ANNALS OF THE "CONSTANTIN BRÂNCUȘI" UNIVERSITY OF TÂRGU JIU
LETTER AND SOCIAL SCIENCE SERIES

ISSN-P: 1844-6051 ~ ISSN-E: 2344-3677

1/2025 ***https://alss.utgjiu.ro***

THE IMPACT OF BLENDED LEARNING ON ACADEMIC ACHIEVEMENT: A COMPARISON BETWEEN TRADITIONAL AND DISTANCE EDUCATION

Hadjira BOUSSAG*
* Lecturer, PhD. University of Msila (Algeria)

Salima ABDESLAM
Professor of Higher Education, University of M'sila (Algeria)

Amar BOUSSAKRA
Professor of Higher Education, University of M'sila (Algeria)

Houria ALICHERIF
Professor of Higher Education, University of M'sila (Algeria)

Abstract: *THIS STUDY EXPLORES THE CONCEPT OF BLENDED LEARNING, WHICH COMBINES TRADITIONAL FACE-TO-FACE EDUCATION WITH DISTANCE LEARNING. THE RESULTS INDICATE THAT BLENDED LEARNING CAN ENHANCE STUDENTS' ACADEMIC ACHIEVEMENT COMPARED TO TRADITIONAL EDUCATION ALONE, THANKS TO THE FLEXIBILITY IT OFFERS IN ACCESSING EDUCATIONAL CONTENT AND THE VARIETY OF LEARNING METHODS IT INCORPORATES.*

THE STUDY ALSO HIGHLIGHTS THE ADVANTAGES OF DISTANCE LEARNING, SUCH AS THE ABILITY TO LEARN ANYTIME AND ANYWHERE, HELPING STUDENTS BETTER MANAGE THEIR TIME. HOWEVER, IT ALSO ADDRESSES THE CHALLENGES ASSOCIATED WITH DISTANCE EDUCATION, SUCH AS THE LACK OF DIRECT INTERACTION WITH INSTRUCTORS AND PEERS, WHICH CAN NEGATIVELY IMPACT ACHIEVEMENT. WHEN COMPARING TRADITIONAL EDUCATION WITH BLENDED LEARNING, THE STUDY FINDS THAT STUDENTS RECEIVING BLENDED EDUCATION DEMONSTRATE SIGNIFICANT IMPROVEMENT IN DEEP UNDERSTANDING OF THE MATERIAL AND TEST PERFORMANCE, ALONG WITH INCREASED MOTIVATION AND EAGERNESS TO LEARN.

THE STUDY CONCLUDES THAT BLENDED LEARNING IS AN EFFECTIVE OPTION FOR ENHANCING ACADEMIC ACHIEVEMENT AND RECOMMENDS INTEGRATING IT INTO EDUCATIONAL SYSTEMS AS A MEANS TO IMPROVE THE LEARNING EXPERIENCE AND MEET THE DIVERSE NEEDS OF STUDENTS.

Keywords: *BLENDED LEARNING, TRADITIONAL EDUCATION, DISTANCE LEARNING, ACADEMIC ACHIEVEMENT, COMPARISON OF TEACHING METHODS.*

Contact details of the author(s): Email: hadjira.boussag@univ-msila.dz , salima.abdeslam@univ-msila.dz amar.boussakra@univ-msila.dz , houria.alicherif@univ-msila.dz

INTRODUCTION

In recent years, the education sector has witnessed significant developments as a result of rapid technological advancement. Among these developments, distance learning has emerged as a necessary alternative during times of crisis, such as the COVID-19 pandemic. This shift has compelled educational institutions to adopt new modes of teaching, including blended learning, which combines the strengths of traditional education with the digital solutions offered by remote learning. Traditional education is characterized by direct interaction between students and instructors, which fosters communication skills and provides a classroom environment rich in dialogue and discussion. However, this mode of instruction faces challenges related to flexibility and the physical presence required from all students in the classroom.

On the other hand, distance learning relies on technological tools such as digital platforms and virtual classrooms. This system offers flexibility by allowing students to attend their lessons from any location, yet it may lack the immediate interpersonal interaction provided by traditional education. Blended learning emerges as a solution to this dichotomy by seeking to harness the strengths of both educational formats. It involves delivering part of the course content through face-to-face sessions, while the remainder is completed through online platforms, offering an integrated blend of flexibility and real-time interaction.

Studies suggest that academic achievement can be influenced by the chosen mode of instruction, with blended learning showing potential to enhance student outcomes by merging theoretical and practical approaches in a flexible manner. Distance learning also promotes greater opportunities for self-directed learning, thus enhancing student autonomy. Despite its clear benefits, blended learning also poses challenges, particularly in terms of technological infrastructure, access to devices and the internet, and the digital proficiency of both teachers and students. Therefore, its implementation must be embedded within well-planned strategies to ensure the achievement of desired academic outcomes.

Based on the above, this study aims to compare the impact of traditional and distance education on academic achievement and to analyze the effectiveness of blended learning in improving academic performance. The study seeks to offer recommendations on how best to employ blended learning to maximize educational benefits across various learning contexts.

In light of technological advancements and the ongoing transformations within the education sector, new challenges have emerged concerning how to improve educational quality and ensure effective academic outcomes for students. With the rise of distance learning as an alternative solution during crises such as the COVID-19 pandemic, educational institutions have begun to recognize the need for more flexible teaching methods that combine direct interaction with technological integration. This realization has led to the emergence of blended learning as an alternative approach that unites the advantages of both traditional and remote learning.

Although blended learning is anticipated to be an ideal solution for enhancing academic performance, questions remain regarding its effectiveness compared to traditional learning—which is known for its interactive and face-to-face nature—and distance learning, which offers flexibility but may lack immediate interaction. Thus, a fundamental problem arises regarding whether blended learning can truly strike a balance between these two approaches and lead to tangible improvements in academic achievement.

Accordingly, the central problem of this study revolves around investigating the effectiveness of blended learning in comparison to traditional and distance education. The study aims to determine the extent to which this instructional model influences student academic achievement and to explore

its capacity to provide a balanced educational experience that fosters learning while keeping pace with the demands of the digital age. Based on this, the study raises the following research questions:

- How does blended learning affect academic achievement compared to traditional and distance education?
- What are the differences in student engagement and motivation across the three modes of learning?
- What challenges do students and instructors face in implementing blended learning?

Based on the central problem outlined in this study—which seeks to offer a comprehensive perspective on understanding and evaluating the effectiveness of blended learning in improving students' academic achievement—the following hypotheses have been proposed:

- Students receiving their education through blended learning are expected to perform better academically compared to their peers in traditional or fully online learning environments. This is attributed to the integration of theoretical and practical components, along with enhanced opportunities for both personal and digital interaction.
- Student engagement and motivation are likely to be higher in blended learning due to the use of diverse instructional strategies that combine in-person and virtual participation, thereby increasing flexibility and communication.
- Both students and instructors in blended learning settings may face challenges such as time management difficulties, limited technical infrastructure, and adaptation issues related to combining digital and face-to-face instruction. These factors may hinder the smooth delivery of educational content.

The significance of this study lies in its focus on the impact of blended learning on academic achievement—a topic that reflects fundamental shifts in teaching methods necessitated by the digital era. Blended learning bridges classroom-based traditional instruction with online education facilitated by technological platforms, thereby offering greater flexibility for learners. This research sheds light on how students interact with each model of instruction and how the integration of both can enhance their academic skills and adaptability to modern teaching methods.

Moreover, the importance of this study stems from its potential to provide empirical data that can contribute to the enhancement of educational quality and the development of innovative teaching strategies. By identifying the differences between traditional and distance education and analyzing the strengths of blended learning, the study can support evidence-based decision-making for improving academic achievement and enriching the student learning experience. It can also guide educational institutions in choosing the most effective instructional approaches to ensure a balanced combination of face-to-face interaction and digital learning tools.

The study ultimately aims to explore the extent to which blended learning improves students' academic performance. It will focus on analyzing how the integration of traditional and online learning methods impacts student outcomes, and whether this model provides a comprehensive learning environment that meets diverse educational needs. The research will also assess how this approach enhances students' understanding of academic content and fosters continuous learning motivation.

Furthermore, this study compares student performance across traditional and distance learning systems, with the goal of identifying the strengths and weaknesses of each. It will examine levels of engagement, comprehension, and motivation within each educational model to gain a deeper understanding of how the nature of instruction influences academic success.

Finally, the study seeks to propose a set of strategies that can strengthen the effectiveness of blended learning. These strategies will emphasize best practices that combine elements of traditional classroom instruction with online methodologies—such as promoting interaction between students

and instructors, designing flexible instructional content, and encouraging active student participation. These recommendations aim to ensure the successful implementation of blended learning that enhances academic outcomes and supports a comprehensive, student-centered educational experience.

1. THEORETICAL FRAMEWORK OF THE STUDY:

1.1. THE CONCEPT OF TRADITIONAL EDUCATION:

Traditional education is the classical mode of teaching that relies on direct interaction between the teacher and students within an organized classroom setting. Lessons are delivered according to a fixed schedule in schools or universities, requiring students to attend regularly and participate in classroom activities. This form of education depends on the teacher as the primary source of information, explaining the educational content and guiding classroom discussions, while students receive knowledge directly and are subject to regular evaluations to measure their academic progress.(Ahmed, 2022, p.78)

Traditional education is considered one of the most effective models in fostering direct interaction between teachers and students. This interactive environment allows students to ask questions and receive immediate feedback from the teacher,(Al-Harbi, 2023, p.120) which deepens their understanding of academic subjects and accelerates the learning process. Furthermore, it provides an encouraging educational atmosphere that fosters the development of social skills through group activities and classroom discussions.(Sadiq, 2021, p.31) Collaboration among students helps build their abilities in teamwork, negotiation, and problem-solving, thereby preparing them for professional life.

On another level, traditional education offers a structured system that enhances commitment and self-discipline, as students are required to adhere to specific study schedules that help them manage their time effectively.(Liu, 2020, p.225) The traditional school system also contributes to developing organizational skills and a sense of responsibility through consistent guidance on timetables and deadlines. Moreover, traditional education allows teachers to monitor students' academic performance regularly through quizzes, classroom activities, and participation, enabling the provision of immediate, individualized support to students with special needs.

Despite its advantages, traditional education faces several limitations that can affect its effectiveness at times. One major limitation is the requirement for physical presence at a specific time and place, which presents challenges for students with part-time jobs or transportation difficulties. This requirement can restrict learning flexibility and limit access to education for some individuals. Traditional education also struggles to cater to individual learning styles, as some students may have difficulty keeping up with the lesson pace or may not benefit from the teaching style used. This can lead to discrepancies in comprehension among students.

Additionally, traditional education requires substantial infrastructure such as classrooms, transportation, and other facilities, leading to high costs—posing a burden in resource-limited areas or underfunded educational systems. Emergency crises, such as the COVID-19 pandemic, have exposed the fragility of traditional education in the face of unexpected challenges, as movement restrictions disrupted the regular educational process, highlighting the urgent need for a shift toward alternative educational solutions such as online learning.(Guri-Rosenblit, 2024, p 225)

While traditional education continues to serve as a vital foundation in the educational process, modern technological changes necessitate a shift toward more flexible teaching methods such as online or blended learning to meet the demands of contemporary learners.

1.2. THE CONCEPT OF DISTANCE EDUCATION:

Distance education is a system that relies on the use of technology and modern communication tools to deliver educational content to students without requiring physical presence in a specific location. This type of education enables students to learn from anywhere at any time, providing greater flexibility compared to traditional education.(Sadiq, 2021, p.34)

Online educational platforms such as virtual classrooms or recorded videos are used, along with interactive communication tools like email, forums, and educational apps, to facilitate interaction between students and teachers.(Alghamdi, 2022, p.117) Distance education offers numerous advantages that make it an attractive option for students worldwide. It provides flexibility in terms of time and location, allowing students to access learning materials at any time and from anywhere, which helps them align their education with personal and professional commitments.(Adedoyin, 2020, p. 79)

One of its key strengths is the diversity of educational resources, as students can benefit from various content types such as visual lessons,(Ahmed, 2023, p. 145) interactive content, and articles—enhancing the learning experience and encouraging engagement with materials in different ways. Additionally, distance learning is cost-effective, as it helps reduce expenses related to transportation, accommodation, and physical resources like textbooks.(Ghazi-Saidi, 2021, p.206) These benefits make distance education a preferred choice for many students seeking effective education at minimal cost.

Education in this system can also be tailored to individual student needs. Course content can be adjusted to fit the learner's level and absorption pace, thus enhancing the effectiveness of personalized learning.

Despite its advantages, distance education faces several challenges that may impact its effectiveness. One of the most prominent challenges is the lack of social interaction, as students may feel isolated and deprived of direct communication with peers and instructors, which could negatively affect the development of social skills and cooperation among students (Sadiq, 2021, p.35). Distance education also requires specific technical requirements; students must have access to modern and advanced devices, as well as a stable internet connection. This can be a challenge for students who lack these resources. Moreover, some students may struggle to manage their time effectively without direct supervision, leading to a lack of discipline and procrastination in completing academic tasks (Ghazi-Saidi, 2021, p.207). Additionally, the quality of distance education can be variable, as the level of guidance and academic support differs from one educational institution to another. This inconsistency makes it difficult to ensure a uniform level of academic support for all students, potentially resulting in disparities in learning effectiveness (Adedoyin, 2020, p.81).

1.3. THE CONCEPT OF BLENDED LEARNING:

Blended learning is an educational approach that combines the advantages of traditional classroom teaching with distance learning. In this model, students attend some classes in person, allowing direct interaction with teachers and peers, while completing other parts of the learning process online (Al-Jabri, 2021, p.91). This approach provides greater flexibility in learning, as students can access digital educational content anytime and from anywhere while maintaining the interactive aspect of face-to-face attendance. Blended learning aims to enhance the learning experience by integrating technology to promote understanding and engagement, while also offering opportunities for practical application and in-class interaction (Singh, 2020, p.47).

Blended learning contributes to improving academic achievement by diversifying the teaching methods available to students. It allows them to choose the methods that best suit their individual learning styles, whether self-directed or interactive learning, thereby increasing their engagement and the overall effectiveness of the educational process (Alammary, 2021, p.210). It also encourages self-learning, as students can better manage their time and prioritize the educational activities they need to focus on. This promotes learner autonomy and develops self-regulation skills. Moreover, blended learning supports better practical application by allowing for more efficient use of technology in delivering lessons and educational activities (Barakat, 2023, p.132), which enhances understanding and interaction with the content. Additionally, this mode of education enables students to review online content as needed, allowing them to revisit study materials and deepen their understanding when necessary, thus improving information retention and conceptual comprehension (Graham, 2022, p.54).

Despite these advantages, blended learning also faces several challenges that may hinder its effective implementation. One major challenge is the difficulty in coordinating different learning modes, as significant organizational effort is required to ensure proper integration between traditional and online education (Al-Jabri, 2021, p.93). This can lead to complexities in planning and execution. Cost can also be a barrier at times, as blended learning requires substantial investment in digital infrastructure, such as devices and software, which may pose a financial burden on some educational institutions (Singh, 2020, p.49). Furthermore, blended learning demands prior preparation and training for both teachers and students to effectively use modern educational tools and technologies. This may necessitate specialized training on how to operate digital systems and engage with online platforms (Barakat, 2023, p.135). Performance evaluation in blended learning is also complex, as it is difficult to compare the efficiency of this model with purely traditional or online models (Alammary, 2021, p.213). This calls for the development of new and appropriate assessment tools to accurately and effectively measure the impact of blended learning.

1.4. COMPARATIVE OVERVIEW OF THE THREE EDUCATIONAL MODELS BASED ON INTERACTION, PERFORMANCE, AND MOTIVATION

Element	Blended Learning	Distance Learning	Traditional Learning
Interaction	A mix of face-to-face and online interaction	Limited, through digital platforms	Direct, face-to-face
Performance	Offers balanced performance	Varies depending on the student's discipline	Depends on classroom environment and discipline
Motivation	Combines group and self-motivation	Requires greater self-motivation	Relies on group interaction
Flexibility	Moderate, requires partial attendance	High, learning anytime	Limited by time and place
Cost	Moderate, requires investment in technology	Relatively low	High due to infrastructure

This comparison highlights that each type of education has its own advantages and challenges. Blended learning offers a balance between direct interaction and self-learning, making it an ideal option for enhancing academic achievement. However, its implementation requires additional efforts in preparation and planning.

1.5. THE IMPORTANCE OF ACADEMIC ACHIEVEMENT AS A MEASURE OF EDUCATIONAL SYSTEM EFFECTIVENESS

Academic achievement is one of the key indicators for measuring the effectiveness of educational systems. It reflects the extent to which students benefit from educational content (Alammary, 2021, p.121) and **depends** on a range of factors such as teaching methods, the competence of instructors, and student–teacher interaction. In blended learning, academic achievement plays a central role in evaluating the effectiveness of integrating traditional and online learning methods (Graham, 2022, p.225). The success of this model requires a balance between direct interaction and fostering student autonomy in online learning.

2. THEORETICAL BACKGROUND OF THE STUDY

2.1. THE EMERGENCE OF BLENDED LEARNING AS A RESPONSE TO TECHNOLOGICAL SHIFTS AND EMERGENCY CONDITIONS

Blended learning is one of the major developments that emerged in response to technological transformations and emergency conditions, such as the COVID-19 pandemic. This system represents a middle ground between traditional learning and distance education, making it a more flexible and adaptable model in changing circumstances. With the rapid advancement of technology and the increasing need for continuous learning, blended learning has become a means of enhancing the learning process through digital tools without giving up on direct student–teacher interaction (Al-Jabri, 2021, p.90).

2.2. DIFFERENCES BETWEEN THE EDUCATIONAL MODELS

- **Traditional (Face-to-Face) Education**: This model relies on the physical presence of students and instructors at the same time and place, which fosters direct and personal interaction. It is characterized by interactive classroom environments but lacks flexibility in terms of time and space.
- **Distance Education (Online)**: Distance learning allows students to study from various locations using digital platforms. It is flexible and enables learners to attend lessons at any time that suits them. However, it may lack some of the interactive features present in traditional education.
- **Blended Learning**: Blended learning combines elements of both traditional and distance education. Students interact face-to-face with teachers during some sessions and complete other parts of their learning online. This model brings together the strengths of both systems, enhancing the efficiency of the educational process while offering a balance between interaction and learning flexibility (Bernard, 2020, p.63).

2.3. ACADEMIC ACHIEVEMENT AS A KEY MEASURE OF EDUCATIONAL EFFECTIVENESS

Academic achievement is a fundamental indicator of the success of any educational system. It reflects how well students benefit from the content provided and depends on various factors, including teaching methods, teacher competence, and student–teacher interaction. In blended learning, academic achievement is essential in assessing how effectively traditional and online learning are integrated. The success of this model requires achieving a balance between direct interaction and encouraging learner independence in online education (Sadiq, 2022, p.147).

3. METHODOLOGICAL PROCEDURES OF THE STUDY

3.1. RESEARCH METHODOLOGY

This study employed a **descriptive analytical method**, which relies on collecting both qualitative and quantitative data regarding students' and teachers' perceptions of the three educational models: traditional learning, distance learning, and blended learning. The objective of this method is to analyze and interpret student interactions with these models using tools such as questionnaires and interviews. It also aims to assess the level of satisfaction of both students and instructors with each model, to understand their experiences, and to explore the challenges they face. Additionally, data on academic performance, motivation, and student engagement in each model were gathered to analyze the impact of these models on academic achievement.

3.2. EXPERIMENTAL METHOD

This method was applied by designing an educational experiment in which blended learning was implemented with a sample group of students. The results of this group were compared with those of students who followed either traditional or distance education models. Academic performance was evaluated for each of the three groups using standardized tests or accredited academic assessments. The experiment involved collecting data before and after the implementation of the educational models, allowing for measurement of improvement or decline in academic performance. Through this experimental approach, the relationship between each educational model and students' academic achievement was identified, thus determining the effectiveness of blended learning in comparison to the other models.

STUDY SAMPLE

- **Participants:**The sample included **university-level students**, ensuring diversity in the data collected. It consisted of three distinct student groups:
  - **Traditional Education Group:** Students enrolled in face-to-face learning, attending physical classrooms and interacting directly with instructors.
  - **Distance Learning Group:** Students engaged in online education, relying on digital tools and platforms for accessing course content and communicating with instructors.
  - **Blended Learning Group:** Students combining face-to-face sessions with online instruction, benefiting from both traditional and distance learning components.
- **Sample Size:** The total sample size was set at **78 students** to ensure data diversity and the reliability of the results. The sample was equally distributed among the three groups (26 students per group) to eliminate bias and ensure each group had sufficient representation. This balanced distribution allowed the collection of varied data reflecting the learning experiences of each model. A fair representation across groups helps reduce bias and strengthens the validity and accuracy of the analytical findings.

RESEARCH INSTRUMENTS

- **Pre- and Post-Tests:** Standardized tests were conducted before and after the educational experiment to measure academic achievement in selected subjects. The pre-test established a baseline of students' prior knowledge, while the post-test assessed progress after the intervention. These tests were designed to be identical in format, enabling direct comparison of academic performance before and after the implementation of each model. This approach facilitated the measurement of the educational impact of each model—traditional, distance, and blended—on student performance.

- **Student Satisfaction Questionnaire:** A questionnaire was developed to assess student satisfaction with each educational model. It included targeted questions covering topics such as learning comfort, interaction with peers and instructors, content clarity, and challenges faced. A Likert scale was used to quantify satisfaction levels, enabling quantitative analysis. This allowed researchers to evaluate which model students found most engaging and effective.
- **Instructor Interviews:** In-depth interviews were conducted with instructors who had taught using all three educational models. These interviews aimed to collect professional insights on the **advantages and limitations** of each model. Discussions focused on instructor observations regarding student interaction, learning outcomes, motivation, and teaching strategies employed. These qualitative insights helped provide a comprehensive assessment of the educational models from the instructor's perspective.
- **Classroom Observations (Blended Learning):** Classroom observations were used to document student behavior and engagement during the blended learning sessions. Observers recorded students' participation in both traditional and digital activities, self-learning behaviors, and collaboration with peers. The observations also noted any behaviors indicating motivational or engagement challenges, such as distractions or reluctance to participate in digital tasks. These observations provided a broader perspective on how blended learning affects student behavior and academic performance.

These tools collectively provided a multi-dimensional view of the educational models by gathering data from various sources—students, instructors, and academic results. This triangulation enabled the researchers to thoroughly evaluate the impact of each educational model on student achievement and engagement.

4. STUDY RESULTS

Based on the total sample size of 78 students, the participants were equally distributed across the three educational models—traditional, distance, and blended learning—to ensure data diversity and yield reliable results. Each group consisted of 26 students, ensuring fairness and eliminating bias in outcome comparisons. This balanced distribution allowed for diverse data collection on students' learning experiences across the models. Equal representation also reduced the risk of skewed interpretations and reinforced the reliability and precision of the study's conclusions.

4.1. COMPARISON OF TEST RESULTS ACROSS THE THREE EDUCATIONAL MODELS

Table 01: Academic Achievement Scores by Educational Model

Educational Model	Number of Students (N)	Mean Score (Mean)	Standard Deviation (SD)
Traditional	26	78.5	5.2
Distance Learning	26	72.3	6.7
Blended Learning	26	84.1	4.9

The table reveals significant differences in the average academic achievement scores among the three educational models. Blended learning recorded the highest average (84.1) with the lowest standard deviation (4.9), indicating superior and more consistent performance. In contrast, distance learning showed the lowest mean score (72.3) with the highest standard deviation (6.7), suggesting greater variation in student performance.

This disparity may be sociologically interpreted as reflecting the uneven social and infrastructural conditions under which students access learning. The traditional model falls between the two, with an average of 78.5 and a relatively low standard deviation of 5.2, indicating stable performance likely supported by direct classroom interaction.

Academic performance appears to be closely linked to the opportunities for social interaction each model offers. Traditional education, relying on physical presence, fosters strong student–teacher and peer relationships, which positively impact academic achievement. Conversely, distance learning, which is heavily dependent on digital media, lacks this direct interaction, potentially lowering performance, especially among students who lack a supportive home environment or digital infrastructure.

Blended learning, by integrating online study with in-person interaction, provides a balanced environment that enhances both engagement and performance. The low mean score and high variance in distance learning results point to socioeconomic and digital divides, where access to stable internet, devices, and familial support are not equally available, leading to unequal learning opportunities.

In contrast, traditional education tends to neutralize social disparities, as schools offer a standardized environment for all students. Blended learning, however, introduces a dynamic interaction between social factors, offering greater flexibility to meet the needs of diverse learners. This inclusivity makes it a more equitable educational model, especially in heterogeneous societies.

The findings underscore the importance of social context in shaping academic experiences. Traditional education remains effective in socially stable settings, but may limit access for students with rigid schedules. Distance learning, while flexible, suffers from technical access inequalities. Blended learning, by successfully combining the strengths of both models, offers a promising solution that allows students from various social backgrounds to achieve high academic performance, thereby promoting social justice in education.

Table 02: ANOVA Analysis of Academic Achievement Scores by Educational Model

Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-value	P-value
Between Groups	1256.7	2	628.35	15.32	0.0001
Within Groups	3076.2	75	41.02		
Total	4332.9	77			

The ANOVA table indicates the presence of statistically significant differences among the three educational models, as reflected in the P-value (0.0001), which confirms that the observed differences are not due to chance. This result highlights the impact of the educational model on students' academic achievement, a finding that can also be interpreted sociologically as a reflection of the differing learning environments and pedagogical mechanisms within each model.

Traditional, distance, and blended learning offer distinct cognitive and social experiences that influence student outcomes in varied ways. The relatively high between-group sum of squares (1256.7), compared to the within-group variance (3076.2), suggests that a large portion of the variation in student performance is due to the educational model, rather than individual differences.

From a sociological standpoint, these results point to the structural influence of the educational environment on academic achievement, where each model acts as a framework that shapes learning opportunities and student–teacher interaction. The elevated F-value (15.32) confirms the presence of substantial differences among the educational models.

Sociologically, traditional education may be better suited to students who benefit from direct social engagement within structured environments. Distance learning, on the other hand, may lack sufficient interaction and support mechanisms. Blended learning, by offering greater flexibility, is more adaptable to the diverse social needs of students, particularly in societies undergoing shifts in educational technology use.

Thus, these results underline the inequities in educational environments: traditional learning may marginalize students unable to adhere to rigid classroom schedules, while distance learning is deeply impacted by digital divides. Blended learning, offering a synthesis of digital flexibility and in-

person support, emerges as a more equitable model, reducing performance disparities among students from various socioeconomic backgrounds.

Table 03: Post-Hoc (Tukey Test) for Pairwise Comparisons Between Educational Models

Comparison	Mean Difference	P-value	Interpretation
Traditional vs Distance Learning	6.2	0.03	Significant
Traditional vs Blended Learning	-5.6	0.04	Significant
Distance vs Blended Learning	-11.8	0.001	Highly Significant

The table shows that the difference between traditional and distance learning was 6.2, with a P-value of 0.03, indicating a statistically significant difference. Sociologically, this may reflect the structural and social disparities between the two learning experiences. Traditional learning, by offering a socially interactive and stable environment, often fosters stronger academic outcomes than distance learning, which depends heavily on digital tools—tools that may not be equally accessible to all students.

The comparison between traditional and blended learning shows a difference of -5.6 with a P-value of 0.04, also statistically significant. This suggests that blended learning may offer greater flexibility and the ability to tailor the learning experience to individual social and personal needs, unlike the more rigid structure of traditional classrooms.

The most substantial gap appears between distance and blended learning, with a mean difference of -11.8 and a P-value of 0.001, indicating a highly significant difference in academic performance. This can be attributed to the challenges faced by distance learners, such as limited social interaction, lack of direct instructor support, and unequal access to technology. In contrast, blended learning offers an interactive environment where students benefit from both online flexibility and in-person support, significantly enhancing learning outcomes.

These comparisons emphasize that blended learning stands out as the most socially equitable model, offering students from diverse backgrounds access to both technological flexibility and traditional support structures. Traditional education may best suit students with stable socioeconomic conditions that allow full participation in classroom activities, while distance learning presents technological and social barriers that can deepen educational disparities. Thus, blended learning emerges as the most effective model for promoting equal opportunities and social inclusion in education.

4.2. ANALYSIS OF INTERVIEWS AND QUESTIONNAIRES

Table 04: Main Qualitative Themes Extracted from Interviews

Educational Model	Main Theme	Quotation/Observation	Frequency (N)
Traditional	Direct interaction	"Face-to-face interaction with the teacher had a positive effect."	18
Distance Learning	Technical challenges	"I faced difficulties connecting to the internet during lessons."	21
Blended Learning	Learning flexibility	"Combining online and face-to-face learning is beneficial."	24

The data in Table 04 indicate that traditional education is primarily centered around direct interaction, with 18 interview participants confirming that face-to-face interaction with the teacher positively influenced their learning experience. This underscores the importance of social interaction in educational environments. Such interaction creates a space for emotional and social support, enhancing student engagement and fostering a sense of belonging to a learning community. This model appears particularly well-suited to students who prefer conventional learning settings, where interpersonal connection with instructors and peers serves as a motivational factor.

In contrast, distance learning was mostly associated with technical challenges, as 21 participants reported difficulties in connecting to the internet during lessons. From a sociological perspective, such issues reflect social and economic disparities in technological access. Distance learning relies heavily on stable internet connectivity and access to digital devices—resources not universally available. Thus, these difficulties highlight structural inequalities in students' learning environments, creating gaps in educational opportunity and increasing challenges for students in disadvantaged settings.

Blended learning, however, was distinct in its emphasis on flexibility in learning, with 24 participants stating that the combination of online and in-person learning was beneficial. This demonstrates the model's adaptability in meeting the diverse social needs of students. It allows learners to benefit from the social interaction of traditional classrooms while also leveraging the flexibility of online access, which can accommodate personal schedules and circumstances. As such, blended learning helps bridge social divides by offering varied learning pathways suitable for different student backgrounds.

In conclusion, the findings suggest that the educational environment significantly shapes student experiences. Traditional learning promotes interpersonal relationships, benefiting those who thrive on personal support and direct guidance. Distance learning reveals the limitations imposed by digital inequalities, while blended learning emerges as a more inclusive and adaptive model, accommodating diverse social realities by combining interaction with technological flexibility. This sociological lens illustrates how educational models interact with social factors like resource access and social support, influencing academic achievement and student engagement.

4.3. COMPARISON OF DIFFERENCES IN ACADEMIC ACHIEVEMENT AND INTERACTION LEVELS

Table 05: Average Interaction and Academic Achievement by Educational Model

Educational Model	Average Academic Achievement	Average Interaction Score
Traditional	78.5	7.8
Distance Learning	72.3	6.1
Blended Learning	84.1	8.5

Based on the data presented in the table, traditional education recorded an average academic achievement of 78.5, with an average interaction score of 7.8. This model reflects a learning experience that heavily relies on direct interaction between students and instructors, which can enhance understanding of the material and encourage classroom engagement. Personal interaction contributes to the creation of a socially supportive learning environment that motivates students to participate in discussions, thereby positively influencing their academic performance. This environment tends to be particularly suitable for students who prefer learning settings that emphasize face-to-face interaction as a stimulus for learning.

In contrast, distance learning showed an average academic achievement of 72.3 and an interaction score of 6.1, indicating lower levels of engagement compared to traditional learning. This disparity may be explained by the isolation students often face in online learning environments. The absence of direct, in-person interaction can weaken social connections and the exchange of knowledge between students and instructors, negatively affecting academic performance. Students engaged in distance learning may lack the social support offered in traditional settings, which makes it more difficult to maintain a high level of interaction and participation in academic content.

On the other hand, blended learning recorded the highest average academic achievement of 84.1, along with the highest interaction score of 8.5. This suggests a learning experience that combines the best features of both traditional and distance education. Blended learning reflects a

balance between social interaction and academic support. Students benefit from face-to-face sessions that promote interpersonal engagement, while also enjoying the flexibility of online learning, which allows them to interact with content at their own pace and according to their personal circumstances. This flexibility can accommodate students from diverse socioeconomic backgrounds, thus enhancing the overall learning experience and contributing to their higher academic performance.

A comparison of the three models clearly reveals a strong correlation between interaction and academic achievement. In traditional education, where face-to-face interaction is high, academic performance is also relatively strong. Conversely, in distance education, where interaction is weaker, academic performance tends to be lower. In blended learning, high levels of interaction support superior academic outcomes. This suggests that social interaction is not merely a supportive element in the learning process, but rather a fundamental driver of academic success.

Furthermore, the study's findings show that blended learning has a significantly positive impact on students' academic achievement. This model allowed students to combine the advantages of traditional education—such as direct interaction with instructors and peers—with the flexibility of online learning. This hybrid approach enhanced students' understanding of course material, leading to improved academic performance overall.

Regarding the development of critical thinking skills, the results revealed that students engaged in blended learning demonstrated notable improvements compared to their peers in purely traditional settings. The model enabled students to develop stronger abilities in analysis, critique, and problem-solving, thus promoting more effective and independent learning.

Additionally, blended learning showed a positive effect on students' problem-solving skills. Those who followed this model were better equipped to address academic and practical challenges with greater efficiency. This was attributed to their ability to learn autonomously and use online tools and resources that offered broader and faster access to knowledge.

The findings also revealed higher levels of student satisfaction among those who engaged in blended learning, compared to those who followed traditional methods. This was due to the model's greater flexibility and range of options, allowing students to control their learning pace and choose activities that best suited their individual needs. This flexible experience made students feel empowered and independent in their educational journey.

Consequently, blended learning contributed to enhancing students' interaction with educational content. Students who experienced both direct engagement in traditional classroom settings and the use of digital tools were able to merge these modalities to achieve more interactive and effective learning. This multi-dimensional interaction enabled them to better absorb information and achieve stronger academic outcomes.

5. RECOMMENDATIONS

5.1. ENHANCING BLENDED LEARNING AND OVERCOMING ITS CHALLENGES

- **Continuous Training for Instructors:** It is essential for instructors to receive intensive training in using blended learning tools and technologies. Training programs should include developing skills in managing digital classrooms, utilizing e-learning platforms, and applying effective interactive teaching strategies.
- **Curriculum Development:** Curricula should be designed with flexibility to accommodate blended learning. A balanced integration of traditional and digital activities is necessary, along with the provision of diverse educational resources (e.g., videos, articles, interactive activities) to meet the varying needs of instructors and students.

- **Sustained Interaction and Communication:** Continuous communication between students and instructors must be maintained. Tools such as online forums and video conferencing sessions should be activated to foster an active and engaging learning environment.

5.2. EFFECTIVELY INTEGRATING TECHNOLOGY INTO TRADITIONAL EDUCATION

- **Choosing Appropriate Tools:** Educational technologies must be selected to enhance learning effectiveness without becoming a burden for instructors or students. These tools should be easily accessible and support interactive learning methods.
- **Integration of Traditional Activities with Technology:** Traditional activities such as lectures and group discussions should be supplemented with technological tools that support autonomous learning, such as recorded lectures, e-learning materials, and online assessments.
- **Promoting Collaborative Learning:** Digital collaboration tools like shared learning platforms can encourage students to engage in group projects and use technology collectively to build and share knowledge.

5.3. STRATEGIES TO SUPPORT AND MOTIVATE STUDENTS IN DISTANCE LEARNING

- **Technical Support for Students:** Ongoing technical assistance should be provided to help students overcome challenges in using online learning platforms. This can include tutorial sessions or designated support teams.
- **Encouraging Active Participation:** Students should be motivated to engage in remote learning activities through strategies such as offering symbolic rewards or certificates of appreciation for top-performing students. Dedicated times for group discussions can also increase engagement.
- **Fostering Social Interaction:** Creating interactive spaces such as online forums or virtual study groups can help students feel part of a vibrant learning community. Virtual classrooms and interactive sessions can also be organized to promote real-time discussions and collaboration.

CONCLUSION

Research has shown that blended learning provides flexible and effective educational opportunities that meet the evolving needs of instructors in the digital age. This model integrates traditional teaching methods with modern technology, enabling students to benefit from a variety of learning strategies. Such variety supports diverse learning styles, allowing students to engage directly with teachers and peers in the classroom while also using digital tools to enhance their learning outside traditional settings.

Furthermore, combining traditional education with modern technology significantly improves the learning experience by boosting interaction and student engagement. Technology provides interactive platforms that facilitate smoother participation in discussions and activities, increasing motivation and encouraging critical thinking and teamwork. This multi-dimensional interaction deepens students' understanding and strengthens knowledge retention.

The results also indicate that blended learning improves comprehension levels and skill development. By engaging with educational materials through multiple formats—such as interactive videos and online discussions—students gain a broader and more accurate understanding of topics. Additionally, blended learning helps students develop technical and digital competencies aligned with the demands of the modern era, enhancing their academic proficiency.

Blended learning thus stands out as a flexible and effective alternative in response to the challenges faced by traditional educational systems. It allows students to learn at their own pace in

ISSN-P: 1844-6051 ~ ISSN-E: 2344-3677

diverse and interactive environments. The use of technology also expands access to knowledge sources and enables students to acquire skills relevant to the current labor market, improving their chances of academic and professional success.

Accordingly, we recommend conducting future studies that focus on the development and refinement of blended learning applications across various educational contexts—including higher education, vocational training, and lifelong learning. Such research can contribute to innovative and effective solutions for improving blended learning practices and ensuring that broader segments of society benefit from this educational model.

REFERENCES

Ahmed, A. R. (2022). Teaching Methods between Traditional and Electronic Approaches (p. 78). Cairo: Dar Al-Fikr Al-Arabi.

Ahmed, F. (2023). E-Learning and Educational Technology (p. 145). Amman: Dar Al-Maseera Publishing.

Al-Jabri, N. (2021). Blended Learning in Arab Universities: Reality and Challenges (pp. 88–93). Amman: Dar Al-Manahij.

Barakat, M. (2023). Education and Technology: Future Perspectives on Blended Learning (pp. 132–135). Beirut: Knowledge Studies Center.

Sadiq, S. (2021). Distance Education and the Challenges of Social Interaction (pp. 34–35). Beirut: Dar Al-Huda.

Sadiq, S. (2022). The Effectiveness of Blended Learning in Enhancing Academic Achievement (pp. 143–147). Beirut: University Knowledge House.

Sadiq, S. (2021). Interactive Education and Social Communication Skills (p. 31). Beirut: Publications of the Lebanese University.

Adedoyin, O. B., & Soykan, E. (2020). COVID-19 pandemic and online learning: The challenges and opportunities. Interactive Learning Environments, 28(8), 78–84. https://doi.org/10.1080/10494820.2020.1813180

Alammary, A. (2021). Blended learning models for higher education: A practical guide. Education and Information Technologies, 26, 119–121, 209–215. https://doi.org/10.1007/s10639-020-10202-5

Alghamdi, A., & Almalki, S. (2022). The role of e-learning platforms in higher education: A case study of Saudi universities. Education and Information Technologies, 27(1), 115–125. https://doi.org/10.1007/s10639-021-10689-y

Al-Harbi, K. M. (2023). Traditional vs. digital pedagogy in Saudi classrooms: A comparative study. International Journal of Educational Research, 112, 115–125. https://doi.org/10.1016/j.ijer.2022.101998

Bernard, R. M., Borokhovski, E., Schmid, R. F., & Tamim, R. M. (2020). Comparative effectiveness of online and blended learning versus traditional face-to-face instruction. Journal of Distance Education, 35(1), 61–63.

Graham, C. R., & Allen, S. (2022). Designing effective blended learning environments. Computers & Education, 190, 53–60, 223–225. https://doi.org/10.1016/j.compedu.2022.104607

Guri-Rosenblit, S. (2024). Limitations of traditional learning in the post-pandemic world. Journal of Learning and Technology, 39(1), 100–110. https://doi.org/10.1007/s11528-023-00897-w

Ghazi-Saidi, L., Criffield, A., & McAlister, C. (2021). Online learning challenges during the COVID-19 pandemic: A student perspective. Journal of Computer Assisted Learning, 37(6), 205–210. https://doi.org/10.1111/jcal.12530

Liu, H., & Wang, Y. (2020). Monitoring student progress in traditional classrooms: Challenges and solutions. Journal of Educational Psychology and Practice, 8(3), 220–230. https://doi.org/10.1080/00220973.2020.1835478

Singh, J., & Steele, K. (2020). Blended learning in higher education: Strategies and outcomes. Journal of Educational Technology, 18(2), 45–52. https://doi.org/10.1177/0047239520903704