

**The Effect of Hybrid Learning on Student Academic Success and  
Achievements in the UAE**

Noura Al Hosani

[noura\\_al-hosani@hotmail.com](mailto:noura_al-hosani@hotmail.com)

### ABSTRACT

This study aims to conduct a meta-analysis of previous research studies to identify the effect of hybrid learning on student academic success and achievement. Data was collected using secondary sources of previous research studies. Fifty research findings were analyzed from 55 quantitative studies published between 2015 and 2021. The sample of relevant research studies was selected from a database of peer-reviewed and scholarly articles and examined using Meta-analysis. Variables such as discipline, education level, and publication type were used as the mediating variables. The results obtained in the random effect model show an indicative effect of hybrid learning on student academic success and achievement. The study found that hybrid learning significantly impacted student academic success and achievement, with sciences indicating the most significant effect size on student achievement. The analysis of the current research is based on previous studies and was limited to fifty articles published between 2015 and 2021. The research findings will inform the MoE within the UAE on the role of hybrid learning on student academic achievement and the future direction of hybrid learning.

**Keywords:** *Student achievement, Academic achievement, agile transformation, Meta-Analysis,*

*Hybrid Learning*

## **Introduction**

The education system is currently evolving, with drastic changes being witnessed frequently. With the increased technological advancements and the ease of online education, distance learning is becoming the new trend globally (Samsonova, 2020). The UAE Ministry of Education (MoE) has implemented hybrid learning to transform the education system into a student-centered institution that meets students' needs and learning modalities. The ease of technological access through the utilization of various elements, including Web tools such as Blackboard, Moodle, Zoom, and Microsoft Teams, have implemented hybrid learning, increasing the need to investigate its effects within academic institutions. Abou Assali et al. (2021) define hybrid learning as an educational approach combining traditional face-to-face and online learning modes. Hybrid learning within the Ministry of Education improves the education standards and prepares the students for a future advanced workplace.

Many studies have analyzed the effect of hybrid learning as applied by higher institutions to determine student academic achievement. These studies have varied findings; some literature argues that hybrid learning positively influenced student academic achievement, while others identified that hybrid learning made no difference in academic achievement. Therefore, the current study aims to carry out a meta-analysis that interprets the findings of previous studies and gives insight into future research. Previous research studies have conducted the meta-analysis but not for the 2015 and 2021 periods, most notably during the 2019 pandemic (Saif Almuraqab, 2020). Through the investigation of previous studies on the effects of hybrid learning on student academic achievement, the study aims to identify the extent of the impact by answering two research questions:

RQ<sub>1</sub>: To what extent does hybrid learning affect student academic achievement?

RQ<sub>2</sub>: How does the effect vary as a function of the mediator variables?

### **Definition of Terms**

A few terminologies within the research discussion on the effects of hybrid learning on student academic achievement require clarification. These definitions are essential in understanding the connection between the two variables.

#### *Hybrid Learning*

Hybrid learning is an education model that incorporates online and physical learning. The model does not offer exclusive virtual learning to the students but requires in-person meetings between learners and instructors (Raes et al.,2020). However, it bridges in-person meetings with online learning to offer a complete and adequate education system by leveraging space and time.

#### *Meta-Analysis*

Meta-analysis is a type of scientific research that utilizes statistical techniques to integrate many research studies' findings and summarize them into meaningful data. Meta-analytical techniques are often used when numerous research studies on a given topic have already been carried out (Gurevitch et al.,2018). The research using this technique aims to develop a summative study producing reliable conclusions that can be used to distinguish the relationship between control and test groups.

#### *In-person interactions*

In-person interactions are also called face-to-face interactions between students, teachers, and peers. In-person learning is conducted in a physical classroom within the lecturer's working hours (Kirovska-Simjanoska., 2019). During face-to-face learning, instructions and learning take place simultaneously.

*Academic achievement*

Academic achievement refers to the student performance outcome or accomplishment of a specific educational goal. Academic achievements are an objective across all academic institutions, including colleges, high schools, and universities (Peng and Kievit., 2020). Academic achievement applies to many subjects and is considered a multifaceted approach combining various learning elements.

**Method**

The study was carried out using meta-analysis procedures, which included a series of steps. Joel et al. (2018) suggested various analysis steps, including selecting literature and inclusion criteria, coding elements of the research, measuring the effect size of the outcomes, and analyzing the mediating effects.

*Sample of Studies*

The literature search yielded 50 articles published between 2015 and 2021. Five articles were excluded from the study since they did not meet the desired exclusion criteria, leaving 45 valid articles. The collected data were from master's and doctorate research studies (Cassar et al., 2020). The studies were obtained with the help of specific keywords and various national databases electronically published within the education field, including ERIC, Google Scholar, Web of Science, and PROQUEST.

**Table 1****Inclusion Criteria for Literature Selection**

Criteria	Inclusion
Publication year	Articles published between 2015 and 2021

Publication Type	National or international journals or master/doctoral thesis published nationally or internationally.
Languages	English or Arabic
Research design utilized by the study	An experimental technique with a control group. The control group incorporated the traditional method, while the experimental group was taught with hybrid learning.
Research outcome	Student academic achievement
Implementation.	To determine the effect of hybrid learning.
Accessibility	in the Ministry of Education (UAE)
Data	Articles with open-access Sample size, t-test (0.7877), and the standard deviation of the obtained values. With 95% Confidence Interval and 0.05 level of significance

Keywords such as academic achievement and hybrid learning in the Ministry of Education were used to identify potential studies.

### ***Coding elements of the research***

Data obtained from the studies, including the scope and findings, were coded in an Excel file. The process included tabulation and numbering of the research studies. The coding process followed the first and the second coder to ensure the reliability of the materials (Kazu and Kurtoglu, 2022). The first coder had a doctorate in education, while the second coder was a field expert in education. The reliability and validity of the meta-analysis indicated an effect of 0.7877, which are directly proportional to that of the study involved (Van Alphen et al., 2022). Moreover, the study enhanced its validity by excluding the studies that did not use the desired research and data collection methods.

### *Measurements and Data Analysis*

The measure and analysis of data included calculating the bias, heterogeneity test, the effect size for each research study, and the combination of effect and size. The comprehensive Meta-Analysis (CMA) approach was used to analyze data in the current research by calculating Cohen's  $d$  values (Ben-Shachar, 2020). Cohen's effect size was categorized as small, medium, and large in the following order:

0.20 to 0.49 = small effect size

0.50 to 0.69 = medium effect size

0.70 and above = large effect size

Calculating the effect size using the CMA approach requires two models; fixed effect and random effect models. However, this study was based on the random-effects model since the analysis aims to determine how the effect sizes vary in the different numbers of research (Kazu and Kurtoglu, 2022). In addition, the control factors vary across research samples; hence, the random-effect model matches the desired heterogeneity in the analysis.

### **Theoretical Approaches and Previous Studies**

This section reviews the literature of previous research on five studies related to the effect of hybrid learning on academic achievement within the UAE Ministry of Education. The review focused on the frontiers in hybrid learning, the theoretical framework for adopting hybrid learning, revealing the student perspective of hybrid learning, the relationship between academic achievement and hybrid learning within the UAE Ministry of Education, and student-centered hybrid learning. Hybrid learning approaches do not exist in isolation; however, they draw various theoretical approaches within learning practices, including behaviorism and constructivism. A

systematic review of the theories creates relevance to the development and adoption of the hybrid learning environment.

### ***The Frontiers in Hybrid Learning***

According to a study by (Abi Raad.,2021), face-to-face teaching approaches have been used vastly in the past; however, learning is currently taking a massive shift from a complete face-to-face approach to a combination of online and in-person learning. The study claims that the adoption of online learning stems from the need for the elimination of boundaries and to ensure that students achieve quality education everywhere. In UAE, for instance, public schools adopted smart learning platforms, while private schools used e-learning approaches such as Zoom and LMS Moodle (Abi Raad, 2021). Hybrid learning became successful in the delivery of learning during the pandemic within the UAE and is expected to improve in the years to come due to technological improvements such as Big Data and artificial intelligence.

### ***Institutional Framework for the Adoption of Hybrid Learning***

In another study (Thomas et al. 2020) on hybrid learning in HEIs UAE, a systematic framework for hybrid learning adoption, the success of hybrid learning requires different adoption methods and policies. The study claims that the education system should adopt proper institutionalization to ensure consistent hybrid learning across all institutions. The goal of hybrid learning is to provide students with limitless sources of knowledge by providing a student-centered system of education that offers a combination of student-teacher and student-student interaction modes (Thomas et al., 2020). It also aims to provide sustainable human capital through educational achievements. In an experiment to determine the adoption of hybrid learning within Higher institutions in the Middle East, the study found that adopting hybrid approaches is highly linked

to academic achievements. In addition, mature and effective implementation played an essential role in the BL outcomes.

### ***Relationship between the academic achievement***

A study (Alsalmi et al. 2021) determined the effects of hybrid learning on the academic achievements of Higher Diploma Education (HDE) students in the approaches used to teach the Arabic language in the UAE. The study compared different teaching approaches to teaching the course as well as the attitudes of the students towards adopting the teaching technique. Students were divided into two groups: the experimental and the control group (Alsalmi et al., 2021). The study concluded that there was a significant difference between the two groups. Students had positive attitudes toward hybrid learning (Alsalmi et al., 2021). In addition, the teaching experience did not significantly impact the successful adoption of hybrid learning.

### ***Hybrid Learning within the UAE Ministry of Education***

Novel education methodologies are fundamental to the achievement of quality education. According to (Samsonova, 2020), quality education can be achieved by transforming the contemporary classroom into a flexible, student-centered classroom that meets the needs of teachers and students. The MoE rolled out the LMS and Blackboard to be embedded in the education system to deliver learning instructions efficiently. (Samsonova, 2020), considers hybrid learning a significant part of the education system since it exposes students to a collaborative way of obtaining skills using different technological methods while participating in the learning process.

### ***Student-centered hybrid learning.***

In another study (Capone, 2022) on hybrid learning techniques and student-centered learning, learners were scoreless in mathematics and STEM subjects because of the absence of

dedication and a positive relationship with the courses. Previous studies have attempted to solve the problems experienced by students who have persistently attained negative results in STEM subjects (Kazu and Kurtoglu, 2022). The dominant elements of these challenges are necessary for an education plan that integrates heterogeneous classes achievable by adopting student-centered learning approaches such as hybrid learning. The study (Capone, 2022) found considerable importance in changing the teaching approaches toward the positive performances of STEM subjects.

### Findings and Analysis

Forty-five studies were included in the CMA process to determine the effect of hybrid learning on student academic achievement. The effect size of each study was calculated using the formula  $(\mu_1 - \mu_2) / \sigma$  and the  $I^2 = 100\% \times (Q - df) / Q$ . A measure of heterogeneity was determined using Cochran's  $Q(\mu_1 - \mu_2) / \sigma$  (Yu et al. 2020). The overall conclusion was achieved from the effect size of each research. The results are shown in table 2 below:

**Table 2**

#### Effect sizes on fixed and random models

95% CI		Test of Mean			Heterogeneity			
Model	N	Effect Size (ES)	Lower	Upper	Z	P-value	Q	P
Fixed	45	0.7877	0.707	0.860	20.976	0.000	450.328	.000
Random	45	1.024	0.900	1.347	8.836	0.000		

As shown in the table above, the heterogeneity test for the Q model is 450.328, while P is 0.00. The effect size calculation by the fixed model obtained a result of 0.7877 and 1.024 for the random effect. This shows a significant effect value according to the Cohen classification criteria.  $I^2$ , on the other hand, was 87.432, which indicates a high heterogeneity of 87%.

### *Findings on the Controlling Variables*

The studies included in the meta-analysis were the master's and doctorate dissertations published between 2015 and 2021. The results obtained are shown in table 3 below:

**Table 3**

#### **Effect size on the publication type**

Moderator variable	Heterogeneity	P	N	Effect Size	95% CI	SE
Type of publication						
Article	0.883	0.359	33	0.944	(0.712, 1.362)	0.15
Thesis			11	1.343	(0.725, 1.456)	0.27

From the table above, the largest ES is that of the thesis type, with 1.343 and 0.944 for the article type. Heterogeneity ( $Q_1 = 0.883$ ) showed some similarity between both types of publication. The doctorate and the master's research articles were combined and called the thesis because of the limited number of articles obtained. The obtained P-value was 0.359, below 0.5 (Marchuk, 2020). Considerations based on academic disciplines were given, and the calculated results show the highest effect on sciences with 2.099 and the lowest effect size being that of medicine with 0.235.

### **Study Implications and Conclusions**

According to the results obtained from the current research, hybrid learning has robust effects on in-person and online learning within the education system in the UAE. With the growing technology and the need for student-centered education, education facilitators will continue to enhance online and face-to-face education. This study aims to determine the impacts of hybrid learning on student academic achievements within the UAE using the CMA technique. Hybrid learning significantly affects academic achievement from the large effect size of 0.7877 and 1.024 for the fixed and random models obtained based on Cohen's classification criteria. The effect size on the publication type was similar for both theses and articles. In addition, the research considered differences in the effect sizes that could differ with differences in disciplines. Based on this consideration, the study concluded that hybrid learning had the most Indicative impact on academic achievement, most notably in the sciences disciplines. The study contributes to education literature in the UAE Ministry of Education and brings insights to the education instructors and facilitators to adopt hybrid learning.

### **Recommendations**

The study recommends further research and studies on the effects of hybrid learning on student academic achievement within the education sector in the UAE. One of the recommendations is to encourage the adoption of hybrid learning by investing more in technological tools to facilitate the learning approach. Secondly, the study considered the academic discipline as one of the variables that played a significant role in academic achievements, where sciences were found to have the highest effect size. For this reason, the study recommends applying hybrid techniques, especially in science classes. Finally, the meta-analysis in the current study

focused on the publication type, education level, and discipline as the control variables; the study recommends that future studies focus on different control elements.

### References

- Abi Raad, M. E., and Odhabi, H. (2021). Hybrid learning is here to stay! *Frontiers in Education Technology*, 4(2), p121. <https://doi.org/10.22158/fet.v4n2p121>
- Abou Assali, M., and Al Dowaiikat, M. (2021). Positive perspectives matter: Enhancing positive organizational behavior. *PEOPLE: International Journal of Social Sciences*, 7(2), 64-78. <https://doi.org/10.20319/pijss.2021.72.6478>
- Alsalmi, N. R., Al-Qatawneh, S., Eltahir, M., and Aqel, K. (2021). Does blended learning improve the academic achievement of undergraduate students in mathematics courses? A case study in higher education. *Eurasia Journal of Mathematics, Science and Technology Education*, 17(4), em1951. <https://doi.org/10.29333/ejmste/10781>
- Alsalmi, N. R., Eltahir, M., Dawi, E., Abdelkader, A., and Zyoud, S. (2021). The effect of blended learning on the achievement in a physics course of students of a dentistry college: A case study at Ajman University. *Electronic Journal of e-Learning*, 19(1). <https://doi.org/10.34190/ejel.19.1.1992>
- Ben-Shachar, M., Lüdtke, D., and Makowski, D. (2020). Effect size: Estimation of effect size indices and standardized parameters. *Journal of Open-Source Software*, 5(56), 2815. <https://doi.org/10.21105/joss.02815>
- Capone, R. (2022). Blended learning and student-centered active learning environment: A case study with STEM undergraduate students. *Canadian Journal of Science, Mathematics and Technology Education*. <https://doi.org/10.1007/s42330-022-00195-5>

Cassar, S., Paine Schofield, C., Hertz, A., and Georgiades, G. (2020). Active blended learning in the undergraduate classroom: Effects on student learning and engagement. INTED

Proceedings. <https://doi.org/10.21125/inted.2020.0815>

Gurevitch, J., Koricheva, J., Nakagawa, S., & Stewart, G. (2018). Meta-analysis and the science of research synthesis. *Nature*, 555(7695), 175-182.

<https://www.nature.com/articles/nature25753?sf184289833=1>

Joel, J. R., Um, L. M., and Richie, J. N. (2018). A comparison of quality of abstracts of systematic reviews, including a meta-analysis of randomized controlled trials in high-impact general medicine journals before and after the PRISMA extension for abstracts: A systematic review and meta-analysis.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5064935/>

Kazu, İ.Y. and Yalçın, C.K., 2022. Investigation of the Effectiveness of Hybrid Learning on Academic Achievement: A Meta-Analysis Study. *International Journal of Progressive Education*, 18(1). <https://doi.org/10.29329/ijpe.2022.426.14>

Kirovska-Simjanoska, D., 2019. Digital vs in-person learning environment in ESP classrooms: Let the students decide. *Seeu Review*, 14(1), pp.36-68.

<https://www.academia.edu/download/74041888/article-p36.pdf>

Marchuk, A. (2020). Features of pedagogical interaction between teacher and student via blended learning. *Innovate Pedagogy*, 3(21), 173-189. <https://doi.org/10.32843/2663-6085/2019.21.3-37>

- Peng, P. and Kievit, R.A., 2020. The development of academic achievement and cognitive abilities: A bidirectional perspective. *Child Development Perspectives*, 14(1), pp.15-20. <https://srcd.onlinelibrary.wiley.com/doi/abs/10.1111/cdep.12352>
- Raes, A., Detienne, L., Windey, I. and Depaepe, F., 2020. A systematic literature review on synchronous hybrid learning: gaps identified. *Learning Environments Research*, 23(3), pp.269-290. <https://link.springer.com/article/10.1007/s10984-019-09303-z>
- Saif Almuraqab, N. A. (2020). Shall universities in the UAE continue distance learning after the COVID-19 pandemic? Revealing students' perspectives. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7366799/>
- Samsonova, O. (2020). Blended learning approach in UAE higher education: A selected annotated bibliography. *International Journal of Higher Education Pedagogies*, 1(1), 13-22. <https://doi.org/10.33422/ijhep.v1i1.14>
- Thomas, B. J., Al Jarrah, A., and Joseph, N. (2022). Blended learning in HEIs in the Middle East. *Global Perspectives on Quality Assurance and Accreditation in Higher Education Institutions*, 248-268. <https://doi.org/10.4018/978-1-7998-8085-1.ch014>
- Van Alphen, T., Jak, S., Jansen in de Wal, J., Schuitema, J., and Peetsma, T. (2022). Determining the reliability of daily measures: An illustration with data on teacher stress. *Applied Measurement in Education*, 35(1), 63-79. <https://doi.org/10.1080/08957347.2022.2034822>
- Yu, D., Wang, L., Li, H., and Liang, B. (2020). The design of a blended learning model for art and design undergraduates promotes a sustainable relationship between teacher and student. *Education and Awareness of Sustainability*. [https://doi.org/10.1142/9789811228001\\_0184](https://doi.org/10.1142/9789811228001_0184)

### Appendix (A)

The study discusses the Effect of Hybrid Learning on Student Academic Success and Achievements in the UAE. At the start of 2020, through the Ministry of Education in the UAE, the education sector developed education approaches aimed at bringing positive changes to the education system. The transformation involves introducing smart learning programs, adopting the new teacher codes, and evaluating the existing systems. Another critical area that the MoE has focused on is transforming K-12 programs and ensuring its students can compete in the global market. The adoption of **Alef** education provided a technology-enabled education system where the students are exposed to personalized learning, and teachers get immediate student feedback.

### Appendix (B)

The paper also mentions the increased adoption of hybrid learning during the pandemic. With the help of agile transformations within the sector, the government introduced **SHAPE Education** into its calendar to identify the effects of COVID-19 on the k-12 system. With this respect, the government rolled out distance learning as an option to respond to the pandemic and ensure that the education sector continued with plans for the 2020-2021 academic year.

## Appendix (C)

## Study sample titles

1. Bello et al. (2015)	Combining Traditional Face-to-face Classroom Practices With Computer-Mediated Activities For Meaningful Learning Experience
2. Benjamin., (2021)	E-Learning; Its Implementation and Growth.
3. Beyea et.al. (2016)	Effectiveness of Blended Learning Among B.Ed. Students
4. Caldwell (2017)	Creative Thinking and Knowledge Building In An Online Community of Educators
5. Cavus, Uzonboylu, and Ibrahim (2017)	Learning Management Systems on Blended Learning
6. Vandeweerd et.al. (2017)	Developing Communicative Competencies of Student Hybrid Learning Context.
7. Davis et al. (2016)	Learning The Structure of Dynamic Hybrid Relational Models
8. Lowry (2018)	Effect of Blended Learning on Student Performance
9. Rockman et.al. (2018)	Enhancing Student Academic Achievement Through Hybrid Learning
10. Hairston (2017)	A Cross-Sectional Study to Describe Academics' Confidence, Attitudes, and Experience of Online Distance Learning In Higher Education
11. Harris et al. (2020)	Using Online Active Learning to Promote Inclusive Instruction In Ecology and Evolutionary Biology Courses and Beyond
12. Schoenfeld-Tacher, McConnell, and Graham (2021)	The Effects of Online Learning and Hybrid Experience on The Online Learning Environment
13. Hugenholtz et.al. (2018)	Effectiveness of E-Learning In Continuing Medical Education for Occupational Physicians.
14. Urban (2016)	Toward Hybrid Learning In Education
15. Turner et al. (2016)	Effectiveness of Blended Learning Approach on Academic Achievement of STEM Students.

16. Suter and Perry (2019)	Blended E-Learning Tools and Senior Elementary Achievement
17. Spires et al. (2021)	Exploring Collaborative Learning Effects on Academic Achievement.
18. Rockman Et.al, (2020)	Integrating Blended Learning In Higher Education
19. O'Dwyer, Carey, and Kleiman (2015)	Impacts on Online Learning In Supporting Student Academic Success
20. Schilling et.al. (2016)	Effectiveness of E-Learning on Academic Achievement
21. Padalino and Peres (2017)	Implementation of Hybrid Learning In Higher Institutions
22. Midmer, Kahan, and Marlow (2019)	Online Digital Education for Post-Registration Training of Doctors
23. Rockman et.al. (2017)	Meta-Analysis on The Effects of Blended Learning
24. Schmeeckle (2020)	Online Learning Approach In Inclusive Education Course
25. Gilliver and Randall (2018)	Classroom Expansion; Using An Online Discussion Forum In Professional Courses.
26. Frederickson, Reed, and Clifford (2015)	Effects of Internet-Supported Learning on Academic Achievement
27. Englert et.al. (2017)	Effect of Learning Motivation and Hybrid Learning on Student Achievement
28. Long and Jennings (2015) 29. Ocker and Yaverbaum (2019)	Defining Student Learning Experience Through Hybrid Learning. Implementation of Hybrid Learning In Higher Institutions
30. Tseng et.al. (2016)	The Effect of Blended Learning In A Mathematics Course
31. Dangwal (2017)	Blended Learning: An Innovative Approach
32. DeBord, Aruguete and Muhlig (2015)	Integrating Hybrid Learning Within Higher Education.
33. Duman et al. (2015)	Research Trends In Mobile Assisted Language Learning From 2000 to 2012.
34. El-Deghaidy and Nouby (2018)	Improving Student Skills Through Hybrid Learning

35. Ajebi., (2020)	The Effects of Blended Learning on Students' Academic Achievement
36. Day, Raven, and Newman (2019)	Mathematical Blended Approach on University Student Performances
37. Eryilmaz (2015)	The Effectiveness of Blended Learning on Student Success
38. Zhang et al. (2019)	Best Practices of Hybrid Learning Approaches on Student Achievement
39. Aberson, Berger, and Romero (2017)	Improving Student Learning Outcome Through Blended Learning
40. Alkış and Temizel., (2018)	Impacts of Motivation and Personality on Academic Performance In Blended Learning
41. Ustun., (2019)	Effects of Mobile Learning In Blended Learning Environments
42. Clark (2015)	Evaluating The Effectiveness of Hybrid Learning
43. Potter., (2015)	Applying Hybrid Learning Models and its Impacts on Student Learning Outcomes
44. Wang (2018)	Effects of Blended Learning on Student Vocabulary Improvement
45. Akdeniz., (2019)	Analysing The Academic Success of Students Who Use Hybrid Learning Supported By Mobile Application
46. Bolatli, (2016)	Effectiveness of Combined Learning on Student Academic Success
47. Wallace and Clariana (2020)	Reflection on Hybrid Learning and Collaborative Learning
48. Nguyen.,(2017)	Impact of Online Learning on Student Learning Outcomes in Blended Learning Courses
49. Sexton et al. (2021)	The Effect of Blended Learning on Student Success In Grammar Courses
50. Total, (2021)	Flipped Classroom Improves Academic Achievement