Algerim SATUBALDINA

An Examination of Blended Learning in the Context of Higher Education

Challenges, Adaptive Strategies, and Institutional Support

Introduction

Background of blended learning in higher education

Blended learning combines traditional (face-to-face) teaching with online learning using digital platforms. (Dziuban et al., 2004). This methodology is well regarded in higher education and can be more efficient because it offers greater flexibility and more interactive teaching than the classroom model. According to Tong et al. (2022), combining the two learning models, the result is students with higher levels of engagement and autonomy. Another study in this area shows that information and communication technologies, when used in education, have led to an increase in hybrid teaching (Bizami et al., 2022). Therefore, it is important to recognize the challenges faced by students using this blended learning method, as this type of higher education has increased. Identifying these barriers will optimize learning outcomes for students, faculty, and the institution making the learning experience more comprehensive and enhancing student performance. This is a bibliographic study on the challenges faced by students in higher education who use blended learning. The article will investigate the actions academics take to address these challenges and provide relevant suggestions for overcoming them. The objective of the study is to understand the greatest challenge students face when using blended learning and address the issues they face so that these difficulties can be resolved, offering better results from blended learning. In addition, this analysis will provide a theoretical analysis of the problems in hybrid teaching, and thus evaluate its alignment with a selected possibility, which is the main focus of this work. The purpose of this comprehensive investigation is to provide educators, institutions, and policymakers with a useful resource that will help them effectively address and overcome these difficulties.

Significance of studying challenges and barriers in blended learning

Conducting a thorough analysis of the challenges students face when entering the blended learning model is crucial. When a broad understanding of the challenges faced by students, educational institutions, and educators is gained, proactive strategies emerge to address discrepancies such as lack of engagement and learning. As educators gain experience in improving teaching techniques and support systems, they maximize the benefits of blended learning. Another important factor in helping to amplify the effectiveness of blended learning programs is that universities must ensure that course design, delivery, and technology are tailored to the challenges students face. As a means of improvement, implementing pedagogical strategies and techniques based on empirical research improves the organization of the learning process. In order to create supportive learning athmosphere and to increase educational equality, it is extremely important to analyze the challenges that hinder the wider implementation of hybrid teaching. Analyzing academic research in this area, it can be concluded that there was a gap between student populations in terms of technological accessibility, digital skills proficiency, and availability of support services. Consequently, addressing the challenges and barriers to blended learning and potential improvements in system efficiency results in benefits such as improved teaching practices, better student outcomes, a more equitable and inclusive education system, advances in teaching and learning research, and informed policy decisions. This ensures that the learning environment strengthens students' intellectual and psychological well-being.

What challenges do students face while studying in blended learning?

The following questions will be raised to implement an investigation into this fundamental issue:

- RQ1: What challenges do students face while studying in blended learning?

- RQ2: How do students react to those challenges? What do they do to manage those challenges?

Therefore, the study might be valuable for educators, teachers, or those simply from university administrators to understand the challenges and to find the ways how to make university or study experience for students more fruitful, resulting in a more practical and efficient experience for students.

Research Methodology

Through documentary research, this study analyzes hybrid learning in higher education, with the emphasize of challenges identification faced by this form of teaching and learning. The methodology section consists of a literature review, a theoretical framework, and the results of previous research, with the aim of providing practical recommendations.

For the analysis, research was conducted in conference proceedings, articles, specialized journals, and reports from academic institutions. With the use of the key words "blended learning", "higher education", "challenges", "coping strategies", "institutional support" publications relevant for this research were identified (Tong et al., 2022). By applying previously established theoretical frameworks, the research demonstrates a solid conceptual foundation for understanding the challenges of blended learning. Therefore, the research frameworks selected were Ecological Systems Theory, Social Presence Theory, Self-Determination Theory (SDT), the Community of Inquiry (CoI) Framework, Cleveland-Innes & Wilton (2018), and the Technology Acceptance Model (TAM).

The literature review for this study was carried out using a documentary research approach,the search conducted using Scopus, Web of Science, ERIC, and Google Scholar, employing combinations of keywords such as "blended learning", "higher education", "challenges", "coping strategies", and "institutional support".

To ensure methodological transparency, specific inclusion and exclusion criteria were applied. As for inclusion criteria: (1) peer-reviewed journal articles published between 2004 and 2023; (2) studies written in English; and (3) research focused on higher education contexts that explicitly discussed blended learning challenges, coping mechanisms, or forms of institutional support. Exclusion criteria included: (1) studies focusing solely on primary or secondary education; (2) non-English publications; and (3) articles unrelated to the research questions.

The search strategy of relevant articles included the identification, screening, evaluation of eligibility and final inclusion, as of the PRISMA framework. In total, 312 matches were found and 18 matches from the alternative sources as reflected in Appendix X. The duplicates were removed and with 260 articles have been processed for screening stage, where 182 were considered as improper. Also, 36 out of 78 records didn't meet the inclusion criteria as for full-text evaluation. At the final stage, 42 studies were used for further consideration.

Regarding the dynamics of blended learning, the following references provide notable insights: Ettekal & Mahoney (2017); Kreijns et al. (2021); Niemiec & Ryan (2009); Cleveland-Innes & Wilton (2018); Sweller et al. (2019); and Granić & Marangunić (2019).

Consequently, relevant academic articles were used to obtain data and create a synthesis. These researchers used thematic analysis to identify recurring themes related to the challenges of blended learning and their coping mechanisms. Regarding the integrity and reliability of the research results, greater understanding was achieved through the analysis of qualitative and quantitative data.

Theoretical Framework

Theories relevant to blended learning challenges and barriers

Understanding the theoretical foundations of barriers in blended learning is vital to effectively addressing them. A range of relevant theories apply in this context, such as the Technology Acceptance Model (TAM), which explores consumer technology use, giving a prominece to perceived usefulness,

ease of use, and attitudes toward technology. These are essential aspects for determining technology acceptability in blended learning (Granić & Marangunić, 2019). Another theory is Social Presence Theory, which investigates how the lack of physical presence in blended learning can impact students' sense of social presence, participation, and coping strategies, showing up the importance of sociability and connectivity (Kreijns et al., 2021). Similarly, Self-Determination Theory (SDT) addresses the internal motivation of people and their psychological needs, such as autonomy, competencies, and relatedness, as playing a key role in influencing student engagement and coping mechanisms in blended learning environments (Niemiec & Ryan, 2009). The Community of Inquiry (CoI) presents how cognitive, social and teaching presences can influence engagement and knowledge building. (Cleveland-Innes & Wilton, 2018). Further, Cognitive Load Theory (CLT) investigates the cognitive load on students during the learning period and examines how course design and structuring in this type of learning influence cognitive load, information processing, and student coping mechanisms (Sweller et al., 2019). As such, Ecological Systems Theory can offer insights into the interactions between humans and environments.

In conclusion, the theories, taken together, provide a complete framework for understanding how hybrid learning impacts students and the challenges they face. These theoretical analyses provide relevant knowledge for proposing useful interventions.

Challenges and Barriers in Blended Learning

Overview of challenges and barriers faced by students

Understanding the barriers encountered by teachers in a hybrid teaching environment is of paramount importance so that both educators and institutions can offer effective support.

The barriers for users of this form of education are extensive, one of which is access to technology and reliable internet connectivity, which can represent a significant obstacle, as there are gaps in the availability of devices and internet access, hindering student participation and learning outcomes. (Asio et al., 2021; Cullinan et al., 2021). In addition, inadequate technical assistance and training accentuate technological challenges, causing learners to become frustrated and unable to make effective use of hybrid learning (Barrot et al., 2021). In addition, a lack of digital skills can make it difficult to engage with digital resources. (Coman et al., 2020; Chaw & Tang, 2023). Self-discipline and a high level of time management are of paramount importance for studying under hybrid learning mode, a lack of these qualities in students may lead to increased procrastination and negatively affect their overall academic performance.(Cobo-Rendón et al., 2022; Eggers et al., 2021). In terms of face-to-face interaction, hybrid environments also present emotional and social challenges, leading to lower motivation and well-being among students (Li, 2022; Zhao & Song, 2022). Precel et al. (2009), Serrano et al. (2019), and Namyssova et al. (2019) argue that when teaching materials are poorly designed and lack structure, this can lead to reduced comprehension on the part of the reader and consequently decrease their engagement with the teaching. When it comes to assessment and feedback in hybrid teaching, approaches need to be addressed in a way that finds solutions to ensure fairness and effectiveness (Gikandi et al., 2011). According to Hattie and Timperley (2007), traditional evaluation methodologies need to be developed to allow for greater adaptability so that there are different modes of active participation.

In conclusion, addressing such challenges may require competent decisions that leverage technological innovation and pedagogical expertise, making performance and behavior assessment efficient (López-Pellisa et al., 2020). Therefore, by identifying and addressing these challenges, both institutions and educators have the opportunity to improve the teaching environment and pave the way for greater holistic educational enrichment, always seeking new opportunities for efficiency and optimization. Such challenges will depend on the educational environment, student demographics, and course design, with a focus on placing efforts on the need for personalized approaches for students to achieve academic success.

Challenges specific to higher education

When discussing hybrid teaching in higher education, the challenges that this type of teaching presents require close examination. Firstly, digital exclusion can be a factor of great concern, as the number of students who do not have access to technology, or even a reliable connection, is considerable. (Rahiem, 2020). This isolation results in significant discrepancies between students, causing obstacles to accessing course materials and engaging fully in blended learning activities. (Asio et al., 2021; Cullinan et al., 2021). When it comes to the lack of accessible assistance and comprehensive training, according to Chervonyi et al. (2021) and Su et al. (2023), this gap leaves students poorly educated in the use of digital tools.

In addition, many students still have limited digital literacy skills, which can hinder their efficient navigation of hybrid learning environments – especially in cases where digital technologies play an important role in education (Tang & Chaw, 2016). Students who are not sufficiently proficient in using digital tools find their ability to access course materials and participate in online activities impaired. (Chaw & Tang, 2023; Coman et al., 2020). Another important point is that students who are enrolled in hybrid education, in order to make good use of it, must have greater autonomy and self-discipline so that they can manage their own time for those who already face difficulties in organization and self-management (McHone, 2020).

In the social and emotional realm, the decrease in face-to-face encounters can generate feelings of isolation and distance, problems that are exacerbated by the absence of the more subtle emotional cues inherent in face-to-face interaction (Eslit, 2023; Li, 2022; Zhao & Song, 2022). From a pedagogical point of view, designing courses that adequately balance the use of digital resources with different learning styles and promote engagement in all formats remains a significant challenge, as does ensuring fair assessments and providing consistent feedback in both the virtual and face-to-face parts of courses (Namyssova et al., 2019; Serrano et al., 2019; Ice et al., 2007; Hattie & Timperley, 2007).

One way to resolve these issues efficiently is for institutions to adopt a broad approach that provides fair access to technology, technical support, and even digital empowerment programs. In addition, the success of hybrid learning environments in higher education depends on careful course planning, organizational structure, and well-defined assessment strategies.

Addressing Challenges in Higher Education Blended Learning

In short, addressing the specific challenges of higher education in a hybrid environment may require a holistic strategy. To address these issues in an effective and functional manner, educational organizations should consider the following measures: First, it is important to ensure equitable access to technology and internet connectivity, which can include efforts such as providing loaner devices, subsidies for internet access, or even partnerships with established local service providers. (Asio et al., 2021; Cullinan et al., 2021; Rahiem, 2020). According to Chervonyi et al. (2021), Su et al. (2023), and Sankar et al. (2022), it is important to equip students with ubiquitous technical support possibilities as well as continuous training for improving students' experiences with online learning platforms. Keeping a high level of students' digital competence including confident use of digital environment can be supported with the help of continuous training. (Tang & Chaw, 2016; Chaw & Tang, 2023; Coman et al., 2020). To achieve efficient management with minimal losses, it is necessary to offer workshops and resources on management so that the target audience can gain mastery (McHone, 2020; Eggers et al., 2021; Cobo-Rendón et al., 2022).

At the same time, it is necessary to encourage the formation of virtual support networks and communities and promote initiatives to leverage emotional well-being in order to combat social and emotional challenges (Eslit, 2023; Li, 2022; Zhao & Song, 2022). In order to provide resources and training that are cohesive and able to maintain engagement in different modalities, educators need to adapt their teaching methods so that learning can progress (Namyssova et al., 2019; Serrano et al., 2019; Jeffrey et al., 2014; Bakhati, 2022). In terms of pioneering forms of assessment, investment in plausible and

useful feedback mechanisms is required to ensure greater accuracy in assessing student performance (Ice et al., 2007; Gikandi et al., 2011; Hattie & Timperley, 2007).

Finally, the improvement of clear guidelines is essential to maintain the integrity of collaborative assessments (López-Pellisa et al., 2020). Therefore, such barriers require proactive and varied conduct, in which institutions are able to invest in technologies, training, and support systems so that students gain useful skills.

Institutional Support and Resources

Educational institutions must not only be aware of and address the inherent obstacles blended learning but also work to play a decisive role in providing support systems and resources to improve student performance. First, it is of utmost importance that assistance and support services be offered in an amplified and easily accessible manner, with technical support teams and academic advisors dedicated to guiding students through their journey in hybrid learning. (Raphael, 2016). For Rashid (2023), investment in learning platforms that are accessible and easy to use, ensuring fluidity, good organisation of materials and integration of tools.

Similarly, it is important to offer workshops on a regular basis that teach how to conduct effective online research and show how to critically evaluate digital sources (Martínez-Alcalá et al., 2018). The higher education institutions are reponsible for supporting students' well-being and health by arranging students counselling services, educating them on stress-reduction and mental wellness programs (Mali et al., 2023). Flexibility in this type of education is of paramount importance, as it recognises the different schedules and commitments of students who have chosen to study in this type of education (Wilson, 2021).

In short, establishing tutoring and mentoring programmes between the parties can foster a sense of community and greater support among students, enabling more experienced colleagues to help newcomers face the challenges of this type of education (Vaughan et al., 2016). This dynamic strengthens bonds, contributes to learning and helps to overcome obstacles collectively.

Conclusion

Through this research, it is possible to confirm that higher education based on hybrid models deals with problems that are real and that have great importance and diverse characteristics. The difficulties are not only access to devices and connection, but also time management and emotional balance (Asio et al., 2021; Su et al., 2023).

The main points highlighted show that overcoming these obstacles requires attitudes and solutions on the part of institutions, namely the inclusion of the promotion of digital equity, the strengthening of support networks, and the expansion of pedagogical policies that are aligned with current demands. Furthermore, as indicated by Martínez-Alcalá et al. (2018) and Mougiakou et al. (2022), adaptation over time is essential to ensure a functional and stimulating learning experience.

The change that these initiatives can bring about is far-reaching. This is especially true when it comes to institutional restructuring to respond to such demands, which not only increases the number of opportunities to acquire knowledge, but also ensures that universities are seen as spaces that promote greater social inclusion and innovation. However, it is recognised that this article has certain limitations, such as the generalised nature of the analysis and the absence of empirical data representing local realities and diverse contexts.

For future research, it is recommended that a study be produced that has empirical characteristics and focuses on certain types of audiences and different contexts, in order to deepen the perception of tactics that are more effective in supporting students. It is also important to emphasise how valuable it is to investigate the role of teachers and managers in implementing these new practices. In general,

responding critically and with a model of excellence is vital for educational institutions to remain relevant in the digital age.

References

- Asio, J. M. R., Gadia, E., Abarintos, E., Paguio, D., & Balce, M. (2021, June 30). Internet Connection and Learning Device Availability of College Students: Basis for Institutionalizing Flexible Learning in the New Normal. *Studies in Humanities and Education, 2*(1), 56–69. https://doi.org/10.48185/she.v2i1.224
- Hattie, J., Timperley, H. (2007, March). The Power of Feedback. *Review of Educational Research, 77*(1), 81–112. https://doi.org/10.3102/003465430298487
- Barrot, J. S., Llenares, I. I., & Del Rosario, L. S. (2021, May 28). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies, 26*(6), 7321–7338. https://doi.org/10.1007/s10639-021-10589-x
- Bizami, N. A., Tasir, Z., & Kew, S. N. (2022, July 29). Innovative pedagogical principles and technological tools capabilities for immersive blended learning: a systematic literature review. *Education and Information Technologies, 28*(2), 1373–1425. https://doi.org/10.1007/s10639-022-11243-w
- Brew, L. S. (2008, January). The role of student feedback in evaluating and revising a blended learning course. *The Internet and Higher Education, 11*(2), 98–105. https://doi.org/10.1016/j.iheduc.2008.06.002
- Chaw, L. Y., & Tang, C. M. (2023, January 27). Learner Characteristics and Learners' Inclination towards Particular Learning Environments. *Electronic Journal of E-Learning, 21*(1), 1–12. https://doi.org/10.34190/ejel.21.1.2537
- Chervonyi, P., Alieksieieva, S., Senchylo-Tatlilioglu, N., Chastnyk, O., & Diomidova, N. (2021, December 8). Peculiarities of the higher education development in a blended learning environment. *Revista on Line De Política E Gestão Educacional*, 2241–2257. https://doi.org/10.22633/rpge.v25i3.15959
- Cobo-Rendón, R., Bruna Jofre, C., Lobos, K., Cisternas San Martin, N., & Guzman, E. (2022, July 19). Return to University Classrooms with Blended Learning: A Possible Post-pandemic COVID-19 Scenario. *Frontiers in Education*, 7. https://doi.org/10.3389/feduc.2022.957175
- Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020, December 11). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability, 12*(24), 10367. https://doi.org/10.3390/su122410367
- Cleveland-Innes, M., & Wilton, D. (2018). Guide to Blended Learning. COMMONWEALTH OF LEARNING. https://openbooks.col.org/blendedlearning/chapter/chapter-2- theories-supporting-blended-learning/
- Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020, December 11). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability, 12*(24), 10367. https://doi.org/10.3390/su122410367
- Cullinan, J., Flannery, D., Harold, J., Lyons, S., & Palcic, D. (2021, May 21). The disconnected: COVID-19 and disparities in access to quality broadband for higher education students. *International Journal of Educational Technology in Higher Education, 18*(1). https://doi.org/10.1186/s41239-021-00262-1
- Dziuban C. D., Hartman J. L., Moskal P. D. (2004). Blended learning. EDUCAUSE Research Bulletin, 7, 1–12.
- Eggers, J. H., Oostdam, R., & Voogt, J. (2021, August 12). Self-regulation strategies in blended learning environments in higher education: A systematic review. *Australasian Journal of Educational Technology*, 175–192. https://doi.org/10.14742/ajet.6453

- Eslit, E. R. (2023, July 12). Striking the Balance: An In-depth Examination of the Blended Learning Challenges for Students, Teachers, and Parents. Preprints. https://doi.org/10.20944/preprints202307.0779.v1
- Ettekal, A. V., & Mahoney, J. L. (2017). The SAGE encyclopedia of out-of-school learning. *Ecological Systems Theory*, 230–241.
- Gikandi, J., Morrow, D., & Davis, N. (2011, December). Online formative assessment in higher education: A review of the literature. *Computers & Education, 57*(4), 2333–2351. https://doi.org/10.1016/j.compedu.2011.06.004
- Granić, A., & Marangunić, N. (2019, July 9). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology, 50*(5), 2572–2593. https://doi.org/10.1111/bjet.12864
- Hattie, J., Timperley, H. (2007, March). The Power of Feedback. *Review of Educational Research, 77*(1), 81–112. https://doi.org/10.3102/003465430298487
- Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. *Journal of Asynchronous Learning Networks, 11*(2), 3–25.
- Kreijns, K., Xu, K., & Weidlich, J. (2021, June 22). Social Presence: Conceptualization and Measurement. *Educational Psychology Review, 34*(1), 139–170. https://doi.org/10.1007/s10648-021-09623-8
- Li, L. (2022, October). Students' Isolation Challenges in Blended EFL Learning During COVID-19: How Can Social Presence and Interaction Help Develop Sense of Community? *Psychology Research and Behavior Management*, Volume 15, 3117–3131. https://doi.org/10.2147/prbm.s388317
- López-Pellisa, T., Rotger, N., & Rodríguez-Gallego, F. (2020, August 25). Collaborative writing at work: Peer feedback in a blended learning environment. *Education and Information Technologies, 26*(1), 1293–1310. https://doi.org/10.1007/s10639-020-10312-2
- Mali, D., Lim, H. J., Roberts, M., & Fakir, A. E. (2023). An analysis of how a collaborative teaching intervention can impact student mental health in a blended learning environment. *The International Journal of Management Education, 21*(3), 100853. https://doi.org/10.1016/j.ijme.2023.100853
- Martínez-Alcalá, C. I., Rosales-Lagarde, A., Alonso-Lavernia, M. D. L. N., Ramírez-Salvador, J., Jiménez-Rodríguez, B., Cepeda-Rebollar, R. M., López-Noguerola, J. S., Bautista-Díaz, M. L., & Agis-Juárez, R. A. (2018, August 28). Digital Inclusion in Older Adults: A Comparison Between Face-to-Face and Blended Digital Literacy Workshops. *Frontiers in ICT*, 5. https://doi.org/10.3389/fict.2018.00021
- McHone, C. (2020). Blended Learning Integration: Student Motivation and Autonomy in a Blended Learning Environment. *Electronic Theses and Dissertations*. Retrieved September 20, 2023, from https://dc.etsu.edu/etd/3750
- Maunula, M., Maunumäki, M., Marôco, J., & Harju-Luukkainen, H. (2023, February 20). Developing Students Well-Being and Engagement in Higher Education during COVID-19–A Case Study of Web-Based Learning in Finland. *Sustainability, 15*(4), 3838. https://doi.org/10.3390/su15043838
- Mougiakou, S., Vinatsella, D., Sampson, D., Papamitsiou, Z., Giannakos, M., & Ifenthaler, D. (2022, October 29). Online and Blended Teaching and Learning Supported by Educational Data. *Advances in Analytics for Learning and Teaching*, 1–58. https://doi.org/10.1007/978-3-031-15266-5_1
- Namyssova, G., Tussupbekova, G., Helmer, J., Malone, K., Afzal, M., & Jonbekova. D. (2019). Challenges and benefits of blended learning in higher education. *International Journal of Technology in Education (IJTE)*, *2*(1), 22-31

- Niemiec, C. P., & Ryan, R. M. (2009, June 25). Autonomy, competence, and relatedness in the classroom. T*heory and Research in Education, 7*(2), 133–144. https://doi.org/10.1177/1477878509104318
- Rahiem, M. (2020, November). Technological Barriers and Challenges in the Use of ICT during the COVID-19 Emergency Remote Learning. U*niversal Journal of Educational Research, 8*(11B), 6124–6133. https://doi.org/10.13189/ujer.2020.082248
- Rashid, M. H. A. (2023, July 30). The Implementation of Blended and Online Learning. *Library & Information Management*. Retrieved September 23, 2023, from https://limbd.org/the-implementation-of-blended-and-online-learning/
- Rajeh Alsalhi, N., Elmagzoub Eltahir, M., Al-Qatawneh, S., Ouakli, N., Bou Antoun, H., I. Abdelkader, A. F., & Jumaili, L. (2021, July 28). Blended Learning in Higher Education: A Study of Its Impact on Students' Performance. *International Journal of Emerging Technologies in Learning (IJET), 16*(14), 249. https://doi.org/10.3991/ijet.v16i14.23775
- Precel, K., Eshet-Alkalai, Y., & Alberton, Y. (2009, April 29). Pedagogical and Design Aspects of a Blended Learning Course. T*he International Review of Research in Open and Distributed Learning, 10*(2). https://doi.org/10.19173/irrodl.v10i2.618
- Sankar, J. P., Kalaichelvi, R., Elumalai, K. V., & Alqahtani, M. S. M. (2022). Effective blended learning in higher education during COVID-19. *Information Technologies and Learning Tools, 88*(2), 214-228.
- Serrano, D. R., Dea-Ayuela, M. A., Gonzalez-Burgos, E., Serrano-Gil, A., & Lalatsa, A. (2019, April 5). Technology-enhanced learning in higher education: How to enhance student engagement through blended learning. *European Journal of Education, 54*(2), 273–286. https://doi.org/10.1111/ejed.12330
- Su, F., Zou, D., Wang, L., & Kohnke, L. (2023, March 2). Student engagement and teaching presence in blended learning and emergency remote teaching. *Journal of Computers in Education*. https://doi.org/10.1007/s40692-023-00263-1
- Sweller, J., van Merriënboer, J., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*,31, 261–292.
- Tang, C. M., & Chaw, L. Y. (2016). Digital Literacy: A Prerequisite for Effective Learning in a Blended Learning Environment?. *Electronic Journal of E-learning, 14*(1), 54-65.
- Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022, December). 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), e12657. https://doi.org/10.1016/j.heliyon.2022.e12657
- Vaughan, N., Clampitt, K., & Park, N. (2016, September 26). To Teach is to Learn Twice: The Power of a Blended Peer Mentoring Approach. *Teaching & Learning Inquiry: The ISSOTL Journal, 4*(2). https://doi.org/10.20343/teachlearninqu.4.2.7
- Wilson, H. (2021). A Complete Guide to Synchronous Vs. Asynchronous Learning. D2L. Retrieved September 23, 2023, from https://www.d2l.com/blog/guide-synchronous-vs-asynchronous-learning/
- Zhao S., Song J. (2022). Unpacking the emotional experiences of learners in a blended learning context. *Front. Psychol.* 13, 879696. 10.3389/fpsyg.2022.879696

Appendix A: PRISMA Flow Diagram of the Literature Selection Process

The figure below illustrates the PRISMA flow of information through the different phases of the literature selection process, including identification, screening, eligibility, and inclusion.

Figure 1 — PRISMA flow