

Comparative Study of Online and Face to Face Instructions

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Abstract

The study highlights several key findings regarding the differences in students' perceptions between face-to-face (F2F) and online learning methods, using course experience questionnaires (CEQ) and online course experience questionnaires (OCEQ). Here's a breakdown of the findings and implications: The study found significant differences in several factors between F2F and online learning methods. These include the total score of the questionnaire, the factor of good teaching (GT), the factor of clear goals (CG), and the factor of appropriate assessment (AA). These differences indicate that students perceive distinct qualities and effectiveness in these aspects depending on the learning method. The lack of social interaction in online learning compared to F2F settings is suggested as a potential reason for these differences. According to constructionist theory, social interaction plays a crucial role in learning, potentially explaining why students rate factors like good teaching, clear goals, and appropriate assessment differently in online contexts. Interestingly, the study found that the factor of emphasis on independence did not show significant differences between F2F and online learning methods. This contrasts with previous research findings, which might be due to the increasing flexibility and adaptability of blended learning approaches where both F2F and online components are integrated. In summary, while online learning has become a prominent alternative due to the pandemic, this study underscores the importance of understanding and addressing the differences in students' perceptions and experiences between online and face-to-face learning environments.

Keywords: Course Experience Questionnaire, Good Teaching, Appropriate Assessment.

Introduction

"The digital age has revolutionized the education landscape" (Sadaf et al., 2024). The transition from face-to-face (F2F) learning to online learning during the COVID-19 lockdowns has indeed been a significant shift in education. Online learning offers advantages such as flexibility in time and location, which can be beneficial for students managing various commitments. However, it has also been noted in previous studies that online learning may have drawbacks compared to traditional face-to-face methods. One of the main concerns highlighted in research is the potential negative impact on academic performance and mental health for students engaged in online learning compared to those in face-to-face settings. This issue has spurred considerable investigation among educators and psychologists aiming to enhance students' learning experiences under these new circumstances. To address these challenges, ongoing research focuses on

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identifying effective strategies and best practices for online learning. This includes optimizing digital learning environments, providing adequate support structures for students, and developing methods to foster engagement and interaction in virtual settings.

Additionally, efforts are being made to understand and mitigate the factors contributing to any negative effects on academic performance and mental well-being associated with online learning. As the educational landscape continues to evolve, further studies and innovations will likely play a crucial role in refining online learning methodologies and ensuring they provide an effective alternative or complement to traditional face-to-face education. This ongoing exploration is essential for improving overall student outcomes in both virtual and physical learning environments. In recent years, the landscape of education has undergone a significant transformation with the advent and widespread adoption of online instructional methods (Jalbani et al., 2023; Maitelo et al., 2023). This shift has sparked a growing interest in comparing the effectiveness of online learning versus traditional face-to-face instruction. Understanding the strengths and limitations of each approach is crucial for educators, policymakers, and stakeholders in shaping future educational strategies (Kissau, 2015; Money Penny & Aldrich, 2016).

This paper is organized as follows: first, the researchers reviewed the existing literature on online learning and face-to-face instruction, highlighting key findings and debates. Next, she presented the methodology employed in this comparative study, including the criteria used for evaluation and the research design. Subsequently, the researcher analyzed and compared the findings from both instructional modes, focusing on learning outcomes, student satisfaction, engagement levels, and other relevant factors. Finally, she discussed the implications of our findings for educational practice and offered recommendations for future research in this evolving field. By systematically examining the strengths and weaknesses of online and face-to-face instruction, this study contributes to a deeper understanding of how best to harness these methods to enhance educational experiences and outcomes in the 21st century.

Research Objectives

- This study aims to critically examine and compare the outcomes, experiences, and effectiveness of online instruction and face-to-face teaching across various educational settings.
- By exploring these two distinct modes of instruction, we seek to provide insights into their respective impacts on learning outcomes, student engagement, and overall educational experiences.
- The purpose of this research is basically to analyze the impact of online and face-to-face instructions on students.
- This research is experimental, and the researchers will provide evidence by collecting data about the effect of online and face-to-face instructions.
- This study revolves around the state objective of which of them has a positive impact on students, whether they receive online or face-to-face instruction.

Significance of the Study

The importance of this comparative study lies in its potential to inform decision-making in educational practices and policy. As educational institutions increasingly adopt online learning platforms, it becomes imperative to evaluate how these digital environments compare to traditional classroom settings. Moreover, understanding the unique advantages and challenges of each

approach can help educators optimize their teaching methods to meet the needs of diverse student populations better.

Literature Review

First of all, Warschauer (1995) compared face to face and electronic discussion in the second language classroom setting. Liu (2007) comparatively studied the learning styles between online and traditional learners and find no significance difference between the results. Gulacar et al. (2013) comparatively analyzed face to face and online methods in the chemistry course. The results revealed that online learning is better than traditional face to face method of learning. Saleh et al. (2013) comparatively investigated effect of online and face to face instructional methods in pathophysiology class and exposed that online teaching is better than traditional face to face method. Sezer et al. (2017) analyzed both types of methods in computer education through experimental research through pretest and posttest. The results showed no significant difference between the scores of both groups.

Bourzgui, et al. (2020) comparatively analyzed online and face to face learning methods in the perceptive of dental educational setting. The research population was the second year students of dental education class and the one hundred and forty-one students were selected as research sample. The questionnaire was used as a research tool for data collection. The results revealed that online learning can provide better results if it is used together with face to face learning. The results suggested both methods should be used together for better results.

Mendoza-Diaz et al. (2020) through a comparative research study analyzed the face to face and online classes in management technology program. The study makes comparison of learners' anticipations, insights, and grades in two courses of management technology. This research was conducted at university level in USA and the population of the study was the undergraduates of this university. The two different courses were taught in different ways. The results revealed that online teaching is better than face to face traditional method.

Saleem et al. (2021) conducted research for the purpose of making investigation and comparison between traditional and online teaching methods for the purpose to judge that which method is more effective in ESL classroom. Moreover, through this study, the researchers make an effort to explore the challenges which ESL teachers often face while employing these methods. The entire population of this study comprises ESL teachers of Pakistan and the sample size was selected the 20 ESL teachers. These ESL teachers were teaching undergraduate level students. For this study interviews and questionnaires were used as a research instrument. The questionnaires were evaluated in descriptive way while interviews were evaluated in thematic way. The results indicated that ESL teachers were unsatisfied with online teaching and were contented with traditional style of face to face teaching method.

Paul and Jefferson (2019). A comparative analysis of student performance in an online vs. face-to-face environmental science course from 2009 to 2016. Stauss et al. (2018). Comparing the effectiveness of an online human diversity course to face-to-face instruction. Stanchevici and Siczek (2019) performance, interaction, and satisfaction of graduate EAP students in a face-to-face and an online class: A comparative analysis. But there is no significance research which is done on face to face and online instruction in Pakistani setting. Therefore, the researchers find this gap and make an effort to fill this gap by using following material and methods.

Conceptual Framework

Challenges and Barriers

Technological Infrastructure

1. Explore issues related to access to technology and the digital divide.
2. Discuss the role of institutional support in mitigating these challenges.

Social Interaction

1. Examine the impact of reduced face-to-face interaction on social learning and peer relationships.
2. Compare strategies for fostering a sense of community in online environments.

Teacher Training and Support

1. Evaluate the importance of teacher training in adopting online pedagogies.
2. Review studies on faculty perceptions and readiness for online teaching.

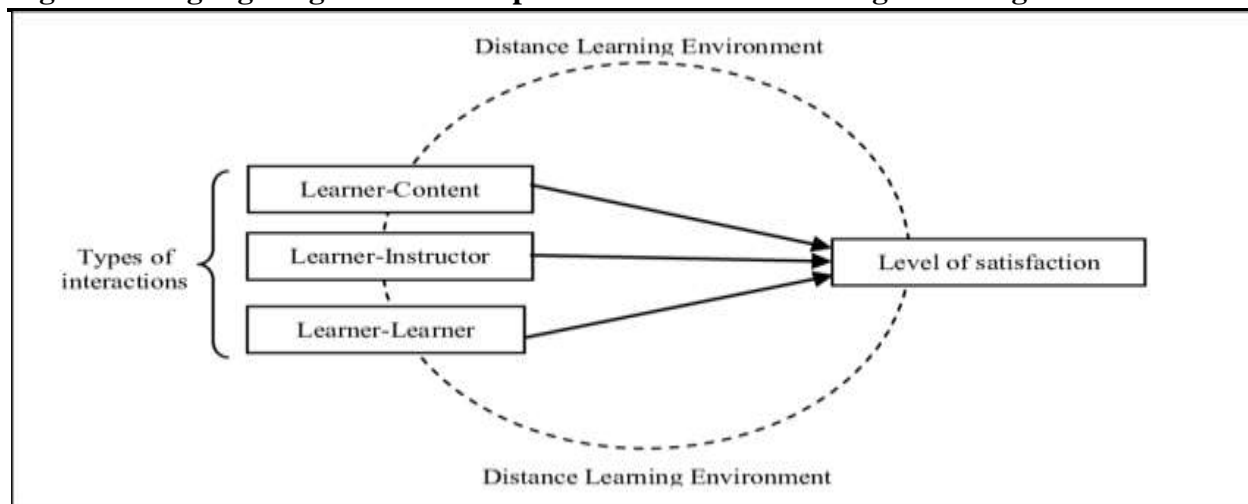
Student Preferences and Satisfaction

1. Summarize findings on student preferences for online vs. face-to-face instruction.
2. Discuss satisfaction levels and factors influencing preferences (e.g., flexibility, convenience, personalization).

Emerging Trends and Innovations

1. Highlight recent developments in online learning technologies (e.g., virtual reality, AI-driven tutoring systems).

Figure 1: Highlighting recent developments in distance learning technologies



Source: https://www.researchgate.net/figure/The-conceptual-framework-of-the-study_fig1_276929272

Theoretical Framework

For discuss their potential impact on bridging the gap between online and face-to-face instruction. This paper investigates students' overall learning experience in F2F and online learning. In this study a survey called the Course Experience Questionnaire (CEQ), designed based on a theory framework is used. CEQ is one of the most typical and widespread instruments used to investigate

university students' evaluation of teaching quality. Compared with other indicators measuring the difference between F2F and online learning, such as academic performance, learning motivation and well-being, the learning experience is a comprehended indicator with six aspects. The learning experience is more suitable to measure pedagogical characteristics and inspire instructors to improve the teaching process. It measures five aspects of High school: clear goals and standards (CG), generic skills (GS), emphasis on independence(IN), good teaching(GT), appropriate workload(AW), and assessments (AA) focusing on students' understanding of course contents. CEQ is originally from and widely used in the Western context. Early in 2016, Yin et al. translated the CEQ into Chinese version and used it to investigate the relationship between learning experience and course satisfaction. The result indicated that CEQ is a valid instrument for investigating students' perceived teaching quality in Chinese universities. Yin et al. modified CEQ to Online Course Experience Questionnaire (OCEQ) to adopt CEQ as a measure of online learning experience, which has been proven to have acceptable reliability and validity. Yin has adopted OCEQ to explore students' engagement and learning experience. This study would adopt CEQ to investigate students' F2F learning experience and OCEQ to investigate students' online learning experience. Based on the various differences between the two learning methods found in previous studies, the present study supposes there should be significant differences in learning experience regarding the six factors between online and F2F learning.

Figure 2: Domains of CEQ overall score

Characteristics	Own capacity		Professional support		Perceived safety		Participation		CEQ score	
	x	p-value	x	p-value	x	p-value	x	p-value	x	p-value
Age										
18 to 30 years	2.28	0.158 ^a	1.70	0.394 ^a	2.60	0.004 ^a	2.57	0.276 ^a	2.27	0.533 ^a
31 years and more	2.19		1.60		2.75		2.45		2.25	
Education										
with secondary and primary school education	2.27	0.428 ^a	1.69	0.614 ^a	2.61	0.099 ^a	2.60	0.233 ^a	2.28	0.585 ^a
with university education	2.22		1.64		2.69		2.46		2.52	
Mode of delivery										
spontaneous vaginal delivery	2.23	0.437 ^a	1.59	0.002 ^a	2.70	0.006 ^a	2.43	0.001 ^a	2.23	0.020 ^a
operative (Instrumental vaginal delivery and Cesarean delivery)	2.28		2.00		2.52		2.91		2.37	
Gestational week										
until 37 th week	2.22	0.563 ^b	1.62	0.940 ^b	2.62	0.626 ^b	2.70	0.148 ^b	2.26	0.763 ^b
38 th -40 th weeks	2.23		1.67		2.68		2.44		2.25	
41 th week and more	2.30		1.68		2.64		2.61		2.30	
Labor duration										
less than 12 hours	2.21	0.034 ^a	1.64	0.462 ^a	2.67	0.474 ^a	2.53	0.826 ^a	2.25	0.276 ^a
more than 12 hours	2.36		1.74		2.62		2.49		2.31	
Oxytocin augmentation during labor										
yes	2.25	0.641 ^a	1.67	0.892 ^a	2.65	0.715 ^a	2.58	0.372 ^a	2.27	0.624 ^a
no	2.24		1.65		2.67		2.47		2.25	
Maternal childbirth injuries										
no	2.34	0.091 ^b	1.66	0.285 ^b	2.62	0.024 ^b	2.46	0.000 ^b	2.27	0.650 ^b
episiotomy, perineal rupture	2.22		1.62		2.51		2.37		2.25	
caesarean – section wound	2.14		1.88		2.71		3.10		2.31	

Source: https://www.researchgate.net/figure/Domains-of-CEQ-overall-score-of-CEQ-and-its-related-variables-n-161_tbl1_356838326

Research Methodology

“Research methodology is the part of the research study in which researchers give an account of the research methods, which they have used to conduct their research”(Ahmad et al., 2024, p.402). In addition, it performs significant role in research therefore, its unjust to disregard its role,

furthermore, there is no possibility to conduct any kind of research deprived of using research methodology (Abbas, 2016; Rao et al., 2023; Ahmad et al, 2023).

Research Population

“The population is defined as a set of individuals, data, or items from which a statistical sample is taken” (Younus et al. 2023, p.3). This study used college students as participants. Since middle and high school students tend to have purely traditional F2F learning in 1 Private School; and choose college students as participants in 1 college from the lower Punjab city of Rahim Yar Khan, Pakistan. The researcher published the study issue on social media using the Wenjuanxing platform and invited different schools and colleges students to participate in this study. The interested people would direct message the researcher and the researcher would send them a link to the secure online questionnaire.

Research Sampling

“Sampling is the process of selecting individuals who participate in the research study” (Rasheed et al. 2024). All of them are different schools and colleges students and have both F2F and online learning in the last three months. Fifty of the students are males and fifty of the students are females. Their age ranged from 12 to 23 years.

Table 1: CEQ Credibility/Expectancy Questionnaire Sampling Chart

50 Students	National Garrison School, RYK
50 Students	Kips College, RYK

A total of 100 participants joined the study voluntarily and filled in the online questionnaire. One hundred students entered the Wenjuanxing platform's questionnaire webpage, and all completed and uploaded the questionnaire. Therefore, this study analyzed 100 valid data.

Research Design

“A design is a general strategy to conduct a research study” (Rasheed et al., 2024, p.692). Research design displays the basic structure and objectives of the research study (Rasheed et al., 2021 Abbas et al, 2024). The questionnaire had two sections: demographic information and course experience questionnaire investigating students' online or F2F learning experience. The online questionnaire based on demographic information of participants like name, age, and academic level was included in the questionnaire. The present study used the Chinese version of the 30-item CEQ Credibility/Expectancy Questionnaire the questionnaire has six factors: clear goals and standards (CG, five items), generic skills (GS, five items), emphasis on independence (IN, six items), good teaching (GT, five items), appropriate workload (AW, five items) and appropriate assessment (AA, five items). The OCEQ has six factors but and same items as in CEQ. All the items on both CEQ and OCEQ are scored on a 5-point Likert Scale: Strongly disagree, Agree, Neutral, Strongly Disagree, Agree. CG refers to students having a clear goal on what they need to learn and knowing how the knowledge would be assessed. GS refers to the transferable and practical skills students learn from the class, including but not limited to analyzing problems, teamwork, and communication. IN refers to the flexibility and independence in how to accomplish the course. GT refers to the perceived teaching quality of the instructor. AW refers to the workload of accomplishing the course. AA refers to the student's evaluation of the property of the assessment.

Reliability

Furthermore, reliability of instruments was calculated in SPSS -27 by Cronbach's alpha technique which was as follow.

Table 2: Reliability Statistics

Cronbach's Alpha CEQ	Cronbach's Alpha Based on Standardized Items of OCEQ	No. of Items
.969	.965	30

Above table shows the reliability statistics of research tools. Reliability of research instruments was 0.965 for OCEQ, and 0.969 for CEQ, which is higher than OCEQ, through Cronbach's alpha technique which is considered good. This study compared the average scores among six factors and the total score of learning experience. One group of IN ($W=.96$, $p<.001$) by using Wilcoxon signed rank in the group normally distributed. While other group compared by t-test.

Data Analysis

Online questionnaires collected data from the 100 voluntary participants and analyzed by SPSS. In this study, the independent variable is the two learning methods and the dependent variable is the different factors of learning experience measured by CEQ and OCEQ. The second analysis is an independent t-test investigating whether there is a significant difference in six factors (CG, GS, IN, GT, AW, AA) and the total score. The coefficient of Cronbach's alpha detects the internal consistency and accuracy of the questionnaire.

Research Findings

T Note. (GT-good teaching, GS-general skills, CG-clear goals, AW-appreciate workload, AA appreciate assessment, IN-emphasis on independence).

Table 3: Descriptive Data for Average Learning Experience Total Score and the Scores among Six Factors between F2F Learning and Online Learning

	Number	Mean	SD	S E
GT-F2F-A	100	177.5357	10.40827	1.96698
GT-Online A	100	182.2963	12.23430	2.35449
GS-F2F-A	100	184.0000	11.92605	2.29517
GS-Online A	100	379.6429	20.27992	3.83254
CG-F2F-A	100	2.412	0.416	0.041
CG-Online A	100	2.276	0.334	0.026
AW-F2F-A	100	12.8148	1.84051	.35421
AW-Online A	100	12.2857	1.30120	.24590
AA-F2F-A	100	52.1786	4.05566	.76645
AA-Online A	100	53.5926	3.96387	.76285
IN-F2F-A	100	12.5714	1.61998	.30615
IN-Online A	100	13.2963	1.79347	.34515
Total-F2F-A	100	5.63	.724	.094
Total-Online-A	100	7.50	.434	.093

(GT-good teaching, GS-general skills, CG-clear goals, AW-appreciate workload, AA appreciate assessment, IN-emphasis on independence).

In the table 3 a significance difference can be seen between the factors of the emphasis on good teaching (GT) between F2F learning (M=177.5, SD=10.4, SE=1.9) and online learning (M=182.2, SD=12.23, SE=2.35) from Wilcoxon signed-rank test.

General Skills (GS) difference between F2F learning (M=184.00, SD=11.92, SE=2.29) and online learning (M=379.64, SD=20.27, SE=3.83) from Wilcoxon signed-rank test.

Clear Goal (CG) difference between F2F learning (M=2.412, SD=0.416, SE=0.041) and online learning (M=2.276, SD=0.334, SE=.026) from Wilcoxon signed-rank test.

Appreciate Workload (AW) difference between F2F learning (M=12.8148, SD=1.84051, SE=.35421) and online learning (M=12.2857, SD=1.30120, SE=.24590) from Wilcoxon signed-rank test.

Appreciate Assessment (AA) difference between F2F learning (M=52.1786, SD=4.05566, SE=.76645) and online learning (M=13.2963, SD=1.79347, SE=.34515) from Wilcoxon signed-rank test.

A significance difference can be seen between the factors of the emphasis on independence (IN) between F2F learning (M=12.5, SD=1.6, SE=0.03) and online learning (M=13.2, SD=1.79, SE=.034) from Wilcoxon signed-rank test.

Total F2F-A learning (M=5.63, SD=.724, SE=.094) and online learning (M=7.50, SD=.434, SE=.093) from Wilcoxon signed-rank test.

Table 4: Paired Samples T-Test for GT, GS, CG, AW, AA and the total score of F2F and online learning

F2F Learning & Online Learning	T. Test	DF	Probability
GT-F2F-A	1.552	51.024	.127
GT- Online A	1.556	53	.126
GS-F2F-A	43.403	53	.000
GS- Online A	43.795	43.967	.000
AW-F2F-A	1.235	53	.222
AW- Online A	1.227	46.664	.226
AA-F2F-A	1.308	52.989	.197
AA- Online A	1.307	53	.197
IN-F2F-A	1.574	52.006	.122
IN- Online A	1.574	53	.121
Total -F2F-A	34.1429	2.57789	.48717
Total - Online A	35.1852	2.90936	.55991

Paired samples total scores of F2F and Online learning t. test for GT,GS,CG,AW,AA and IN are shown a In Good Teaching(GT) there is not too much difference as the figures show, F2F and Online learning GT-F2F-A(t. test 1.552,DF 51.024, P .127)and GT- Online A(t. test 1.556,DF 53, P .126) learning from online.

In General Skills General Skills (GS) difference between F2F learning (T. Test=43.403, DF=53, P=.000) and online learning (T. Test=43.795, DF=43.967, P=.000) from Wilcoxon signed-rank test.

In Appreciate Workload (AW) difference between F2F learning (T. Test=1.235, DF=53, P=.222) and online learning (T. Test=1.227, DF=46.664, P=.226) from Wilcoxon signed-rank test.

In Appreciate Assessment, (AA) difference between F2F learning (T. Test=1.308, DF=52.989, P=.197) and online learning (T. Test=1.307, DF=53, P=.197) from Wilcoxon signed-rank test.

In emphasis on independence) (IN) difference between F2F learning (T. Test=1.574, DF=52.006,P=.122) and online learning(T. Test=1.574, DF=53,P=.121)from Wilcoxon signed-rank test.

Total F2F results are (t. test 34.1429, DF 2.57789, P .48717) and the total online results are (t. test 35.1852, DF 2.90936, P .55991).

Discussion

According the results of table 3 Total F2F-A learning (M=5.63, SD=.724,SE=.094) and online learning(M=7.50,SD=.434,SE=.093) from Wilcoxon signed-rank test are shown that F2F mean is 5.63 and online mean is 7.50 which is greater than F2F but in SD online learning shows the weaknesses of the students and in SE there is no too much difference between the figures.

Paired samples' total scores of F2F and Online learning t. test for GT,GS,CG,AW,AA and IN are Total F2F results are (t. test 34.1429,DF 2.57789, P .48717)and the total Online results are (t. test 35.1852,DF 2.90936, P .55991) T. Test total score F2F is 34.1429 and online 35.1852, DF total score F2F is2.57789 and online 2.90936 and in P too students priorities towards online are a little more than F2F.

These results bring new changes that are opposite to traditional learning. Though there is not a big difference but learners' priorities for online learning are in the initial stage. These results show the new generations' previous liking or trend towards online learning. The result identifies that when the course prioritizes conceptual knowledge and the skills for applying the knowledge, students prefer F2F learning. No doubt both these methods improve learners' skills but they need to improve in many ways.

Conclusion

In conclusion, this study uses an online survey to collect quantitative data on students' learning experiences and compare whether there is a difference in learning experience between F2F learning and online learning. The result shows that the difference between the two learning methods is significant and some measures could be taken to improve students' online learning experience from various factors. The trend of the new generation towards online learning is good but F2F learning has its benefits which can't be ignored. The result suggested that the course designer increase the class student-instructor and student-student interactivity in online lessons to let students perceive higher teaching quality. In the meantime, instructors could communicate more with students to ensure that students have a clear goal during the learning process and are happy with the assessment. Meanwhile, the proper combination of F2F and online learning is worth further exploring.

Recommendations

- As the lack of interaction is one of the crucial differences between online and F2F learning, further study could do a mediating analysis to investigate whether social interaction is a mediating factor between learning methods and learning experience.
- Second, adolescents of different ages and stages tend to have different levels of adaptability and cognitive abilities, so it is suggested to repeat this study among both high school and primary school students.

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