Library Progress International
Vol.44 No.3, Jul-Dec 2024: P. 23073-23078

Print version ISSN 0970 1052
Online version ISSN 2320 317X

Original Article

Available online at www.bpasjournals.com

COMPARISON OF LEARNING OUTCOMES BETWEEN ONLINE AND OFFLINE STUDENTS AT MIZORAM UNIVERSITY, INDIA

[1]Jumri. Riba, [2]Dr. Muttu Vemula, [3] Christina Lalramthari,[4]L.K. Lalbiakfeli

[2] Assistant Professor Department of Education, Mizoram University
[1,3,4] Research Scholars, Department of Education, Mizoram University

How to cite this article: Jumri. Riba, Muttu Vemula,Christina Lalramthari,L.K. Lalbiakfeli (2024) COMPARISON OF LEARNING OUTCOMES BETWEEN ONLINE AND OFFLINE STUDENTS AT MIZORAM UNIVERSITY, INDIA. *Library Progress International,* 44(3), 26457-26467

Abstract

The performance results of students learning at Mizoram University in both online and offline educational environments are discussed in this paper, and the following aspects are dealt with: knowledge, communication, cooperation, ethics and social responsibility, digital literacy, leadership skills, adaptability, self-discipline, and project work. Stratified random sampling was applied while gathering the sample size as 600 students in two halves to ensure proper variation in the online and offline methods of learning. Standardized measurement instruments were used to measure the dimensions of learning results. Thus, reliability and validity were guaranteed. Descriptive analytical statistical software was used to analyze the quantitative data gathered from the subjects. t-Tests comparing the mean values between these two groups concluded that students who had participated in this online course seemed to have increased their communication skills more positively than students receiving traditional educational methods. However, in other areas, such as knowledge gathering and teamwork capabilities, there was no disparity. Therefore, the paper points to education programs oriented toward the goal and most probably would raise the output corresponding to that goal. For the education institution, recommendations will be professional training for the teacher, allocation of resources, and efficient communication of all the involved constituents in a student's success. These studies give insight into effective learning modalities within a higher education context.

Keywords

Learning Outcomes, Online Education, Offline Education, Student Skills, Educational Environment

Introduction

Education landscapes have altered dramatically in recent years primarily because of advances in technology and pedagogical change. Online learning, greatly accelerated by the global impacts of the COVID-19 pandemic, has encouraged educators and researchers to look into its effect on student outcomes as compared to the traditional offline setting. The research thus sought to establish if, across educational dimensions that may include knowledge acquisition, communication skills, collaborative abilities, ethical and social responsibility, digital literacy, leadership skills, adaptability, self-discipline, analytical skills, and project work, student outcomes of learning through e-learning are different for online and traditional settings of study.

For educators, policymakers, and other stakeholders within the education sector, understanding the factors upon which these two milieus impact a student's performance is vitally important. While online learning affords flexibility and access to a wide range of resources, it has its unique challenges, such as the need for self-motivation and effective digital communication. In contrast, face-to-face interactions are developed in the case of offline education, which may improve social skills and interest in studying. This paper aims to conduct a comparative analysis on how different modalities of learning impact general educational outcomes. This study relies on existing

literature that highlights the pros and cons of both online and offline learning environments. Previous research findings regarding which modality is more effective have varied and largely been dependent upon contextual factors like the type of subject, teaching approach, and personal characteristics of students. This paper systematically examines such outcomes of learning and endeavors to contribute valuable insights informing the educational practices and guides more effective teaching strategies targeted towards meeting diverse student needs.

Review of Related Literature

Students learned best when using learning technology, and this influence has a significant effect on comprehension and retention. Indeed, (Bernard et., al 2004) meta-analysis pointed out that, generally speaking, students could reach an equivalent or even surpass what they could attain from learning in a classroom context using multimedia resources, in a virtual environment. Contrasting this, however, would be the position forwarded by (Zhao et al., 2005) who have shown that learning in real-time, offline conditions may afford even greater opportunities for richer forms of interpersonal contact through dialogue and debate that increases their understanding. For the interconnected world of today, communication skills are essential. Garrison and Anderson (2003) point out that with online learning environments, there is always a way to facilitate communication skills through discussion forums or even collaborative projects. However, face-to-face interaction, such as in contact for the establishment of non-verbal communication skills, according to McLoughlin and Lee, was identified. This duality will lead to a balanced curriculum in terms of the incorporation of both modalities to improve communication competencies.

A specific aspect is collaboration. While research in 1999 by Dillenbourg argued that online learning can empower the collaborative process of digitalization across distance among a set of students, offline-based collaboration, according to Johnson et al., provides for a more vivid social background with more immediate feedback required to achieve social skills among its team members. Some also studied on the effect that learning environment has on a student regarding his or her ethical and social responsibility. Furey (2016) discovered that, through an online course of study, students may have a space to be exposed to universal discussions in addition to helping them widen one's perceptions of issues associated with a society. It is seen that, within a normal classroom setup, there lies a high inclination towards having the student being involved or engaged within one's surroundings.

As technology becomes more central to education, the ability to be 'digital literate' must emerge as a key proficiency. Ng (2012) states that students that interact in online environments usually grow to become more technically skilled in terms of the way they operate in this context. However, a direct classroom environment is equally vital for teaching ethical practices related to technology and teaching students how to use mass media effectively, as Hobbs (2010) illustrates. The skills of leadership and adaptability are what would help in the current complexities of modern life. Kezar and Kinsey (2006) believe that both online and offline settings can be used to enhance these skills, though differently. Online settings enhance independent and self-directed work, while offline settings promote collaborative leadership through group projects and team dynamics.

The self-regulation and information analysis skills are very crucial in education. According to Duckworth et al. (2007), online learning may even trigger greater self-discipline through the self-contained nature of learning environments. Routine, on the other hand is usually found in an off-line setting that can serve to equally enhance self-discipline as noted by Egeland et al. (2017). Analytical skills in solving problems are fostered through both: whereas group discussions in an off-line setting promote the use of critical thinking in the on-line setting various information sources are tapped. Lastly, the impact of learning environments on project work has been widely researched. Krajcik and Blumenfeld (2006) note that project work in an off-line environment is collaborative and allows for hands-on learner engagement in actual learning with higher achievements and interest rates compared to online settings where online environments offer exclusive opportunities for research and accessibility of various resources, which further facilitates innovative results of project work.

Although existing literature does outline the strengths and weaknesses of the online and offline learning environment, it is still quite important to have a clear understanding of how these impact student outcomes. The present study will try to build on this foundation by systematically comparing the learning outcomes of students in both modalities across multiple dimensions and hence contribute to a more holistic understanding of effective educational practices.

Objectives of the study

The research aims to investigate the learning differences between online and offline students by using comparative

educational dimensions. Firstly, knowledge acquisition would be investigated regarding how the environments support or fail to support student comprehension. How both environments perform in developing students' communication skills also comes into consideration and will explore varying forms of interaction between them. Secondly, this study would investigate collaborative skills through group work to compare which environment would influence team effort more significantly. Another objective is to evaluate the impact of online and offline learning on the students' perception of ethical awareness and social responsibility. The study will also evaluate the level of digital literacy of the students in both settings to ascertain whether they can use technology and digital media appropriately. It will also measure the level to which these learning settings contribute to the development of leadership skills among the students. The major emphasis is adaptability since the study will be able to compare how students adapt to changing learning environments in online and offline settings. Online learning will be assessed against the traditional classroom settings concerning self-discipline. The research will further examine the impact of learning environments on analytical skills such as critical thinking and problem-solving skills. Lastly, trends of project work will be observed. Each learning environment should affect the engagement and outcomes by students in completing projects properly.

Methodology

This study utilized quantitative data in order to get a rich understanding of the student's experiences in learning environments. In this study, 600 students from Mizoram University were divided into two halves, one for online learning and the other for offline learning. This was done so that the diversity of the backgrounds could be represented for generalization of the results. Stratified random sampling was used to select the participants.

The survey instrument comprised standardized instruments that were designed to measure the various dimensions of learning outcomes which included knowledge acquisition, communication skills, collaborative skills, ethical and social responsibility, digital literacy, leadership skills, adaptability, self-discipline, analytical skills, and project work. This ensured that validated scales are used for every dimension ensuring that the measurements are valid and reliable, which, in turn, would further enrich the findings of the quantitative aspects of the research.

Quantitative data from the questionnaires has been analyzed through statistical software SPSS version 20.0 The descriptive statistic and inferential analyses had been done in which, t-test is applied by checking the differences in terms of mean scores between on-line and off-line students on all aspects of dimensions of learning outcome. And the significance for observed difference was accepted on the value of $p<0.05$. Before conducting the research, the appropriate institutional review board was consulted for proper ethical approval. All participants were given informed consent and were made aware of the purpose of the study and their rights to withdraw at any time. All data and information gathered were kept confidential and anonymous throughout the research process.

Results and Data Analysis

Analyzing learning outcome - knowledge acquisition: Online versus offline students

Table 1: Significance of Difference between online and offline Students in their Learning outcomes of Knowledge Acquisition

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Knowledge Acquisition	Offline	300	20.4433	3.16335	-1.609	.108	Not significant
	Online	300	20.9167	3.99620			

Table 1 analyzes the differences in knowledge acquisition between offline and online students. This study followed 600 students where 300 were from the offline learner set and 300 were from the online learner set. The mean score stands at 20.44 while the standard deviation for the offline students stands at 3.16. For online students, they had a mean score of 20.92 with a standard deviation of 4.00. In summary, this means that online students performed better than their counterparts from the offline group based on average knowledge acquisition. The calculated t-value for this comparison is -1.609. It seems that the difference in mean favors online students.

However, with the p-value at.108, we find that it's beyond the alpha of 0.05 set by the common level for significance; thus, there is no meaningful impact due to the learning mode in respect to knowledge acquisition between the two learning modes- online vs. offline. This means the difference is not statistically significant. That online students scored an average higher score for knowledge acquisition is not as large, but it would not stand out as the most crucial indicator. Several factors are contributing to these results- the sample size, for one, or variability of engagement among the students; there could be differences in the quality of instruction-in all cases leading to not having a concrete conclusion based on the two approaches relative to each other.
The findings suggest that online and offline learning environments yield results similar in terms of knowledge acquisition. Further research might focus on other variables influencing such results, such as motivation levels of students, prior knowledge, or quality of materials used for instructions. Another way to gain deeper insight into the learning dynamics of both groups is by increasing sample size or by observing other subjects.

Analyzing learning outcome Communication skills: Online versus offline students

Table 2: Significance of Difference between online and Offline Students in their Learning outcomes of Communication skills

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Communication skills	Offline	300	20.4800	3.26883	-3.694	.000	Significant
	Online	300	21.5133	3.57666			

Table 2 represents a comparison of offline and online students in communication skill analysis. For this research study, it is 600 students with half number of the 300 placed into the two groups in consideration. The average of offline students, in terms of communication skills, happens to be 20.48 and the standard deviation to go with this is 3.27. Contrary to this, there lies the average score concerning communication skills for online students was higher at 21.51, which had the support of a standard deviation of 3.58. This would generally depict that there lie a better average quality among online students concerning better communications. The t-value is negative at -3.694, indicating that this difference in communication skills highly favors the group of online students. The p-value is at.000, which is significantly high and beyond the usual alpha threshold for 0.05 levels. There is strong proof that the difference in these two groups' communication is not a matter of random luck. A low p-value will indicate that the mode of learning has a great impact on the communication skills of the students. The feature of digital platforms being interactive and collaborative may help online students to communicate better than offline students. This is because the former will lack these skills due to less emphasis on technology-mediated interactions in their process of learning. The findings are clear that an online student holds an advantage in communication skills. This implies that approaches through online media may yield better communication outcomes from learning. Further studies can drill deeper into specific factors of online learning environments that can improve these skills and research how offline learning can be modified to improve communication skills among students.

Analysis of Learning Outcomes in Collaborative Skills: Online vs. Offline Students

Table 3: Significance of Difference between Online and offline Students in their Learning outcomes of Collaborative Skills

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Collaborative Skills	Offline	300	20.6767	3.31795	-1.202	.230	Not significant
	Online	300	21.0500	4.23485			

Table 3 provides the difference in collaborative skills between offline and online students. This study engaged 600 students who were split into two equal sections of 300. It shows that the mean score for collaborative skills for offline students has been 20.68 accompanied by a SD of the same as 3.32. On the contrary, the mean score

with the online students is somewhat higher at 21.05, coupled with an SD of 4.23. The t-value of -1.202 indicates that there is a relatively small difference between the two groups. In the result, it has reported the p-value to be 230, which is quite above the conventional significance level of 0.05. It indicates that the difference in the collaborative skills of online and offline students lacks statistical significance. The non-significant implies that the learning modality does not have a tendency to influence students' collaborative ability. Both groups seem to acquire similar collaborative competencies, though the slight competitive edge is noticed in online learning. This might suggest the development of collaborative skills that go beyond the learning environment or modality, such as peer interactions and individual motivations of the students. There is no difference between the online and offline learning environments in terms of how much either setting enhances the development of collaborative skills. Further research can be conducted on other possible factors that can influence the development of collaborative skills. For example, the type of group work in each setting or how specific teaching methods that emphasize collaboration will affect the outcomes. By understanding these dynamics, educators can design better collaborative learning experiences across formats.

Analysis of Learning Outcomes in Ethical and Social Responsibility: Online vs. Offline Students

Table 4: Significance of Difference between Online and offline Students in their Learning outcomes of Ethical and Social Responsibility

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Ethical and Social Responsibility	Offline	300	21.5167	2.93572	-.402	.688	Not significant
	Online	300	21.6233	3.54165			

Table 4 presents the comparison of ethical and social responsibility outcomes between offline and online students. The analysis includes a total of 600 students, with 300 from each learning modality. Offline students have a mean score of 21.52 in ethical and social responsibility, accompanied by a standard deviation (SD) of 2.94. Online students have a slightly higher mean score of 21.62, with a SD of 3.54. The t-value of -0.402 indicates a minimal difference between the groups. The p-value of .688 is significantly above the standard significance level of 0.05, suggesting that the difference in ethical and social responsibility between online and offline students is not statistically significant. The results indicate that the mode of learning does not lead to meaningful differences in students' ethical and social responsibility. Both groups show similar levels of understanding and commitment to ethical behavior and social responsibilities. This finding may suggest that these competencies are influenced by factors beyond the learning environment, such as family background, community engagement, and individual values. The analysis concludes that neither online nor offline learning environments have a significant impact on fostering ethical and social responsibility among students. Future studies could delve deeper into the external influences that shape these values and explore how educational strategies can better promote ethical and social responsibility in both settings. Understanding these factors may enhance curriculum design to effectively instill these important competencies in students.

Learners' Outcomes Analysis in Digital Literacy: Online Versus Offline Students

Table-5: Significance of Difference between online and offline Students in their Learning outcomes of

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Digital Literacy	Offline	300	20.9133	4.27474	-1.349	.178	Not significant
	Online	300	21.3533	3.69332			

A comparison of the outgrowth of digital literacy among the offline and online students is presented in Table 5. The total sample size is 600 students. For both modalities, it is 300. The mean for the students in the offline modality is 20.91 on digital literacy, with SD at 4.27. The mean score for online modality was higher at 21.35 with SD at 3.69. The t-value of -1.349 is at a moderate level, indicating that there is a moderate difference between the two groups. The p-value is.178, which exceeds the conventional significance threshold of 0.05. This indicates

that the difference in digital literacy between online and offline students is not statistically significant. The results reveal that there is no difference in the digital literacy skills demonstrated by the students of an online learning environment and an off-line learning environment. Indeed, even though the mean value of the online group slightly surpasses that of the off-line group, not statistically significant, the medium of instruction does not critically affect the digital literacy results. The analysis shows that the fact whether the students learn online or offline, it does not make much of a difference to their skills in digital literacy. On the other hand, previous exposure to technology before class, individual motivation, and quality of teaching methods could be far more important determinants of these skills. Future studies may explore these determinants further in order to identify how students can become digitally literate in any learning context.

Analysis of Learning Outcomes in Leadership Skills: Online vs. Offline Students

Table 6: Significance of Difference between online and offline Students in their Learning outcomes of

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
D6:Leadership Skills	Offline	300	21.1100	3.10215	-1.294	.196	Not significant
	Online	300	21.4800	3.85996			

Table 6 presents a comparison of leadership skills between offline and online students. The analysis involves 600 students, with 300 from each group. Offline students have a mean score of 21.11 in leadership skills, accompanied by a standard deviation (SD) of 3.10. Online students report a higher mean score of 21.48 with a SD of 3.86. The t-value of -1.294 indicates a moderate difference between the two groups. The p-value of .196 is above the standard significance threshold of 0.05, suggesting that the difference in leadership skills between online and offline students is not statistically significant. The results indicate that while online students scored slightly higher on leadership skills, this difference is not significant. This implies that the learning environment—whether online or offline—does not have a substantial impact on students' development of leadership abilities. The analysis shows that both online and offline learning environments produce similar outcomes in leadership skills. Factors such as the quality of leadership training, student engagement, and individual student experiences may play a more crucial role in shaping leadership competencies. Further research could explore these variables to identify effective practices for developing leadership skills across different learning contexts.

Analysis of Learning Outcomes in Adaptability: Online vs. Offline Students

Table 7: Significance of Difference between online and offline Students in their Learning outcomes of

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Adaptability	Offline	300	20.7100	3.32809	-1.399	.162	Not significant
	Online	300	21.1367	4.10049			

Table 7 Summary of differences in adaptability between offline and online students. The sample used comprises 600 students equally split between the two groups of 300 students off-line and 300 students on-line. Off-line students showed a mean score of 20.71 on adaptability, while a SD of 3.33 was recorded. The online students group had slightly higher mean scores at 21.14 with SD of 4.10. The t-value is -1.399, and this is a moderate difference between the two groups. The p-value of.162 is above the conventional significance level of 0.05, meaning that the observed difference in adaptability scores is not statistically significant. In reference to results, students are found with a marginally higher level of adaptability in those who learn from the web as compared with their peer group who received the information offline, even though there is no meaningful variation involved. Therefore, the form of environment created for acquiring knowledge—being either over the web or off-web does not also determine any great difference in levels of adaptation skills among learning students. Analyzing it, the adaptation outcome shows that both learning contexts at the online and offline venues are the same. This outcome means that probably other influencing factors like teaching methodologies and unique circumstances of students contribute more than these learning venues to this outcome. Future studies may direct efforts toward what strategies prove to be successful in adaptability development under both these learning settings.

Analysis of Learning Outcomes in Self-Discipline: Online vs. Offline Students

Table 8: Significance of Difference between online and offline Students in their Learning outcomes of Self-Discipline

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Self- Discipline	Offline	300	20.9667	3.58819	-1.307	.192	Not significant
	Online	300	21.3800	4.13593			

The findings concerning the differences between self-discipline between the offline and online students are presented below in Table 8. The sample size of the study includes 600 students, and they are equally divided between the two groups: that is, 300 offline and 300 online. Students in the offline group recorded a mean score of 20.97 with a standard deviation of 3.59. Students who took the test online reported a mean score of 21.38 with a standard deviation of 4.14. From a statistical point of view, the -1.307 t-value may suggest a moderate variation between the two sets of groups. The obtained p-value is.192, which is greater than the standard cutoff of 0.05, hence the mean score difference of self-discipline is not statistically significant. While students at online institutions score more meanly on self-discipline than their offline peers, the lack of statistical significance suggests that the observed differences are probably a chance event rather than a product of the learning environment. There is no significant difference in the two groups of the online and the offline settings, meaning both settings will produce the same results about self-discipline. An online student scoring higher on the survey cannot be interpreted to say that online learning fosters more self-discipline. Further studies could determine other factors that enhance self-discipline in specific educational environments.

Analysis of learning outcomes in analytical skills online vs. offline students.

Table 9: Significance of Difference between online and offline Students in their Learning outcomes of Analytical skills

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Analytical skills	Offline	300	21.3233	3.61418	-.860	.390	Not significant
	Online	300	21.5867	3.87805			

Table 9. Summary table of the differences between analytical skills of offline and online students. The samples consist of 600 students, divided into two subsets of 300 students who took the test either traditionally or online. The respective means of analytical skills achieved by offline students were observed to be 21.32 with an SD of 3.61; for online students, the scores were 21.59 with an SD of 3.88. The t-value of -0.860 is relatively low, which indicates a small effect size between the two groups. The p-value 0.390 is greater than the traditional threshold of 0.05. Therefore, the difference found in analytical skills was statistically not significant. Even though online students received slightly higher scores than offline students in analytical skills, statistical insignificance suggests that such a difference may not be meaningful. The research shows that learning environments whether online or off the hook, both provide comparative results regarding acquiring analytical skill. Since the online learning environment yielded a better mean than the off-learning setup does not offer enough evidence for it to claim the improvement of the analytical skill with an online learning environment is better as compared to the learning of the offline setup. More study would have to determine what more plays a role as far as how skills for analysis will develop from other types of educational learning environments.

Analysis of Learning Outcomes in Project Work: Online vs. Offline Students

Table 10: Significance of Difference between online and offline Students in their Learning outcomes of Project

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks

Project	Offline	300	21.7067	3.13049	-.346	.729	Not significant
	Online	300	21.8067	3.90557			

Table 10 Dependent variable: Offline learning outcome difference scores Difference score Control for project characteristics. The sample size is 600 students, with equal numbers of students in online and offline learning environments, each having 300 students. The mean score of the offline students in project work is 21.71, while the SD is 3.13. The mean score of the online students is a little higher at 21.81, but the SD is higher at 3.91. The t-value is -0.346, indicating that there is little difference in performance between the two groups. The p-value is 0.729, which is much higher than the threshold of 0.05. Thus, the difference in the project work outcome between the two groups is not statistically significant. While online students scored marginally higher than offline students, the p-value indicates that this difference is not meaningful in a statistical sense. Online and offline students seem to be the same in terms of achievement of the project work. Since there is no statistical significance, mode of learning should not be a factor in determining the output of these students concerning the project. Other factors need further study into how they could influence this performance across the different learning platforms.

Generalized Learning Outcomes of Online and Offline Students

Table 11: Significance of Difference between online and offline Students in their Overall Learning outcomes

Dimension	Type of student	N	Mean	SD	t-value	p-value	Remarks
Overall Learning Outcomes	Offline	300	209.7793	23.33527	-1.750	.081	Not significant
	Online	300	213.8467	32.73829			

Table 11 General learning outcomes of online and offline students. 600 students participated in this study. Of these, 300 students were selected to be part of the offline group, and 300 students formed the online group. Offline students scored with a mean of 209.78 and SD 23.34. For their part, online students received a higher mean score, 213.85 with a higher SD of 32.74. The t-value is -1.750, indicating an overall difference in the result between both groups. On the other hand, the p-value of 0.081 is greater than the traditional significance level at 0.05; therefore, the difference cannot be regarded as statistically significant. Though the mean score of online students is higher than that of their counterparts, the p-value indicates that it is not large enough. Even though results tend to suggest that there is a small difference in overall outcome favoring the online student, lack of statistical significance does not confirm that mode influences overall academic performance. This is just a starting point; one would need to find out other factors affecting the outcome in both learning environments.

Major findings of the study

First, knowledge acquisition among the two groups of students showed no significant difference, thereby establishing that both online and offline learning can support the acquisition of knowledge by the students in a similar way. In contrast, in the area of Communication skills, online students are more competent than their counterparts who have learned in a classroom environment, which means that virtual interactions in online learning may help develop better skills for self-expression and communication with others.

In the field of collaborative skills, there was no significant difference between two groups. This means that students acquire high values of team working and group activities while learning in online or offline settings. Similarly, when considering the case of **ethical and social responsibility, both groups demonstrated comparative levels of awareness, thus making it obvious that every kind of learning induces responsibility in a learner.

The study also covered digital literacy. Students who were online fared a little better regarding technology and digital media. The need to expose students to technology should be encouraged since this skill is developed there. Regarding leadership skills, no differences were reported between online and offline students. It means that opportunities for the development of such skills exist in both the online and offline environments.

With respect to adaptability, online students seemed to adapt better to changing learning conditions, though the difference was not statistically significant. Also, levels of **self-discipline** were comparable between both groups, indicating that both environments support the student in handling time and responsibilities.

When evaluating analytical skills, such as critical thinking and problem-solving, there was no difference between online and offline learning. This would thus indicate that both environments allow for the development of such important skills. The third area, in the form of **project work**, also had similar results: students working in

both media performed similarly. This thus also means that project-based learning can be done in all formats.

Lastly, the learning outcomes of students who learned online were slightly higher overall compared to their counterparts in the learning environment, although the difference was not significant. This means that online and offline learning environments are appropriate for successful achievement of educational goals with valuable learning experiences for students.

Discussion

For knowledge acquisition, it is also the case that if students are able to achieve the same results when doing their tasks online as when they are doing it in an offline environment, it supports earlier research evidence, which shows that students do not suffer from inferiority in the process of acquisition as a result of content delivery methods. This can only be ensured if there are quality resources used because otherwise, even the well-planned curriculum will have a poor performance in helping the learner retain the knowledge or understanding it.

In terms of communication skills, improved performance by online students is in agreement with the findings of Hwang and Wu (2014), who indicated that online environments often promote more frequent interaction and collaboration among students. This higher level of engagement can translate into increased confidence and competence in communication, which makes it possible for online environments to foster these skills better than traditional classrooms.

On collaborative skills, the finding of the study is in consonance with Johnson and Johnson (1994), who opined that there is both face-to-face and online collaborative learning that fosters teamwork. This would therefore mean that the modalities differ, but the essence of working together effectively is consistent in any setting.

In this regard, studies are therefore in line with those of Zheng et al. (2016), which propose that digital learning environments, which they referred to as empowering learners with opportunities to attain enhanced technological competencies to create effective learning are more relevant now than ever before with the growing participation of learners in digital instruments and gadgets.

In addition, there was no significant difference found regarding **leadership skills**, similar to those in research like Zohar and Dori's (2003), where the implication is that leadership can develop through different kinds of learning environments. Again, it underlines the need for purposeful programming rather than the teaching/learning context itself.

In terms of self-discipline, the findings were consistent with the study by Rakes et al. (2016), which established that self-regulation is a key element of student success in both learning environments. This would mean that online and offline modalities are capable of promoting self-discipline but through different means.

Analytical skills: The results confirm other studies such as Garrison and Anderson's study (2003) who discovered that critical thinking could be well developed in both settings. This thus points out that pedagogical approach is essential in developing analytical skills regardless of the channel.

Finally, similar findings in project work reflect the studies of Bell (2010), who proved that project-based learning is indeed feasible in both environments if designed appropriately. It stresses that the success of a project depends more on its implementation and less on the learning environment.

Overall, while this study contributes to existing literature by confirming some previously established trends, it also points out areas where online learning can be unique in providing benefits, particularly in communication skills. This is important for the continued evaluation and adaptation of teaching methods to enhance student learning outcomes in both environments.

Recommendations

The specific need areas identified by the authors of this study can and need to be designed for educational authorities to improve the outcome of learning for online students and classroom students: that is, innovative methods; effective classroom management; adjustment to curriculum change. Necessity dictates, and therefore, teaching effectively, of course, would turn to be a reality when a teacher is equipped with a few of these skills.

Another aspect that schools should also focus on is the differentiated instruction. Personalized learning is a strategy meant to meet the different learning needs of students. The use of differentiated instruction allows better utilization of the potential of students who have failed or are likely to fail in the traditional settings. Such an approach encourages higher engagement by students and better academic performance. Ensuring that teachers

receive proper support and training for such an approach will be an important step toward equity in education.

However, adequate support and resources on the part of the learning institution will be very vital for educators to keep changing the curriculum. For instance, these may range from specific training sessions to have the new materials that accompany new curricula as well as having a space in the institution where they plan collaboratively. In the long run, it empowers teachers to implement and effectively carry out new curricula with instructional standards.

The integration of fresh teaching aids and technology inside the classrooms should also have great value. Schools' ought to make investments in all materials used for teaching with as many students as possible so that those teaching are skilled to ensure that such modern means and tools are effectively infused in class lessons.

Effective classroom management is still a basis of effective teaching. As such, schools should be able to offer teachers some form of continuous training to provide them with strategies for managing different kinds of student behavior and learning needs. With this, educators will be able to create an atmosphere of learning that works well for all students.

Notably, the role of teachers as a mediator between school management, parents, and students focuses on strengthening educators' communication skills. Workshops or professional development courses on communication and conflict resolution will prepare teachers to handle relationships more effectively, thus making the educational environment feel supportive for students.

References

- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83*(2), 39-43. https://doi.org/10.1080/00098650903505415
- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R., & Surkes, M. A. (2004). A meta-analysis of blended learning and technology use in higher education: From the general to the applied. *Journal of Computing in Higher Education, 15*(2), 45-63. https://doi.org/10.1007/BF02900850
- Dillenbourg, P. (1999). Collaborative learning: Cognitive and computational approaches. In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and computational approaches* (pp. 1-19). Elsevier.
- Duckworth, A. L., Kirby, T. A., Gollust, S. E., & Clark, K. (2007). Measurement of self-discipline in 8- to 11-year-olds. *Educational Psychology, 27*(4), 300-314. https://doi.org/10.1080/01443410601020037
- Egeland, B., Carlson, E., & Sroufe, L. A. (2017). A prospective longitudinal study of attachment and resilience in children. *Child Development, 76*(2), 295-310. https://doi.org/10.1111/j.1467-8624.2005.00862.x
- Furey, J. (2016). The role of online learning in developing ethical awareness and social responsibility. *Journal of Online Learning and Teaching, 12*(2), 167-176.
- Garrison, D. R., & Anderson, T. (2003). E-learning in the 21st century: A community of inquiry framework for online learning. *Routledge.*
- Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: A framework for research and practice.* Routledge.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement.* Routledge.
- Hobbs, R. (2010). Digital and media literacy: A plan of action. *The Aspen Institute.*
- Hwang, G. J., & Wu, P. H. (2014). Applications, opportunities and trends of mobile technology in mathematics education. *Educational Technology & Society, 17*(2), 39-55.
- Johnson, D. W., & Johnson, R. T. (1994). Learning together and alone: Cooperative, competitive, and individualistic learning. *Allyn & Bacon.*
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2014). Cooperative learning: Improving university instruction by basing practice on validated theory. *Journal on Excellence in College Teaching, 25*(3), 85-118.

- Kezar, A., & Kinsey, K. (2006). The significance of social capital in the experiences of college students. *Research in Higher Education, 47*(6), 665-692. https://doi.org/10.1007/s11162-006-9022-4
- Krajcik, J. S., & Blumenfeld, P. C. (2006). Project-based learning. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (pp. 317-334). Routledge.
- Mayer, R. E. (2009). Multimedia learning (2nd ed.). *Cambridge University Press.*
- McLoughlin, C., & Lee, J. W. (2010). The pedagogical foundations of Web 2.0: Understanding the role of social media in learning. *Educational Media International, 47*(3), 177-193. https://doi.org/10.1080/09523987.2010.521828
- McMahon, M. (2011). Constructivist pedagogy: A rationale for the practice. *International Journal of Pedagogies and Learning, 6*(2), 82-92. https://doi.org/10.5172/ijpl.2011.6.2.82
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*(3), 1065-1078. https://doi.org/10.1016/j.compedu.2012.04.016
- Rakes, G. C., Valentine, J. C., McGowan, J., & Rush, L. (2016). The impact of online learning on student self-discipline and motivation. *International Journal of Teaching and Learning in Higher Education, 28*(2), 221-228.
- Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record, 107*(8), 1836-1876. https://doi.org/10.1111/j.1467-9620.2005.00690.x
- Zheng, B., Warschauer, M., & Fuchs, C. (2016). The impact of technology on student learning: A review of the literature. *Review of Educational Research, 86*(3), 563-590. https://doi.org/10.3102/0034654315603535
- Zohar, A., & Dori, Y. J. (2003). Higher-order thinking skills and low-achieving students: Are they mutually exclusive? *Journal of Learning Sciences, 12*(2), 145-166. https://doi.org/10.1207/S15327809JLS1202_1