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Research Paper

Unraveling the Connections: Exploring the Relationship between Teaching Effectiveness and Academic Achievement in Blended Learning Environments

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Abstract

With the rise of blended learning, assessing the factors influencing student academic performance has become essential. Teaching effectiveness is a critical component of this dynamic, potentially affecting students' academic success. This study examines the relationship between teaching effectiveness and the academic performance of students engaged in blended learning environments. The primary objective of this research was to determine whether a significant relationship exists between teaching effectiveness and student academic performance. Specifically, this study evaluated various aspects of teaching effectiveness, including the learning environment and instructional practices, and their impact on student achievement. A descriptive-correlational research design was employed, using Simple Random Sampling to select 297 student respondents from the records provided by the university registrar's office. The study measured teaching effectiveness using the university's standardized School Form (SF) 7, while students' academic performance was gauged via their general weighted average for the 2022-2023 academic year. Data analysis included calculating the mean and standard deviation to determine the levels of teaching effectiveness and academic performance, with Pearson's r used to assess the correlation between these variables. The results indicated that the learning environment aspect of teaching effectiveness scored the highest, while instructional and assessment practices scored the lowest. Overall, teaching effectiveness was rated "Very Satisfactory." A significant positive correlation was identified between teaching effectiveness and student academic performance, thus contradicting the null hypothesis. The findings underscore a strong, consistent positive relationship among the various dimensions of teaching effectiveness, revealing that effective teaching in one area is linked with higher effectiveness in others. This interconnectedness highlights the importance of a comprehensive approach to enhancing teaching practices and suggests that improvements in teaching effectiveness can lead to better academic outcomes in blended learning contexts.

Keywords: *pedagogy, blended learning, teaching effectiveness, academic performance*

INTRODUCTION

Despite the devastating effects of the COVID-19 pandemic, the education system has undergone unprecedented changes. This global crisis, characterized by the rapid spread of the virus through human contact and airborne transmission, necessitated the closure of educational institutions—often hubs of interaction and learning—to curb its spread. The impact of this pandemic is long-lasting and is poised to reshape the educational landscape in the years to come. Traditional face-to-face learning, once considered a cornerstone of education, became impossible in many communities, forcing institutions to adopt innovative blended learning models that combine online and in-person instruction. These changes are not just temporary responses to the crisis but profound shifts with the potential to transform education as we know it.

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In 2022, two years after the initial lockdowns, most educational institutions eased restrictions in line with health authorities' recommendations. This led to the implementation of blended learning modalities, which are effective solutions that enhance learning engagement. To maximize benefits for educators and learners, it is critical to leverage the strengths of each instructional approach by combining the advantages of online and in-person teaching.

To ensure student learning continues to progress amid the COVID-19 pandemic, the education and training sector has advocated for the integration of remote "face-to-face" instruction via television and online learning through the Internet (Tong et al., 2022). The teaching and learning environment are evolving, with various innovations incorporating technology into the learning process, particularly blended learning. While this pedagogical approach has gained widespread acceptance, its adoption has been gradual. Among these innovations, blended learning, which merges face-to-face and online teaching, stands out as particularly significant. However, its effective implementation, particularly in developing regions, faces challenges (Kintu et al., 2017).

Teaching and learning are intrinsically linked, with student learning often considered the most widely accepted measure of educational success. Research consistently shows a strong positive correlation between students' perceptions of how much they learned in a course and their overall evaluations of the teacher and the course itself. Students who report learning more tend to rate their instructors more favorably. Additionally, students' perceptions of the learning environment significantly influence their learning strategies and approaches (Mastrokoukou et al., 2022).

Thus, blended learning, often referred to as technology-enhanced learning, is increasingly expected by students in higher education. This approach leverages internet or computer-based tools to enrich in-person interactions between instructors and students. This paper presents several case studies that demonstrate strategies to engage students through technology-enhanced learning, aiming to boost both academic performance and student satisfaction (Morris, 2010; Aitken, 2010).

Obiedat et al. (2014) defined blended learning as a term concerned with transmitting knowledge. Previous theories expounded in the literature have defined blended learning as "the learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and founded on transparent communication amongst all parties involved with a course". It is also used interchangeably for hybrid or mixed learning in academic theories. However, all of these concepts broadly refer to the integration "blending" of e-learning tools and techniques. Generally, it has many advantages over the traditional way of learning and transmitting knowledge (Face-to-Face); the cost effectiveness is one of the most advocated advantages for both the accredited learning institution and students. This advantage will improve the education process. Flexibility and time management are perceived as another main advantage of the blended learning.

Teaching effectiveness is crucial in blended learning environments because it directly influences students' academic outcomes and overall performance. Effective blended learning practices can boost student engagement, motivation, and retention, whereas ineffective practices can result in disengagement and lower academic achievement. Furthermore, teaching effectiveness in blended learning plays a critical role in preparing preservice teachers for the realities of the modern teaching profession, which increasingly requires integrating technology into classroom instruction. By examining the factors that influence teaching effectiveness in blended learning, educators can identify best practices that promote student success and better prepare future teachers for the challenges of a rapidly evolving educational landscape.

The assessment of teaching effectiveness has also evolved, with changing definitions and perspectives leading to new methods of measurement (Hoidn et al., 2020). There is broad consensus that high-quality teaching is critical and may be the most important factor in improving

student achievement. Specifically, teaching effectiveness refers to the impact that classroom elements—such as instructional practices, teacher expectations, classroom organization, and resource utilization—have on student performance (Campbell et al., 2003). While this definition describes classroom dynamics, student achievement remains the primary measure of effectiveness.

Blended learning and teaching effectiveness require teachers to adapt their methods to accommodate both online and in-person learners. Effective teaching practices can enhance engagement, motivation, and retention, whereas poor practices can lead to disengagement and poor academic outcomes. Moreover, teaching effectiveness in this context is vital for educators to successfully integrate technology into classroom teaching.

Statement of the Problem

This study determines the significant relationship between teaching effectiveness and the academic performance of preservice teachers in blended learning. Specifically, it attempts to answer the following questions:

1. What is the mean teaching effectiveness score in blended learning?
2. What are the respondents' academic performance in blended learning?
3. Is there a significant relationship between teaching effectiveness and learners' academic performance?

Given these considerations, the shift in teaching and learning driven by the COVID-19 pandemic has not only transformed students' learning experiences but also significantly impacted the teaching profession. This study explores the relationship between faculty teaching effectiveness and the academic performance of teacher education students in a blended learning environment.

LITERATURE REVIEW

Blended learning (BL) has emerged as a widely adopted instructional approach in higher education that integrates multiple teaching methods to meet the diverse needs of both full-time and part-time learners. This study examined the effectiveness of BL in teaching English as a foreign language (EFL) to third-year part-time students at the Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic. The research methodology incorporates a comprehensive review of relevant literature from two primary databases—Web of Science and Scopus—along with an analysis of student performance on final assessments and feedback from two open-ended survey questions. Results indicate that BL is an effective teaching method, with students expressing overall satisfaction with both in-person and online learning formats. Furthermore, the study highlights the positive impact of employing a range of teaching strategies tailored to student needs, demonstrating that the BL approach supports students' linguistic, professional, and personal responsibilities, ultimately promoting their language acquisition while accommodating their work and family commitments (Klimova, 2021).

A literature review reveals several key insights regarding the effectiveness of BL. It is a valuable method for enhancing educational outcomes, providing greater access to resources, and improving cost efficiency. By making learning more engaging and inclusive, BL addresses diverse learning styles and fosters a more personalized educational experience. This flexibility allows educators to deliver course content in ways that are more responsive to student needs, which leads to improvements in both teaching quality and student success (Sevari & Falahi, 2021).

Further research has demonstrated that BL positively influences student effectiveness in several areas, including achievement, engagement, involvement, retention, and cognitive development. Additionally, its impact on academic staff effectiveness is shaped by factors such as delivery methods, performance evaluation, and motivation. These findings emphasize the necessity of enhancing course management, refining learning materials, and developing supportive policies

to facilitate the successful adoption of BL in higher education contexts (Anthony et al., 2019).

The evolving nature of BL, as noted by Stacey and Gerbic (2006), has transformed teaching and learning in higher education, particularly through the integration of information and communication technologies (ICT). The blending of pedagogy and technology has led to new instructional models that combine traditional teaching with digital resources and interactive tools. This paper will review studies from both the existing literature and the authors' own research to identify effective teaching practices within the context of BL.

Incorporating traditional and ICT-supported teaching methods, BL provides an innovative educational model that leverages the advantages of classroom-based and online learning environments. By offering a wide range of learning modalities, BL enhances students' skills and expertise across various domains (Means et al., 2009). Overall, the literature review highlights the transformative potential of BL in higher education, demonstrating its capacity to foster an enriched learning experience that aligns with the needs and responsibilities of today's diverse student population.

Theoretical Framework

This study is grounded in the Complex Adaptive Blended Learning System (CABLS) model, as described by Wang et al. (2015), which positions the learner at the core while emphasizing the interdependence of all components. CABLS identifies six primary elements: the learner, teacher, technology, content, learning support, and institution, each possessing unique characteristics and subsystems. These elements do not function in isolation but interact dynamically, creating a complex adaptive system through continuous interactions. The CABLS framework is intended to "enable a deeper, more accurate understanding of the dynamic and adaptive nature of blended learning" (Wang et al., 2015). For those developing blended learning courses or programs, this approach highlights essential, interrelated components. Educators may find the interactions between content, learners, and technology especially relevant.

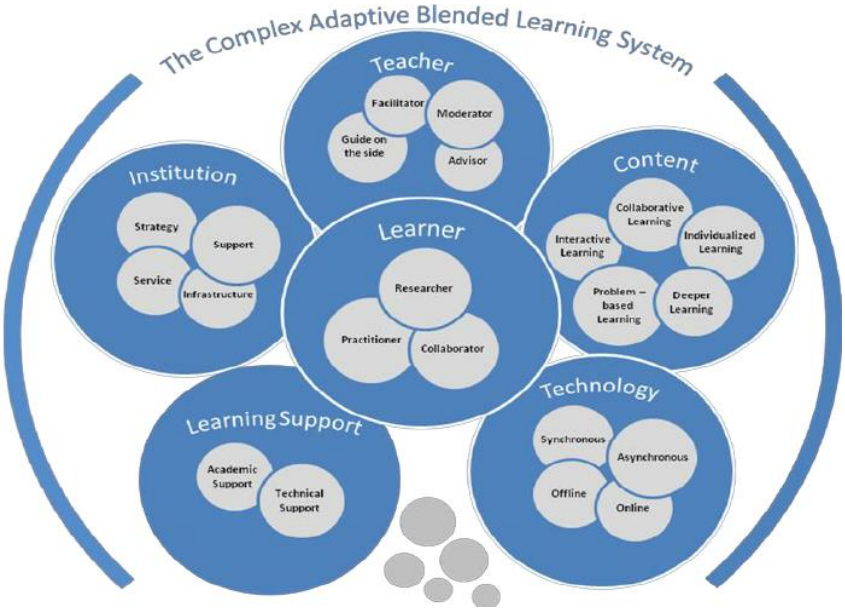

Figure 1. The CABLS framework (Wang et al., 2015)

Further, the study was anchored on the Community of Inquiry (CoI) Model (Garrison et al., 1999), which is rooted in inquiry-based teaching and learning principles, drawing from John Dewey's work and constructivist views on experiential learning. The CoI model outlines the core

elements required to foster deep, meaningful learning, identifying educational experiences as a convergence of three key "presences": cognitive, teaching, and social. In this study's adaptation, presence is understood as a state of heightened awareness, openness, and responsiveness to the social, cognitive, emotional, and physical dimensions of both individual and group dynamics within learning environments. The CoI framework supports structured inquiry by detailing teaching activities and offering theory-based guidance on the content and processes essential for blended learning. Adhering to the model's original three presences—social, cognitive, and teaching—blended learning guided by the CoI framework promotes opportunities for self-reflection, active cognitive engagement, interaction, and peer learning. Additionally, timely expert guidance from instructors fosters engagement and collaborative application activities, underscoring the value of cultivating communities of inquiry in various learning settings, whether face-to-face, online, or blended.

The Community of Inquiry (CoI) Model and the Complex Adaptive Blended Learning System (CABLS) are appropriate theoretical frameworks for this study because they comprehensively address the dynamics of blended learning environments, which are central to understanding teaching effectiveness and academic performance.

Thus, the CoI and CABLS frameworks provide a holistic foundation that integrates key pedagogical, technological, and institutional components. This combined approach enables a nuanced examination of how blended learning environments can be structured to maximize teaching effectiveness and academic performance, making them highly suitable for this study.

Conceptual Framework

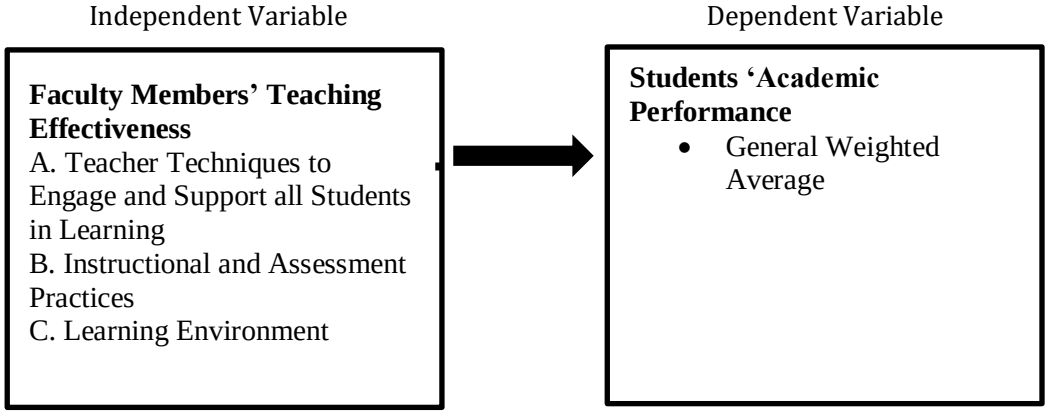

Figure 2. Research Paradigm

This study utilized the independent variable (IV) and dependent variable research paradigm model, where the independent variable is the Faculty Members' Teaching Effectiveness along with its indicators: Teacher Techniques to Engage and Support all Students in Learning; Instructional and Assessment Practices; and Learning Environment. On the other hand, the dependent variable is academic performance, which will be measured in terms of the respondents' General Weighted Average (GWA).

Hypothesis

The study was tested at 0.05 level of significance. There is no significant relationship between teaching effectiveness and learners' academic performance.

RESEARCH METHOD

This study employs a quantitative approach using a descriptive-correlational design, with the Pearson Product-Moment Correlation Coefficient (Pearson r) as the primary method for data analysis. Pearson r is widely recognized for examining relationships between continuous variables (Cohen et al., 2018). Additionally, the mean and standard deviation were used to describe the levels of teaching effectiveness and academic performance, following established methods for data summarization (Gravetter & Wallnau, 2007).

Data were collected through a questionnaire adapted from the Laguna State Polytechnic University School Form (SF) 7, which assesses teaching effectiveness. Academic performance data, specifically students' general weighted averages for the 2022-2023 academic year, were obtained from the university registrar. Simple random sampling was applied to select 297 respondents, ensuring an unbiased and representative sample (Lomax & Hahs-Vaughn, 2013). Data analysis included calculating the mean and standard deviation to determine the levels of teaching effectiveness and academic performance, with Pearson's r used to assess the correlation between these variables.

To ensure the validity and reliability of the SF 7 instrument, a pilot test was conducted prior to full data collection. The pilot test results were analyzed to confirm the instrument's consistency and accuracy in measuring teaching effectiveness.

FINDINGS AND DISCUSSION

Profile of Student Respondents

Table 1. Age Distribution

Age Group	Frequency	Percentage
Below 20	33	11.1
20 - 23	249	83.8
24 - 27	12	4.0
28 and above	3	1.0
Total	297	100.0

Table 1 reveals that a significant majority of the respondents (83.8%) belong to the 20-23 age groups. Conversely, only 1.0% of the respondents were aged 28 years or older. The data clearly indicate that most respondents are in the age group of 20-23. This suggests that the study, survey, or sample population was predominantly composed of young adults.

The significant presence of young adults in the sample population carries several key implications for the study. Primarily, this demographic profile indicates that the findings are likely to reflect the preferences, learning styles, and needs of younger students, who generally possess a greater familiarity with digital technologies and may be more open to engaging with blended learning environments. Furthermore, the insights derived from this age group can guide the creation of customized instructional strategies that address the specific characteristics and challenges encountered by young adults in higher education.

In addition, recognizing the age distribution of respondents can assist educators and policymakers in developing targeted programs and resources that respond to the distinct experiences of younger learners. For example, the focus on flexibility and accessibility inherent in blended learning models may particularly appeal to those who frequently juggle academic obligations alongside work and social activities. Consequently, this study highlights the importance of considering age-related factors when implementing educational strategies, especially within blended learning contexts, to improve engagement and academic achievement among young adults.

Table 2. Sex Distribution

Sex	Frequency	Percentage
Male	82	27.6
Female	215	72.4
Total	297	100.0

As presented in Table 2, the majority respondents are female, with 215 of them constituting 72.4% of the total. On the other hand, 82 male respondents made up 27.6% of the total sample. Thus, the table illustrates the sex distribution within the sample, indicating that a substantial majority of respondents are female, with males constituting the minority. This information provides insights into the gender demographics of the studied groups.

The predominance of female respondents has several important implications for this study. First, the findings may reflect the specific experiences, preferences, and challenges faced by female learners, which can differ from those of their male counterparts. Understanding these gender dynamics can inform the development of targeted educational strategies that cater to the needs of female students, potentially enhancing their learning outcomes.

Additionally, sex composition may influence classroom interactions and participation patterns. Educators can leverage this knowledge to foster inclusive learning environments that encourage student contributions, ensuring that both male and female voices are heard.

Moreover, this sex disparity raises questions about the factors contributing to the higher representation of females in the sample. Exploring these underlying reasons could lead to valuable insights into enrollment trends and the effectiveness of existing programs aimed at attracting and retaining male students in the educational setting. Overall, the findings underscore the importance of considering gender demographics in educational research and practice, as they can significantly shape both the learning environment and the educational experience of students.

Table 3. Course Distribution

Course	Frequency	Percentage
Bachelor of Elementary Education (BEED)	41	13.8
Bachelor of Physical Education (BPED)	42	14.1
Bachelor of Secondary Education (BSED) -English	41	13.8
Bachelor of Secondary Education (BSED)- Filipino	59	19.9
Bachelor of Secondary Education (BSED) -Mathematics	13	4.4
Bachelor of Secondary Education (BSED)-Science	19	6.4
Bachelor of Secondary Education (BSED) -Social Studies	29	9.8
Bachelor of Technical-Vocational Teacher Education (BTVTED)- Food and Service Management	12	4.0
Bachelor of Technology and Livelihood Education (BTLED) - Home Economics	41	13.8
Total	297	100.0

Table 3 presents a comprehensive breakdown of the distribution of respondents across various academic programs and courses. In this dataset, there are 297 individuals, and they are distributed across multiple academic programs. The majority respondents are enrolled in Bachelor of Secondary Education (BSED)- Filipino with 19.9 % or 59, while the least in number were pursuing Bachelor of Technical-Vocational Teacher Education (BTVTED) -Food and Service Management course with 4.0% or 12.

Collectively, this table offers a detailed breakdown of the distribution of respondents across various academic programs, enabling an understanding of the diversity of courses within the sample. It is important to note that each academic program has a unique number of participants, which contributes to the overall demographic composition of the study.

The diverse distribution of respondents across academic programs highlights important implications for both study and educational practice. First, the predominance of students in the Bachelor of Secondary Education (BSED)- Filipino suggests a strong interest in this field, which may reflect broader trends in education and cultural engagement. This insight could encourage educational institutions to invest more resources in enhancing curricula and support services tailored to these students, thereby enriching their academic experiences and engagement.

Moreover, the relatively low enrollment in the Bachelor of Technical-Vocational Teacher Education (BTVTED) -Food and Service Management course raises questions about potential barriers that might be dissuading students from pursuing this course. Understanding these barriers—whether they are related to perceived career prospects, program visibility, or student interest—could provide valuable information for program development and marketing strategies. Educational institutions might consider implementing outreach initiatives or curriculum revisions to attract more students to the Bachelor of Technical-Vocational Teacher Education (BTVTED) - Food and Service Management course, ensuring that this program receives the attention and resources it deserves.

Table 4. Year Level Distribution

Year Level	Frequency	Percentage
First	167	56.2
Second	120	40.4
Third	7	2.4
Fourth	3	1.0
Total	297	100.0

Table 4 reveals that more than half of the student-respondents participated by the first-year students, this is with the frequency of 167 at 56.2%. The predominance of first-year students in the respondent pool has several important implications for this study. First, this representation suggests that the findings primarily reflect the experiences, challenges, and perspectives of new students transitioning into higher education. Understanding this demographic is crucial for identifying first-year students' specific support needs, such as orientation programs, academic advising, and social integration initiatives that facilitate their adjustment to university life.

Furthermore, the substantial presence of second-year students warrants attention because it indicates continued engagement with the academic community beyond the initial year. This distribution allows for comparisons between the experiences of first- and second-year students, which can highlight shifts in academic performance, motivation, and integration over time.

The insights gained from this distribution can inform the development of targeted interventions and programs aimed at enhancing the educational experiences of students with different academic levels. For example, tailored workshops or support services could be designed to address the unique challenges faced by first-year students, such as time management and study skills, while also recognizing the evolving needs of second-year students as they progress in their studies.

In conclusion, the findings presented in Table 4 emphasize the importance of considering year-level representation. By focusing on the unique characteristics and needs of first- and second-year students, educators and administrators can create more effective strategies to support student success throughout their academic journey.

Teaching Effectiveness

Table 5 presents the results of teaching effectiveness in terms of Teacher Techniques to Engage and Support all Students in Learning.

Table 5. Teacher Techniques to Engage and Support Students in Learning

Indicative Statements	Mean	Std. Deviation	Interpretation
1. Facilitation of student collaboration	4.468	0.881	Effective
2. Elicits students to be engaged in the academic learning	4.471	0.870	Effective
3. Ask questions that promote creativity, critical and analytical thinking skills	4.488	0.934	Effective
4. Provides instructional scaffolding to assist and support student learning	4.441	0.943	Effective
Composite	4.467	0.853	Effective

The highest mean score among the indicative statements was "Ask questions that promote creativity, critical and analytical thinking skills" with a mean score of 4.488 (SD=0.934), while the lowest mean score of 4.441 (SD=0.934) goes to "Provides instructional scaffolding to assist and support student learning". The composite mean score of 4.467 (SD=0.853) implies that teaching effectiveness in terms of teacher techniques to engage and support all students in learning was "Very Satisfactory."

The data offer valuable insights into specific teaching practices and their effectiveness, allowing for informed decisions and potential improvements in the instructional strategies employed to engage and support all students in their learning experiences.

The findings are consistent with those of Su et al., (2023), who found that students were highly engaged and perceived strong teaching presence in both learning modes. Notably, students who received Emergency Remote Teaching demonstrated significantly higher engagement levels than those who experienced blended learning. However, both groups reported similar perceptions of teaching presence. Eight categories of influential factors were identified, and the implications of these findings are discussed.

Table 6 presents the results of teaching effectiveness in terms of Instructional Assessment Practices.

Table 6. Instructional and Assessment Practices

Indicative Statements	Mean	Std. Deviation	Interpretation
1. Essential learning outcomes are communicated to all students	4.451	0.914	Effective
2. Gives specific and immediate feedback to students	4.471	0.937	Effective
3. Provides appropriate assessment procedures and checks for understanding to determine instructional needs of all students	4.451	0.951	Effective
4. Fosters a climate of fairness, caring and respect	4.465	0.911	Effective
Composite	4.460	0.862	Effective

The highest mean among the indicative statements was "Give specific and immediate feedback to students" with a mean score of 4.471 (SD=0.937), while the lowest mean score of 4.451 (SD=0.934, SD=0.914) goes to "Essential learning outcomes are communicated to all students" and "Provides appropriate assessment procedures and checks for understanding to determine instruction needs of all students". The composite mean score of 4.460 (SD=0.862) implies that teaching effectiveness in terms of instructional and assessment practices was "Very Satisfactory."

Consequently, the data provide insights into specific instructional and assessment practices and their effectiveness. It highlights areas of strength, such as effective feedback mechanisms, and areas that may benefit from improvement, including clear communication of learning outcomes and assessment strategies. These findings offer a valuable foundation for enhancing teaching practices to better meet students' needs and expectations.

There is growing emphasis on student engagement and blended learning approaches in higher education. This article illustrates how collaborative learning applications, combined with a blended approach to learning, can be effectively employed to design and support assessment activities. These activities are intended to enhance student engagement with course concepts, foster interactions with peers, faculty, and external experts, and ultimately lead to improved student success and satisfaction (Vaughan, 2014).

Table 7 shows the results of teaching effectiveness in terms of the learning environment.

Table 7. Learning Environment

Indicative Statements	Mean	Std. Deviation	Interpretation
1. Maintains standards for behavior, routines, and transitions	4.535	0.858	Effective
2. Reinforces effort or provides recognition (praise) to students	4.508	0.927	Effective
Composite	4.522	0.865	Effective

The highest mean among the indicative statements was "Maintains standards for behavior, routines and transitions" with the mean score of 4.535 (SD=0.858), while the lowest mean score of 4.508 (SD=0.927) was "Reinforces effort or provides recognition (praise) to students". The composite mean score of 4.522 (SD=0.865) implies that teaching effectiveness in terms of learning environment was "Excellent."

As a result, the data revealed the overall effectiveness of teaching practices in creating a positive and structured learning environment. This highlights the need for continued attention to positive reinforcement practices while recognizing the success of maintaining high standards for behavior, routines, and transitions in the classroom.

The study findings align with those of Marie (2020), indicating significant differences at the 0.05 level in the mean scores of the test, favoring the experimental group. Additionally, the findings revealed statistically significant differences at the 0.05 level in the participants' pedagogical performance before and after the implementation of the blended learning method of teaching, with results favoring the post-implementation phase.

Table 8. Teaching Effectiveness

Indicators	Mean	Std. Deviation	Interpretation
A. Teacher Techniques to Engage and Support all Students in Learning	4.467	0.853	Effective
B. Instructional and Assessment Practices	4.460	0.862	Effective
C. Learning Environment	4.522	0.865	Effective
Overall	4.483	0.833	Effective

Table 8 illustrates the results of teaching effectiveness, including its indicators. Among the indicators of Teaching Effectiveness, the highest mean score was for the Learning Environment with a mean score of 4.522 (SD=0.833), and the lowest mean score was for the Instructional and Assessment Practices with a mean score of 4.460 (SD=0.862). The overall mean score of 4.483 (SD=0.833) implies that the Teaching Effectiveness were "Very Satisfactory."

Therefore, the data indicate an overall very satisfactory level of Teaching Effectiveness, with a strong emphasis on the quality of the learning environment. However, it also highlights the importance of ongoing efforts to enhance instructional and assessment practices for the benefit of students and the teaching process.

Academic Performance

Table 9. Academic Performance

Year Level	Mean	SD	Interpretation
First	1.480	0.333	Very Satisfactory
Second	1.375	0.179	Very Satisfactory
Third	1.369	0.226	Very Satisfactory
Fourth	1.403	0.214	Very satisfactory
Overall	1.434	0.281	Very satisfactory

Table 9 presents the Academic Performance of the student respondents grouped by year level. The grading system of the state university involved in this study employs 1-5 scaling, where 1.0 is the highest (Excellent) while 5.0 or failed. Among academic performance grouped by year level, the highest mean score belongs to the "Third" year student with a mean score of 1.369 (SD=0.226). The overall mean score of 1.434 (SD=0.281) indicates that the academic performance of the student respondents for the academic year 2022-2023 was at the "Very Satisfactory" level.

The data implies that the state university has achieved a "Very Satisfactory" level of academic performance among its students during the academic year 2022-2023, with third-year students performing exceptionally well. This reflects the success of the university's grading system and the quality of education provided, while also indicating the potential for maintaining and further improving this level of academic excellence.

The correlation between teaching effectiveness and academic performance

Table 10 presents the result of Pearson's product moment correlation coefficient (or Pearson r) conducted the determine the significant correlation between teaching effectiveness and academic performance.

Table 10. Correlation between Teaching Effectiveness and Performance

Teaching Effectiveness	GWA
A. Teacher Techniques to Engage and Support all Students in Learning	-0.47*
B. Instructional and Assessment Practices	-0.74*
C. Learning Environment	-0.62*
Overall	-0.63*

* Correlation is significant at the 0.05 level.

The Pearson correlation revealed a significant negative correlation between Teacher Techniques to Engage and Support all Students in Learning (r-value=-0.47, p-value<0.05), Instructional and Assessment Practices (r-value=-74, p-value<0.05), and Learning Environment (r-value=-0.62, p-value<0.05). The overall (Teaching Effectiveness) showed a significant negative correlation (r-value=-0.63, p-value<0.05).

The result of the Pearson Correlation showed a significant, which suggests that there was a significant negative relationship between Teaching Effectiveness and Academic Performance. Hence, the hypothesis that there is no significant relationship was *rejected*. Therefore, the data underscore a consistent and significant negative correlation among the various dimensions of teaching effectiveness. When one aspect of teaching is less effective, it tends to correspond to lower effectiveness in other aspects. This emphasizes the interconnectedness of these components in the teaching process and highlights the need for a holistic approach to improving teaching effectiveness.

The findings align with the research of Chakawodza et al. (2024), who demonstrated the effectiveness of blended teaching on academic achievement among Grade 12 learners studying organic chemistry at an underprivileged school in South Africa. The results revealed that participants taught using blended methods (Group 1) scored significantly higher than those taught using traditional face-to-face methods (Group 2). The success of blended teaching—incorporating active learning strategies such as the flipped classroom—was attributed to enhanced learner interactions, deeper learning, increased practice opportunities, and timely addressing of misconceptions, which collectively boosted learners' confidence in organic chemistry. Consequently, blended teaching appeared to motivate Group 1 learners, leading to higher academic achievement, despite the challenges posed by the COVID-19 pandemic.

CONCLUSIONS

The results of the study reveal that teaching effectiveness has a significant impact on students' academic performance in a blended learning environment, which leads to the *rejection of the hypothesis* suggesting no significant relationship between the two. Essential aspects of teaching effectiveness, such as varied instructional strategies, engaging activities, and supportive teaching practices, were found to positively influence student achievement. This implies that in a blended learning context, where traditional face-to-face instruction is integrated with online learning, the quality and adaptability of teaching are crucial for enhancing students' understanding and retention of the material.

Blended learning is particularly effective because it combines the benefits of both in-person and online learning. In-person interactions offer immediate feedback and clarification, while online components provide students with the flexibility to revisit content at their own pace, reinforcing their learning. This combination addresses different learning styles and helps students apply complex concepts more effectively. The study thus emphasized that teaching effectiveness in blended learning not only contributes to academic success but also caters to students' diverse

needs, fostering a more individualized and impactful educational experience.

Furthermore, the data suggest that when educators employ effective teaching practices, such as fostering collaboration among students and using interactive technologies, students are more likely to achieve higher academic outcomes. This highlights the critical role of teaching effectiveness in promoting student success in blended learning frameworks. Ultimately, the findings underscore the necessity for educators to continuously refine their teaching strategies to maximize student engagement and achievement in blended learning environments.

Recommendations

Educational institutions and policymakers can adopt a more integrated approach to teacher professional development that recognizes that teaching effectiveness is a multifaceted and interconnected process. Rather than focusing on isolated aspects, training programs should aim to address all relevant components simultaneously—teaching techniques, instructional and assessment practices, and the creation of a supportive learning environment. A holistic approach ensures that teachers are not only skilled in individual areas but are also able to understand and apply the synergy between these elements, leading to more effective teaching overall. By embedding this interconnected approach into teacher training, institutions can better equip educators to meet students' diverse needs in blended learning environments.

Teacher training programs can be designed to integrate effective teaching techniques, assessment methods, and strategies to create a positive learning environment. Such programs would help educators recognize the significant role each component plays in the learning process and encourage them to adapt their practices based on students' evolving needs. A focus on the interplay between these areas can improve the educator's ability to engage students, provide meaningful feedback, and create an environment that fosters active learning and critical thinking. Moreover, these training initiatives can be tailored to incorporate emerging technologies and online teaching methods, ensuring that teachers are prepared for the unique challenges of blended learning.

Administrators should consider mentoring relationships and peer collaborations among educators to foster the exchange of teaching practices and strategies. Experienced teachers can mentor newer colleagues and offer guidance on effectively integrating various teaching components. By sharing insights on balancing teaching techniques, assessment methods, and the learning environment, seasoned educators can help their peers understand how these elements are interdependent and contribute to teaching success. Peer collaboration and mentoring not only enhance individual teaching practices and help create a culture of continuous professional growth within educational institutions. Teachers who collaborate and learn from each other are more likely to adopt holistic and effective teaching approaches.

LIMITATION AND FURTHER RESEARCH

The limitations of this study are the specific design and methodological characteristics that may have influenced the interpretation of the findings. Future research should address the identified gaps in our understanding arising from these findings and seek to extend and further validate this research.

Future research may include conducting longitudinal studies to track changes in teaching effectiveness over time. By gathering long-term data, researchers can observe how the relationship between teaching techniques, assessment practices, and the learning environment evolves as educators gain more experience. Longitudinal studies can provide valuable insights into whether the interconnectedness of these components strengthens or weakens as teachers

refine their practices. Such studies may also reveal the impact of ongoing professional development and the influence of external factors (such as technological advancements or changes in educational policies) on teaching effectiveness. Understanding these long-term trends will help educators and policymakers develop strategies to continuously improve teaching effectiveness in blended learning settings.

REFERENCES

Aitken, J. E. (2010). Blended Learning for Adaptation to Needs. In *Cases on Online and Blended Learning Technologies in Higher Education: Concepts and Practices* (pp. 76-89). IGI Global. https://doi.org/10.4018/978-1-60566-880-2.CH005

Anthony, J., B., Kamaludin, A., Romli, A.M., Raffei, A.F., Phon, D.N., Abdullah, A., Ming, G.L., Shukor, N.A., Nordin, M.S., & Baba, S. (2019). Exploring the Role of Blended Learning for Teaching and Learning Effectiveness in Institutions of Higher Learning: *An empirical investigation. Education and Information Technologies, 24*, 3433 - 3466. https://doi.org/10.1007/s10639-019-09941-z

Campbell, R. J., Kyriakides, L., Muijs, R. D., & Robinson, W. (2003). Differential Teacher Effectiveness: Towards a Model for Research and Teacher Appraisal. *Oxford Review of Education*, *29*(3), 347–362. https://doi.org/10.1080/03054980307440

Chakawodza, J. M., Nakedi, E. M., & Kizito, R. N. (2024). The Effectiveness of Flipped Classroom Pedagogy in Promoting learning engagement in Organic Chemistry in Grade-12 Students in the Context of South Africa and Covid-19. *International Journal of Science Education*, 1–27. https://doi.org/10.1080/09500693.2024.2342574

Cohen, L., Manion, L., & Morrison, K. (2018). *Research Methods in Education (8th ed.)*. London: Routledge. https://doi.org/10.4324/9781315456539

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, *2*(2-3), 87-105. https://doi.org/10.1016/S1096-7516(00)00016-6

Gravetter, F. J., & Wallnau, L. B. (2007). *Statistics for the Behavioral Sciences* (7th ed.). Thomson Wadsworth. https://psycnet.apa.org/record/2007-18967-000

Hoidn, S., & Reusser, K. (2020). Foundations of Student-Centered Learning and Teaching. In *The Routledge International Handbook of Student-Centered Learning and Teaching in Higher Education* (pp. 17-46). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9780429259371-3/foundations-student-centered-learning-teaching-sabine-hoidn-kurt-reusser

Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended Learning Effectiveness: The Relationship Between Student Characteristics, Design Features and Outcomes. *International Journal of Educational Technology in Higher Education*, *14*, 1-20. https://doi.org/10.1186/s41239-017-0043-4

Klimova, B. (2021). Blended Learning as an Effective Approach to English Language Teaching at the Institutions of Higher Learning—A Case Study. In: Park, J.J., Loia, V., Pan, Y., Sung, Y. (eds) *Advanced Multimedia and Ubiquitous Engineering. Lecture Notes in Electrical Engineering, vol 716*. Springer, Singapore. https://doi.org/10.1007/978-981-15-9309-3_17

Lomax, R. G., & Hahs-Vaughn, D. L. (2013). *An Introduction to Statistical Concepts*. Abingdon-on-Thames: Routledge. https://www.scirp.org/reference/referencespapers?referenceid=2345953

Marie, M.J. (2020*).* Improved Pedagogical Practices Strengthens the Performance of Student Teachers by a Blended Learning Approach. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3631708

Mastrokoukou, S., Kaliris, A., Donche, V., Chauliac, M., Karagiannopoulou, E., Christodoulides, P., &

Longobardi, C. (2022, March). Rediscovering Teaching in University: A Scoping Review of Teacher Effectiveness in Higher Education. In *Frontiers in Education* (Vol. 7, p. 861458). Frontiers Media SA. https://doi.org/10.3389/feduc.2022.861458

Means, Barbara and Toyama, Yuki and Murphy, Robert and Bakia, Marianne and Jones, Karla (2009) *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies.* Project Report. Centre for Learning Technology. https://repository.alt.ac.uk/629/

Morris, N. P. (2010). Blended Learning Approaches Enhance Student Academic Performance. In *Proceedings of Enhancing Learning Experiences in Higher Education: International Conference*. Hong Kong University. http://www.cetl.hku.hk/conference2010/conf_proc.htm

Obiedat, R, Eddeen, L., Alassaf, N. (2014) Effect of Blended-Learning on Academic Achievement of Students in the University of Jordan. *International Journal of Emerging Technologies, 9*(2), 37-44. https://doi.org/10.3991/ijet.v9i2.3220

Sevari, K., & Falahi, M. (2017). Develop and improve teaching and learning through blended learning Teaching Development and Improvement through Blended Learning. *Journal of Educational Studies*, *10*, 20-26. http://nama.ajaums.ac.ir/article-1-255-en.html

Stacey, E., Gerbic, P. (2006). Teaching for Blended Learning. In: Kumar, D., Turner, J. (eds) *Education for the 21st Century — Impact of ICT and Digital Resources. IFIP WCC TC3 2006. IFIP International Federation for Information Processing, vol 210*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-34731-8_24

Su, F., Zou, D., Wang, L., & Kohnke, L. (2023). Student engagement and teaching presence in blended learning and emergency remote teaching. *Journal of Computers in Education*, 1 - 26. https://doi.org/10.1007/s40692-023-00263-1

Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022). The Effectiveness of Blended Learning on Students' Academic Achievement, Self-Study Skills and Learning Attitudes: A Quasi-Experiment Study in Teaching the Conventions for Coordinates in the Plane. *Heliyon*, *8*(12). https://doi.org/10.1016/j.heliyon.2022.e12657

Vaughan, N.D. (2014). Student Engagement and Blended Learning: Making the Assessment Connection. *Education Sciences, 4*, 247-264. https://doi.org/10.3390/EDUCSCI4040247

Wang, Y., Han, X., & Yang, J. (2015). Revisiting the Blended Learning Literature: Using a Complex Adaptive Systems Framework. *Journal of Educational Technology & Society*, *18*(2), 380-393. https://www.jstor.org/stable/jeductechsoci.18.2.380