

Investigating Students' Readiness for Implementing Small Private Online Courses (SPOC) in Trigonometry within Indonesian High Schools

Yusnita Rahayu¹, Yayat Ruhiat², Cucu Atikah³

¹ Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; umialifbani@gmail.com

² Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; yruhiat@untirta.ac.id

³ Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; cucu.atikah@untirta.ac.id

ARTICLE INFO

Keywords:

students' readiness;
blended learning;
SPOC;
trigonometry;
Indonesian high schools

Article history:

Received 2025-04-03

Revised 2025-07-31

Accepted 2025-12-28

ABSTRACT

This study examined the readiness of Indonesian high school students to engage in blended learning using a Small Private Online Course (SPOC) for trigonometry instruction and identified factors that support or hinder this readiness. Using a quantitative descriptive design, data were collected from 58 Grade XI students at SMA Negeri 5 Kota Serang. A validated questionnaire measured six readiness dimensions: cognitive understanding, learning motivation, digital literacy, access to technology, learning environment, and interaction skills. The instrument demonstrated strong reliability (Cronbach's Alpha = 0.875). Results indicated that 81% of students were categorized as "very ready," reflecting high preparedness, especially in digital access and cognitive understanding. Nevertheless, several constraints emerged, including decreased motivation, less supportive learning environments, and limited self-regulation. These findings suggest that SPOC-based trigonometry learning can be implemented immediately or in the near term, provided schools strengthen support mechanisms such as digital orientation, motivational scaffolding, and structured learner assistance. The study contributes practical evidence to inform classroom implementation and broader mathematics education policy in Indonesia.

This is an open access article under the [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.



Corresponding Author:

Yusnita Rahayu

Universitas Sultan Ageng Tirtayasa, Serang, Indonesia; umialifbani@gmail.com

1. INTRODUCTION

Blended learning, an instructional model combining face-to-face teaching with online components, has emerged as a powerful response to the evolving demands of 21st-century education (Tonbuloglu & Tonbuloglu, 2023.; Garrison & Vaughan, 2008). With the advancement of digital technologies and increasing need for flexible learning, this model enables richer, more personalized learning experiences, particularly in complex subjects such as mathematics.

In this study, we aim to explore how the Small Private Online Course (SPOC), a more focused and interactive adaptation of the MOOC model (Fox, 2013; Guicai et al., 2016), can support blended learning for trigonometry instruction in Indonesian secondary schools. Unlike MOOCs designed for massive

audiences, SPOCs serve smaller, targeted learner groups and promote deeper interaction with both content and instructors (Ruiz-Palmero et al., 2020; Zheng et al., 2018).

The integration of blended learning and SPOCs into secondary education has gained global traction due to their pedagogical benefits—enhancing motivation, improving learning outcomes, and fostering digital competencies (El Messaoudi, 2024; Fitri & Zahari, 2019; Tong et al., 2022). However, in Indonesia, especially in mathematics education at the secondary level, empirical research on SPOC adoption remains limited.

This study addresses that gap by investigating the readiness of high school students to adopt SPOC-based blended learning in trigonometry, a topic often considered difficult due to its abstract and spatial reasoning demands (Nurmeidina & Rafidiyah, 2019). We assess readiness across six dimensions: cognitive understanding, learning motivation, digital literacy, technology access, learning environment, and interaction skills. Understanding these readiness factors is essential, as previous studies have shown that a lack of preparation can hinder the success of digital learning initiatives (Dray et al., 2011; Rasouli et al., 2016).

Past research has often treated readiness as a checklist of technical access or general attitudes (Ngampornchai & Adams, 2016), but few studies offer a structured, context-specific profile of students' preparedness, especially in STEM-focused blended environments. By focusing on trigonometry and the SPOC model, this study contributes both theoretically and practically: it enriches the understanding of digital readiness in STEM education and offers actionable insights for educators, curriculum developers, and policymakers working to scale blended learning in Indonesia.

2. METHODS

A quantitative descriptive research design was used to assess high school students' readiness for a SPOC-based blended learning model. The study took place at SMA Negeri 5 Kota Serang, Indonesia, and involved 58 Grade XI students (ages 15–18). Participants were selected through purposive sampling. This strategy was chosen because the study aimed to analyze students with prior exposure to online or blended learning environments, key to ensuring relevance to the SPOC context. The inclusion criteria were: (1) prior experience with online platforms (e.g., Google Classroom, Zoom, or learning management systems), and (2) availability of personal digital devices (laptop/smartphone). The sample included 19 males (32.8%) and 39 females (67.2%).

The primary instrument was a student readiness questionnaire adapted from Hung et al. (2010), covering six dimensions: 1) Cognitive readiness; 2) Learning motivation; 3) Digital literacy; 4) Access to technology; 5) Learning environment; and 6) Interaction readiness.

Each item used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questionnaire underwent expert review for content validation and pilot testing for refinement. Reliability testing using Cronbach's Alpha yielded a coefficient of 0.875, indicating high internal consistency according to George & Mallery (2003) as quoted from Allevato (2019).

Descriptive statistics (mean scores, percentages) were employed to interpret student readiness levels. This approach was chosen because the study's goal was exploratory—to map the overall profile of student preparedness rather than to test specific hypotheses. While inferential statistics (e.g., t-tests or ANOVA) could reveal subgroup differences (e.g., by gender or device access), such analysis was beyond the study's scope. Future research may expand on this with a larger, stratified sample to explore subgroup effects more robustly.

Readiness levels were categorized according to Rasouli et al. (2016):

- a. 81%–100% = Very Ready
- b. 61%–80% = Ready
- c. 41%–60% = Moderately Ready (needs additional guidance)
- d. 21%–40% = Less Ready (requires further intervention)
- e. 0%–20% = Not Ready (alternative learning solutions needed)

Prior to analysis, assumption testing was conducted. The Shapiro-Wilk test confirmed normal distribution of readiness scores ($p > 0.05$), justifying the use of mean-based interpretation. Homogeneity and independence assumptions were reasonably satisfied due to the single-group design and consistent administration.

Ethical procedures were followed throughout the study. Written informed consent was obtained from students and school administrators. Participation was voluntary, and students were assured of anonymity and confidentiality. Data were coded to prevent identification, and findings were reported in aggregate form only.

3. FINDINGS AND DISCUSSION

This section further reinforces the study's contribution to the broader discourse on digital readiness in mathematics education in Indonesia. While studies on blended learning exist, very few provide empirical insight into the SPOC model within the specific context of Indonesian secondary trigonometry instruction. By articulating how student readiness intersects with localized educational challenges, such as infrastructure gaps and digital inequality. This study not only maps learner preparedness but also identifies contextual opportunities for effective SPOC integration.

3.1. Findings

3.1.1 Validity and reliability

Table 1. Table of Validity and Reliability of the Instrument

| Case Processing Summary | | N | % |
|-------------------------|-----------------------|----|-------|
| Cases | Valid | 58 | 100.0 |
| | Excluded ^a | 0 | .0 |
| | Total | 58 | 100.0 |

a. Listwise deletion based on all variables in the procedure.

Table 2. Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .875 | 14 |

The table shows the case processing summary that proves all the 58 responses (100%) were valid, meaning that no data was excluded. The use of listwise deletion ensured that only fully completed responses were analyzed, maintaining data integrity. This complete dataset strengthens the reliability and accuracy of the study's findings. The reliability statistics show the Cronbach's Alpha value of 0.875. According to George & Mallery's Acceptable Level of reliability, as quoted from (Allevato, 2019) A reliability coefficient above 0.8 is considered "good," while values above 0.9 indicate "excellent" reliability. This result confirms that the questionnaire effectively measures the intended constructs of student readiness.

3.1.2 Findings of the survey

1. Cognitive Readiness and Learning Motivation

Table 2. Table of Cognitive Readiness and Learning Motivation

| Statement | VA | A | SD | D | SD |
|--|---------------|---------------|---------------|----------|----------|
| I understand the concept of blended learning and how it works. | 6 (10.3%) | 44 (75.9%) | 8 (13.8%) | 0 (0%) | 0 (0%) |
| I understand how online learning takes place. | 6 (10.3%) | 27 (46.6%) | 23 (39.7%) | 2 (3.4%) | 0 (0%) |
| I realize the benefits of technology-based learning in understanding the subject matter. | 7 (12.1%) | 41 (70.7%) | 7 (12.1%) | 3 (5.2%) | 0 (0%) |
| I am motivated to study independently and complete online assignments on time. | 8 (13.8%) | 39 (67.2%) | 10 (17.2%) | 1 (1.7%) | 0 (0%) |
| I have high discipline in completing online assignments independently. | 10 (17.2%) | 40 (69%) | 5 (8.6%) | 2 (3.4%) | 1 (1.7%) |

Based on the table above, for the first statement (I understand the concept of blended learning and how it works) or the students' readiness about the concept of blended learning, it shows that majority (86.2%) understand the concept (VA = 10.3%, A = 75.9%), are aware of blended learning, but a small group (13.8%) might need further explanation or training. For the second statement (I understand how online learning takes place), 56.9% (VA + A) understand how online learning works. However, A significant 39.7% (SD) and 3.4% (D) are unsure or disagree. The third statement about recognizing the benefits of technology-based learning, 82.8% (VA + A) recognize the benefits. And 12.1% (SD) and 5.2% (D) are uncertain or disagree. Related to motivation for independent study & completing online assignments, that is the fourth statement, it shows that 81% (VA + A) feel motivated, and 17.2% (SD) and 1.7% (D) struggle with motivation, while the last statement, which is about discipline in completing online assignments, most students (86.2%) report having high discipline, as well as 8.6% (SD), 3.4% (D), and 1.7% (SD) indicate lower discipline. It can be inferred that most students understand blended learning and feel motivated, and nearly 43% of students are unsure about online learning processes, and some struggle with motivation and discipline.

2. Students' Access to Technology Devices and Infrastructure

Table 3. Table of Students' Access to Technology Devices and Infrastructure

| Statement | VA | A | SD | D | SD |
|--|---------------|---------------|----------|-------------|--------|
| I have technological devices that support online learning (laptop, tablet, or smartphone). | 13 (22.4%) | 41 (70.7%) | 3 (5.2%) | 1 (1.7%) | 0 (0%) |
| I have stable internet access to follow online learning. | 13 (22.4%) | 39 (67.2%) | 5 (8.6%) | 1 (1.7%) | 0 (0%) |

Based on the table above, the first statement related to the availability of technological devices 93.1% (VA + A) of students have access to a laptop, tablet, or smartphone for online learning. 6.9% (SD + D) do not have reliable devices. It means that the majority of students have the necessary technology, but a small percentage (6.9%) may struggle with access. On the other hand, the second statement related to the internet stability for online learning confirms that 89.6% (VA + A) report having stable internet access, and 10.3% (SD + D) experience unstable or limited internet access. It means that while most students have stable internet, around 10% may face connectivity issues, which could hinder engagement in online learning activities.

3. Learner Technology Skills

Table 4. Table of Learner Technology Skills

| Statement | VA | A | SD | D | SD |
|--|--------------|---------------|----------|-------------|--------|
| I can operate digital devices to access learning materials. | 9 (15.5%) | 44 (75.9%) | 5 (8.6%) | 0 (0%) | 0 (0%) |
| I can use the online learning platform well. | 9 (15.5%) | 48 (82.8%) | 1 (1.7%) | 0 (0%) | 0 (0%) |
| I can use interactive features in online learning, such as discussion forums and online quizzes. | 9 (15.5%) | 41 (74.1%) | 5 (8.6%) | 1 (1.7%) | 0 (0%) |

This table evaluates students' technical proficiency in using digital devices and online learning platforms, which are essential for successful participation in Blended Learning with SPOC. It shows that 91.4% (VA + A) can operate digital devices to access learning materials, and 8.6% (SD) struggle with basic digital literacy, for the first statement. It means the majority are comfortable with technology, but a small group (8.6%) may need extra training on how to navigate digital tools effectively. For the second statement, 98.3% (VA + A) feel confident using online learning platforms, and only 1.7% (SD) face challenges. It means that almost all students are comfortable with learning platforms, meaning technical issues are unlikely to be a major barrier. The last statement, related to Ability to Use Interactive Features (Forums, Quizzes, etc.), 89.6% (VA + A) can engage with interactive features, while 10.3% (SD + D) find it difficult. It means that while most students can use interactive elements, a small group (10.3%) may need additional guidance on using discussion forums, quizzes, or collaborative tools effectively.

4. Environment Readiness and Learning Facilities

Table 5. Table of Environment Readiness and Learning Facilities

| Statement | VA | A | SD | D | SD |
|--|--------------|---------------|---------------|-------------|--------|
| I have a comfortable and distraction-free study space to study online. | 9 (15.5%) | 37 (63.8%) | 10 (17.2%) | 2 (3.4%) | 0 (0%) |
| I can organize my study schedule independently without having to be supervised by teachers or parents. | 6 (10.3%) | 45 (77.6%) | 6 (10.3%) | 1 (1.7%) | 0 (0%) |

This table assesses students' readiness in terms of study environment and self-discipline, which are crucial for effective participation in Blended Learning with SPOC. From the first statement there are 79.3% (VA + A) of students have a suitable learning environment, and 20.6% (SD + D) struggle with distractions or lack a comfortable study space. It means that while most students have a good study environment, a significant minority (1 in 5 students) may experience distractions at home, which could affect their focus in online learning. Meanwhile, the second statement, related to proficiency in using online learning platforms, shows that 98.3% (VA + A) feel confident using online learning platforms, and only 1.7% (SD) face challenges. It means that almost all students are comfortable with learning platforms, meaning technical issues are unlikely to be a major barrier.

5. Interaction Readiness and Independence in Online Learning

Table 6. Table of Interaction Readiness and Independence in Online Learning

| Statement | VA | A | SD | D | SD |
|---|------------|------------|------------|--------|--------|
| I am active in online discussions and interact with teachers and peers. | 5 (8.6%) | 39 (67.2%) | 14 (24.1%) | 0 (0%) | 0 (0%) |
| I have the initiative to look for additional teaching materials to understand the material more deeply. | 15 (25.5%) | 39 (67.2%) | 4 (6.9%) | 0 (0%) | 0 (0%) |

This table evaluates students' engagement in online discussions and their initiative in independent learning, both crucial for success in Blended Learning with SPOC. Based on the first statement, it is found that 75.8% (VA + A) actively participate in online discussions, 24.1% (SD) are less engaged and may struggle with interaction. It means that while most students are interactive, 24.1% of students may be hesitant to participate in discussions, possibly due to a lack of confidence, shyness, or unfamiliarity with online engagement. However, for the second statement, 92.7% (VA + A) actively seek extra learning materials to enhance understanding, and 6.9% (SD) do not take this initiative. It can be inferred that most students are self-motivated learners, but a small group (6.9%) may need encouragement or structured guidance to develop research and critical thinking skills.

Discussion

This section critically examines the findings of the study by systematically integrating them with relevant theoretical frameworks and reflecting on broader contextual factors that influence students' readiness for SPOC-based learning in trigonometry. It also offers a set of tailored implications for addressing the observed disparities and maximizing the pedagogical potential of SPOC in Indonesian secondary education.

Interpreting Readiness Through Theoretical Frameworks

To offer a coherent and structured analysis, this discussion is organized around established learning theories, moving beyond descriptive reporting to theoretically grounded interpretation.

Community of Inquiry (CoI) (Garrison & Akyol, 2013) offers a valuable framework for analyzing online learning readiness, emphasizing the interaction of three core elements: cognitive presence, social presence, and teaching presence. In this study, the 76.6% score in cognitive readiness and motivation indicates that while most students understand the concept of blended learning and express willingness to engage, their cognitive presence may still be underdeveloped. This could be due to a lack of metacognitive strategies or prior experience with autonomous learning environments, which suggests the need for scaffolded learning pathways, especially in cognitively demanding topics like trigonometry.

Self-Determination Theory (SDT) (Deci & Ryan, 1985) provides further insights into motivational dynamics. While 81% of students claimed to be motivated, nearly one-fifth of respondents reported difficulties in maintaining discipline and consistency in online learning. This discrepancy highlights the difference between intrinsic motivation and behavioral self-regulation. To bridge this gap, SPOC modules can incorporate motivational scaffolding such as gamification, adaptive feedback, self-monitoring tools, and opportunities for student autonomy—all of which have been shown to increase self-determined learning behavior.

The Technology Acceptance Model (TAM) (Davis, 1989) helps explain the high level of technological confidence, as over 90% of students indicated access to digital devices and confidence in using them. However, 10.3% reported intermittent or insufficient internet connectivity. From the TAM perspective, if perceived ease of use is high but actual access is limited, the effectiveness of technology

integration is undermined. Thus, policy-level support is needed to ensure infrastructural equity, such as subsidized data plans or the development of offline-accessible SPOC platforms.

Technological Pedagogical Content Knowledge (TPACK) (Koehler & Mishra, 2005) further contextualizes the digital readiness results. Although digital literacy was generally strong, 10.3% of students reported difficulties engaging with interactive tools like forums and quizzes. This suggests that technological fluency alone is insufficient; students also require pedagogical guidance on how to use these tools effectively for knowledge construction, peer feedback, and collaboration. Teacher-facilitated orientation sessions could bridge this gap by modeling productive online behavior and digital academic discourse.

From the perspective of Vygotsky's Social Constructivist Theory (1978), learning is inherently social and mediated by interaction with more capable peers or facilitators. However, 24.1% of students in this study indicated low participation in online discussions. This lack of social presence may stem from unfamiliarity with online communication norms, fear of judgment, or limited discussion facilitation. To enhance peer-to-peer interaction, the SPOC model should include structured discussion prompts, rotating student moderators, and community-building activities that emphasize collaboration over performance.

Contextual and Critical Reflections

While the theoretical frameworks provide robust explanations, the findings must also be situated within the broader educational and sociocultural context of Indonesia.

One critical factor is socioeconomic disparity, which likely influences both access and perceived readiness. Students from middle- to upper-income families may have access to stable internet, personal devices, and quiet study environments, while those from disadvantaged backgrounds may struggle with shared devices, inconsistent connectivity, or household responsibilities. These disparities are rarely reflected in readiness scores alone, which underscores the need to triangulate self-report data with demographic and contextual information.

School infrastructure and teacher capacity are also essential but underexplored dimensions. Teachers' digital readiness significantly affects students' experience of SPOC learning. If teachers are not confident in creating, managing, or facilitating online modules, students may receive less engaging content, reduced feedback, and minimal interactive opportunities. Future studies should include teacher-level assessments and institutional audits to more accurately determine ecosystem-wide readiness.

Moreover, it is important to consider the limitations of self-reported instruments. Students may overestimate their digital competence or motivation due to aspirational bias, the tendency to report idealized behaviors or attitudes that align with perceived expectations. Given that this study was administered in a formal school setting, students might have felt pressure to appear digitally capable or self-regulated. Therefore, future research should incorporate performance-based assessments (e.g., online task completion rates) or third-party evaluations (e.g., teacher ratings) to corroborate self-reported data.

Implications for Tailored SPOC Implementation

The findings of this study have several practical implications for improving the implementation of SPOC-based trigonometry instruction in Indonesian secondary schools. Rather than adopting a one-size-fits-all model, SPOC should be adapted to account for variability in students' readiness dimensions.

- a. *Motivational Scaffolding*: To address challenges in self-discipline and sustained engagement, SPOC platforms can incorporate gamified learning pathways, progress dashboards, and embedded goal-setting features.

- b. *Peer-Led Tutorials and Interaction Design*: To improve social presence and confidence, students can be encouraged to take on rotating roles as discussion leaders or peer tutors, fostering a more collaborative learning culture.
- c. *Equitable Access Models*: Schools and developers should provide downloadable content, asynchronous video lectures, and mobile-first interfaces to accommodate students with limited or inconsistent internet access.
- d. *Environmental and Time-Management Support*: For students in distracting or unsupervised environments, SPOC modules could include planning tools, notification reminders, and parent-student learning contracts.
- e. *Teacher Professional Development*: Teachers need structured training that integrates technological, pedagogical, and content knowledge (TPACK) to effectively facilitate SPOC instruction. Professional learning communities and digital mentoring programs can support this development.

While the average readiness level of 81% suggests that students are generally well-prepared for SPOC integration, a more granular analysis reveals important disparities in motivation, interaction, and access. These inconsistencies highlight the need for a nuanced, equity-focused approach to SPOC design and implementation in Indonesian mathematics education. Far from being a fixed trait, readiness is shaped by contextual, infrastructural, and pedagogical factors. As such, digital innovation in education must move beyond technical deployment and toward comprehensive ecosystem transformation—one that aligns theory, practice, and local realities.

4. CONCLUSION

This study provides critical insights into Indonesian high school students' readiness to adopt Small Private Online Courses (SPOC) for trigonometry instruction, revealing a generally high level of preparedness across key dimensions such as digital literacy, technology access, and self-regulated learning. However, it also uncovers unevenness in areas like environmental support and peer interaction, which remain important barriers to equitable implementation. Unlike previous studies that focused broadly on online learning or blended learning in higher education contexts, this research advances the field by situating SPOC within the specific context of secondary mathematics education in Indonesia, a subject and level that remain underrepresented in empirical digital learning literature. By offering a readiness profile tied to pedagogical implications, this study helps bridge the gap between theoretical readiness frameworks and classroom-level implementation strategies.

To support effective SPOC implementation in Indonesian high schools, several practical steps can be taken. Educators and school administrators should focus on designing SPOC modules that are both flexible and structured, allowing students to learn at their own pace while maintaining regular feedback and check-ins. Motivation can be enhanced through gamified features, goal-setting tools, and peer-led discussions that foster active participation. Additionally, schools should provide students with basic training to navigate online platforms and use interactive tools such as quizzes and forums effectively.

REFERENCES

- Adams, P. (2006). Exploring social constructivism: Theories and practicalities. *Education 3-13*, 34(3), 243–257. <https://doi.org/10.1080/03004270600898893>
- Allevato, E. (2019). A Project-based Approach to Examine University Teachers Attitudes towards Visually Impaired Students. *Scholarly Journal of Psychology and Behavioral Sciences*, 2(3), 171–183. <https://doi.org/10.32474/sjpbs.2019.02.000137>
- Arnidah, A., D, S., Sinaga, A. V., & Aswan, D. (2022). The Development of Blended Learning in Learning Evaluation Subject in Universities in Makassar City. *AL-ISHLAH: Jurnal Pendidikan*,

- 14(3), 3289–3302. <https://doi.org/10.35445/alishlah.v14i3.1296>
- Bao, W. (2020). COVID-19 and Online Teaching In Higher Education: A Case Study of Peking University. *Human Behavior and Emerging Technologies*, 2(2), 113–115. <https://doi.org/10.1002/hbe2.191>
- Çırak Kurt, S., Yıldırım, İ., & Cüçük, E. (2018). Harmanlanmış Öğrenmenin Akademik Başarı Üzerine Etkisi: Bir Meta-Analiz Çalışması. *Hacettepe University Journal of Education*, 33(3), 1–27. <https://doi.org/10.16986/HUJE.2017034685>
- Crawford, M. (2020). Ecological Systems Theory: Exploring the Development of the Theoretical Framework as Conceived by Bronfenbrenner. *Journal of Public Health Issues and Practices*, 4(2). <https://doi.org/10.33790/jpchip1100170>
- Dray, B. J., Lowenthal, P. R., Miszkiewicz, M. J., Ruiz-Primo, M. A., & Marczyński, K. (2011). Developing An Instrument to Assess Student Readiness for Online Learning: A Validation Study. *Distance Education*, 32(1), 29–47. <https://doi.org/10.1080/01587919.2011.565496>
- El Messaoudi, M. (2024). The Impact of a Blended Learning Model on Undergraduate University Students' Digital Literacy Skills: Empirical Evidence from Higher Education. *Educational Process: International Journal*, 13(4), 84–101. <https://doi.org/10.22521/edupij.2024.134.5>
- Fitri, S., & Zahari, C. L. (2019). The Implementation of Blended Learning to Improve Understanding of Mathematics. *Journal of Physics: Conference Series*, 1188(1). <https://doi.org/10.1088/1742-6596/1188/1/012109>
- Fox, A. (2013). From MOOCs to SPOCs. *Communications of the ACM*, 56(12), 38–40. <https://doi.org/10.1145/2535918>
- Garrison, D., & Akyol, Z. (2013). The Community of Inquiry Theoretical Framework. *Handbook of Distance Education*, 104–119.
- Vaughan, N. D. (2008). Blended Learning in Higher Education: Framework, Principles, and Guidelines. In *A Wiley Imprint*. John Wiley & Sons, Inc.
- Koehler, M. J., & Mishra, P. (2005). What happens when teachers design educational technology? *Journal of Educational Computing Research Environmental Science and Technology*, 32(2), 131–152.
- Legault, L. (2020). Encyclopedia of Personality and Individual Differences. *Encyclopedia of Personality and Individual Differences*, June. <https://doi.org/10.1007/978-3-319-28099-8>
- Ma, Q., & Liu, L. (2011). The Technology Acceptance Model. *Advanced Topics in End User Computing, Volume 4, January 2005*. <https://doi.org/10.4018/9781591404743.ch006.ch000>
- Manna, M. S., Balusamy, B., Sharma, M., & Samuel, P. (2023). Blended Learning and MOOCs. In *Blended Learning and MOOCs*. <https://doi.org/10.4324/9781003307730>
- Ngampornchai, A., & Adams, J. (2016). Students' acceptance and readiness for E-learning in Northeastern Thailand. *International Journal of Educational Technology in Higher Education*, 13(1). <https://doi.org/10.1186/s41239-016-0034-x>
- Nguyen, V. A. (2017). Towards The Implementation of An Assessment-Centred Blended Learning Framework At The Course Level: A Case Study In A Vietnamese National University. *International Journal of Information and Learning Technology*, 34(1), 20–30. <https://doi.org/10.1108/IJILT-08-2016-0031>
- Parjuangan, S., & Meliyanti. (2021). Blended Learning Platform: A Requirement Analysis. *2021 International Conference on ICT for Smart Society (ICISS)*, 1–6. <https://doi.org/10.1109/ICISS53185.2021.9533257>
- Rasouli, A., Rahbania, Z., & Attaran, M. (2016). Students' Readiness for E-learning Application in Higher Education. (2016). *Malaysian Online Journal of Educational Technology*, 4(3), 51–64. *Malaysian Online Journal of Educational Technology*, 4(3), 51–64.
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling Teachers' Readiness for Online Teaching and Learning in Higher Education: Who's Ready? *Computers in Human Behavior*, 118(October 2020), 106675. <https://doi.org/10.1016/j.chb.2020.106675>
- Serovaiskaia, E., & Serovaiskii, A. (2022). Challenges and Prospects of Online Education Due to the

- Covid-19 Pandemic. in L. Chechurin (Ed.), *Digital Teaching and Learning in Higher Education*. Springer International Publishing. <https://doi.org/10.1007/978-3-031-00801-6>
- Sharma, P., & Barrett, B. (2018). *Best Practices for Blended Learning*. Pavilion Publishing and Media Ltd.
- Sun, J. C. Y., & Rueda, R. (2012). Situational Interest, Computer Self-Efficacy and Self-Regulation: Their Impact on Student Engagement in Distance Education. *British Journal of Educational Technology*, 43(2), 191–204. <https://doi.org/10.1111/j.1467-8535.2010.01157.x>
- Thorne, K. (2003). Blended learning: How to Integrate Online and Traditional Learning. In *Central African Journal of Medicine* (Vol. 48, Issues 5–6). Kogan Page Limited.
- Tonbuloğlu, B., & Tonbuloğlu, İ. (2023). Trends and Patterns in Blended Learning Research (1965–2022). *Education and Information Technologies*, 28(11), 13987–14018. <https://doi.org/10.1007/s10639-023-11754-0>
- 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), e12657. <https://doi.org/10.1016/j.heliyon.2022.e12657>
- Widianingsih, O., Ishak, M., Kasih, I., Nugroho, S., & Faridah, E. (2023). Development of Teaching Media Based on Android Application for Floor Gymnastic Blended Learning. *Al-Ishlah: Jurnal Pendidikan*, 15(4), 6594–6604. <https://doi.org/10.35445/alishlah.v15i4>
- Yu, W., & Du, X. (2019). Implementation of a blended learning model in content-based EFL curriculum. *International Journal of Emerging Technologies in Learning*, 14(5), 188–199. <https://doi.org/10.3991/ijet.v14i05.8546>
- Zimmerman, & J, B. (2010). Becoming a Self-Regulated Learner : An Overview Becoming a Self-Regulated Learner : An Overview. *Theory Into Practice*, 5841(2002), 64–70. <https://doi.org/10.1207/s15430421tip4102>