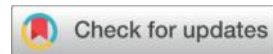


The Role of Hybrid Learning in Improving Students' Academic Achievement: A Field Study of a Sample of Students at the Faculty of Humanities and Social Sciences, University of Adrar.



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Abstract:

The relationship between hybrid learning and students' academic achievement is based on the premise that a well-considered integration of in-person and remote instruction can create a more flexible and diverse learning environment, enabling students to engage with educational content in various ways.

This study, conducted on a purposive sample of 243 second-year Master's students at the Faculty of Humanities and Social Sciences at the University of Adrar, explores this premise.

The findings indicate that the mean scores for the sample's responses regarding the study variables were similar and reflected a moderate level of significance. Furthermore, the results demonstrate a substantial impact of hybrid learning on students' academic achievement—accounting for 91% of the variance in academic performance—and all tested hypotheses were found to be statistically significant.

The relationship between these two variables can be explained through several mechanisms, most notably: investment in digital infrastructure, addressing disparities in digital skills, implementing synchronous assessment, and ensuring academic integrity.

Keywords: Blended Learning, Face-To-Face Learning, Distance Learning, Technological Infrastructure, Digital Skills, Students' Academic Achievement, Synchronous Assessment.

1. Introduction:

The COVID-19 pandemic had far-reaching consequences, affecting various aspects of life—most notably the economy, education, and food security—for individuals across the globe. While most nations sought to ensure the continuity of essential economic activities and mitigate the repercussions of the crisis, the higher education sector faced exceptional challenges. These included the suspension of in-person educational activities and the closure of universities—precautionary measures taken to curb the spread of the virus among students and staff, and to prevent transmission to the wider community. Such circumstances compelled higher education institutions to seek alternatives to ensure the continuity of the educational process, primarily by adopting distance learning models and leveraging digital technologies.

The importance of this educational mode grew during the pandemic, as institutions were forced into a "compulsory digitalization" to ensure that learning could continue (Pohlenz, Felix, Berndt, & Seyfried, 2023). The concept evolved from the simple use of basic digital tools into sophisticated, interactive learning systems designed to foster learner autonomy (Medina, 2025). With an increasing reliance on digital educational platforms, distance learning has transcended its role as a mere stopgap measure for continuing studies; it has become a significant factor in the development of educational practices and the re-evaluation of teaching and assessment methods. Distance education has experienced rapid growth in recent years; studies indicate an annual increase of 4.57% in research output since 1993 (Aldosemani et al., 2024). Today, distance education is no longer merely an emergency alternative; it has become a cornerstone of higher education and vocational training, offering advantages such as flexible scheduling, global access to content, and the development of digital skills essential for the twenty-first century (Weldon, Ma, Ho, & Li, 2021).

Driven by the continuous evolution of information and communication technology, the higher education sector has undergone rapid transformations. This has led to the emergence of modern educational models that transcend the limitations of traditional instruction, fostering more flexible and interactive learning environments. Hybrid education—characterized by a structured integration of in-person and distance learning—stands out as a prominent model, as it leverages the strengths of both approaches to support the educational process and enhance its outcomes.

In this context, academic achievement emerges as a key indicator for evaluating the success of the educational process and its effectiveness in meeting its objectives, as it reflects the extent to which students have acquired the targeted knowledge, skills, and competencies.

Consequently, there is a clear need to examine the role of hybrid education in the academic achievement of university students, to identify the mechanisms through which it can contribute to improved academic performance, and to uncover the challenges that may limit its effectiveness.

1-1: The Problem

Despite the challenges imposed by the pandemic, higher education institutions continued to provide educational services by relying on various digital media, remote learning platforms, and video conferencing systems. This shifted remote learning from an alternative option to an urgent necessity for ensuring the continuity of the educational process. This transition posed a significant challenge for many higher education institutions that were engaging with remote learning for the first time, as there was insufficient time for prior planning, organizational preparation, and adaptation to the requirements of a digital educational environment. Under these circumstances, both faculty members and students found themselves facing a new mode of instruction, requiring them to adapt to its specific methods and tools.

Although hybrid learning offers potential benefits—such as greater flexibility, a diverse range of knowledge sources, and the accessibility of educational content at various times—its contribution to improving the academic achievement of university students remains contingent upon the conditions of its implementation and the characteristics of the educational environment in which it is applied.

While combining in-person and online instruction can enhance comprehension, facilitate lesson review, and foster self-directed learning, students may also encounter difficulties. These include poor internet connectivity, limited digital skills, a decline in direct interaction, or challenges in managing time and staying committed to online activities. Academic achievement serves as a key indicator for assessing the extent to which students have acquired the intended knowledge, skills, and competencies throughout their course of study. Given this, there is a need to examine the relationship between the implementation of hybrid education and the level of university achievement. This involves analyzing the nature of its impact on students' academic performance and identifying the factors that either enhance its effectiveness or limit its contribution to improving academic outcomes. Consequently, this paper addresses the following research questions:

- What is the impact of hybrid education on students' academic achievement?
- Are there differences in the impact of hybrid education on students' academic achievement based on gender?
- Are there differences in the impact of hybrid education on students' academic achievement based on the student's academic department?

1-2: Study Hypotheses

- There is a statistically significant effect (at a significance level of $\alpha \leq 0.05$) of hybrid education on students' academic achievement.
- There are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the impact of hybrid education on students' academic achievement attributable to the gender variable.
- There are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the impact of hybrid education on students' academic achievement attributable to the student's academic department.

1-3: Study Model
This study proposes a conceptual model for analyzing students' academic achievement, integrating theoretical findings from previous research on hybrid education and the emergency transition to various online delivery methods. The proposed conceptual model draws upon the student satisfaction model for distance education developed by Sun, Tsai, Finger, Chen, and Yeh (2008), as well as the model by DeLone and McLean (2003)—which has been used to describe the success of various information systems, including hybrid education systems (Khalid, 2025).

Based on this, a model has been constructed to represent the nature of the relationships between the study variables, as illustrated in the figure below.

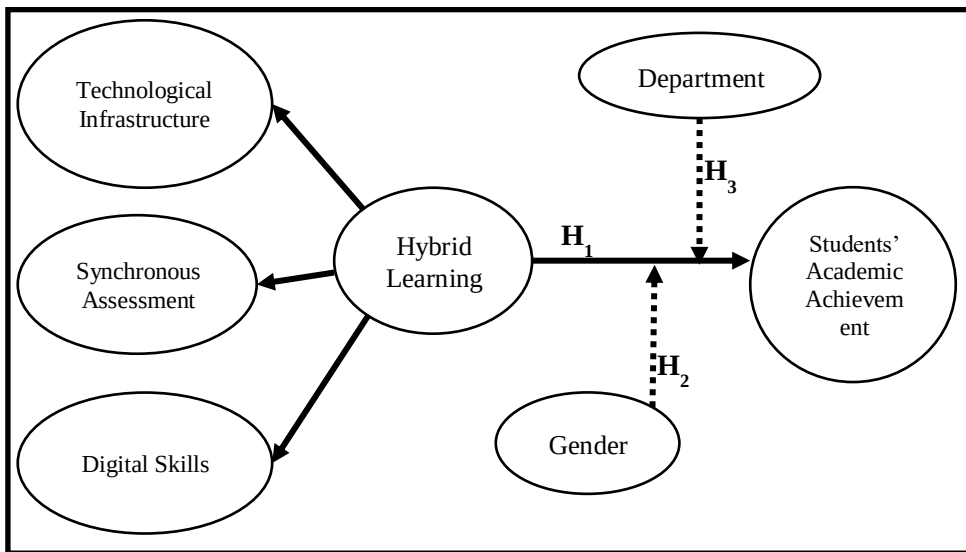


Figure (1): The study's hypothetical model.

1-4: Significance of the Study

The significance of this study stems from the growing importance of digital transformation in higher education institutions, as well as the need to evaluate modern educational models based on their contribution to improving the quality of learning and its outcomes.

The significance of the study is twofold:

First: Scientific Significance: This lies in clarifying the relationship between hybrid learning and academic achievement, and in identifying the theoretical mechanisms that explain the impact of this educational model on student performance—thereby enriching the literature on hybrid learning and higher education.

Second: Practical Significance: This involves providing indicators and recommendations that universities and faculty members can utilize when designing hybrid courses and developing educational platforms.

1-5: Objectives of the Study

This study aims to achieve several objectives, most notably:

- To clarify the concept of hybrid learning and its fundamental characteristics within the context of university education.
- To analyze its potential role in improving the academic achievement of university students.
- To identify the key educational and technical factors that influence its effectiveness.
- To uncover the challenges that may hinder students from fully benefiting from this educational model.
- To propose a set of recommendations to assist universities in improving the implementation of hybrid learning and enhancing its academic outcomes.

1-6: Research Methodology

This study employs a descriptive-analytical approach, which is well-suited to the research problem. This methodology involves describing the phenomenon through scientific research tools and techniques, ultimately yielding findings that highlight the correlations and the magnitude of the impact between the study variables.

2-: Theoretical Framework

Hybrid learning represents a fundamental shift in contemporary educational systems, integrating direct, face-to-face instruction with online learning to provide a flexible and comprehensive educational experience (Angwaomaodoko, 2025; Saidakbarovna, 2026). This model goes beyond merely adding digital tools to the classroom; it entails a pedagogical redesign aimed at fostering learner autonomy (Ahmed, 2025).

Unlike purely e-learning, hybrid learning preserves the vital human and social interaction essential to the educational process. Simultaneously, it surpasses traditional education by offering a diverse range of learning resources and enabling students to learn at their own pace (Kenney & Newcombe, 2011; Oktaria, Badeni, & Alexon, 2023).

2-1: The Concept of Hybrid Learning

Hybrid learning is defined as an educational model based on the systematic integration of in-person (face-to-face) instruction and distance learning. It involves distributing educational activities between physical classrooms and digital platforms, guided by a pedagogical design that specifies the nature, objectives, implementation methods, and assessment criteria for each activity. The term "hybrid education" is sometimes used interchangeably with "blended learning," though its specific usage can vary depending on the context and the educational institution. In this article, "hybrid education" refers to the structured combination of in-person and online activities within a single course.

Hybrid education—or blended learning—is an instructional model that integrates traditional, face-to-face teaching with online learning components, offering a flexible educational experience that can be adapted to the needs of learners. This model emerged in response to the limitations inherent in both purely traditional education and fully online education—limitations that became particularly evident during the COVID-19 pandemic. The goal of hybrid education is to leverage the strengths of both approaches while addressing the challenges associated with each. The following points highlight the key aspects that distinguish hybrid education from both traditional and fully online learning models.

I. Definition and Characteristics

- Hybrid Learning: Combines in-person instruction with online learning, allowing students present in the classroom and those connecting remotely to participate simultaneously (Ryazantseva, 2024). This model goes beyond simply moving traditional lectures online; it involves restructuring the educational process to integrate direct, in-class interaction with the capabilities offered by digital technology—such as recorded lectures, interactive resources, online forums, and digital assessments.

- Traditional Learning: Relies primarily on in-person attendance, with a focus on direct interaction between students and faculty members; it is often characterized by limited flexibility (Baliram & Dhawale, 2025).

- Online Learning: Relies entirely on digital media and offers a high degree of flexibility, though it may lack the social interaction found in traditional educational environments (Baliram & Dhawale, 2025).
- Online Learning: This often relies on independent study, which requires students to possess self-discipline and the ability to manage their time effectively (Garza & Javier, 2010).

Second: Advantages of Hybrid Learning

- Flexibility: Hybrid learning allows students to choose the time and place that best suit them for engaging with educational materials, accommodating diverse learning styles and individual needs (Mandarino, Mardula, & Santana, 2023).

- Enhanced Engagement: Integrating technology into the educational process helps boost student motivation and increases their participation in learning activities (Junior et al., 2024).

- Personalization: It enables the provision of learning experiences tailored to individual differences among students, by accounting for variations in learning pace and personal preferences (Junior et al., 2024).

Third: Challenges Limiting the Effectiveness of Hybrid Learning

Hybrid learning—which combines online and in-person instruction—faces several challenges that can hinder its effectiveness. Key challenges include technological barriers, shortcomings in pedagogical practices, and cultural resistance to change. Addressing these challenges is essential for improving the hybrid learning experience and ensuring equitable access to education. First: Technological Barriers

Weak digital infrastructure, a lack of appropriate devices, or disruptions to digital services can hinder access to online lectures, resources, and assessments. Furthermore, the effective implementation of hybrid learning requires a robust technological infrastructure, as well as an adequate level of digital skills and literacy among students (Ryazantseva, 2024). Internet Access: Many students lack access to a reliable internet connection, which hinders their full participation in hybrid learning environments (Baliram & Dhawale, 2025; Smaihi & Rawiya, 2025).

Disparities in Digital Skills: Some students may struggle with using educational platforms, submitting assignments, or engaging in online activities—difficulties that can affect their performance if they do not receive the necessary training and support. Furthermore, a lack of digital proficiency among both students and faculty can lead to the ineffective use of hybrid learning tools, negatively impacting the level of interaction and learning outcomes (Khalid, 2025).

Inconsistency in Technological Standards: Disparities in access to technology and the quality of available resources can create inequalities in the educational experiences of students (Smaihi & Rawiya, 2025).

Second: Pedagogical Challenges

Faculty Readiness: Many instructors lack sufficient training in implementing hybrid teaching methods, which may result in the adoption of ineffective instructional strategies (Mirzoeva et al., 2024). The transition of the instructor's role—from a mere transmitter of knowledge to a facilitator and guide of the educational process—requires the acquisition of new skills and the adoption of teaching approaches suited to this educational model (Ryazantseva, 2024).

Passive Learning Patterns: A tendency toward learning methods based on passive reception may lead to... Weakening of student engagement and motivation to learn in hybrid learning environments (Durango & Colorada, 2025).

Third: Cultural Resistance

Fixed Mindsets: Resistance to change among students and instructors—often deeply rooted in traditional educational practices—can pose a barrier to the adoption of hybrid learning models (Khalid, 2025).

Shifting Perceptions: The effective adoption of hybrid learning requires a tangible cultural shift, necessitating a change in attitudes and perspectives toward technology, as well as toward learning and teaching methods (Khalid, 2025).

Despite these challenges, hybrid learning offers significant opportunities to enhance flexibility within the educational process and provide learning experiences that cater to the individual needs of students. Nevertheless, overcoming these obstacles is a fundamental prerequisite for maximizing the potential of hybrid learning and ensuring inclusivity and equal opportunity within educational environments.

2-2: The Concept of Student Academic Achievement

Student academic achievement refers to the level of knowledge, skills, and abilities a student acquires as a result of their participation in the educational process. It is typically measured through tests, examinations, ongoing assessments, and academic grades.

While student academic achievement serves as an important indicator for evaluating the extent to which educational goals have been met, its interpretation requires consideration of various influencing factors—such as a student's cognitive readiness, motivation to learn, teaching methods, the quality of educational content, and the social and technical conditions surrounding the learning process.

In a university setting, a distinction can be made between "actual" academic achievement—measured by objective academic results—and "perceived" academic performance, which reflects a student's own assessment of their level of learning, understanding, and ability to meet course requirements. Distinguishing between these two is essential when conducting field studies related to hybrid education.

2-3: The Relationship Between Hybrid Education and Academic Achievement

Studies have shown that hybrid education—which combines in-person instruction with online learning components—contributes positively to improving academic achievement across various educational environments. This model leverages the inherent advantages of both in-person and digital learning settings, aiming to enhance student engagement in the educational process and

improve their academic performance. The effectiveness of hybrid education is influenced by several factors, including instructional design, accessibility to educational resources, and the presence of the instructor and their interaction with students; collectively, these factors contribute to better academic outcomes. The following are the key findings from research regarding the relationship between hybrid learning and academic achievement:

First: The positive impact of hybrid learning on academic achievement

- A meta-analysis encompassing 45 studies revealed a statistically significant positive impact of hybrid learning on academic achievement. It further indicated that the field of biology showed the largest effect size among the disciplines examined (Kazu & Yalçın, 2022).

- Results from a study conducted in Nigeria demonstrated that hybrid learning contributes significantly to improved academic performance; students in hybrid learning environments outperformed their peers in traditional educational settings in the subject of geography, achieving higher scores in the areas of knowledge, comprehension, and application (Hassan, Azumi, & Jamila, 2026).

- In Pakistan, a study showed that the perceived quality of hybrid learning—incorporating factors such as ease of access to educational resources and the quality of instructional design—serves as a positive indicator of academic achievement. It has also been shown that intrinsic motivation plays a partial mediating role in this relationship (Bibi, Shahzad, Kubra, & Riaz, 2025).

Second: Factors Enhancing the Effectiveness of Hybrid Learning

- Implementing hybrid learning requires an appropriate technological infrastructure, as well as training and qualifying instructors to use digital technologies effectively, ensuring optimal utilization of the advantages offered by this educational model (Fauzi & Harsoyo, 2025).

- Effective hybrid learning environments contribute to fostering learner autonomy, providing timely feedback, and supporting intrinsic motivation—all of which are essential factors for improving students' academic performance (Bibi, Shahzad, Kubra, & Riaz, 2025).

- The design of courses based on hybrid learning should focus on employing interactive and engaging teaching methods, allowing for the full realization of the potential this model offers to support learning and improve educational outcomes (Fauzi & Harsoyo, 2025).

Despite the notable benefits demonstrated by hybrid learning, its successful implementation remains contingent upon sound planning, execution, and careful consideration of students' educational needs. Some studies indicate that a segment of students may continue to prefer traditional teaching methods. This underscores the importance of accounting for variations in learning

preferences and designing hybrid education models that align with specific educational objectives and the needs of learners (Batman, 2025).

3: Practical Framework

3-1: Study Population and Sample

The study population consists of second-year Master's students in the Faculty of Humanities and Social Sciences at the University of Adrar, totaling 619 students. The Morgan table (Krejcie & Morgan, 1970, p. 608) was used to determine the appropriate sample size for the study, as illustrated in the table below.

Table (01): Study sample based on the Morgan table.

<i>Returned questionnaires</i>	<i>Required sample size (n)</i>	<i>Population size (N)</i>
<i>243</i>	<i>242</i>	<i>619</i>

Source: Prepared by the research team.

The sample was selected using a purposive sampling method, by distributing an electronic link to the questionnaire via the online pages of each department (group).

3-2: Study Instrument

To achieve the study's objectives and examine the impact of hybrid learning on students' academic achievement—from the perspective of students in the Faculty of Humanities and Social Sciences at the University of Adrar—an electronic questionnaire was developed. This instrument was based on relevant scientific literature and prior research, and incorporated input from specialists in the field to ensure its suitability for the research topic and its variables.

The questionnaire consisted of two main parts: the first part was designed to collect general data about the study participants, while the second part contained a series of items aimed at measuring the study variables and determining the nature of the relationships between them. This second section comprised 16 closed-ended items.

In designing the questionnaire, care was taken to ensure that the items covered the various dimensions of the study's theoretical framework and aligned with the research objectives and hypotheses. Furthermore, the questions were formulated in a clear and precise manner to ensure they were easily understood and answered by the participants. To measure the respondents' responses and determine their level of agreement with the questionnaire items, a five-point Likert scale was adopted. This scale consists of five graduated levels, allowing for the assessment of the sample members' attitudes and opinions regarding the impact of hybrid education on academic achievement, as shown in the following table:

Table (02): The adopted Likert scale.

1	2	3	4	5
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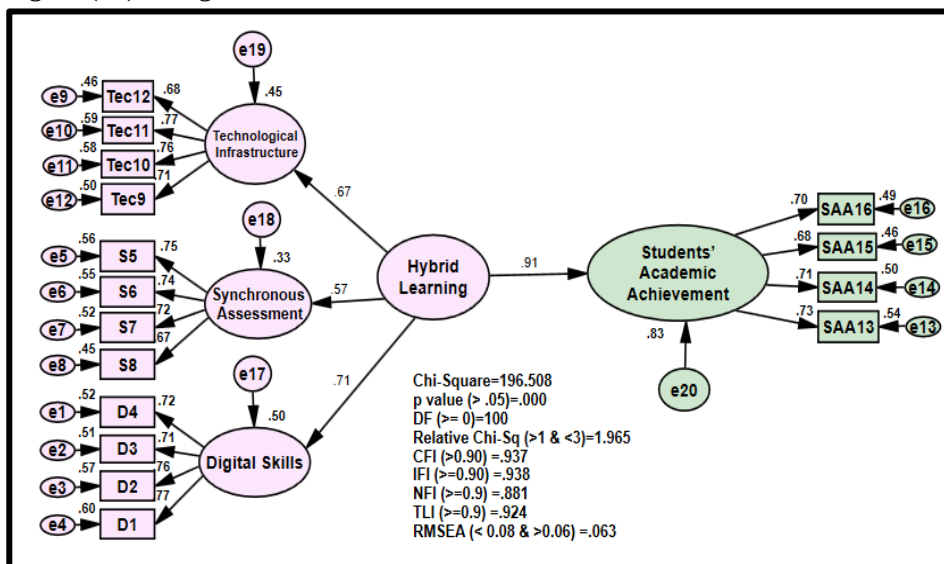
never	rarely	sometim es	mostly	always
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Source: Prepared by the research team

3-3-3 Model Testing

As shown in the figure below, all dimensions of hybrid learning were found to be significant factors. Furthermore, all goodness-of-fit indices indicate that the data align with the theoretical model.

Figure (02): Integrated AMOS Model



. Source: Prepared by the research team

3-3-1: Testing for Normal Distribution of Data

The appropriate statistical method is determined by the type of distribution to which the data belongs. If the distribution is normal, parametric statistical methods are appropriate; if it is non-normal, non-parametric methods should be used (Sekaran & Bougie, 2016, p. 286). To verify the data distribution, tests for skewness and kurtosis are employed.

Assessing multivariate normality requires examining multivariate skewness and kurtosis values—a procedure essential for analyses involving exploratory factor analysis, confirmatory factor analysis, and path analysis. Furthermore, testing for multivariate normality can provide useful diagnostic information prior to conducting specific statistical tests (Bonett et al., 2002). In this study, multivariate normality was assessed using the AMOS software and Mardia's coefficient. As a general rule, the critical ratio (C.R.) for Mardia's multivariate coefficient should be less than or equal to ± 1.96 (Mardia, 1970). Additionally, univariate skewness and kurtosis values are considered; values falling between ± 1 indicate a normal distribution, while values between ± 2 are

generally accepted as indicating a normal distribution (George & Mallery, 2016, p. 114). The table below presents the results of Mardia's multivariate test.

Table (03): Results for the multivariate normality of the data

Variable	Min	Max	Skew	C.R.	Kurtosis	C.R.
S5	2	5	-0.027	-0.171	-0.396	-1.258
S6	2	5	0.086	0.546	-0.281	-0.893
S7	2	5	-0.186	-1.18	-0.497	-1.578
S8	1	5	-0.174	-1.108	-0.17	-0.538
Tec12	2	5	-0.162	-1.027	-0.655	-2.081
Tec11	1	5	-0.164	-1.041	-0.155	-0.492
Tec10	2	5	-0.058	-0.365	-0.392	-1.244
Tec9	1	5	-0.086	-0.546	-0.226	-0.719
SAA13	2	5	0.143	0.909	-0.643	-2.042
SAA14	2	5	0.018	0.112	-0.697	-2.212
SAA15	1	4	-0.315	-2	0.087	0.275
SAA16	1	5	-0.11	-0.701	-0.064	-0.203
D4	2	5	0.079	0.499	-0.406	-1.289
D3	2	5	-0.073	-0.463	-0.342	-1.086
D2	2	5	0.051	0.322	-0.499	-1.585
D1	2	5	-0.06	-0.381	-0.347	-1.103
Multivariate					-0.771	-0.250

. Source: Prepared by the research team based on outputs from SPSS v. 26.

As shown in the table above, the critical value for Mardia's coefficient falls within the acceptable range at -0.250. Furthermore, all items were found to follow a normal distribution, as they met the required criteria.

3-3-2: Validity and Reliability Testing

Table (4) presents the standardized factor loadings—the extent to which items load onto their respective factors—as well as the reliability of the factors within the model's structural framework. All factor loadings were statistically significant ($p < .001$). Model reliability was confirmed using Composite Reliability (CR), with values ranging from 0.80 (for "Student Academic Achievement") to 0.83 (for "Digital Skills"), all of which exceed the recommended threshold of 0.70. The table also indicates that the Average Variance Extracted (AVE) is greater than 0.5 ($AVE > 0.5$) and that the Composite Reliability (CR) is greater than the AVE ($CR > AVE$). The AVE values range from 0.50 (for "Student Academic Achievement") to 0.55 (for "Digital Skills"),

demonstrating convergent validity. Discriminant validity—assessed via the Maximum Shared Variance (MSV) for the "Hybrid Learning" variable—yielded values ranging from 0.18 (for "Synchronous Assessment") to 0.24 (for "Digital Skills" and "Technological Infrastructure"), all of which are lower than the corresponding AVE values for each dimension.

Table (4): Descriptive Statistics and Validity and Reliability Tests

Dimension	Item	Mean	Standard Deviation (SD)	Factor Loadings λ	SE	Composite Reliability (CR)	Average Variance Extracted (AVE)	Maximum Shared Variance (MSV)
Digital Skills	D1	3.36	0.69	0.77	0.04	0.83	0.55	0.24
	D2	3.16	0.72	0.77	0.04			
	D3	3.39	0.74	0.72	0.04			
	D4	3.26	0.77	0.72	0.05			
Synchronous Assessment	S5	3.29	0.71	0.76	0.04	0.82	0.52	0.18
	S6	3.29	0.72	0.75	0.04			
	S7	3.35	0.71	0.71	0.04			
	S8	3.19	0.69	0.67	0.04			
Technological Infrastructure	Tec9	3.33	0.76	0.72	0.05	0.81	0.51	0.24
	Tec10	3.40	0.75	0.74	0.04			
	Tec11	3.28	0.76	0.73	0.05			
	Tec12	3.28	0.75	0.68	0.04			
Students' Academic Achievement	SAA13	3.11	0.79	0.73	0.05	0.80	0.50	/
	SAA14	3.09	0.71	0.75	0.04			
	SAA15	2.97	0.69	0.71	0.04			
	SAA16	3.04	0.69	0.65	0.04			

. Source: Prepared by the research team based on AMOS v.24 outputs.

3-4: Testing the Correlational Relationship

This type of analysis is used to examine the relationship between two variables, in order to determine the direction and strength of the association between them. According to Field (2018) and Hair et al. (2019), a linear relationship between variables can be assessed using Pearson correlation analysis, provided that the data follow a normal distribution. Based on Cohen (1988), correlations below 0.30 indicate a weak relationship, values ranging from 0.30 to 0.49 indicate a moderate relationship, and values above 0.49 are considered to represent a strong relationship.

Table (05): Results of the Correlation Analysis

	Digital Skills	Synchronous Assessment	Technological Infrastructure	Hybrid Learning	Students' Academic Achievement
Digital Skills	1	.342**	.414**	.781**	.520**
Synchronous Assessment	.342*	1	.278**	.708**	.445**
Technological Infrastructure	.414*	.278**	1	.761**	.488**
Hybrid Learning	.781*	.708**	.761**	1	.646**
Students' Academic Achievement	.520*	.445**	.488**	.646**	1
**. Correlation is significant at the 0.01 level (2-tailed).					

. Source: Prepared by the research team based on outputs from SPSS v.26.

3-5: Hypothesis Testing

3-5-1: First Hypothesis (H1): There is a statistically significant effect (at a significance level of $\alpha \leq 0.05$) of hybrid learning on students' academic achievement.

To determine the significance of the effect of hybrid learning on students' academic achievement, the study employed structural equation modeling (SEM) using path analysis, which examines the relationships between two or more variables. As shown in the table below, the path is statistically significant ($p = 0.000$) with a standardized estimate of 0.646. This confirms the first hypothesis (H1): there is a statistically significant effect (at a significance level of $\alpha \leq 0.05$) of hybrid learning on students' academic achievement.

Table (6): Results of the first hypothesis test

Path			Unstandar dized Estimates	Stand ard Error (SE)	Compo site Reliabi lity (CR).	Signific ance Level	Standard ized Estimate s
Hybri d Learn ing	→	Students , Academi c Achieve ment	0.823	0.063	13.13	***	0.646

Source: Prepared by the research team based on AMOS v.24 outputs.

:2-5-3Second Hypothesis (H2): There are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the effect of hybrid learning on students' academic achievement that can be attributed to the gender variable.

The analysis results presented in Table (8) indicate that there are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the effect of hybrid learning on students' academic achievement based on gender. This is supported by the standardized path estimates between the variables, which show statistical significance. This suggests a consistent pedagogical approach and effective utilization of hybrid learning elements to enhance academic achievement for students of both genders. Consequently, it can be concluded that gender does not act as a barrier to the effectiveness of hybrid learning factors in improving students' academic achievement.

Table (7): Results of the second hypothesis test.

Path			Gen der	Unstanda rdized Estimates	Stand ard Error (SE)	C.R .	Signific ance Level	Standar dized Estimat es
Hybri d Learn ing	→	Students , Academ ic Achieve ment	Male s	0.69	0.111	6.22 7	***	0.555
			Fem ales	0.891	0.075	11.8 09	***	0.691

Source: Prepared by the research team based on AMOS v.24 outputs.

:3-5-3Third Hypothesis (H3): There are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the impact of hybrid learning on students' academic achievement that can be attributed to the student's department.

Table 08 indicates that there are no statistically significant differences (at a significance level of $\alpha \leq 0.05$) in the impact of hybrid learning on students'

academic achievement based on the student's department. This is supported by the statistical significance of the paths ($P = 0.000$), which implies that a student's departmental affiliation does not act as a barrier to their academic achievement or to the factors associated with hybrid learning.

Table (80): Results of the third hypothesis test.

Path			Department	Unstandardized Estimates	Standard Error (SE)	C.R.	Significance Level	Standardized Estimates
Hybrid Learning	→	Students' Academic Achievement	Information and Communication Sciences and Library Science	0.836	0.121	6.906	0.836	0.651
			History and Archaeology	0.78	0.109	7.136	0.78	0.642
			Sociology and Demography	0.796	0.128	6.214	0.796	0.645
			Psychology, Educational Sciences, and Speech Therapy	0.885	0.146	6.046	** *	0.665

Source: Prepared by the research team based on outputs from AMOS v.24.

4: Conclusion

The COVID-19 pandemic had a profound impact on the education sector, as the near-total closure of educational institutions worldwide created an unprecedented and simultaneous shock to education systems. Despite the magnitude of the challenges posed by this crisis, addressing it offered an opportunity to transform negative consequences into prospects for development—by implementing necessary measures to ensure student health and safety, mitigating learning losses, and utilizing e-learning to maintain the continuity of the educational process.

The closure of schools and universities during the pandemic resulted in several negative repercussions for students, most notably the disruption of the educational process and a decline in opportunities for interaction, learning, and academic development. Furthermore, the abrupt shift to remote learning modalities triggered psychological changes in both students and teachers, which, to varying degrees, affected their performance and their ability to adapt to the demands of the new educational environment.

In this context, the study sought to identify the key factors influencing students' academic achievement during the COVID-19 pandemic, amidst the forced transition toward e-learning. The results confirmed all the proposed hypotheses and demonstrated that the theoretical model aligns with the collected data, thereby supporting its reliability and its capacity to explain the relationships between the study variables. The study results indicate that the effectiveness of hybrid learning is significantly linked to the availability of administrative and technical support, as well as the active role played by instructors in the remote learning process—particularly through providing appropriate responses and timely feedback. Furthermore, the findings highlight a positive impact of hybrid learning on students' academic achievement. Conversely, no statistically significant differences in academic achievement were found based on gender or the student's department. These results underscore the importance of diversifying learning modes and methods to suit students' needs, while ensuring they possess the capabilities required to engage in and adapt to the demands of hybrid learning environments.

Key recommendations from the study include:

First: Investing in digital infrastructure. Inadequate digital infrastructure, a lack of suitable devices, or disruptions to digital services can hinder access to lectures, resources, and online assessments.

Second: Addressing disparities in digital skills. Some students may struggle with using educational platforms, submitting assignments, or participating in online activities—challenges that can negatively affect their performance if they do not receive the necessary training and support.

Third: Self-regulation and time management. Online activities require a degree of discipline and autonomy; procrastination or poor planning can lead to an accumulation of assignments and a lower level of exam preparedness. Fourth: Increasing the intensity of interaction and communication: If the online component is designed solely for downloading files and submitting assignments—without providing opportunities for discussion and guidance—students may experience educational isolation, leading to a decline in their level of engagement.

Fifth: Pedagogical and technical burdens: Designing hybrid courses requires significant effort in preparing digital resources, organizing activities, developing assessment methods, and monitoring student progress; it also necessitates ongoing training for faculty members.

Sixth: Synchronous assessment and ensuring academic integrity: Assessing student learning online requires selecting appropriate tools to verify the acquisition of knowledge and skills, while upholding fairness, transparency, and equal opportunities for participation.

These recommendations indicate that the effectiveness of hybrid education does not depend on the provision of technology alone; rather, it requires the integration of technical, organizational, and pedagogical aspects.

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