, the lack of facilitates, infrastructure and other factors posing challenges to many urban and rural students and teachers on smooth and effective running of online classes. The present study aims to analyse the challenges in remote/online learning as a comparative study among urban and rural students and teachers. The study focuses on understanding the different challenges to mitigate them through suggesting real-time and cost-effective solutions thereby enhanced online learning and teaching experience. Questionnaire Survey is administered in the study to collect the data. Convenience Sampling is used to select the sample. Factor analysis, regression analysis and independent sample t-test are conducted to achieve the objectives of the study. Results indicated that the rural students and teachers faced more challenges compared to urban areas due to the lack of access to resources and financial constraints to buy online learning platforms like mobile phone, laptop etc. But challenge like lack of interaction were faced more or less same by both rural and urban area students. The importance of some common facilities that appeared to be the need for both rural and urban students and teachers, to improve the effectiveness of online teaching and learning is explored through this study.

Keywords

Online learning, Remote Learning, Learning Challenges, Learning Infra Structure, Rural and Urban Students

1. Introduction

The coronavirus was declared a global epidemic by 2020, and several regions accepted distance from each individual as a means of eradicating the problem (Paulo *et al*, 2020). Indeed, many countries throughout the world have decided to close schools across the country in order to prevent the virus from spreading and disrupting the education of millions of students. The Corona virus has tainted the school educations and cultural processes over the world (Osman, 2020)). Technology has the potential to help in this aspect. Online learning is a sort of education that is offered through the use of a computer or other digital devices. It can be seen of as a kind of learning assistance because it allows students to finish their studies at any time being anywhere in the world. Online education has various advantages, including the opportunity to learn from anywhere, the flexibility to choose, and the cost savings, especially transporting and other related costs (Suri, 2021).

The criticality of online learning has increased as a result of the worldwide health crisis. It enables students to communicate with their teachers and peers even when they are not in class (Melissa Bond, 2020). However, there are still a number of difficulties that can arise when adopting this style of instruction. Many governments and researchers agree that socially disadvantaged groups confront substantial hurdles when it comes to accessing online learning. Concerns regarding the rising disparity between rich and poor have been more prominent as a result of the

closure of educational institutions. School closures may have a negative impact on pupils from low-income families who are forced to spend time with their more advantaged peers.

1.1 Motivation

COVID-19 has had a worldwide impact that has proven unpredictable (Mukesh Rawal, 2021). Our research aimed to provide a complete analysis of the educational sector in Karnataka's rural and urban districts in response to the COVID-19. The virus had such a significant impact that online education became an apparently omnipresent element of our expanding environment, leading to the closure of schools and the end of physical interactions between teachers and students. Fortunately, most schools and educational institutions quickly switched to an online method to allow students to resume their studies. As a result, education has undergone significant transformations, including the rise of e-learning, in which instruction takes place remotely on digital platforms rather than in physical classrooms.

The major goal was to investigate the impact of online education on learning outcomes in Karnataka's rural and urban districts. Because online education was both a blessing and a burden for some of them, we used this study to examine and comprehend the key obstacles that students encounter in grasping concepts and the challenges that teachers face in delivering the course contents. Online learning is rapidly becoming one of the most effective ways to impart education.

1.2 Objectives of this Study

- The major objectives of the study are reported below:
- To identify challenging factors of online/remote learning among teachers and students
- To analyse the differences in Online/Remote Learning Challenges among Urban and Rural Students
- To analyse the differences in Online/Remote Teaching Challenges among Urban and Rural Teachers

2. Literature Summary

An extensive review of literature was carried out to understand the opinion on online/remote learning among students and teachers as well as the differences in challenges faced by urban and rural students and teachers.

Whenever it comes to teachers' availability, students' time to travel to the city, and the contact between the students and their teachers and colleagues, blended learning is a fantastic method of teaching and learning in rural areas (Ghimire, 2022). It was required to transition from a face-to-face classroom to a virtual classroom during the confinement caused by the COVID-19 pandemic by implementing digitally mediated instruction. Emergency remote teaching (ERT), which replaced face-to-face instruction, was designed, according to Hodges et al. (2020), to "provide temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis," rather than "re-create a robust educational ecosystem". It was required to transition from a face-to-face classroom to a virtual classroom during the confinement caused by the COVID-19 pandemic by implementing digitally mediated instruction. Emergency remote teaching (ERT), which replaced face-to-face instruction, was designed, according to Hodges et al. (2020), to "provide temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis," rather than "re-create a robust educational ecosystem." Teachers and students had to reflect, adapt, adjust, innovate, and leverage digital platforms with new student-centered practises that were ideal for ERT during this transition period (Vale, et al. 2021). This virtualization of educational systems (Nobre and Mouraz, 2020), which undertook a precursor experience of the reconfiguration of education for the digital age, highlighted the need for teacher training and forced intensive training in the first period of the pandemic, focused on education technologies, to strengthen digital literacy (Rahim, et al., 2020).

Small rural schools, according to Sharplin (2002), are under-resourced in terms of curriculum materials and technology. Bond (2020) in her studies revealed the challenges around teachers' digital competences and infrastructure, with respect to teacher ICT skills, family access to technology, parent engagement in learning, and student health and well-being. The study indicates the importance of knowledge on the usage of technologies to have better online learning experience. Further, Stenman and Pettersson (2020) provide a brief overview of distant learning in rural locations, taking into account the aspects from the standpoint of teachers. Based on the COVID-19 emergency, Ferri et al., (2020) examined the prospects and limitations of emergency remote instruction and established the importance of proper system in place to cope with such situations. Osman (2020) revealed the impact

of pandemic on education methods in Sultan Qaboos University. The unpreparedness created a lot of chaos in the education system. Paulo *et al* (2020) explored how local educational systems responded to the COVID-19 pandemic by providing school continuity via online learning when schools were closed. The adaptability to the new system posed lots of challenges. Simamora, (2020) discuss the difficulties faced by students, instructors, and the administrative office of Cadi Ayyad University in Morocco, which was limited to a single geographical region. Gillett-Swan, (2017) focus on the benefits of E-learning rather than the conditions or challenges that students experience. Garbe et al., (2020) focused on parent's experiences and their struggles due to school closure. Suri (2021) focuses on difficulties of online learning for Indigenous Australian students living in remote communities who do not have adequate access to online learning technologies. Ghimire (2022) focus is about the challenges faced by higher educational institutions in their training and learning activities during the pandemic. In order to respond to disruptive changes in the way that teaching is done, how students are interacted with, and how knowledge is reflected upon, educational institutions have to transform into a place for change. To provide a differentiated and inclusive response for all pupils throughout this initial period of confinement, constant training allowed for the deployment of new technologies as part of the learning and knowledge-appropriation processes (Huber and Helm 2020; Flores, et al. 2021).

During the covid-19 pandemic, Daimary (2020) focuses on the impact and implications of online learning. Ayu (2020) conduct study to assess the challenges and scope in Leading e-learning at higher education. Hossain et al., (2021) focused on, current college students are battling against a few side effects of serious mental pressure and the most noteworthy feeling of dread toward scholastic flimsiness following a time of devastating COVID-19 flare-up in Bangladesh. Dumford, & Miller, (2018) focuses on-to determine various factors influence online learning in higher education in this emergency shifts. A descriptive survey method is conducted with the university students of West Bengal. Karen McCutcheon, Maria Lohan, Marian Traynor, Daphne Martin (2015), focused on the use of an online or blended learning model has the potential to enhance the teaching of clinical skills in undergraduate nursing. García-Morales, (2018) highlighted pitfalls and opportunities for online education in higher education sector. Cahpay (2020) focuses on parents' experiences as they participate in their children's distant learning during the Covid-19 crises. Dumford, & Miller (2018) focused on the obstacles that students and instructors experienced during the covid-19 pandemic, addressing all of the topics that were brought forward.

The research gaps were identified after the detailed review of literature. Most of the studies focused on teacher's experience and their perspective and does not consider the responses of students. Limited studies were carried out having a comparative analysis among rural and urban students of Karnataka. Student's perspectives, experiences, attitudes and feelings are not deeply addressed previously. Most of the studies were conducted just after the closure of the schools to analyse immediate effect of pandemic. These gaps were considered to frame the objectives of our study.

3. Methods and Methodology

This study is empirical in nature. The population of the study was the students and teachers of rural and urban areas of Karnataka. Data collection plays vital role to carry out the study future and it has direct impact on the research outcomes as well. Obtaining the right data from right candidates at the right time helps us to increase the efficiency of the process and eliminate the doubt. There are two types of data, primary and secondary data. Primary data is nothing but collecting data from scratch. Whereas, secondary data is collected to support the primary data such as collecting info from the internet, research studies etc. To carry out the study we used primary data method to collect the data from students and teachers from rural and urban areas of Karnataka through questionnaire.

3.1. Data Collection

Primary data was our fundamental method to obtain the relevant data from students and teachers of rural and urban areas, data were obtained through a pre-designed questionnaire consisting of 33 items for Students and 22 items for teachers. Questionnaire survey helps to maintain the confidentiality of the responses given by the respondents. Questionnaire was prepared based on the literature review and relevant experience of teachers and students The questionnaire was distributed through Google form. The questionnaire for Students and teachers were divided into three sub-sections- Demographic profile, Scaled variables and short answer questions.

A pilot study was conducted to check the validity and reliability of questionnaire before administering the questionnaire to the larger population. To this the total number of responses that were obtained from the students was 194 and teachers was 49 from rural and urban areas.

3.2. Methodologies used to Achieve the Objectives

Demographic characteristics were analysed using descriptive statistics. Further, the challenging factors with respect to teaching and learning among teachers and students were identified through exploratory factor analysis. Regression analysis was conducted to derive the criticality of each identified factors. To know the statistical significance of the mean differences in the challenging factors among the rural and urban students and teachers, Independent Sample t-Test was conducted.

4. Results and Discussion

The collected data was analysed using different statistical analysis and tools to reach the objectives.

4.1. Validity and Reliability Analysis of the Questionnaire

Face Validity of the Questionnaire is done by an expert in this area. The Reliability Analysis allows us to understand the consistency of the questionnaires. In this study two questionnaires were framed, one for students which consists about 20 scaled variables questions and other for teachers which has 14 questions in it, and we collected the responses from the students and teachers using the Likert scale. The Reliability Analysis of the questionnaire was conducted using the SPSS software and the derived Cronbach's Alpha Value for students and teachers' questionnaires is reported in Table 1. The questionnaire is said to have good consistency if the Cronbach's Alpha Value is more than 0.7, and the questionnaire is said to have better consistency if Cronbach's Alpha Value is more than 0.8, the questionnaire is said to have Best Consistency if Cronbach's Alpha Value is more than 0.9.

Reliability Analysis is conducted for the student's questionnaire and the Cronbach's Alpha Value attained was 0.88, which indicated good internal consistency of the data set based on the responses collected through questionnaire.

Table 1. Reliability analysis for students

Cronbach's Alpha	No. of Items
0.88	20

And similarly, Reliability Analysis is conducted for the teacher's questionnaire and the Cronbach's Alpha Value attained was 0.76, which again indicated internal consistency of the measurement scale (Table 2).

Table 2. Reliability Analysis for the Teachers

Cronbach's Alpha	No. of Items
0.76	14

4.2 Demographic Characteristics of the Respondents

When analysed the age of the respondents, among the students who have responded the highest belonged to the age category of 23 years. Further, the respondents consisted of 62% male population and 38% female population. Majority of the respondents were from urban area constituting 63% and that of from rural area was 37% approximately. The most preferred mode of education by the respondents were offline mode- 83%, based on various factors such as understanding concepts, doubts clearing and socialising etc. The remaining 17% of students prefer online education due to reasons such as work along with study, travelling difficulties, hesitant to socialize etc. Furthermore, according to the teachers offline teaching is more convenient compared to face-to-face meeting. However, students that feel online is more convenient were only about 20 % and the remaining 80% population felt it is better to attend classes and interact face to face with teachers for better learning experience.

4.3 Data Analysis to Achieve the Objectives

In order to achieve the objectives of our study Factor Analysis, Regression Analysis, T- test and Descriptive analysis were conducted to achieve the objectives of the study. The current research considered 3 main objectives leading to understanding the challenges faced by teachers as well as students in online teaching and learning.

4.3.1 Identifying the challenging factors of online / remote learning among teachers and student

Exploratory factor analysis (EFA) was conducted to identify the challenging factors with respect to online learning and teaching with respect to rural and urban students. Principal component analysis with varimax rotation was considered as the most suitable method in this context to derive the maximum uncorrelated factors. Before that KMO and Bartlett's Test was conducted to understand the sample adequacy and data adequacy for factor analysis respectively. Both the values derived satisfied the threshold values as reported in Table 3, thereby confirming the sample and data adequacy for factor analysis.

Table 3. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.87
Bartlett's Test of Sphericity	Approx. Chi-Square	919.893
	Sig.	.000

Further, a factor analysis was conducted with principal component analysis and varimax rotation to derive maximum uncorrelated factors. The factor analysis results derived three factors with regards to challenges faced by Students and five factors with regards to challenges faced by teachers. The rotated component matrix for the student challenging factors is in Table 4.

Table 4. Identified Challenge factors and the corresponding variables for students

Variables	Factors
The lack of access to online sessions impacted the online learning process	Lack of Academic Guidance
The lack of academic guidance in online learning impact my studies	
Course material was difficult to understand without proper guidance	
Interaction with faculty during online sessions was difficult	
Lack of teacher-learner interaction impacted the learning process	
Online classes were very stressful	
The lack of availability of devices to attend online sessions impacted online learning	Lack of Infrastructure
I faced financial constraints to buy the required gadgets to attend online classes	
Lack of knowledge about usage of electronic devices impacted my online classes	
Lack of knowledge in using online tools like Zoom, MS Teams, Google Meet etc. impacted my online learning	
The timings of online classes were not convenient	
I feel more distracted during online class	Lack of Interaction
I faced network issues which impacted my learning process	
Lack of social interaction with my fellow-learners impacted the learning process	
I think offline classes are better than online classes	

Thus, the factors derived for students were Lack of Academic Guidance, Lack of Infrastructure and Lack of Interaction.

Further to analyse the criticality of the derived factors regression analysis was carried out and the results are depicted in Table 5.

Table 5. Criticality of the derived factors

Identified Factors	Variance Explained	Beta	P- value
Lack of Academic Guidance	18.61	0.64	0.00
Lack of Infrastructure	17.83	0.62	0.00
Lack of Interaction	14.04	0.46	0.00

The results of regression analysis indicated that lack of academic guidance was the highest challenge faced by the students in online learning followed by Lack of infrastructure including network issues.

Further, as part of objective one factor analysis was conducted to identify the challenging factors among teachers with regard to online teaching. As a first step in factor analysis, **KMO and Bartlett's Test** was carried out again to know the sample and data adequacy. The results derived were satisfactory to go forward with factor analysis as reported in Table 6.

Table 6. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.76
Bartlett's Test of Sphericity	Approx. Chi-Square	919.89
	Sig.	0.00

Further, a factor analysis was conducted with principal component analysis and varimax rotation to derive maximum uncorrelated factors. The rotated component matrix for the student challenging factors is in Table 7.

Table 7. Identified Challenge factors and the corresponding variables for teachers

Variables	Factors
Handling students is difficult in online classes than offline classes	Difficulty in completing the syllabus
I found difficult to use online tools (MS Teams, Google Meet)	
I found difficult to convey the message that I have intended to do it online classes	
I found it difficult to complete the syllabus during online classes	
Students' engagement was less during online classes	Lack of Student's Engagement
I was not sure that the students were learning the subject during online classes	
Students' interaction was less during online classes	
I am not able to give my best while teaching online	Difficulty in Course Delivery
I am not able to deliver the same standard of teaching through online mode	
I felt need of more resources to teach students online	lack of Resources
I feel connecting to students face to face is better than online education	

I feel offline classes are better than online classes	
Students rarely came with doubts	Lack of Support from Organizations
The resource support for online classes from University/Institutions was not sufficient	

Five main factors were identified through factor analysis based on their similarity in nature. The derived challenges factors for the teachers were Difficulty in completing the syllabus, Lack of Student's Engagement, Difficulty in Course Delivery, Lack of Resources, Lack of Support from Organisations

Further regression analysis was carried out to understand the criticality of the identified factors. The results are reported in Table 8.

Table 8. Criticality of the identified factors

Identified Factors	Variance Explained	Beta	P- value
Difficulty in completing the syllabus	17.1	0.571	0.00
Lack of Student's Engagement	16.97	0.522	0.00
Difficulty in Course Delivery	14.99	0.333	0.00
Lack of Resources	14.96	0.418	0.00
Lack of Support from Organisations	10.79	0.333	0.00

4.3.2 Analysis of the Differences in Online/Remote Learning Challenges among Urban and Rural Students

The factors identified in objective one with respect to challenges in online learning among rural and urban students were further analysed to have a comparative analysis among urban and rural students. Independent Sample t-test was carried out to know the statistical significance of the mean challenges among rural and urban students.

The alternate hypotheses framed for independent Sample t-test were;

H₁. There is Significant difference in lack of academic guidance among urban and rural students

H₂. There is Significant difference in lack of Infrastructure among urban and rural students

H₃. There is Significant difference in lack of Interaction among urban and rural students

The group statistics with mean and frequency are for the rural and urban students are displayed in Table 9.

Table 9. Group Statistics of students

Factors	Area	Frequency	Mean
Lack of Academic Guidance	Urban	123	3.50
	Rural	71	3.78
Lack of Infrastructure	Urban	123	2.93
	Rural	71	3.35
Lack of Interaction	Urban	123	3.97
	Rural	71	4.03

Mean Values for all the three Challenges were high among rural students. The results indicated that rural students are finding more difficulty in Online/Remote learning. To understand the statistical significance of this difference in mean values, Independent Samples t-Test was conducted and the results are displayed in Figure 1.

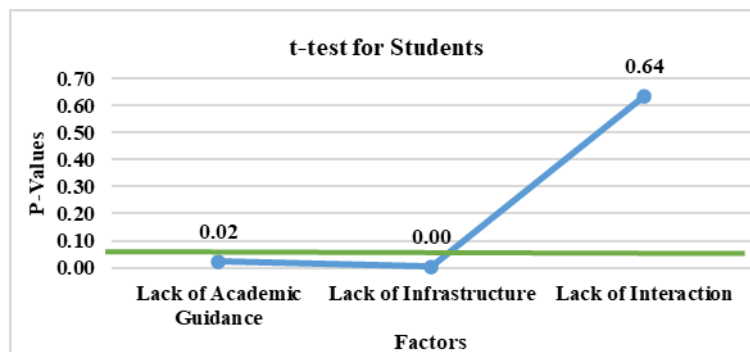


Figure 1. Result of t-test for students

P-values were lesser than the level of significance (0.05) only for 2 factors as displayed in Figure 1. The result indicate that the mean differences were significant only for the factors Lack of Academic Guidance and Lack of Infrastructure among urban and rural students. Both Urban and Rural students were facing the same challenge in Lack of Interaction with their peers.

4.3.3 Analyse of the Differences in Online/Remote Teaching Challenges among Urban and Rural Teachers

Hypotheses for the independent Sample t-test were;

H₄. There is Significant difference in Difficulty in Completing the Syllabus among urban and rural teachers

H₅. There is Significant difference in Lack of Student's Engagement among urban and rural teachers

H₆. There is Significant difference in Difficulty in Course Delivery among urban and rural teachers

H₇- There is Significant difference in Lack of Resources among urban and rural teachers

H₈- There is Significant difference in Lack of Support from Organisations among urban and rural teachers

The group statistics of the factors among rural and urban teachers are displayed in Table 10.

Table 10. Group statistics of teachers

Factors	Area	Frequency	Mean
Difficulty in completing the syllabus	Urban	33	2.44
	Rural	16	3.16
Lack of Student's Engagement	Urban	33	3.93
	Rural	16	4.46
Difficulty in Course Delivery	Urban	33	2.59
	Rural	16	2.96
lack of Resources	Urban	33	4.30
	Rural	16	4.31
Lack of Support from Organizations	Urban	33	3.53
	Rural	16	3.84

Mean Values for all the five Challenges were high for rural teachers. This indicates that rural teachers are finding more difficulty in Online/Remote teaching. To understand the statistical significance of the difference in mean values, Independent Samples t-Test was conducted and the results are displayed in Figure 2.

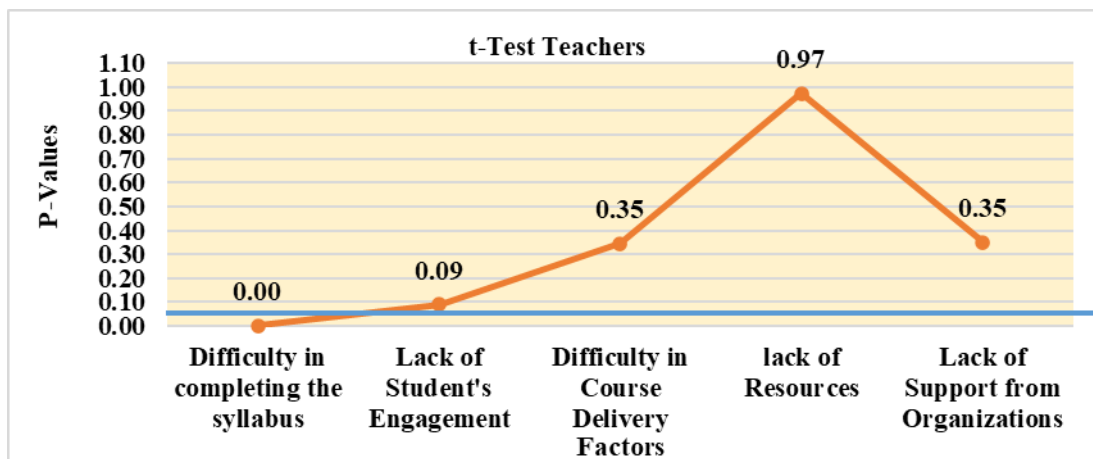


Figure 2. Result of t-test for students

P-values were lesser than the level of significance (0.05) only for the factor, difficulty in completing the syllabus as shown in Figure 2. The result indicates that the mean difference was significant only for the factor difficulty in completing the syllabus among rural and urban teachers. More infrastructure, network speed and connectivity can be the helping factors for urban teachers in completing the syllabus faster than rural teachers. Both urban and rural teachers were facing more or less the same challenge in factors such as lack of student's engagement, difficulty in course delivery, lack of resources and lack of support from organizations.

5. Conclusion

Due to pandemic, sudden and drastic changes were experienced in every sector including education sector. Where Schools and colleges started to move towards web-based learning in the recent times. This study mainly focused on the impact of remote education on rural and urban teachers and students. Furthermore, their outcomes were obtained through questionnaire method. The study concluded that online learning and teaching has many limitations as well as advantages. These challenges found higher among rural students as well as rural teachers. The advantages and disadvantages of each student and instructor perspective have been discussed.

Lack of Academic Guidance, Lack of Infrastructure and Lack of Interaction were the major identified challenges among both urban and rural students. However, the result indicates that only for the factors Lack of Academic Guidance and Lack of Infrastructure both urban and rural students showed significant among urban and rural students. Both Urban and Rural students were facing the same challenge in Lack of Interaction with their teachers and peers. Further, both urban and rural teachers were facing more or less the same challenge in factors such as lack of student's engagement, difficulty in course delivery, lack of resources and lack of support from organizations. Thus, the results of the study give insight on the challenging factors with respect to online learning and teaching. These insights on challenges helps to treat both urban and rural students and teachers differently to provide infrastructure facilities and other trainings for their betterment. Today, teacher preparation is universally acknowledged as a high-quality component of both teaching and learning. The educational process was impacted by the new responsibilities that instructors, students, and the educational community played. It was important to address the disparities in digital skill levels and student and teacher access to technological resources.

6. Recommendations

The suggestions & recommendations are made based on the output derived from the analysis. The analysis clearly states that the students in rural areas face more difficulty in terms of online/remote learning and some of the possible solutions are discussed here.

Digi notes can be the one of the best possible solutions for students to get access to their course materials and simultaneously teachers can keep track on their notes and update whenever changes to be with this student can be benefited with the updated notes and go through whenever they are in need off. During our research it is found that there was lack of student engagement during online classes, which was one of the major challenges faced by the

teachers. In order to overcome this challenge, it is suggested that there should be some activities where questions should be raised from the students itself, activities like pick and speak, content writing, debate's related to their education background, paper presentation, webinars towards mental health etc. Such activities motivate to involve themselves into the process and shape themselves. Further, the research revealed that many students regrets that they do not have practical exposure towards the theoretical concepts and labs. It is recommended that students should be given space to work on the related case studies with respective to their domain, which helps the students to learn practically. In addition to this, it enhances the student engagement as well. Weekly catch ups should be done to discuss about the case which helps students to gain different perspective towards the case.

Training and counselling sessions should be organized in the villages to motivate rural youths to join online learning courses. There should be more awareness campaigns among the rural community about new government programs and policies to keep them up to date, to improve their distance learning resources, and to access data to be learned. State governments can organize courses on how to provide online content for teachers. An electronic library should be provided in the villages to increase access to digital learning resources. Particular attention should be paid to the development of computer literacy and technology tools. Different methods of communication should be used to disseminate information on the availability of training courses online, free of charge or with a minimum certification fee on different platforms. Satellite can help close the 'homework gap' for students in many rural areas Satellite access can help, today for those students, parents and school districts on the other side of the digital divide, waiting for fibre or cable is not practical and may be futile. Establishing learning centre at every village which can give access to study material to students via audio recordings, video recordings and text books etc. can reduce the challenges

7. Limitations and Future Scope for Study

The study used only questionnaire survey to collect the information and purely quantitative. Other data collection tolls such as focus group discussion, observation method, social media monitoring etc can be conducted to get more reliable data. Our research was mainly concentrated on teachers and students with a sample size of 50 teachers and 196 students which can be extended more for better result. Research failed to study about the challenges faced by the parents to provide better education to their children's which would have been more holistic study. Special consideration can be done by selecting particular Rural and urban areas of Karnataka and data can be compared to analyse the fact to overcome the challenge's faced by the teachers and students. On the above-mentioned points researchers can come up with innovative methods to make teaching sessions interactive and efficient to overcome the challenges faced by the teachers and students.

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