



## Research Article

# Student performance evaluation between offline and online pedagogy: A critical analysis with possible suggestions

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## ABSTRACT

This study develops a literature review and thereby critically analyses the student performance under online and offline teaching platforms. Online education has much popularity as the leading education instruction mostly during the outburst of COVID-19 pandemic. As a result, as of now different institutes in different countries provide education to the students through online pedagogy. For comparative review analysis, the researcher critically analyzed the current and related published papers in top indexed journals of ISIWOS & SCOPUS. Overall, the review analysis suggests combining online based teaching with current teaching trend and thereby employ the privileges of digital learning to explore teaching tactics for the stated learning effectiveness. In particular, the existing relevant literature guides us that the student performance of online pedagogy is significantly better than that of face-to-face platform. So, the medium of education can affect the student satisfaction that can eventually affect overall performance. Thus, the online academic process must be planned and executed with proper care. Thus, this study substantially promotes to profoundly reconsidering and modifying the underlying propositions of online pedagogy; and thereby design the decision of effective teaching pedagogy.

**Keywords:** *Teaching Pedagogy; Online Teaching; Face-to-Face Teaching; Student Performance*

## 1. INTRODUCTION

The online teaching platform has been notably exploring for the demand of the time. Even it has now raised a solid question if it has surpassed offline pedagogy in terms of better outcome from the students. What boosted the progress of online platforms even more is the new crisis that the entire world has severely faced by systematic effect of Covid-19 epidemic. We find that Covid-19 is one of the fatal known virus which has already taken a number of human lives around the globe; and for this virus infection, the world has lost its normal life severely for a long time. Hence, the COVID-19 contagion is instigating tremendous health, social, educational and economic crisis around the world. So, due to the COVID-19 crisis, e-learning has recently become the prime medium and mandatory part of all categories of educational institutions (Radha et al., 2020). As a result, online education platforms went from an experiment to the inelastic necessity. The reason is that in the modern society when intelligent mobile devices become popular, the internet breaks through the restrictions on time and space and becomes a ubiquitous

learning tool (Lin and Chen, 2017). Therefore, it is important to examine and thereby provide a clear reflection of what the students have achieved from online platforms and how it has become more popular relative to counterpart teaching pedagogy.

It is critically analyzed that there is still a continuing debate and academic issue while reflecting the online teaching pedagogy. In addition, hardly any existing literature guides us evidently about the performance of student assessment under offline versus online pedagogy. In this context, Radha et al., (2020); Bryson and Andres (2020) find that there is generally a positive thought among students about online learning and its stated outcome. In the future, this e-learning module might turn out to be an unavoidable option in higher education. This is because there is also a great interest and on rise use of these e-learning programs for academic use; however, a few numbers among them are not enthusiastic about e-learning. Similarly, Lin and Chen (2017) remark that online teaching platform presents better positive effect on learning intrinsic drive and academic performance than traditional teaching does. Therefore, in light of the realistic propositions, we consider that online teaching pedagogy requires further investigation with real testbed in cross-regions perspective; and thereby recheck if student performance of online platform becomes significantly better in comparison to its counterpart off-line teaching method.

It is reviewed that the existing literature is not adequate to identify clearly which teaching platform might confirm better student performance. Undoubtedly, only the real efforts put by the students can attain a significant performance in the online platforms as well as in the offline platforms. Both the platforms have their own advantages and drawbacks on student performance. In general, interesting and interacting teaching can enhance the performance of students in both the platforms. Thus, there is no strong evidence that is one reliable and sufficient platform of being better than other available ones. So, the primary objective of this study is to prepare a descriptive literature on comparative student performance analysis under online versus offline teaching platforms. To know about the performance of students in both platforms, we first need to find an appropriate criterion that will allow us to properly execute the integrated task. A proper way of evaluating student educational performance is the student completion rates of course materials. To the contrary, Lin & Chen (2017) failed to identify statistically significant evidence that online versus offline learning could be a factor that influences a student's completion of coursework. Other researchers discovered that performance of students takes a deteriorating turn in online classes (Trawick et al., 2010), while some researchers even find that learning quality improves in an online format. In addition, Washburn et al., (2004) identify that there is absolutely no difference in performance, yet significant differences in satisfaction & motivation of the students. In this regard, it is also argued that student learning was deduced by using the student grades during the end of the course (Brown & Liedholm, 2002). So, it is important to empirically examine if student performance of online pedagogy is significantly better than that of face-to-face platform.

To address the research issue, at first, for developing the review analysis, we went through the works and findings of recent and relevant papers published in the leading indexed journals (Appendix-1). The review analysis suggests to combine online teaching with

current teaching trend and also execute the benefits of online learning to develop practicable teaching tactics for achieving teaching effectiveness. Then, we reviewed the empirical analysis from the existing scholarly works; and the overall, the overall analysis documents that the regression coefficients of student performances of online pedagogy are positive and significantly higher than those of offline platform. Hence, the medium of education can affect the student satisfaction that can eventually affect their performance. Therefore, *ceteris paribus*, regarding the debate and impacts of online versus traditional learning systems on student performance, our findings document that the student performance under online teaching pedagogy is better than that of counterpart off-line teaching platform. The possible explanation is that with technological development, learners now want best practices; and the emergence of online education has made it possible to get a quality education for students with busy lives and limited versatility. In addition, web-based education has provided the opportunity to integrate classes worldwide through a single internet link, as opposed to conventional classroom teaching; and student's thirst for knowledge has got overall better benefits for online platforms (Basilaia & Kvavadze, 2020).

We arrange rest of the study in following sections: section 2 describes a relevant literature review for hypothesis development. Then section 3 addresses the study methodology. After that, section 4 provides analysis with implications and suggestions. Finally, the study is wrap up with the conclusion of the study.

## **2. LITERATURE REVIEW AND HYPOTHESIS**

In earlier section, it is noted that with the pace of time and advancement of technology, the teaching platform has been influenced and updated. The traditional teaching isn't the only platform rather than the students are engaged in online teaching and learning platforms. According to Kattoua et al., (2016), academic institutions are making significant investments in e-learning systems because of the exponential growth of internet technology, to sustain their conventional teaching and to improve the learning experience and success of their students for the demand of the time. According to Kebritchi et al., (2017) online education shifts all elements of teaching and learning particularly in higher education. Regarding the problems in the delivery of online courses, the authors argued that some students are facing concentration & device issues in online classes, some of them severely face financial constraints, and therefore are not able to expose their best performance. Instead, teachers are trying their heart and soul to make the teaching procedure more interesting in online platforms. Sometimes the lecturer conveys expertise to learners in conventional teaching with no feedback from those learners (Crosby 2000). The move to less conventional classes, however, coincided with a greater emphasis on more student-centered learning, with the lecturer fostering or guiding the learning of the students instead of simply delivering knowledge (Balluerka et al., 2008).

In the existing literature, a good number of prior scholarly works compared the efficacy of online versus conventional instruction. For instance, Metzler et al., (2021) remark that the students notably showed higher satisfaction using the online platform relative to

counterpart pedagogy. To the contrary, some studies support traditional teaching in the classroom, claiming that online students will quit more easily and online learning can lack feedback for both students and teachers. Teachers may not get proper response and interactions in the e-learning platforms. Student retention, satisfaction, and success may be affected due to these deficiencies. According to Ouellette et al., (2006) distance learning also has its apologists, identifying that great number of students who response more as well perform better in their traditional classroom peers than online education. The authors argued that in conventional class teaching, insufficient pre-class research planning, restricted engagement in class activities, and inadequate discussion depth are typical phenomena; similarly, certain issues in online teaching should not be ignored. The faculties have less influence over online teaching compared to conventional in-person lectures, and students are likely to ignore the classes indeed.

We understand that the estimated efficiency level of differing teaching platforms is measured in terms of the scores accomplished, the students' perception regarding how much they learned in the course, and the students' level of satisfaction upon completion of the course. In this respect, the study of Singh et al., (2012) conclude that students taking the online format of a course are more efficient than their offline counterparts. Moreover, the results of the study found a difference in the efficiency while considering the number of hours spent in study as an indicator of performance. The final grade of students, intrinsic motivation and overall satisfaction with the course also increased in an online format. Similarly, Pei and Wu (2019) mentioned that online learning has advantage to explore undergraduate's knowledge and skill in comparison to offline learning, and online learning might be judged as a potential approach in undergraduate medical learning pedagogy. Likewise, Lin and Chen (2017) found evidence that there is a better positive effect provided by digital teaching on learning motivation than traditional teaching does. They mentioned online learning system shows better positive effect on integrated learning outcomes than that of conventional teaching. These findings are also directly supported by Nortvig et al., (2018); Molise & Dube 2020; Basilaia & Kvavadze 2020).

By interrupting our daily lives in recent history, the COVID-19 pandemic is instigating tremendous human and economic crisis around the world. The online teaching platform has got its highest peak because of it. There is nothing like face-to-face experiences and participation in the classroom by exchanging new ideas and brainstorming sessions. As of now, teachers work regularly through virtual classes to adapt and make learning enjoyable, efficient and imperative (Muthuprasad et al., 2020). We review that students, however, were not fully happy with this online learning process. It is the best way to guide the students or provide the study material to the students if the situation is not managed until that time (Bao, 2020). Despite the tremendous advancement of e-learning in education and its perceived advantages, if participants are inclined not to embrace and use the method, the usefulness of such tools will not be effective. Therefore, in order to improve the learning experience of students, it has become important for practitioners and policy makers to consider the factors influencing consumer adoption of web-based learning systems (Tarhini et al., 2014). Hence, for the demand of the time, the conventional offline learning system in real classroom is dramatically changed to face-to-screen

processes in internet-based classrooms. However, the finding of Paul and Jefferson (2020) contradict that 63 percent of the IT-savvy Generation Z participants expressed a desire for the classroom environment, 28 percent for self-study, and just 9 percent expressed an interest in the virtual class.

We find that continuous developments in the modern era in technology have made online education simpler and popular. According to Cojocariu and Boghian (2014), most terms such as online learning, open learning, web-based learning, computer-mediated learning, blended learning, m-learning etc. have in common the ability to use a device with internet connection that offers the possibility to acquire knowledge from anywhere, anytime, and any means. One can deem online learning as a technical tool that makes the teaching-learning process more student-centered, innovative, and even more flexible. In online environments, students can learn and interact with instructors and other students independently from anywhere (AlAzzam et al., 2021; Singh and Thurman, 2019; Currie-Mueller and Littlefield, 2018; Sarah et al., 2018). However, we analyze that student can attend live lecture sessions with real-time interaction between educator and learner, with an opportunity of continuous feedback and development.

We review that many institutions face various problems when conducting online classes. Slow technological advancement is the biggest reason for this problem. In this respect, Dhawan (2020) shows that the most frequent problem faced in online learning is network instability (39.16%); the concerned stakeholders cannot take/participate classes when wi-fi is not connected. The second most frequent complaint involved unilateral interaction with a response rate of 17.41%. Interaction is not possible and the quality of the educational environment is poor, content is not conveyed accurately, and direct interaction is not possible. The third most frequent complaint was the reduced concentration of responses (29.13%). Many students also answered that it was difficult to concentrate on class for long periods of time. In this respect, McCutcheon et al., (2015) conclude that several underlying constraints of online system are inadequate data stream, disappointment with assignment change, constraint on team project, decline academic achievement, unplanned class design, reduced class understanding, dislike the class session, grading policy, administrative dissatisfaction, dissatisfaction with relationship formation, and dissatisfaction with academic context and educational situation.

So, we analyze that various studies are conducted to assess the consequence of versatile teaching platform on student performance but the finding is inconclusive. A quasi-experimental style was used by Driscoll et al., (2012) to assess variations and differences in student performance and satisfaction across the online and face-to-face (F2F) classroom settings. The existence of a selection effect and the satisfaction of the student do not vary substantially between the two environments. Though the online learning process has no boundaries for the required resources, time for learning and it gives more freedom compared to the offline learning experience. The formation of improved online educational models' students can earn more interests in the learning experience. In this respect, Paul and Jefferson (2019) reported that an increasing number of students are now preferring online classes because they find the conventional modality of the

classroom restrictive, inflexible, and inconvenient. In terms of class level result, they found no substantial difference in student performance between online and face-to-face (F2F) learners. Similarly, Tabassum et al., (2021); Larson and Sung (2009); Cho and Cho (2014) also demonstrated the same in their research where they compared face-to-face, blended and online delivery mode stating that delivery modes have no significant impact on learners' performance.

We review that while several researchers have found that there is no considerable difference in student performance between online and offline (face-to-face) learner, few studies have shown that the performance of students varies depending on the teaching platform. Regarding the comparison of offline and online learning, Pei and Wu (2019) conclude that in comparison to offline learning, online learning has precedence to enhance students' knowledge & efficiency. Similarly, Lin and Chen (2017) remarked that the digital learning process has a positive relationship with the incentive for learning and the learning outcome. Further, Xu, Yuan, and Liu, (2020) showed that the online behavior of learners were predictors of their performance, and with the progress and modification of the courses, the predicted outcomes have become more consistent, satisfactory and reliable. Many other researchers like Biktimirov and Klassen, (2008); Ho et al, (2016); Jesus et al, (2017); Zeng et al, (2018); Shorey et al, (2018) also shared the same findings. On the other hand, Ury (2004) found that the online class had a positive impact on the effectiveness but a negative impact on student performance in the report. In addition, Helms (2014) showed that relative to their F2F equivalents, online students had significantly lower grade point averages, lacked significantly more grade opportunities, and were significantly more likely to fail the course.

As of now, we find that university students prefer purchasing e-textbooks as an alternative to traditional textbooks. Hence, Rockinson-Szapkiw et al, (2013) found that in comparison to traditional print materials and text-books, online textbooks and learning materials have more possibility for better performances by having perceived affective learning and psychomotor education systems. They also demonstrate that there was no difference in cognitive learning and grades between the two groups, suggesting that the electronic textbook is as effective for learning as the traditional textbook. Regarding the influential factors of e-learning and satisfaction level, Nortvig et al, (2018) identify that among many factors, some seem to dominate more, for instance, educator presence in online settings, interactions between students, teachers and content, and designed connections between online and offline activities. In this respect, Wang (2010) reflected that the implementation of ICT tools in blended learning significantly promotes social interaction among students and their engagement; however, it does not automatically facilitate students in their adoption of active learning strategies.

So, this study finds that a number of studies are conducted to evaluate offline & online teaching pedagogy. In a recent study, Yao et al, (2020) discussed about two online teaching methods and found that live broadcast teaching is more efficient and interaction studying process than recorded video-based study. However, Yan et al, (2020) focused on the purpose of designing a mixed online and offline teaching system; because hybrid teaching system is overcoming the shortcoming of traditional classroom teaching

system. In addition, Torres-Martín et al, (2021) find that students are not satisfied with virtual learning; because teaching staffs and students do not have enough knowledge regarding image editing, computer graphics, video editing, and tools for detecting plagiarism. Further, Fatonia et al, (2020) stated that the medical students of the UK prefer face to face teaching than online teaching as they don't feel totally prepared for their profession without doing face to face sessions for communication. Another research conducted on Bangladeshi medical students shows that 70% of the students responded that online class is not a good substitute of traditional face to face classes (Khanom et al, 2020). Similar is the study finding of Barteit et al, (2020) who argued that online learning has not reached its anticipated potential yet, because of the limited financial resources and restricted evaluation approaches. Overall, we review that student performance under online pedagogy and offline platform is inconclusive and subjective in existing literature. So, it is noticed that there is still a considerable research interest to examine the specific direction that online pedagogy is likely to provide better student performance. Therefore, considering the overall discussions, debates and indecisive findings, we finally construct the following proposition:

H<sub>A</sub>: Student performances of online pedagogy are better than those of offline platform.

### **3. RESEARCH METHODOLOGY AND DATA**

In this research paper, we primarily examine the dynamic linkage between student performance and teaching pedagogy. Considering a quali-quantitative method commonly treated as meta-literature review, we conduct a synthesis analysis on student performance and teaching pedagogy to assess various insights. Methodologically, we review the current and supportive research findings of the prominent scholarly publications of ISI Web of Science (ISI\_WOS) through bibliometric analysis coupled with content analysis (Hossain, 2021). In simple, we comprehend that a meta-analysis is supposed to be the critical review of the existing literature; and hence, it is a sequence of various analyses across multiple dimensions. Now-a-days, using a bibliometric analysis to carry out a meta-literature review is a globally accepted flourishing research technique. In this regard, this meta-literature is distinctive and unique in nature which incorporates bibliometric citation along with content assessment. In concomitant to the research stated objective, this paper conducts a quali-quantitative literature that consists of several stages and systematic sample selection approach.

In order to have a representative research sample on related and current studies, the study uses ISI Web of Knowledge mostly by penetrating in the search option 'topic', for the keywords and diverse underlying issues and relevant facts: teaching pedagogy, online teaching, face-to-face teaching, student performance, education and research institutions, and higher education & research institutions, among others. This careful and double streaming of journal and keyword have the possible advantage of restricting the focus to relevant research journals and of assuring that our sample truly comprises our research related articles. Initially, we selected 136 published articles on different issues on student performance and teaching pedagogy. We further read the title and abstract of all

articles published in the selected journals to guarantee that the sample is meticulously completed. Finally, after the screening process, we confirmed and carefully reviewed 82 recent and relevant papers. We find that the selected scholarly works are published in 18 leading and good quality journals of ISI Web of Science (ISI\_WOS). In addition, we attempted to retrieve all other relevant bibliometric information of the respective articles, such as journal name, article title, author/s, purpose, key finding, methodology, and above all possible research gap which are summarized in Appendix-1. In line with our stated research issue, Hart et al, (2019) systematically summarized the following '*Descriptive Statistics*' about the online versus offline learning outcomes and student performance:

**Table 1. Descriptive Statistics**

Model	Initial Attempt Sample		Credit Recovery Sample	
	Face-to-face	Online	Retook Face-to-face	Retook Online
<i>Performance/Outcomes</i>				
Overall CGPA (out of 4 scale)	2.983	3.108	2.841	2.992
Passed concurrent course (C or better)	0.713	0.796	0.579	0.628
Took and passed next course	0.653	0.694	0.415	0.479
Persist to expected second semester, 12th-grade year	0.721	0.768	0.650	0.769
<i>Student Features</i>				
Female	0.492	0.536	0.398	0.457
White	0.442	0.612	0.342	0.519
Black	0.221	0.149	0.309	0.200
Hispanic	0.284	0.168	0.315	0.229
Asian	0.023	0.031	0.010	0.015
Multiracial	0.024	0.033	0.019	0.030
Other race	0.006	0.008	0.005	0.007
Free or reduced-price lunch	0.480	0.360	0.613	0.445
Gifted	0.048	0.070	0.017	0.037
Limited English proficiency	0.202	0.086	0.242	0.120
Special education	0.113	0.093	0.163	0.113
<i>FCAT Eighth-Grade Score</i>				
Math	0.125	0.180	0.135	0.188
Reading	0.112	0.195	0.133	0.165
Grade 9	0.415	0.475	0.448	0.514
Grade 10	0.505	0.525	0.452	0.486
<i>School features</i>				
Percentage White	48.167	56.568	43.083	52.161
Percentage Black	22.430	18.704	25.638	19.953
Percentage Hispanic/Latino	25.491	19.966	27.760	23.373
Percentage Asian	2.583	2.918	2.413	2.940
Percentage other race	41.436	37.939	43.864	38.619
Urban	0.254	0.254	0.276	0.261
Suburban	0.592	0.552	0.592	0.608
Rural	0.150	0.192	0.127	0.129
Charter	0.031	0.029	0.022	0.032
Magnet	0.306	0.252	0.338	0.268
<i>CAT Ninth Grade Score</i>				
Math	0.107	0.132	0.108	0.113
Reading	0.087	0.128	0.104	0.137
<i>School Accountability Grade</i>				
A grade	0.274	0.361	0.201	0.335

Model	Initial Attempt Sample		Credit Recovery Sample	
	Face-to-face	Online	Retook Face-to-face	Retook Online
B grade	0.317	0.375	0.287	0.367
C grade	0.205	0.195	0.214	0.193
D grade	0.142	0.093	0.194	0.107
F grade	0.027	0.021	0.059	0.047
<i>Subject area</i>				
Mathematics	0.278	0.308	0.441	0.351
Sciences	0.313	0.378	0.219	0.250
English subject	0.219	0.228	0.223	0.241
Social studies areas	0.178	0.187	0.117	0.159
Estimated sample ratio	0.715	0.285	0.762	0.238

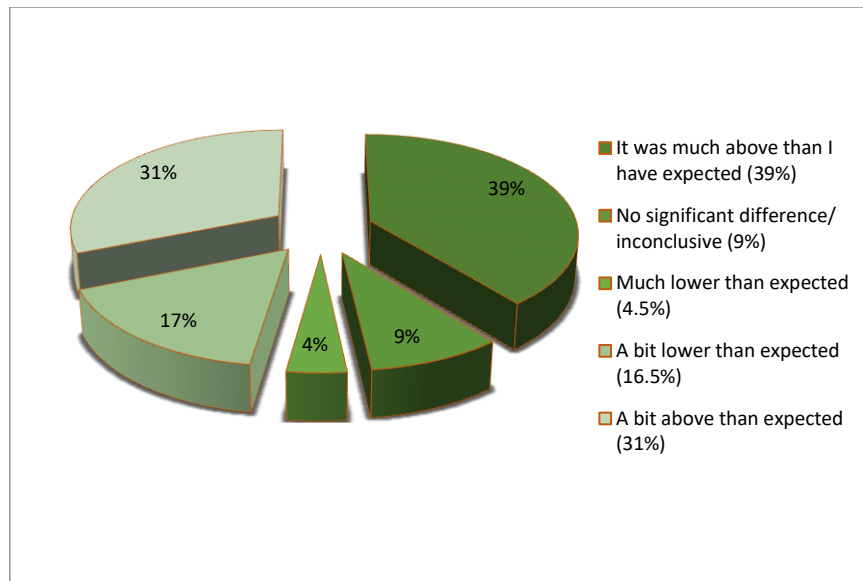
*Comparison among the outcomes of statistical analysis of first attempt sample & credit recovery sample of students who participated in offline & online educational platform. The above tabulations are based on USA Department of Education data source terminal. Binary values are presented as proportions unless noted otherwise. The credit recovery student all failed a prior attempt at the class (achieved a course average of <1.0). Here CAT indicates 'Comprehensive Achievement Test' in the context of USA.*

From the 'Descriptive Statistics' of the above Table, we identify that for the initial attempt sample result, the mean of CGPA (out of 4 scale) under online teaching pedagogy (3.108) is much higher than that of face-to-face teaching pedagogy (2.983). In the same vein, for the credit recovery sample, the mean of CGPA (out of 4 scale) under online teaching pedagogy (2.992) is much higher than that of face-to-face teaching pedagogy (2.841). This finding is consistent to all other grades under school accountability grade scale.

#### **4. INTERPRETATIONS WITH IMPLICATION & SUGGESTION**

Let us now address the analysis on possible implications and suggestions of the study. We critically review if online teaching pedagogy is likely to provide better performance than those of counterpart face-to-face platform. For that purpose, we present the findings on comparative performance between online and off-line based on existing empirical analysis. Further, we conduct an in-depth discussion to reflect the academic and practical usages of the study finding.

In line with our research issue, we conduct a robust test by a questionnaire survey from our own departmental students to examine the student performance during the online versus offline education, and the key finding is presented in the following Fig. 1. We find that out of 210 students, 39% students responded that their online performance was significantly higher than their expectation. In addition, 31% respondents claimed that their online mark was insignificantly higher than their expectation under counterpart teaching pedagogy. However, only 4.5% claimed that online mark was significantly lower than their expectation under counterpart off-line teaching pedagogy. These survey results reconfirm our hypothesis that online teaching pedagogy is likely to provide better performance than those of counterpart face-to-face platform.



**Fig. 1.** Perception about the marks during the online versus offline education

We understand that education is the integrated approach of knowledge acquisition, or learning process, acquired skill, moral value, belief, mutual respect and habit. To become an educated person, people generally attend a class, or they might depend on themselves which it is termed '*self-study*' (Mart, 2013). Along with face-to-face education medium, as of now online education has got much popularity as the leading education platform around the world. The importance of the study on this area has been augmented even more due to the COVID-19 pandemic which has forced traditional online classes to be shifted to online mediums. Hence, this study is relevant in the context of effective education pedagogy. The reason is that many studies and educational institutions are concerned with the difference between online and offline teaching platforms to find out which system is most effective in terms of learning outcome and student performance. Several studies (González-Gómez et al, 2016; Ryan et al, 2016) have compared offline teaching to online teaching to examine which format provides the highest level of contribution to student academic excellence; and they have found indecisive and inconclusive remark in their studies. It is suggested that the adoption of a flipped classroom model of blended (mixture of online and offline) learning results in higher grades when compared with those achieved by learners by following a conventional classroom setting (González-Gómez et al, 2016).

Though there is a common perception that the online teaching format produces better learning achievement among students, several studies have presented the exact controversial outcome. A notable decline in exam grade throughout the entire semester is observed for student in hybrid section of the performance of students in respectively hybrid and traditional segments of a basic psychology module (Rahman, 2021; Powers et al, 2016; Cheng and Chau, 2016). A suggested reason for this is that these students had to deal with difficult concepts independently and without sufficient explicit face-to-face teaching. Nonetheless, we analyze that the possible negative aspects of online pedagogy are technical problems, lack of face-to-face interaction and the perception that online classes seem to require more time and work. In this respect, Ryan et al, (2016) conclude

that online learning opportunities must be designed to capitalize on both technological advances, multidisciplinary knowledge about academic content, better learning and proper instruction for achieving its stated objective.

To distinguish the suitability of digital and face-to-face learning, Lin and Chen (2017) noted that courses that focus on suitability, accessibility and flexibility are suitable for digital learnings while traditional face-to-face teaching is supposed to be better for courses that required practical context. Though traditional teaching is not completely replaceable by digital learning, it could achieve the best teaching effect and make students glad to learn through reinforcing traditional teaching along with digital learning. We analyze that integrating digital learning into class based teaching does not simply benefit student, but teacher would also have different benefits at different levels. It promotes personal professionalism and teachers could perceive that students realize teachers' efforts and passion for teaching. When considering the merits of online teaching, it is important to acknowledge the institutional and personal obstacles faced by students and teachers that affect student performance. We find that instructor's concern about copyright, heavy workload, insufficient time for feedback, and above all impact of online teaching on tenure or promotional prospects are substantial (Hong et al, (2020). Also, faculty with less experience on technology may receive insufficient pedagogical support in crafting curricula in an entirely new medium (Hong et al, 2020; Yen et al, 2018). We critically review that the mentors new to online teaching modality may severely struggle to provide quality student learning outcomes without satisfactory development prospects. Hence, Jesus et al,, (2017) argued that online classrooms can be just as effective as off-line classrooms with proper preparation and faculty familiarity with reliable technology and technical support.

There are several studies that conducted the comparative analysis among online, offline and blended pedagogy. It is recommended that the blended modality might be more effective and useful than online and offline systems, because it capitalizes on the strength of both modalities, particularly leading to positive student learning outcomes (Ali, 2020; Ho et al,, 2016; Jesus et al,, 2017). In this respect, Ho et al, (2016) stated that student learning in a blended modality indicated a significantly higher level of knowledge of hands-on approach and overall satisfaction with the course than face-to-face approach. The discussions of online education may take on a polarized all-or-nothing approach, and instructor may feel that they may prefer one modality or other. However, the blended modality offers a promising middle-ground in allowing instructors to flexibly combine the two. The effectiveness of online teaching could be enhanced merely when the system functions are rich and diverse being close to user perception and being able to attract students logging in to the system for learning. Regarding the mixed digital learning, the administration of educational institutions could provide teachers with software and hardware support and assistance according to the needs, to reduce the shortcoming of digital learning and integrate teachers to form an organization similar to professional communities.

Finally, the application of online pedagogy includes network-based learning, computer-based learning, virtual classrooms, and digital cooperation. The promotion of online

teaching could provide alternative innovation of class teaching. Though making change in traditional face-to-face teaching modes is entitled to some difficulties, but such difficulties could be overcome when teachers often exchange teaching experiences and learning through web communities to advance the teaching methods and improve classroom management. By adopting these specific steps, digital learning would be accepted by students and teachers with the advanced use of information technology and the relevant technologies. They can combine the online teaching & learning methods with existing teaching approaches and thereby utilize the benefits of digital learning to explore practicable teaching tactics for achieving stated goal and education effectiveness in reality.

#### **4.1. SUGGESTIONS AND RECOMMENDATIONS:**

Based on our study findings and the analysis of other indexed journal articles, it is suggested that we are in a transitional regime where there are noticeable benefits to opt for an online teaching platform. Yet, there is a lack of professional training and prior evidence to fully disregard the tried-and-true methods of teaching offline and in-person methods. In addition, online learning has not reached its anticipated potential because of the limited financial resources and restricted evaluation approaches. Perhaps then, instead of contrasting and comparing the two methods, an integrated education system called blended learning can be achieved by carefully mixing and utilizing both methods (Rashid et al, 2020; Pei and Wu, 2019; Chen and Peng, 2008). In this respect, let us now summarize several possible suggestions and recommendations:

- Both online and offline methods have been proven to provide specific benefits that complement, rather than conflict with one another. So, in order to reap the benefit of both online and offline teaching methods, a blended education strategy could potentially be applied.
- A modular training method should be adopted to break down teaching topics into small chunks and increase student participation when students are being taught online. This approach may be important to keep in mind even when utilizing a teaching method similar to the blended learning method mentioned earlier.
- Online teaching is a relatively new idea. So, in order to quickly adapt, institutions should apply teaching assistants. Teachers can consult with these online teaching professionals before each class session in order to fully build a framework for teaching online effectively.
- Right now, online teaching is limited to a selected few commonly known tools and software. In order to convert online teaching as a viable method of education, a greater interest and study should be taken to educate both teachers and learners on how to best utilize different teaching tools available online.
- In terms of entrepreneurship education, it may be more effective to teach the basics offline than online, though online and other non-traditional approaches may be more appropriate in order to teach students to have an entrepreneurial mindset.

- A willingness and strong commitment to promote online teaching are required in order to be better prepared for the contextual circumstances.

## 5. CONCLUSION

In the era of science and technology, online teaching pedagogy is getting more and more famous than the traditional offline teaching platform. We analyze that place might be the principal distinction between online and offline learning. Participants are expected to migrate to the respective venue through offline learning, whilst the online learning and training can be done from anywhere in the world. Nonetheless, students might face idiosyncratic constraints in both the platforms, but all they need is to put proper efforts to get their expected result and performance. Having the importance considered, we systematically attempt to conduct a literature review and then analyze the possible difference in student performance under online and offline teaching platforms. With that end view, we went through the latest top indexed papers of ISI WOS and SCOPUS by implementing a quali-quantitative research method. In particular, this review paper attempts to provide a thoughtful discussion and critical analysis of various insights and thematic areas of teaching pedagogy. The review analysis suggests to integrate online teaching with current teaching trend and utilize digital learning to develop practicable teaching strategies for the teaching effectiveness and proper management learning outcome.

We find that the sudden appearance of COVID-19 has really put everything at a standstill for a long while; and the education sector is no different. As classes were forced to be closed, the institutions started providing online education to help the students to continue their studies. The scenario in online and offline classes are quite different yet regardless of the platform. As a consequence, there is still a curiosity which type of teaching pedagogy show better student performance. Therefore, based on secondary review analysis, we document that the overall student performances of online pedagogy are significantly better than those of offline platform. So, the medium of education can affect the student satisfaction that can eventually affect their performance. Thus, the online academic process must be planned and executed with proper care to maintain the quality and relevance of education. We wish that the availability of devices among the students must be ensured before going ahead with online classes. With the ongoing adverse situation, the concept of online platform education might go a long way to develop the future of the youths around the globe.

Therefore, this paper considerably promotes in deeply rethinking regime of online pedagogy; and thereby to design the decision of effective teaching pedagogy and stated management learning outcome. As a whole, this academic piece of work suggestively promotes to explore our knowledge & understanding in international context, outlines underlying probable future research agenda, and eventually executes appropriate strategy & dynamism for market practitioners, policymakers, and other stakeholders. However, we admit the limitations of the study, because the study is mostly related to content analysis while classifying important issues of existing literature. Nonetheless, for potential scholars in future, we propose the intensive and robust meta-analysis by

incorporating other relevant databases; for instance JSTOR, Scopus, Google Scholar & SCImago by using advanced software.

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## APPENDIX-1:

**Table 2.** Sample appendix of meta-analysis

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
1	González-Gómez, D., Jeong, J. S., Rodríguez, D. A. and Cañada-Cañada, F.	2016	Journal of Science and Education Technology	These investigations seek to determine the success and interpretation of this new approach by students in a flipped classroom.	Participant and non-participant observation	Research Article	Almost 97% of students felt that it was very important to watch video lessons before going to the class to succeed in the

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
							proposed learning goals.
2	Ryan, S., Kaufman, J., Greenhouse, J., Joel, She, R. and Shi, J	2016	Community College Journal of Research and Practice	Community colleges have used distance education as a means to give their large numbers of non-traditional student's greater flexibility and access.	Experiments	Qualitative study with event analysis.	Whether online or hybrid/mixed formats are used, colleges and universities around the country are increasingly using online platforms as a means of teaching.
3	Powers, K. L., Brooks, P. J., Galazyn, M., and Donnelly, S	2016	Psychology Learning and Teaching	This study compared study results in hybrid and traditional fields for introductory psychology students, with the MyPsychLab course pack and the associated Blackboard management system.	Experiments	Research Article	We were able to encourage technical literacy as a learning aim by helping students manage online demands in an introductory level course.
4	Lin, M. H., & Chen, H. G.	2017	Eurasia Journal of Mathematics, Science and Technology Education	Encourage technical literature as a learning goal by helping students navigate the online needs in the introductory level course.	Descriptive Research	Research Article	Students comply with interactive learning support in the area of learning.
5	Ubell, R.	2017	Online Research Consortium Blog	The reason why faculty don't want to teach online.	Descriptive Analysis	Website Article	In several years, research has failed to inspire most faculty members' overwhelming negative attitudes towards virtual learning.
6	Smith, F.	2016	One in Four Students Enrolled in Online Courses	Online education's importance and credibility.	Descriptive Analysis	Website Article	Most university leaders agree and recognize that online learning is important for the long-term strategy of their institutions
7	Jesus, A., Gomes, M. J., & Cruz, A.	2017	The Institution of Engineering and Technology	Case-based approach to therapeutics design and implementation	Descriptive Research	Research Article	The output of b-learning students was higher, not statistically important.
8	Ho, V.T., Nakamori, Y., Ho, T.B. and Lim, C.P.	2016	Combination of E-learning and face-to-face	This thesis aimed to study the efficacy of a combined learning model for secondary school teachers using	Experiment	Research Article	This study showed that implementing a course on TPD in a mixed model of learning enhances

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
			discussion. Education and Information Technologi es	a quasi-experimental framework in a hands- on approach			the knowledge of HOA and overall student satisfaction with the course in comparison to the conventional course.
9	Shorey, S., Siew, A. L., & Ang, E.	2018	Nurse Education Today	The purpose of this study is to understand the progress and future perceptions of the Singapore nursing profession.	Survey	Qualitative study with event analysis.	The students felt that the combined communication module for pedagogy increased their learning and increased their trust in similar situations.
10	McCutcheon , K., Lohan, M., Traynor, M., & Martin, D.	2015	Journal of Advanced Nursing	Determining whether the use of an online or mixed learning paradigm can increase clinical teaching in undergraduate care.	Experiment	Research Article	This review is the failure to demonstrate that a combined approach to clinical education in undergraduate nursing education has been implemented.
11	Yen, S. C., Lo, Y., Lee, A., & Enriquez, J	2018	Education and Information Technologi es	The goal of the study was to compare student outcomes and course satisfaction across modalities on a three-way basis on-line and in a blend of instructional methods during a Child Development course.	Descriptive Research	Research Article	students performed equally well across all three-teaching modalities, allaying traditional concerns about online and blended teaching efficacy.
12	AlAzzam, M. Saswan, A. & Abdalahim, A.	2021	Sage Journals	To understand the effect of online education on students	Journalistic Research	Analytical Research	Students are experiencing more depression and anxiety
13	Hong, Y., Li, X., Lin, Y., Xie, J., Yan, X., & Lin, Z.	2020	Research Square	To analyze feedback from teachers and students	Journalistic Research	Descriptive Research	Majority of students preferred online classes whereas more teachers were into offline classes
14	Hart, C. M., Berger, D., Jacob, B., Loeb, S., & Hill, M.	2019	Sage Journals	To compare the effectiveness between offline and online classes in higher education	Journalistic Research	Analytical Research	The online setting is less effective
15	Mart, Ç.T.	2013	Internation al Journal of Academic Research.	To discuss a teacher's commitment & dedication to student learning	Descriptive Research	Education al Research	Passion is a motivational factor that affects teacher performance
16	Ozili, P. K., &	2020	SSRN	To demonstrate	Descriptive	Analytical	COVID-19 is an

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
	Arun, T.		Electronic Journal	COVID-19 impact on the Global Economy	Research	Research	opportunity to improve the public health sector.
17	Paul, J., & Jefferson, F	2019	Frontiers in Computer Science	To determine which teaching method proved more effective over the 8-year period	Chi-square analysis, Independent sample T-test & ANOVA test	Quantitative Analysis	No significant difference in student performance between online and face-to-face learners
18	Pei, L., & Wu, H.	2019	Medical education online	To evaluate whether online learning can improve learning outcomes of undergraduate medical students in comparison to offline	Meta-analysis	Quantitative Analysis	There is no evidence that offline learning works better compared to online.
19	Tabassum, M., Mannan, S. E., Parvej, M. I., & Ahmed, F.	2021	Aquademia	To find out teacher's perceptions about online education, and problems faced related to e-learning	Descriptive statistics	Quantitative Analysis	Majority of teachers were staying at home and continue their online educational but very few of them think the process are not helping students
20	Rashid, C. A., Salih, H. A., & Budur, T.	2020	International Journal of Social Sciences & Educational Studies	To analyze the contribution of online education & students perception about it	Survey questionnaire	Questionnaire analysis	Positive tendency in the students that they want to have homework instead of online exams
21	Rahman, A.	2021	Sage Journals	To understand the effectiveness of online education	Journalistic Research	Analytical Research	Online education has not been that much effective
23	Eric P. Bettinger, Lindsay Fox, Susanna aylor	2017	American Economic Review, 107 (9): 2855-75.	In this paper the purpose is to estimate the effects of taking a college course online, instead of in a traditional in-person classroom setting, on student achievement and progress in college.	Literature Review Analysis	Qualitative study with topic analysis.	The key finding of this review is that taking a course online, instead of in-person, reduces student success and progress in college. Grades are lower both for the course taken online and in future courses. Students are less likely to remain enrolled at the university.
24	Peter Kahn, Lucy Everington, Kathleen Kelm, Iain Reid,	2016	Education Tech Research Dev 65:203-218	The purpose of this article is to report on a multiple case study that Explored student engagement in a set of	Article	Quantitative Study with empirical analysis	This study identified ways in which tasks and social relations in the online learning environments triggered reflexivity

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
	Francine Watkins			postgraduate degrees offered on a fully online basis.			on the part of students. Rather than displaying one dominant mode of reflexivity, the students considered in the study were seen to draw on a range of modes.
25	Tagreed Kattoua, Prof. Musa Al-Lozi, Dr. Ala'aldin Alrowwad	2016	International Journal of Business Management and Economic Research (IJBMER), Vol 7(5)	This study aims to provide a discussion of the current e-learning environments including their characteristics, limitations, advantages and the major factors that affect the acceptance of such technologies.	Literature review	Quantitative study with empirical analysis	This review found that student variables, such as behaviors and attitudes, cultural backgrounds and other demographic characteristics are important variables that influence student learning, especially in a collaborative e-learning environment.
26	Florence Martin, Chua Wang, Ayesha Sadaf	2018	The Internet and Higher Education and Higher Education, volume 37	To examine student perception on the helpfulness of the twelve different facilitation strategies used by instructors on establishing instructor presence, instructor connection, engagement and learning.	Descriptive statistics study.	Quantitative study with empirical analysis.	Undergraduate students rated significantly lower on engagement and learning in comparison to post-doctoral and other post graduate students.
27	Shea, Peter; Bidjerano, Temi	2016	Online Learning, v20 n3 p14-15	The purpose of this study was to examine national data (US Dept. of Ed. Beginning Postsecondary Student Survey, 2004-09) on three outcomes for community college students with and without online education experiences.	Journal article	Qualitative study with empirical analysis.	The findings suggest significantly more students who had engaged in online education had either attained an associate degree at the end of the observation period or transferred to a different institution.
28	Sanna smith Jagers and Di Xu	2016	Computers & education, volume 95	The purpose of the current study is to develop an online course design assessment rubric that includes four areas, and explore the	Article Study.	Qualitative analysis with empirical and event analysis.	The results indicate that the quality of interpersonal interaction within a course relates positively and significantly to

SL	Author	Year	Journal	Purpose	Methodology	Type	Key Findings
				impact of each area on student end-of-semester performance in 23 online courses at two community colleges.			student grades. Additional analyses based on course observation and interview data suggest that frequent and effective student–instructor interaction creates an online environment that encourages students to commit themselves to the course and perform at a stronger academic level.
29	Sarah McGrew; Joel Breakstone; Teresa Ortega; Mark Smith and Sam Wineburg.	2018	Theory & Research in Social Education, Volume 46	The purpose of this assessment is to assess students' civic online reasoning—the ability to effectively search for, evaluate, and verify social and political information online.	Research work	Exploratory research.	The results point to a need for curriculum materials that support students' development of civic online reasoning competencies.