**JOURNAL INFORMATIC, EDUCATION AND MANAGEMENT (JIEM)**
Vol. 7, No. 1, February 2025, pp. 33 ~ 41
ISSN: 2716-0696, DOI : 10.61992/jiem.v7i1.120

# Student Perceptions of Online Learning Application Effectiveness

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**Article Info**

***Article history:***
Received 31 January 2025
Revised 15 February 2025
Accepted 28 February 2025

***Keywords:***
Student Perception, Online Learning, Digital Platforms, Application Effectiveness, Distance Education

**ABSTRACT**

This study aims to explore students' perceptions of the effectiveness of online learning applications in supporting academic learning. The research was conducted using a quantitative descriptive method involving [number] students from [institution or study program], who have used various online learning platforms such as Google Classroom, Zoom, and Moodle during their learning activities. Data were collected through a structured questionnaire focusing on user experience, ease of access, interactivity, and perceived learning outcomes. The results indicate that a majority of students perceive online learning applications as effective in facilitating flexible and accessible learning. However, some limitations were noted, particularly in terms of internet connectivity, user interface, and reduced face-to-face interaction. The study concludes that while online learning applications are generally well-received, their effectiveness can be improved through better technical support and instructional design. These findings provide valuable insights for educators and developers in optimizing digital learning environments.



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## 1. INTRODUCTION

The integration of online learning applications into educational settings has become increasingly prevalent, particularly with the rapid advancements in technology and the unforeseen circumstances that have necessitated remote learning solutions (Almelhi, 2021). The proliferation of Learning Management Systems and various digital tools has significantly impacted educational practices, presenting students with novel avenues for accessing information and engaging with course materials (Al-Mamary, 2022). These platforms are not entirely novel, as computers have been commonplace in higher education within developed nations for many years (Al-Mamary, 2022). With institutions striving to deliver rigorous curricula and accommodate diverse student populations, the efficacy of these online learning applications in meeting both institutional objectives and the unique needs of students warrants careful examination (Wenzel & Moreno, 2022). It is crucial to evaluate how students perceive the effectiveness of these applications in terms of facilitating their learning experiences, promoting engagement, and fostering a supportive educational environment (Al-Mamary, 2022). The perception of students regarding these applications can further dictate acceptance and adoption (Al-Mamary, 2022). Understanding these

perspectives is not only vital for refining the design and implementation of online learning applications but also for ensuring that these tools genuinely enhance the overall educational journey for students (Umarova, 2024).

**Statement of the Problem**

Even though online education is becoming more popular, many students face challenges that affect how well they learn. Some students may struggle because they do not have reliable access to the internet or computers (Santos et al., 2022). Also, some students might find it hard to stay focused and motivated when learning online because they do not have the structure of a traditional classroom. It is also difficult for teachers to keep students interested and manage classrooms well in online learning (Anwar & Anjarningsih, 2024). It's worth noting that blended learning might make some students feel disconnected from the school community (Ashfaq, 2023).

**Purpose of the Study**

This study aims to investigate how students perceive the effectiveness of online learning applications, focusing on the impact of blended learning strategies. Blended learning, which combines traditional classroom instruction with online resources, has shown promise in supporting differentiated learning for students with disabilities (Utami et al., 2024). It's been proven that blended learning helps students learn and achieve more in different fields.

Understanding these perceptions can provide valuable insights into the strengths and weaknesses of current online learning applications, guiding educators and developers in creating more effective and engaging learning experiences. The goal is to identify which parts of online learning students find most helpful and which parts need improvement. By gathering and analyzing student feedback, this research seeks to inform the design and implementation of online learning strategies that enhance student outcomes and satisfaction (Widajati et al., 2023).

**Research Questions**

How do students perceive the effectiveness of online learning applications in terms of engagement and motivation?

What specific features of online learning applications do students find most beneficial for their learning?

**Gaps in the Literature**

While there is research on blended learning's effect on academic performance, it is scarce, even though some studies show it has a more positive impact than traditional and online learning (Liu et al., 2024). More research is needed to address the lack of thorough and current understanding regarding blended learning's effects on various educational outcomes across different countries and educational contexts (Cao, 2023).

## 2. THEORETICAL BASIS

**Blended Learning and Student Outcomes**

Blended learning combines traditional teaching with online resources to improve education. Studies have found that blended learning can improve students' grades and how well they learn (Tong et al., 2022). Students generally have positive feelings about blended programs and teaching methods (Ashfaq, 2023). The flexibility and cost-effectiveness of blended learning make it attractive. . Blended learning is beneficial for improving learning results (Ye et al., 2023).

**Effectiveness of Online Learning**

Effective online learning involves thoughtful preparation to make sure students stay interested and learn well. Online learning is a key strategy for delivering education to large groups and promoting lifelong learning during the pandemic (Ashfaq, 2023). Using a blended learning method, where online and offline learning are combined, can help students understand concepts better.

**Student Perceptions of Online Learning**

How students feel about online learning is very important for figuring out how well it works. Online education can help improve the national knowledge system and make the country more competitive, which is why it deserves more attention. Understanding what students think helps improve online learning and make it more attractive to them.

**Online Learning Applications**

Online learning applications have become increasingly important tools in modern education, offering diverse features and functionalities designed to enhance the learning experience. Online education is becoming more popular, as it allows students to learn from anywhere and at any time, boosting chances for self-improvement and empowerment. (Chen et al., 2022).

**Factors Influencing Perceptions**

Many things affect what students think about online learning, including how well they can use technology, how motivated they are, and how well the online courses are designed. Some students may not have consistent access to the internet or computers, which can make it hard for them to participate fully in online learning (Rivera-Vargas et al., 2021). Also, some students may struggle to stay focused and driven in online learning settings because they lack the structure of a regular classroom. Therefore, it's critical to consider these factors when evaluating the effectiveness of online learning applications and when creating strategies to improve the online learning experience for all students.

**Student Attitudes Toward Online Learning Platforms**

Student attitudes towards online learning platforms are multifaceted, influenced by a range of factors including prior experiences with digital media, the perceived ease of use of the technology, and the extent to which these platforms foster a sense of connection and community. Students' attitudes toward using digital media in learning, expectations related to social norms, self-efficacy, motivation, and perceived constraints all contribute to their overall perception of online learning environments (Henne et al., 2024). A positive attitude towards Learning Management Systems significantly increases the likelihood of a student adopting and effectively utilizing these systems (Al-Mamary, 2022). Moreover, the design and functionality of online learning applications play a pivotal role in shaping student perceptions. Platforms offering intuitive interfaces, seamless navigation, and interactive features are more likely to be viewed favorably by students, as these attributes directly contribute to a more engaging and productive learning experience (Al-Mamary, 2022). Conversely, platforms plagued by technical glitches, confusing layouts, or a lack of interactive elements may lead to frustration and disengagement among students. The incorporation of gamified elements and virtual manipulatives can enhance engagement, providing opportunities to apply concepts in interactive ways, especially for visual learners (Engelbrecht & Borba, 2023). Furthermore, it is essential to acknowledge that students' perceptions of online learning applications are also shaped by their individual learning styles and preferences (Adewale et al., 2024). While some students may thrive in self-directed, asynchronous online environments, others may prefer the structure and real-time interaction offered by traditional face-to-face instruction. Institutions must be aware of the challenges from transitioning to virtual learning and implementing the technology (Butt et al., 2021).

**Factors Influencing Perceptions of Effectiveness**

Several factors influence students' perceptions of the effectiveness of online learning applications, and among the most prominent is the quality of interaction and communication facilitated by these platforms. Online learning should be designed to reduce transactional distance for increased interactions. Applications that enable seamless communication between students and instructors, as well as among students themselves, are more likely to be viewed as effective in fostering a sense of community and promoting collaborative learning. The availability of prompt and constructive feedback from instructors is another critical factor

influencing students' perceptions of effectiveness (Mamun & Lawrie, 2023). When instructors actively engage with students, provide timely responses to queries, and offer personalized feedback on assignments, students are more likely to perceive the online learning environment as supportive and conducive to their academic success. Conversely, a lack of interaction and feedback can lead to feelings of isolation and disengagement, undermining the perceived effectiveness of the online learning application (Ashfaq, 2023). Effective instructional planning enables students to build and practice ways to get around any potential roadblocks that may lie in the path of their education (Wicaksono et al., 2023). The flexibility and accessibility afforded by online learning applications also play a significant role in shaping student perceptions. Platforms that allow students to access course materials and participate in learning activities at their own pace and from any location are often viewed favorably, as they accommodate diverse schedules and learning preferences. However, internal factors such as technology issues and time management skills can be a detriment to the overall success of online learning (Gustiani et al., 2022).

## 3. RESEARCH METHODOLOGY

### Research Design

The investigative approach employed in this study is premised on a quantitative research design, leveraging survey methodology to garner comprehensive insights into students' perceptions of online learning applications. This method will gather data from a large number of participants, providing a broad overview of trends and opinions (Al-Natour & Woo, 2020).

### Data Collection

The central instrument for data collection in this study is a structured survey questionnaire, meticulously designed to capture nuanced perceptions of online learning applications among students. The survey instrument incorporates a combination of multiple-choice questions, Likert-scale items, and open-ended prompts to facilitate a comprehensive exploration of student perspectives.

### Data Analysis

Descriptive statistics, including means, standard deviations, and frequencies, will be employed to summarize the demographic characteristics of the sample and provide an overview of students' perceptions of online learning applications. Additionally, inferential statistical techniques, such as t-tests and analysis of variance, will be utilized to examine differences in perceptions across various demographic subgroups and identify potential predictors of online learning effectiveness. (Umarova, 2024).

Data analysis techniques are a way of analyzing research data, including relevant statistical tools to be used in research. The data analysis in this study uses qualitative descriptive analysis techniques. Measurement of questionnaire data scores is calculated using a Likert scale measurement scale. With the categories Strongly Agree (SA), Disagree (D), Agree (A), and Strongly Disagree (SD).

Tabel 1. Likert Scale Assessment Weight

| Answer Choices | Code | Score | |
|---|---|---|---|
| | | + | - |
| Strongly Agree | SA | 4 | 1 |
| Agree | A | 3 | 2 |
| Disagree | D | 2 | 3 |
| Strongly Disagree | SD | 1 | 4 |

The negative or positive perceptions of students towards online learning are known based on the answers of respondents consisting of 54 active online students with an average of around 70% of the expected 100%, if the respondents' answer choices do not reach 70% then the perception of students who have been online is included in the less good category.

The score from the questionnaire data is calculated using percentage statistics with the following formula:

$$P = \frac{F}{N} X100$$

Description:

P = Percentage value of respondents' answers

F = Frequency of respondents' answers

N = Number of respondents.

The percentage of the questionnaire will be expressed in the form of assessment result categories. The assessment result categories are used to determine students' perceptions of online learning. Determination of the qualitative average percentage category uses the indicators in table 2.

Table 2. Questionnaire Assessment Categories

| Category Percentage | Interval |
|---|---|
| 86% - 100% | Very Good |
| 85% - 70% | Good Less Good |
| 69% - 54% | Not Good |
| 53% - 38% | |

As for knowing the obstacles in online learning using descriptive analysis techniques obtained from the results of interviews with respondents. The type of qualitative descriptive research is a type of research with a process of obtaining data that is as it is.

Table 3. Overall Results of Student Perceptions of Online Learning

| Indicator | Average (%) | Category |
|---|---|---|
| Reception | 65,1 | Not good |
| Evaluation | 65 | Not good |
| **Average** | 53,2 | Not good |

Based on Table 3, it is known that the overall results of students' perceptions of online learning consisting of acceptance and evaluation indicators show a value with an average of 53.2% with a poor category. The diagram based on perception indicators can be seen in Figure 1.

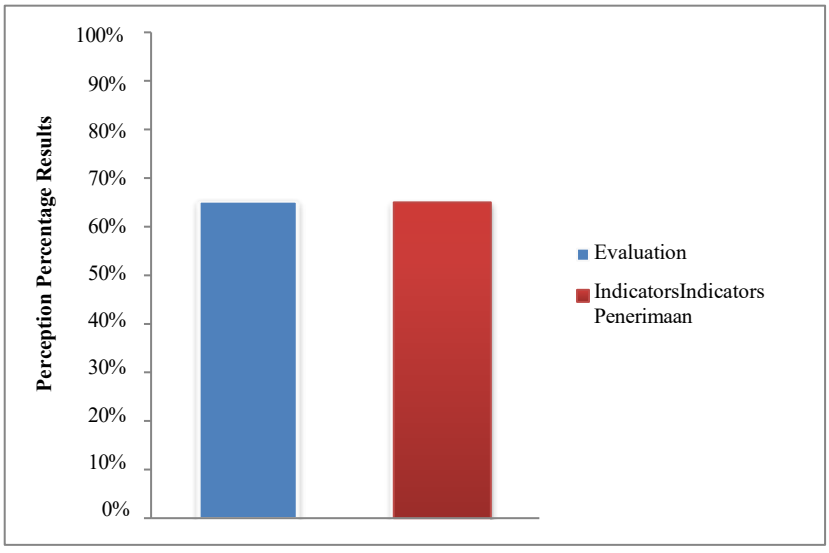

Figure 1. Overall Results of Student Perceptions based on Perception Indicators.

The overall data results obtained based on the perception indicator can be seen in Table 3. The graph above illustrates that there is not much difference in the value obtained in the perception indicator. Based on the data from the questionnaire answers, the acceptance indicator consists of 65% while the evaluation indicator consists of 65.1%.

## Discussion

In examining the data gleaned from the survey responses, it is evident that students hold multifaceted perspectives regarding the efficacy of online learning applications. Students noted that blended learning improved their academic performance and engagement (Ashfaq, 2023). The integration of technology into the educational framework offers flexibility and personalized learning experiences, yet it also presents challenges pertaining to student motivation and engagement (Siddiqui et al., 2024). It is worth mentioning that the integration of face-to-face and online learning can promote critical thinking and independence (Ashfaq, 2023). It is evident that well-designed online platforms can foster student engagement and augment learning outcomes.

## REFERENCES


Abbad, M. (2021). Using the UTAUT model to understand students' usage of e-learning systems in developing countries. Education and Information Technologies, 26(6), 7205. https://doi.org/10.1007/s10639-021-10573-5

Adel, A., & Dayan, J. (2021). Towards an intelligent blended system of learning activities model for New Zealand institutions: an investigative approach. Humanities and Social Sciences Communications, 8(1). https://doi.org/10.1057/s41599-020-00696-4

Adelakun, N. O., & Omolola, S. A. (2020). A Pragmatic Study on E-Learning System for Higher Education in Developing Countries. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3856391

Adewale, M. D., Azeta, A. A., Abayomi-Alli, A., & Sambo-Magaji, A. (2024). Impact of artificial intelligence adoption on students' academic performance in open and distance learning: A systematic literature review. Heliyon, 10(22). https://doi.org/10.1016/j.heliyon.2024.e40025

Alkhatib, A. S., & Jaradat, S. A. (2021). The Impact of Blended Learning using the Ideas Box on the Motivation for Learning Among Non-formal Syrian Female Refugee Students in Jordan. International Journal of Interactive Mobile Technologies (iJIM), 15(11), 81. https://doi.org/10.3991/ijim.v15i11.21961

Al-Mamary, Y. H. (2022). Why do students adopt and use Learning Management Systems?: Insights from Saudi Arabia. International Journal of Information Management Data Insights, 2(2), 100088. https://doi.org/10.1016/j.jjimei.2022.100088

Almelhi, A. M. (2021). The Role of the Blackboard LMS in EFL Course Delivery During the COVID-19 Pandemic: Investigating Attitudes and Perceptions of Faculty and Students. International Journal of English Linguistics, 11(2), 46. https://doi.org/10.5539/ijel.v11n2p46

Al-Natour, S., & Woo, C. (2020). The determinants of learner satisfaction with the online video presentation method. Internet Research, 31(1), 234. https://doi.org/10.1108/intr-04-2019-0155

AlShawabkeh, A., Woolsey, M. L., & Kharbat, F. (2021). Using online information technology for deaf students during COVID-19: A closer look from experience. Heliyon, 7(5). https://doi.org/10.1016/j.heliyon.2021.e06915

Anderson, L., Carter, M. J., & Direnzo, A. (2021). Online Teaching and Learning: Perspectives of Faculty and Students from the Cyber-Trenches. SCHOLE A Journal of Leisure Studies and Recreation Education, 37, 112. https://doi.org/10.1080/1937156x.2021.1897901

Anigri, M. (2021). E-learning for smart-universities: pandemic challenges and opportunities in Morocco. E3S Web of Conferences, 297, 1066. https://doi.org/10.1051/e3sconf/202129701066

Anthony, B., Kamaludin, A., Romli, A., Raffei, A. F. M., Phon, D. N. E., Abdullah, A., & Ming, G. L. (2020). Blended Learning Adoption and Implementation in Higher Education: A Theoretical and Systematic Review. Technology Knowledge and Learning, 27(2), 531. https://doi.org/10.1007/s10758-020-09477-z

Anwar, S. E., & Anjarningsih, H. Y. (2024). Implementation of Hybrid Learning Adopting Multisensory Approach in English Classroom for Dyslexic Students. Jurnal Pendidikan Humaniora, 12(1), 9. https://doi.org/10.17977/um011v12i12024p9-25

Ashfaq, M. S. (2023). A Blended Learning Approach to Improve Student's Performance in Higher Education. Pakistan Social Sciences Review, 7. https://doi.org/10.35484/pssr.2023(7-iv)23

Bashir, S., & Lapshun, A. L. (2024). E-learning future trends in higher education in the 2020s and beyond. Cogent Education, 12(1). https://doi.org/10.1080/2331186x.2024.2445331

Butt, S., Mahmood, A., Saleem, S., Rashid, T., & Ikram, A. (2021). Students' Performance in Online Learning Environment: The Role of Task Technology Fit and Actual Usage of System During COVID-19. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.759227

Cannaos, C., Onni, G., & Casu, A. (2024). Blended Learning: What Changes? Sustainability, 16(20), 8988. https://doi.org/10.3390/su16208988

Cao, W. (2023). A meta-analysis of effects of blended learning on performance, attitude, achievement, and engagement across different countries [Review of A meta-analysis of effects of blended learning on performance, attitude, achievement, and engagement across different countries]. Frontiers in Psychology, 14. Frontiers Media. https://doi.org/10.3389/fpsyg.2023.1212056

Casanova, V. S., & Paguia, W. M. (2021). Expectations, Experiences, and Satisfaction of the Graduate Students with Distance Online Learning Environment in OMSC Graduate School during the Covid-19 Pandemic. Journal of Practical Studies in Education, 3(1), 14. https://doi.org/10.46809/jpse.v3i1.39

Chen, R., Li, W., Zhou, J., & Zhou, R. (2022). The Development of Online Education: An Analysis Based on Four Countries. Advances in Social Science, Education and Humanities Research/Advances in Social Science, Education and Humanities Research. https://doi.org/10.2991/assehr.k.220504.341

Cheung, S. K. S., Wang, F. L., & Kwok, L. F. (2023). Online learning and blended learning: new practices derived from the pandemic-driven disruption. In Journal of Computing in Higher Education (Vol. 35, Issue 1, p. 1). Springer Science+Business Media. https://doi.org/10.1007/s12528-023-09350-9

Cîrneanu, A.-L., & Moldoveanu, C.-E. (2024). Use of Digital Technology in Integrated Mathematics Education. Applied System Innovation, 7(4), 66. https://doi.org/10.3390/asi7040066

D. S. (2023). Blended Learning: A Necessity for Indian Education System. International Journal For Multidisciplinary Research, 5(4). https://doi.org/10.36948/ijfmr.2023.v05i04.4574

Devi, B. M., Sharma, C., & LEPCHA, N. (2021). Blended Learning - A Global Solution in the Age of COVID-19. Journal of Pharmaceutical Research International, 125. https://doi.org/10.9734/jpri/2021/v33i41b32351

Durães, D., Toala, R., & Nováis, P. (2021). Emotion Analysis in Distance Learning. In Advances in intelligent systems and computing (p. 629). Springer Nature. https://doi.org/10.1007/978-3-030-68198-2_58

Engelbrecht, J., & Borba, M. C. (2023). Recent developments in using digital technology in mathematics education. ZDM, 56(2), 281. https://doi.org/10.1007/s11858-023-01530-2

Et.al, W. A. (2021). The Influence of Blended Learning to Understanding Concept. Türk Bilgisayar ve Matematik Eğitimi Dergisi, 12(3), 3756. https://doi.org/10.17762/turcomat.v12i3.1658

George, B., & Wooden, O. S. (2023). Managing the Strategic Transformation of Higher Education through Artificial Intelligence. Administrative Sciences, 13(9), 196. https://doi.org/10.3390/admsci13090196

Getenet, S., Cantle, R., Redmond, P., & Albion, P. (2024). Students' digital technology attitude, literacy and self-efficacy and their effect on online learning engagement. International Journal of Educational Technology in Higher Education, 21(1). https://doi.org/10.1186/s41239-023-00437-y

Gustiani, S., Ardiansyah, W., & Simanjuntak, T. (2022). Motivation in Online Learning Amidst Covid-19 Pandemic Era: Students' Intrinsic and Extrinsic Factors. Advances in Social Science, Education and Humanities Research/Advances in Social Science, Education and Humanities Research. https://doi.org/10.2991/assehr.k.220202.029

Hashim, N., & Hamidon, Z. (2022). Blended Learning in Technical and Vocational Education and Training (TVET) Training Institute. International Journal of Academic Research in Progressive Education and Development, 11(1). https://doi.org/10.6007/ijarped/v11-i1/12343

Henne, A., Möhrke, P., Huwer, J., & Thoms, L. (2024). Finally Digital Natives? Changes in Media Use among Science Students during the COVID-19 Pandemic. Education Sciences, 14(6), 555. https://doi.org/10.3390/educsci14060555

Ilin, V. (2021). The role of user preferences in engagement with online learning. E-Learning and Digital Media, 19(2), 189. https://doi.org/10.1177/20427530211035514

Kipchumba., D. S. (2021). Challenges, Responses and Prospects for Post COVID-19 Higher Education Management in Kenya. Journal of Business and Entrepreneurship, 3(1). https://doi.org/10.51317/ecjbms.v3i1.305

Krismadinata, K., Verawardina, U., Jalinus, N., Rizal, F., Sukardi, S., Sudira, P., Ramadhani, D., Lubis, A. L., Friadi, J., Arifin, A. S. R., & Novaliendry, D. (2020). Blended Learning as Instructional Model in Vocational Education: Literature Review. Universal Journal of Educational Research, 8, 5801. https://doi.org/10.13189/ujer.2020.082214

Liu, Y., Ma, S., & Chen, Y. (2024). The impacts of learning motivation, emotional engagement and psychological capital on academic performance in a blended learning university course. Frontiers in Psychology, 15. https://doi.org/10.3389/fpsyg.2024.1357936

Mamun, M. A. A., & Lawrie, G. (2023). Student-content interactions: Exploring behavioural engagement with self-regulated inquiry-based online learning modules. Smart Learning Environments, 10(1). https://doi.org/10.1186/s40561-022-00221-x

Mohee, R., Rampersad, R. D., Chadeea, T. K., Patten, V., & Ittea, R. (2022). Strengthening and Sustaining Online and Blended Learning in the Aftermath of Covid-19 through Quality Assurance Measures: The Case of Public Higher Education Institutions in Mauritius. Tenth Pan-Commonwealth Forum on Open Learning. https://doi.org/10.56059/pcf10.2963

Park, S. E. (2021). Planning for Blended Learning for the Post-Pandemic Era. American Journal of Biomedical Science & Research, 13(3), 268. https://doi.org/10.34297/ajbsr.2021.13.001868

Rivera-Vargas, P., Anderson, T., & Cano, C. A. (2021). Exploring students' learning experience in online education: analysis and improvement proposals based on the case of a Spanish open learning university. Educational Technology Research and Development, 69(6), 3367. https://doi.org/10.1007/s11423-021-10045-0

Salam, U., Wahdini, W., Surmiyati, S., Rezeki, Y. S., Riyanti, D., & Suthathothon, P. (2023). Teachers' challenges and strategies in using digital media in teaching English. Journal of English Language Teaching Innovations and Materials (Jeltim), 5(1), 49. https://doi.org/10.26418/jeltim.v5i1.63204

Santos, J., Bittencourt, I. I., Reis, M., Challco, G. C., & Isotani, S. (2022). Two billion registered students affected by stereotyped educational environments: an analysis of gender-based color bias. Humanities and Social Sciences Communications, 9(1). https://doi.org/10.1057/s41599-022-01220-6

Schulz, M. (2023). E-Learning as a Development Tool. Sustainability, 15(20), 15012. https://doi.org/10.3390/su152015012

Siddiqui, R. A., Sonawane, A., & Shinde, S. (2024). Blended Learning Models: Combining Online and Offline Education for Optimal Outcomes. INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT, 8(12), 1. https://doi.org/10.55041/ijsrem39682

Smith, K., & Smith, D. (2021). Tuition attendance and students with mental health disability: does widening tuition options increase access? Open Learning The Journal of Open Distance and E-Learning, 39(4), 304. https://doi.org/10.1080/02680513.2021.1999801

Tian, M. (2023). The Impact of Blended Online and Offline Learning on College Students. Lecture Notes in Education Psychology and Public Media, 7(1), 166. https://doi.org/10.54254/2753-7048/7/20220772

Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane. Heliyon, 8(12). https://doi.org/10.1016/j.heliyon.2022.e12657

Umarova, Z. (2024). Developing the Professional Competence of Future Chemistry Teachers through Digital Technologies: A Case Study of Kazakhstan. International Journal of Information and Education Technology, 14(8), 1119. https://doi.org/10.18178/ijiet.2024.14.8.2140

Utami, I. S., Budi, S., Arnez, G., & Hafid, A. (2024). Blended Learning Design to Support Differentiated Learning: A Case Study for Students with Disability. Journal of ICSAR, 8(1), 26. https://doi.org/10.17977/um005v8i1p26

Wenzel, A., & Moreno, J. (2022). Designing and Facilitating Optimal LMS Student Learning Experiences. The Northwest eLearning Journal, 2(1). https://doi.org/10.5399/osu/nwelearn.2.1.5642

Wibawa, R. P., Wibawa, S. C., Susanti, M. D. E., & Sulistiyo, E. (2021). E-readiness Measurement in the Virtual Application Learning. IOP Conference Series Materials Science and Engineering, 1125(1), 12059. https://doi.org/10.1088/1757-899x/1125/1/012059

Wicaksono, B. H., Ismail, S. M., Sultanova, S. A., & Abeba, D. (2023). I like language assessment: EFL learners' voices about self-assessment, self-efficacy, grit tendencies, academic resilience, and

academic demotivation in online instruction. Language Testing in Asia, 13(1). https://doi.org/10.1186/s40468-023-00252-2

Widajati, W., Mahmudah, S., Nur, D. R. K., Ekasari, D., Minarsih, N. M. M., Anggraeny, D., & Dwirisnanda, D. A. (2023). Blended Learning to Improve Vocational Life Skills in Making Batik for Disabilities. Jurnal Pedagogi Dan Pembelajaran, 6(3), 465. https://doi.org/10.23887/jp2.v6i3.64400

Ye, Y., Zhang, G., Si, H., Xu, L., Shenghua, H., Li, Y., Zhang, X., Hu, K., & Ye, F. (2023). A Hierarchy-based Analysis Approach for Blended Learning: A Case Study with Chinese Students. arXiv (Cornell University). https://doi.org/10.48550/arxiv.2309.10218

Zhang, Y., Chen, T., & Wang, C. (2020). Factors Influencing Students' Willingness to Choose Blended Learning in Higher Education. In Lecture notes in computer science (p. 289). Springer Science+Business Media. https://doi.org/10.1007/978-3-030-51968-1_24

Zhu, M., Berri, S., & Zhang, K. (2021). Effective instructional strategies and technology use in blended learning: A case study. Education and Information Technologies, 26(5), 6143. https://doi.org/10.1007/s10639-021-10544-w

Zhu, Y. (2022). The Impact of Digital Technology on the Optimization of Higher Education Teaching Models in an Epidemic Environment. Security and Communication Networks, 2022, 1. https://doi.org/10.1155/2022/5301459

Zou, Y. L., Kuek, F., Feng, W. Z., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. Frontiers in Education, 10. https://doi.org/10.3389/feduc.2025.1562391