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# Perception of Equivalence Between Online and Face-to-face Academic Activities by Undergraduate Medical Students During COVID-19 Pandemic

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**ABSTRACT**

**Background and aim:** As online teaching continues to grow in recent years and COVID-19 Pandemic lockdown enforced medical education for online classes in most of the countries, including India, so it is important to investigate medical student's overall Perception about online teaching environments compared to face-to-face (F2F) teaching.

**Materials and methods:** A study was conducted to evaluate the Perception of undergraduate medical students about online teaching. An observational study initiated during lockdown period in April 2020 in a new medical college running in the second year and only two batches available with a total strength of 330 student's attending classes through online mode from the last five months during COVID-19 Pandemic and 295 students were voluntarily participated in the study depending on exclusion and inclusion criteria. The authors measured the student's Perceptions through a pretested questionnaire by assessing their level of interaction, Small Group Teaching (SGT), understanding concepts, knowledge acquired, and conducive environment for learning online courses compared to face-to-face (F2F) courses by using a 5-point Likert scale.

**Results:** Students' overall Perception of online classes conducted in terms of interaction, SGT, knowledge acquired, concepts, and conducive environment for learning was negative compared to Face-to-face (F2F) teaching mode.

**Conclusion:** From a small study, it is very well evidence that students are not able to enjoy online teaching in comparison to face-to-face (F2F) teaching, but online teaching methods can be used as an additional tool instead of replacing it with face-to-face (F2F) classes, particularly in medical education to develop a hybrid curriculum.

## 1. Introduction

Recently online teaching is preferred in higher education by different countries.[1] Online classes are becoming an alternative option for universities facing space availability problems, and most universities are predicting continued growth in online class offerings.[2] Online academic course options are also becoming the most popular day by day as most students prefer it for a more flexible and convenient mode of higher education.[3] But few have argued that this rapid embrace of online learning could lead to a negative approach towards online education.[4, 5] A significant worry of such investigations is whether participants' online course is similarly acceptable on the off chance that we contrast it with conventional face-with Face instructing for picking up information and learning. A huge extent of the past investigations done on online classes in various educational systems has concentrated on evaluating the general proportionality of online and face-to-face learning. The outcome of several such meta-investigations recommended that online and face-to-face (F2F) learning courses are comparable concerning students' academic performance.[6-9] For preparing quality and skilled doctors for today's digital environment, the teaching methods used in medical education should be considered on priority. Online teaching is used quite frequently in higher education but not much in medical education. But due to C0VID-19 Pandemic Lockdown, Medical schools all over the world have been closed from March 2020, so medical universities are also instructed to continue courses of medical students through online mode as it is a challenge for most of the countries, including India. It is hard to survey online education courses as it is affected by so many numerous elements which may make boundaries for web-based learning, for example, authoritative issues, social association, scholastic abilities, student inspiration, time and backing for examination, helpful condition for study, cost and internet issues.[10]

Thus authors assessed the Perception of medical students about online teaching, which is important for some reasons such as the connection between students impression of the learning condition and scholarly results, with discernment affecting both how student's approach a course and the amount

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they learn and understand their points of view enables the administrators and clinical instructors to settle on more useful choices in offering various courses and educational program to plan in future.[11-13]

A significant amount of research has been done on student's Perceptions of online classes in different courses. Still, the least data is available about medical student's Perceptions about online teaching classes. Thus, this study evaluated medical undergraduates' overall impression of online classes, concentrating chiefly on whether participants see online classes intuitive, proficient, and theoretical when contrasted with customary vis-à-vis classes. In that sense, the current investigation gives both testings of undergraduate supposition on the theme's education during online classes and a model for estimating observation in a more summed up sense. The current study approaches undergraduate medical observations with a comparably wide degree by requesting them to compare online and face-with face courses along with a few unique measurements, without reference to explicit courses or subjects.

## 2. Materials and methods

***Study Area and Participants***

This prospective observational study was conducted to evaluate students' Perception of online teaching classes initiated during the lockdown period in April 2020 and after attending online classes for five months after having the ethical approval (No. ECR/1192/Inst/MP/2019) from the Ethical Research Committee in New Government medical college, Ratlam, with a total strength of 330 students. The participants are Ist Prof & IInd Prof undergraduate MBBS students attending online lectures regularly during the lockdown period for the sample size. Students who cannot attend online classes regularly due to network issues, inadequate mobile data, not having smartphones, and electricity issues are excluded from the study. From these criteria, a total of 295 students were eligible for the study on a volienteerly basis.

***Study Design***

After Ethical clearance from the institutional ethics committee, based on inclusion and exclusion criteria, 295 undergraduate medical students participated in the study, out of which 158 were boys, and 137 were girls. To get a more extensive example, the analysts picked ongoing courses going from Ist and IInd MBBS subjects, varying in the topic and online and face-to-face formats and the duration of online classes. To restrict the impact of curriculum content or configuration on results, participants were told to consider their overall Perception of online and face-to-face (F2F) courses when reacting to questions instead of assessing explicit courses they had taken. Researcher's sent the Questionnaire to the participants via What's app, and they replied to the questions measuring their perceptions of the level of interaction, Small Group Teaching (SGT), understanding concepts, knowledge acquired, and conducive environment with online and face-to-face courses.

***What is Measured?***

We measured students' perceptions of online classes and face-to-face (F2F) classes by asking questions based on the general level of interaction, Small Group Teaching (SGT), understanding concepts, knowledge acquired, and conducive environment for study. We used Likert five point scale for measuring student perceptions of online classes. The research questions which were measured.

***Level of Interaction***

The degree of interaction undergraduates perceived both as a rule and with their companions and educators or facilitator online versus eye to eye classes was estimated with a 03-item, five-point Likert-type ( e.g., Online Didactic lectures are more interactive as compared to face-to-face (F2F) Didactic lectures). A median is a good measure of scales in comparison to the mean. A higher median score indicated a perception of students' academic performance through online classes was low compared to face-to-face (F2F) classes; a low median score stipulated a perception that improves academic performance through online classes.

***Comparative SGT Methodology***

The three-item Likert-type scale estimated participants' perception about SGT methods like tutorials, Problem Based Learning(PBL), case studies conducted in online and face-to-face (F2F) problem-based online Tutorials are better as compared to face-to-face (F2F) tutorials to improve my academic performance"). A higher median score indicated a perception of students' academic performance through online Small Group Teaching (SGT) methods was less compared to face-to-face SGT methods; a low median score indicated a perception that improves academic performance through online Small Group Teaching (SGT) methods.

***Comparative Subject Concepts***

Subject concepts were measured with three things evaluated on a five-point Likert-type scale (e.g., "Online teaching helps me understand concepts better than face-to-face (F2F) teaching."). A higher median score indicated a perception of subject concepts through online classes was less compared to face-to-face (F2F) classes; a low median score indicated a perception that improves concepts through online classes.

***Comparative Knowledge Acquired***

The perceived amount of knowledge acquired by participants in online courses compared to face-to-face (F2F) classes was measured using a three-thing, five-point Likert-type scale (e.g., "Online Teaching helps to prepare me better for examination compared to face-to-face (F2F) Teaching"). A higher median score evaluated the perception of students' knowledge gathered through online classes was less than face-to-face (F2F) classes; a low median score indicated a perception that increases the amount of knowledge gathered through online classes.

***Comparative Conducive Environment for Learning***

The Conducive Environment for learning was measured with three things evaluated on a five-point Likert-type scale (e.g., "online learning environment by staying at home helps me improve my academic performance better than face-to-face (F2F) teaching). A higher median score means the face-to-face (F2F) environment is conducive for study in comparison to online classes. Cronbach's alpha reliability test's internal consistency of each of the 15 things was estimated and showed 0.935. The 5-point Likert scale reactions were joined into three distinctive straight out factors 'agree' (strongly agree plus agree), 'neutral,' and 'disagree' (strongly disagree plus disagree). Based on the score (In percentage), students' perception of online classes was analyzed between Ist & IInd year students.

***Statistical Analysis***

In the present study, statistical analysis was carried out using Epi info TM for windows version 7.2.4.14 the data were analyzed by descriptive statistics & Spearman's correlation.

## 3. Results

As in the scale system, the best measure for descriptive statistics is the median. In Table 1. descriptive statistics for the comparative level of interaction, comparative SGT, comparative subject concepts, comparative knowledge gained, and conducive comparative environment for learning were calculated, including all 15 items, and found that most of the perception shows four as the median.

**Table 1. Item wise average score for student's Perception towards online academic activity vs. F2F academic activity.**

| Research Questions | Median (IQR) |
|---|---|
| ***1. Comparative level of interaction*** | |
| a) Online Didactic lectures are more interactive as compared to F2F Didactic lectures. | 4 (3-4) |
| b) Online teaching is able to engage me better for study as compared to F2F teaching. | 4 (3-4) |
| c) I am able to participate actively more in online teaching as compared F2F teaching. | 4 (3-4) |
| ***2. Comparative SGT(small group teaching)*** | |
| a) Online Tutorials are better as compared F2F to improve my academic performance. | 4 (3-4) |
| b) Online PBL sessions are better as compared to F2F PBL Session to improve my academic performance . | 4 (3-4) |
| c) Online Early clinical exposure (ECE)/Case base studies are better in improving my academic performance as compared F2F ECE. | 4 (3-5) |
| ***3. Comparative subject concepts*** | |
| a) Online teaching helps me to understand concepts better than F2F teaching. | 4 (3-4) |
| b) Online teaching is able to motivate me better for Self directed learning (SDL) as compared F2F learning. | 3 (2-4) |
| c) I am comfortable in clearing my doubts / queries through online teaching as compared F2F teaching. | 3 (3-4) |
| ***4. Comparative knowledge acquired*** | |
| a) Online Teaching helps to prepare myself better for examination as compared F2F Teaching. | 4 (3-5) |
| b) Online teaching helps me to feels confident in passing examination as compared to F2F teaching. | 4 (3-5) |
| c) Online teaching helps me to get better guidance from my senior's as compared to F2F teaching. | 4 (3-4) |
| ***5. Comparative Conducive Environment for learning*** | |
| a) Home environment is conducive for my learning as compared Hostel environment. | 4 (3-5) |
| b) online learning resources (Internet facilities ,PDF ) help me to improve my academic performance better than F2F learning resources (Library, teacher's availability). | 4 (3-5) |
| c) online E-classes schedule suited better for my learning as compared to F2F schedule. | 3 (3-4) |

The scale reflects the "Disagree," and for more accuracy, the interquartile range, i.e., 75th and 25th percentile, also reflects mostly between 3 and 4. The overall higher median score of 4 indicated students' perception of teaching activities through online classes was less than face-to-face classes. In Table 2, it is represented that Spearman's correlation between the questions of student's perception towards online academic activity and face-to-face (F2F) academic activities are significantly positively associated with confidence Interval 95%. Fig. 1 represents the overall scores of student's perceptions calculated in percentage between Ist & IInd year students.

**Table 2. Spearman's correlation between the questions of student's perception towards online and F2F academic activities.**

| Students Perception towards online academic activity vs F2F academic activity | Spearman's Correlation | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **A1** | **B1** | **C1** | **A2** | **B2** | **C2** | **A3** | **B3** | **C3** | **A4** | **B4** | **C4** | **A5** | **B5** | **C5** |
| a) Online Didactic lectures are more interactive as compared to F2F Didactic lectures. | 1.000 | 0.669** | 0.590** | 0.515** | 0.520** | 0.580** | 0.564** | 0.495** | 0.508** | 0.578** | 0.516** | 0.423** | 0.403** | 0.480** | 0.475** |
| b) Online teaching is able to engage me better for study as compared to F2F teaching. | ---- | 1.000 | 0.650** | .558** | 0.501** | 0.547** | 0.585** | 0.590** | 0.571** | 0.581** | 0.524** | 0.472** | 0.510** | 0.536** | 0.550** |
| c) I am able to participate actively more in online teaching as compared F2F teaching. | ---- | ---- | 1.000 | 0.517** | 0.467** | 0.470** | 0.554** | 0.544** | 0.578** | 0.531** | 0.508** | 0.424** | 0.461** | 0.524** | 0.572** |
| a) Online Tutorials are better as compared F2F to improve my academic performance . | ---- | ---- | ---- | 1.000 | 0.511** | 0.454** | 0.472** | 0.454** | 0.475** | 0.459** | 0.439** | 0.451** | 0.346** | 0.464** | 0.479** |
| b) Online PBL sessions are better as compared to F2F PBL Session to improve my academic performance . | ---- | ---- | ---- | ---- | 1.000 | 0.597** | 0.375** | 0.510** | 0.453** | 0.405** | 0.373** | 0.405** | 0.280** | 0.453** | 0.413** |
| c) Online Early Clinical Exposure (ECE)/Case base studies are better in improving my academic performance as compared F2F ECE. | ---- | ---- | ---- | ---- | ---- | 1.000 | .457** | 0.427** | 0.458** | 0.426** | 0.423** | 0.447** | 0.315** | 0.521** | 0.412** |
| a) Online teaching helps me to understand concepts better than F2F teaching. | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.565** | 0.555** | 0.604** | 0.550** | 0.460** | 0.395** | 0.495** | 0.514** |
| b) Online teaching is able to motivate me better for Self Directed Learning (SDL) as compared F2F learning. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.593** | 0.568** | 0.526** | 0.489** | 0.451** | 0.431** | 0.528** |
| c) I am comfortable in clearing my doubts / queries through online teaching as compared F2F teaching. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.488** | 0.456** | 0.464** | 0.382** | 0.429** | 0.520** |
| a) Online Teaching helps to prepare myself better for examination as compared F2F Teaching. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.760** | 0.474** | 0.477** | 0.432** | 0.550** |
| b) Online teaching helps me to feels confident in passing examination as compared to F2F teaching. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.505** | 0.401** | 0.408** | 0.522** |
| c) Online teaching helps me to get better guidance from my senior's as compared F2F teaching. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.293** | 0.401** | 0.506** |
| a) Home environment is conducive for my learning as compared Hostel environment. | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.391** | 0.395** |
| b) online learning resources (Internet facilities, PDF ) help me to improve my academic performance better than F2F learning resources (Library, teacher's availability). | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 1.000 | 0.478** |

**** Spearman's Correlation is significant at 0.01 level (2-tailed) and CI is 95%.**

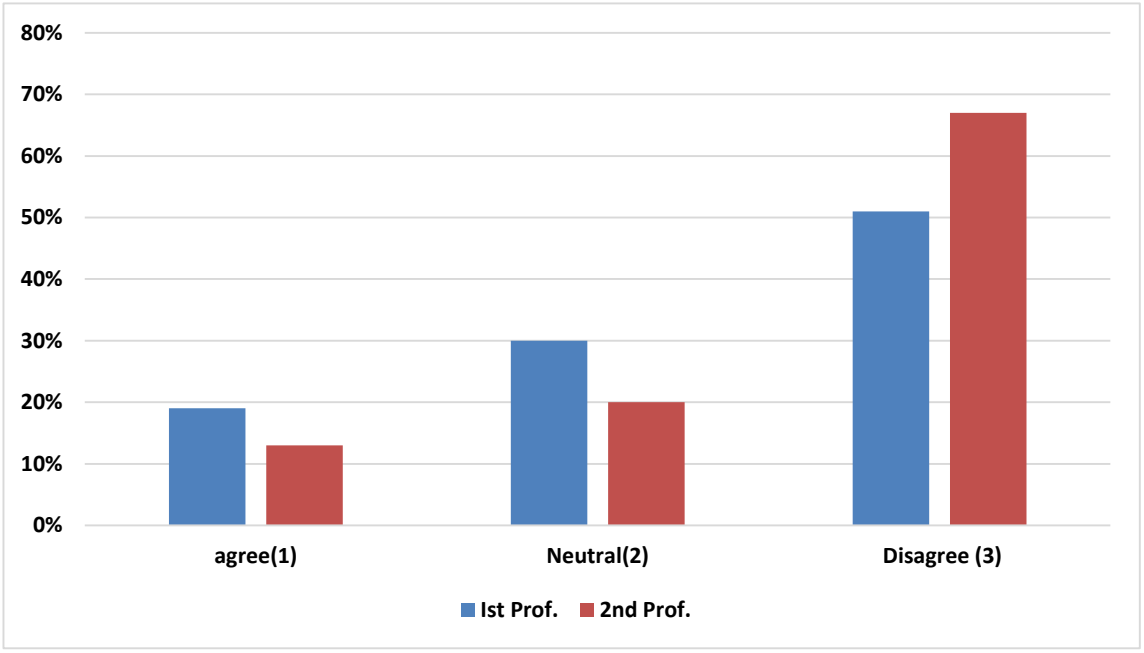


**Fig. 1. Comparitive scores for student's perception of online vs. F2F classes according to year of study.**

It is evident from the figure that the overall perception of first-year students shows that 19% agree, 30% neutral, and the remaining 51% disagree that online teaching is better than face-to-face (F2F) teaching, which indicates that their perception is more towards face-to-face (F2F) teaching. Compared to first-year students, even second-year students mostly perceive face-to-face (F2F) teaching as an effective mode compared to online teaching, which is reflected in figures with greater scores to disagree. (67%) Again, it is a sign that as your upgrade in the classes, the preference for online classes reduced.

## 4. Discussion

This study investigated undergraduate medical students' perspectives about online teaching and the relation between those perceptions and found that face-to-face (F2F) was a more interactive and useful learning resource to gain knowledge and concepts compared to online teaching.

The present study reveals the mean score close to or higher than four (on a 5-point scale) about the perception of the level of interaction, which is consistent with the study done by Faux & Black-Hughes[15] and Leasure et al.[16] This indicates that face-to-face (F2F) teaching offers better interaction as compared to online classes. The medical curriculum is designed so that a greater number of hours are attributed to small group teaching activities, so this may be why the students feel face-to-face (F2F) teaching is more interactive. As already discussed in the introduction, students and teachers are exposed to online teaching for the first time, so it may not be easy to adapt to this new teaching mode with immediate effect. As in a medical course, when students get upgraded to the higher classes, more time will be spent on clinical postings and practicals, which will help them gain the clinical skills, so the view of undergraduates might be more averse to change with expanding presentation to online-based courses.[17] In our further investigations, we did not found any significant difference in students' perception of the amount of interaction in terms of students' academic year.

Medical student's perception of SGT effectiveness through face-to-face (F2F) mode has been studied by Various researchers have studied medical student's Perception of SGT effectiveness through face-to-face (F2F) mode to foster their academic performance.[18, 19] Still, it is important to recognize if Small Group Teaching (SGT) is equally effective by online teaching mode. Our study reported a higher mean score on a 5-point scale, which reveals that student's Perception of face-to-face (F2F) SGT is better than online SGT mode to improve academic performance. We found that students' perception of understanding concepts was better through face-to-face (F2F) teaching mode than online teaching, which may be attributed to better clearance of academic queries/doubts by peers and teachers through face-to-face (F2F) mode. Our college conducts seminars, quizzes, and integrated teaching in horizontal and vertical integration as part of a curriculum that might motivate students for Self-directed learning to clear concepts. These extra-academic activities are possible mostly through face-to-face (F2F) teaching. Our study shows that the perception of students about gaining the knowledge through face-to-face (F2F) teaching is significantly more as compared to online teaching, which is similar to the results reported by Cryan et al.(2007)[20] Horspool & Yang(2010)[21] and Carrie Anne Platt et al.(2014)[22] As per our result, a student's overall perception of the face-to-face (F2F) learning environment is higher than the online environment. Before Lockdown, they are adapted to a college environment with library facilities, teachers, and seniors' guidance for the study. So, staying at home after Lockdown and attending classes online with adjusting time for study regularly might be difficult for them due to social and technical barriers, Space availability, learning resources available, distractions. The present study found a significant correlation between the perceived level of interaction and the amount of knowledge gained to clear the concepts through didactics lectures as well as Small Group Teaching (SGT) methods.

The students who perceived online & face-to-face (F2F) classes as more interactive also perceived greater knowledge gained as well as understanding the concepts better through online & face-to-face (F2F) classes; this finding is similar to the finding conducted by Carrie Anne Platt et al.[22] Davis, B. G.[23] and McKeachie, W. J.et al.[24] Our study found that the overall Perception of IInd year student's about online classes was less as compared to Ist year students. It is evident from the findings that in comparison to first-year students, second-year students are more composed and clearer in giving their perception. Secondly, as students start upgrading to higher medical education classes, students are exposed more to clinical practicals. The present study suggests that further investigations like impact on eyes of online

studies on the students, students' performance in main exams after online studies, Parents and teachers' perception on online studies, etc., are the broad areas.

***Limitations and Future Research***

Since this study has been conducted by recruiting participants from newly established single medical colleges, the sample size may not be sufficient to generalize our findings of students' perception of online classes to other institutes. Another limitation of the study is that we have not investigated the impact of students' online classes' perception on academic performance as perception might be subjective.

## 5. Conclusion

The study was conducted in a Pandemic time where Medical education was forced to shift to online teaching. The results indicated that the student's perception of online teaching mode is negative. From a small study, it is very well evidence that online teaching helps students to gain knowledge and engage them in studying to some extent. Still, it is not able to enjoy online teaching as compared to face-to-face (F2F) teaching. Still, online teaching methods can be used as an additional tool instead of replacing it with face-to-face (F2F) classes, particularly in medical education, to develop a hybrid curriculum. New instructive techniques are constantly valued and, from various perspectives, can furnish better commitment contrasted and customary education.

## Conflict of Interest

The authors declared that there is no conflict of interest.

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