Physical Vs. Virtual Classroom: A Comparative Study of Teacher Effectiveness Before and During Covid-19 Pandemic

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Abstract

In the wake of the Covid-19 Pandemic, it became mandatory for educational insititutions to shift operations online and resume classes. In order to capture the difference in the quality of teaching arising due to the use of online platform, this study collected perceptions of teachers on their teaching effectiveness in the physical setting and the virtual environment. For this purpose, data was collected from 224 teachers using the Teacher Effectiveness Scale (Jani, Shahid, Thomas, Francis & Francis,2018). Descriptive Statistics, Paired Samples T-Test and Independent Samples T-Test were used for analysis. It was found that quality of teaching was significantly higher in traditional settings. Also, it was found that the teaching quality of female teachers was more severely affected than male teachers due to the use of online platforms. No differences in teaching quality between real and online classrooms were found across age groups and tenure. Suggestions for improvement include online training sessions for teachers where technical skills and online pedagogical skills may be imparted. This study has bridged an important gap by presenting a comparison of physical and virtual classrooms from the teacher's perspective.

Keywords:- Teacher Effectiveness, Quality of Teaching, Covid-19 Pandemic, Teachers, Lockdown, Online Teaching, Physical Classroom, Virtual Classroom.

1.1 Introduction

The Covid-19 Pandemic has led to the temporary closure of educational institutions all over the world. The global lockdown has affected 70% of the world's student population as per a UNESCO report. Most schools and colleges have resumed teaching online and minor assessments have been cancelled. In India, most of the examinations for public qualifications have been deferred or cancelled. It has been decided that students of all grades excluding the 10th and 12th standardshall be promoted without exams.

In colleges, online assessment tools like time-bound quiz and oral exams are being used as

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final assessment of student's performance. In order to prevent teaching interruptions, the colleges are resorting to latest online platforms. This has tremendously helped the institutions in coping with the damage caused by the health crisis. The online teaching experience is new to most teachers. Although online teaching can never replace traditional teaching, it has addressed a huge gap in today's times and shall continue to be mainstream until the situation improves.

The debate regarding the teaching quality in physical vs. virtual settings is an ongoing one. Online platforms restrict interaction of teacher to only one student at a time while teacher is able to engage all students in the real classroom. Unreliable internet connection, poor audio/video, lack of attention from teacher, poor doubt resolution are some other difficulties faced by students in online classrooms. Also, there are more cases of cheating during exams in online courses as there is no supervision or monitoring. It is found that some students log in to sessions but are not attending the lecture.

On the other hand, online classes are also more convenient due to comfort, low cost, no commuting time, studying from the safety of one's home etc. Some studies have also linked online teaching to superior student performance. Also, online teaching imparts technical skllls to students which is impossible in a brick-and-mortar setting.

Teaching is regarded as a noble profession the world over. Teaching is one of the most important professions as it has huge implications for society and student's academic success. The effectiveness of teachers affects the lives of students. Therefore, keeping the present context of the global crisis in mind, the present study seeks to determine the change in teaching quality owing to the adoption ofdigital platforms for teaching by educational institutions. As countries all over the world struggle to flatten the curve, educational institutions shall remain closed until is safe to reopen. Consequently, most colleges and schools are planning for online semesters and assessment. In the light of the above, the suggestions provided in the study may be of use in designing online educational programmes for the students.

1.1 Research Objectives

(i) To determine the level of teacher effectiveness in physical and virtual classrooms in selected colleges in and around Chandigarh.

(ii) To determine the differences in physical and virtual classrooms with regard to the level of teacher effectiveness in selected colleges in and around Chandigarh.

(iii) To determine the differences in change in the level of teaching effectiveness with regard to gender, age and tenureof teachers arising due to the adoption of online platfroms.

1. Literature Review

1.1 Physical Vs. Online Teaching

Physical Teaching refers to the face-to-face teaching that takes place in a brick-and-mortar setting in the presence of students. Online Teaching is the use of online platforms for teaching and it takes place behind the computer screens and through the medium of internet.

Numerous studies have found that traditional teaching is more effective than online teaching with regard to content, course coverage, clarity etc. (Allen and Seamans, 2013, Alsaaty

et al., 2014; Brown and Park, 2016; Neuhauser, 2010, Pai, 2013).Researchers have found that students in physical setting score more than their counterparts in virtual settings (Brown and Leidholm, 2002; Figlio et al., 2010; Parsons-Pollard et al., 2008, Shachar and Neumann, 2003).

On the contrary, some studies have reported that students perform better in online courses (Gratton-LaVoie, 2009, Harmon, 2006, Means et al., 2010).Russell (1999) and Stack (2015) reported no difference between real and virtual students with regard to their performance. As can be seen, majority of the researchers have reported superior student performance in real environment.

1.2 Teacher Effectiveness

Teacher Effectiveness is an important indicator of teaching quality that helps determine the student's performance. Research has found that teacher effectiveness is the most significant factor affecting student achievement.

Teacher Effectiveness is defined as "the impact that classroom factors, such as teaching methods, teacher expectations, classroom organisation, and use of classroom resources, have on students' performance."(Campbell, Kyriakides, Muijs, and Robinson, 2004).

Goe (2007) observed that teaching effectiveness is essentially an assessment of student learning. Burroughs et al. (2006) identified three main categories of teacher effectiveness, namely, teacher experience, teacher knowledge and teacher behaviour.

Highly effective teachers have a profound role in shaping the lives of students. It is found that students who are with highly effective teachers for more than one year are able to outperform others(Heck, 2009).Some of the characteristics of highly effective teachers include verbal ability, certifications, pedagogical skills, subjectual knowledge, personal traits like optimism, dedication, commitment, respect for students and enthusiasm.

1.3 Gap in Existing Literature

As can be seen from the literature review, there are numerous studies on the comparison between online and real classrooms from the student's perspective or considering the student's exam scores. However, there were no studies that had compared the online and traditional platforms taking the teacher's perspective into account.

Secondly, majority of the studies were based on metanalysis of the scores obtained by students in the exams. These studies did not record the perceptions of students or teachers.

Thirdly, it was found that most of the studies were conducted in developed countries like USA. As a result, the results of these studies cannot be extrapolated to India due to socio-economic and cultural differences.

Lastly, the differences in the change in teaching effectiveness among teachers (with regard to their age, gender and tenure) due to the adoption of online platforms for instruction were yet to be studied.

2. Research Model And Hypotheses

Based on the research objectives, the research model was developed (SeeFigure 1). Thus, four hypotheses have been formulated to this effect testing the signficance of the difference among physical and virtual classrooms with regard to the teacher effectiveness. The second, third and fourth hypotheses are regarding the effect of gender, age and tenure on the change in the level of teacher effectiveness due to the use of online platforms.

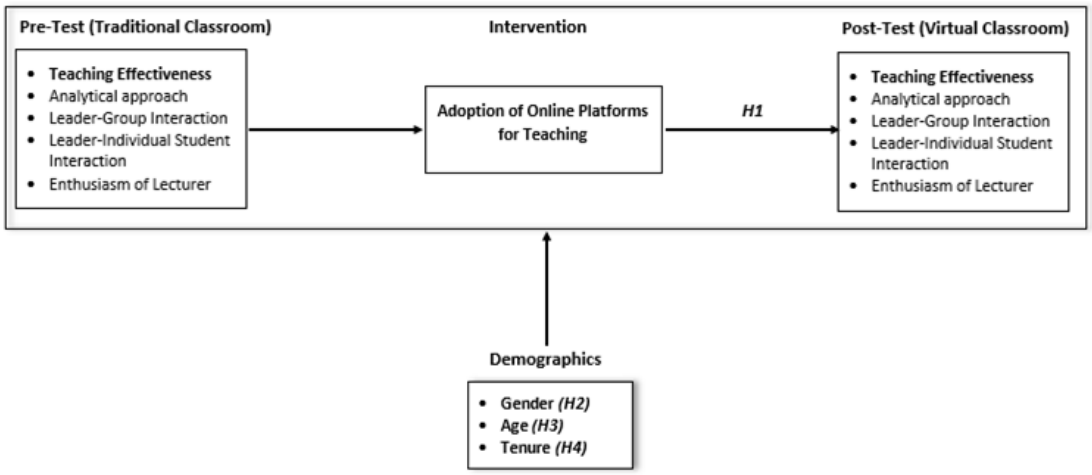

Figure 1.Research Model for the study

Based on the research model, the following hypotheses were framed.

H1. There is a signficant difference between Physical and Online Teaching Effectiveness(H1.1), Analytical approach (H1.2), Clarity of teaching (H1.3), Lecturer-group interaction (H1.4), Lecturer-Individual Student interaction (H1.5) and Enthusiasm of Lecturer (H1.6).

H2. There is a significant difference in the change in teaching effectiveness of male and female teachers.

H3. There is a significant difference in the change in teaching effectiveness of teachers under the age of 35 years and teachers above the age of 35 years.

H4. There is a significant difference in the change in teaching effectiveness of teachers who had served for less than 5 years and teachers who had served for more than 5 years.

1. Method

1.1 'Research Design

The research design was cross-sectional, descriptive, diagnostic and quantitative in nature.

1.2 Sample

Subjective sampling method was used for data collection because of time, cost and workforce limitation. Teachers serving in two universities and five colleges located in and around Chandigarh were approached for the study via email and telephone. Number of respondents is 224 comprising 94 males and 130 females.

1.3 Demographics

Four demographic variables have been included in the study: gender, age, tenure and highest educational qualification.The response scales are gender (1 = Male, 2 = Female), age (1 = 20 to 35 years, 2 = 35 to 50 yearsand 3 = 50+ years), tenure (1 = Less than 1 year, 2 = 1 to 5 years, 3 = 5 to 10 years and 4 = 10 + years) and highest educational qualification (1 = Bachelors, 2 = Masters and 3 = Doctorate).

1.4 Teacher Effectiveness

Teacher Effectiveness Scale designed by Jani, Shahid, Thomas, Francis & Francis (2018) was used to measure quality of teaching in the present study. It had a high internal consistency reliability with cronbach α =

0.914. It comprises 20 items categorised into five components as described below-

i. Analytical approach(4 items, cronbach α = 0.819) means presenting facts along with recent developments in the field and adopting a practical rather than theoretical approach.

ii. Clarity of Teaching(4 items, cronbach α = 0.826) refers to conceptual clarity and preciseness.

iii. Lecturer-group interaction (4 items, cronbach α = 0.714) means the extent to which the teacher is able to engage the class as a whole.

iv. Lecturer – Individual Student interaction (4 items, cronbach α = 0.815) means the extent to which teacher is communicating with individual students while teaching.

v. Enthusiasm of Lecturer (4 items, cronbach α = 0.776) refers to the energy or zeal a teacher has for teaching students.

An example of the items includes, "I know if the class understands me or not."

1.5 Procedure

Teachers serving in two universities and five colleges located in Chandigarh, Mohali and Panchkula were selected for data collection. Data was collected from respondents using online surveys. The duration for questionnaire completion is 3 to 5 minutes. The link to the online questionnaires was distributed to 300 teachers of which 224 responded.

1.6 Data Analysis

Descriptive analysis was performed to determine the means and standard deviations among variables. Paired Samples T-Test was used to determine thedifference between physical and virtual classrooms with regard to the level of teacher effectiveness.To determine the difference in the level of teacher effectiveness among teachers (with regard to the gender, age and tenure) due to the use of online platforms, the difference method was used. In this method, the difference between physical and online teaching effectiveness was calculated. Then, independent samples T-test was conducted to know the significance of the differences across gender, age and tenure of the teachers.

2. Results

2.1 Demographic Characteristics of the Sample

The target respondents in this study are teachers serving in theselected universities and colleges in and around Chandigarh. As shown in table1, total sample size is 224. Within the sample, 130 respondents (58%) are females, 85 respondents (38.1%) have a tenure of 5 to 10 years. 114 respondents (51.1%) are in the age group of 35 to 50 years while 178 respondents (79.8%) are Masters.

Table 1. Respondents' Characteristics (N=224)

Demographic	Groups	Frequency	Percentage
Gender	Male	94	42%
	Female	130	58%
Age	Under 35 years	90	40.3%
	35 to 50 years	114	51.1%
	50+ years	19	8.6%
Tenure	Less than 1 year	26	11.7%
	1 to 5 years	64	28.7%
	5 to 10 years	85	38.1%
	10+ years	48	21.5%
Highest Educational Qualification	Bachelors	13	5.9%
	Masters	178	79.8%
	Doctorates	32	14.3

Source: Authors' Research

1.1 Inferential Analyses

1.1.1 Comparison of Physical and Online Teaching Effectiveness

Table 2 depicts the results for the Paired Samples T-Test. As can be seen, there was a significant difference between the traditional teaching effectiveness and online teaching effectiveness (t = -91.217, p =.000). This shows that overall teaching effectiveness was significantly higher in a traditional classroom than in a virtual classroom.

Secondly, it was found that there was no significant difference between the real and virtual classrooms with regard to the analytical approach used by the teacher (t = 1.306, p = .193). Therefore, the teacher made use of similar methodology while teaching in both the settings.

Thirdly, the results showed that there was no significant difference between physical and virtual classrooms with regard to the clarity of teachers (t = -1.259, p = .209). Thus, this proves that teachers possess similar levels of conceptual clarity and subjectual knowledge when teaching in real and online classrooms.

Fourthly, it was found that the lecturer-group interaction was significantly higher in real classes as compared to the online classes (t = 80.480, p = .000).

Similarly, it was found that the lecturer-individual student interaction was also significantly higher in physical setttings as compared to virtual settings (t = 58.826, p = .000).

Lastly, the enthusiasm of teachers was also found to be significantly higher when teaching in physical presence of students rather than in virtual classrooms (t = 74.203, p = .000).

Table 2.Paired Samples T-Test results for the Difference between Physical and Online Teaching Effectiveness

Pair	Mean (SD) for Physical Teaching Effectiveness	Mean (SD) for Online Teaching Effectiveness	Mean (SD) for Difference	T	Sig.
Physical – Online Teacher Effectiveness	5.98(.39)	3.41(.22)	**-2.57(.42)**	**-91.217**	**.000**
Physical – Online Analytical Approach	5.96(.78)	6.00(.65)	.047(.54)	1.306	.193
Physical – Online Clarity of Teaching	5.98(.61)	6.07(.57)	-.078(.92)	-1.259	.209
Physical – Online Lecturer-Group Interaction	5.85(.83)	1.51(.30)	4.33(.80)	80.480	.000
Physical – Online Lecturer-Individual Student Interaction	6.01(.92)	1.75(.46)	4.26(1.08)	58.826	.000
Physical – Online Enthusiasm of Teacher	6.10(.57)	1.71(.53)	4.38(.88)	74.203	.000

Source: Authors' Research

5.2.2 Change in Teacher Effectiveness across Gender

The Independent Samples T-Test results as indicated in Table 3 show that there was a significant difference between male and female teachers with regard to the change in their teaching effectiveness due to the use of online platforms (t = -16.409, p = .000). As can be seen in table 3, male teachers had a mean physical teaching effectiveness score of 5.74 while that of female teachers was 6.15. Due to the global lockdown, online platforms were adopted and as a result, the teaching effectiveness dropped to 3.55 for males and 3.31 for females. However, this drop in teaching effectiveness was more in case of females than males. The difference in the change of teaching effectiveness across gender came out to be significant.

Table 3.Independent Samples T-Test Results for Difference between Physical and Online Teaching Effectiveness across Gender

Gender	N	Mean (SD) for Physical Teaching Effectiveness	Mean (SD) for Online Teaching Effectiveness	Mean (SD) for Difference	T	Sig.
Male	94	5.74(.39)	3.55(.19)	2.19(.31)	-16.409	.000
Female	130	6.15(.28)	3.31(.19)	2.84(.24)		

Source: Authors' Research

5.2.3 Change in Teacher Effectiveness across Age

As can be seen in Table 4, Independent Samples T-Test results show that there is no significant difference between physical and online teaching effectiveness across age (t = -.151, p = .880). The teaching effectiveness of teachers under 35 years was 5.98 in physical settings while the same was 5.98 for teachers above the age of 35 years. Due to use of online platforms, the teaching effectiveness of teachers under 35 years lowered to 3.42 while for teachers above 35 years, it lowered to 3.40. There was no signficant difference between teachers belonging to the two age groups with regard to the change in teaching effectiveness.

Table 4. Independent Samples T-Test Results for Difference between Physical and Online Teaching Effectiveness across Age

Age Group	N	Mean (SD) for Physical Teaching Effectiveness	Mean (SD) for Online Teaching Effectiveness	Mean (SD) for Difference	T	Sig.
Under 35 years	90	5.98(.40)	3.42(.23)	2.56(.41)	-.151	.880
35 + years	134	5.98(.38)	3.40(.22)	2.57(.42)		

Source: Authors' Research

5.2.4 Change in Teacher Effectiveness across Tenure

Table 5 indicates the results of the Independent Samples T-Test Analysis. It was found that there was a significant difference between real and online teaching effectiveness across tenure (t = -14.486, p = .000). In case of teachers who had served for less than 5 years, the teaching effectiveness had dropped from 5.76 in real classroom to 3.54 in virtual classrooms. Similarly, for teachers who had served for more than 5 years, the teaching effectiveness decreased from 6.13 to 3.32 on online platform. As can be seen teaching effectiveness lowered more in case of teachers who had served for less than 5 years as compared to those who had served for

Table 5.Independent Samples T-Test Results for Difference between Physical and Online Teaching Effectiveness across Tenure

Tenure	N	Mean (SD) for Physical Teaching Effectiveness	Mean (SD) for Online Teaching Effectiveness	Mean (SD) for Difference	T	Sig.
Less than 5 years	90	6.13(.32)	3.32(.20)	2.81(.29)	-14.486	.000
5 + years	134	5.76(.37)	3.54(.19)	2.21(.30)		

Source: Authors' Research

1. Discussion & conclusion

The present study aimed to determine the difference between physical and online teaching effectiveness. 224 responses collected from teachers serving in two universities and five colleges in and around Chandigarh were analysed.

Four hypotheses were framed based on the research model. The first hypothesis stated that there is a significant difference betweenphysical and online teaching effectiveness. It was found that the real teaching effectiveness was significantly higher than online teaching effectiveness. Thus, the first hypothesis was supported by the results. Similar results were obtained by Allen and Seamans (2013), Alsaaty et al. (2014), Brown and Park (2016), Brown and Leidholm (2002), Figlio et al. (2010), Neuhauser (2010), Pai (2013), Parsons-Pollard et al. (2008)and Shachar and Neumann (2003)suggesting that physical teaching is superior to online teaching.

The second sub-hypothesis stated that there is a significant difference between real and online teaching with regard to the analytical approach. The results found that the analytical approach used by teachers was nearly the same in both settings and there was no significant difference. Therefore, sub-hypothesis H1.2 was not supported by the findings. A plausible explanation could be that the global lockdown was unprecedented and unplanned. As a result, teachers who were previously unexposed to latest technologies had to resort to online platforms as a mandate. Hence, teachers adopted tried and tested methodologies for teaching online.

The third sub-hypothesis stated that there is a significant difference in the level of clarity of teachers in physical and online settings. No significant difference was found in the conceptual clarity or subjectual knowledge of teachers due to use of online platforms. Therefore, the sub-hypothesis H1.3 was not supported by the findings.

The fourth sub-hypothesis stated that there is a significant difference in the level of lecturer-group interaction in traditional and online settings. The results found that lecturer-group interaction was significantly higher in real classrooms. This could be because communication takes place behind the computer screens in virtual settings. Also, due to the lack of monitoring and supervision, students cheat by logging into sessions but not attending the lectures. As most students live in less populated cities and rural areas, there is a problem of unreliable internet connection and poor audio/video. Thus, students are disengaged and passive during online sessions. Therefore, the sub-hypothesis H1.4 was supported by the findings.

The fifth sub-hypothesis stated that there is a significant difference in the level of lecturer-individual student interaction in traditional and online settings. It was found that lecturer-individual student intreraction was significantly higher in brick-and-mortar settings than online classrooms. This is because, it is not possible for teacher to interact with individual students and clarify doubts during online sessions. On the contrary, in case of real settings, the teachers can be approached at all times for doubt resolution. Therefore, the sub-hypothesis H1.5 was also supported by the findings.

The sixth sub-hypothesis stated that there is a significant difference in the level of enthusiasm of teachers in real and online settings. The results found that teachers were more energetic and zealous in physical classrooms than in the online sessions. This is due to the lack of the physical presence of students. Also, there is lesser use of emotions and social skills when using digital platforms because of lesser interaction. The mental depression caused due to the lockdown imposed to curb the Covid-19 pandemic may also be a contributingfactorin this dip in the enthusiasm of teachers. Therefore, the sub-hypothesis H1.6 was also supported by the findings.

The second hypothesis stated that there is a significant difference in the change in teacher effectiveness across gender due to use of online platform. The results showed that there was a drop in teaching effectiveness of both male and female teachers in virtual settings. However, this drop was more in case of female teachers than male teachers. Also, the difference in the drop of teaching effectiveness was significant. This shows that the online platforms affected the teaching quality of female teachers more than that of the male teachers. Therefore, the second hypothesis was also supported.

The third hypothesis stated that there is a significant difference in the change in teacher effectiveness across age due to use of online platform. It was found that the teaching quality had lowered by nearly same points in case of teachers under 35 years and those above 35 years. Thus, the third hypothesis was not supported.

Lastly, the fourth hypothesis stated that there is a significant difference in the change in teacher effectiveness across tenure due to use of online platform. It was found that the teaching quality of teachers had lowered. However, in case of teachers who were teaching for less than 5 years, the teaching effectiveness had decreased considerably more than in case of teachers who had served for more than 5 years. As teachers with more than 5 years of experience have more experience and knowledge of student engagement, they were able to use tactics in order to manage students during online sessions. In case of teachers who had served

for less than 5 years, their inexperience in handling students led to the further decrease in quality of teaching during online sessions. Therefore, the teaching quality of teachers with less than 5 years of experience was more severely affected by the use of online platforms as compared to those with more than 5 years of experience. Hence, the fouth hypothesis was supported.

2. Recommendations

The results of the present study confirm that physical teaching quality is higher than online teaching quality. This presents room for improvement in terms of training sessions where technical skills may be imparted to teachers about the use of latest digital technologies that could be used for lectures, assignments, assessment and so on. Training sessions on Online Classroom Management and Student Engagement may also be provided to teachers to improve their online teaching effectiveness. Secondly, the teaching pedagogy which is more suitable to online environment must be adopted. For instance, study material such as e-books, powerpoint presentations or course handouts/dockets may be distributed at the start of academic session so that students are well-equipped and familiar with the topics. This will also compensate for the poor internet connection in tier-II cities and villages. Short assignments and caselets on the pattern of final examinations may be administered to students on a regular basis. Doubt resolution sessions may be held for weaker students. Also, individual students could be encouraged to email or message their doubts rather than discuss during online sessions in order to save time. Student interaction groups may be formed which may be moderated by a teacher so that useful discussions related to curriculum may ensue among students.

The global lockdown has taught all individuals and corporates the most meaningful lessons. Only those firms shall survive which can adapt to the current scenario and learn and impart key skills during this difficult phase. The Covid-19 Pandemic has changed the way businesses function and has forced companies to realign their business strategies. The lessons learned during this phase shall be of use in similar times ahead.

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