



Accepted	: May 11, 2026
Revised	: June 23, 2026
Approved	: June 24, 2026
Published	: June 24, 2026

EFFECTIVENESS OF THE IGNATIAN CYBERGOGICAL EXPERIENCE MODEL IN IMPROVING STUDENTS' DIGITAL LITERACY: AN ANDRAGOGICAL APPROACH

Lazfihma^{1*}, Dwi Ismawati², Debi S Fuadi³, Dwi Lyna Sari⁴, Meli Afrodita⁵

^{1*,2,3,4,5} Universitas Bengkulu

Jl. WR. Supratman, Kandang Limun, Kec. Muara Bangka Hulu, Kota Bengkulu, Bengkulu, Indonesia

* Corresponding Author. lazfihma@unib.ac.id

Abstract: This study aims to examine the effectiveness of the Ignatian Cybergogical Experience (ICE) model from an andragogical perspective in improving students' digital literacy in the Teaching Material Development course. This research employed a quasi-experimental design with a nonequivalent control group design involving 60 undergraduate students of the Indonesian Language Education Program, divided into experimental and control groups. The experimental group received instruction using the ICE model, while the control group was taught using conventional methods. Data were collected through pretest and posttest, supported by questionnaires and observations, and analyzed using t-tests and N-Gain. The results revealed a significant improvement in students' digital literacy in the experimental group compared to the control group ($p < 0.05$). The N-Gain score in the experimental group was categorized as high, whereas the control group showed moderate improvement. These findings indicate that the ICE model based on andragogy is effective in enhancing digital literacy. The ICE model promotes meaningful, experience-based learning through reflection and active engagement, aligning with adult learning principles. Therefore, it can serve as an innovative instructional approach in higher education to support digital literacy development. However, the findings should be interpreted with caution, as the study involved only 60 students from the Indonesian Language Education Program enrolled in a single course at one institution and was conducted over one semester. Future studies involving larger and more diverse samples from different disciplines and institutions, as well as longer intervention periods, are recommended to examine the broader applicability and long-term impact of the ICE model.

Keywords: Adult learning, andragogy, digital literacy, higher education, ignatian cybergogical experience, teaching material development.

INTRODUCTION

The development of digital technology in the 21st century has brought fundamental changes to various aspects of human life, including higher education. Digital transformation has not only impacted how individuals access information but also transformed the way they learn, interact, and construct knowledge. In this context, higher education is required to produce graduates who possess not only academic competence but also adequate digital literacy as part of 21st-century skills. Digital literacy is a key competency because it relates to an individual's ability to access, understand, evaluate, and produce information critically and responsibly in a digital environment (Anisah et al., 2020; Sharma et al., 2023).

From an adult education perspective, college students are classified as adult learners, possessing distinct characteristics compared to students in primary and secondary education. Adult learners possess extensive life experiences, specific learning needs, and a tendency toward independent and problem-centered learning. Therefore, learning approaches in higher education need to be tailored to these characteristics through an andragogical approach (Knowles, 1980; Sugiyanto & Wahyuni, 2020). Andragogy is defined as the art and science of helping adults learn, emphasizing independence, experience as a learning resource, and the relevance of learning to real-life needs (Knowles, 1980; Merriam, 2018). Given these characteristics, adult learners require learning environments that encourage autonomy, participation, and responsibility in constructing their own knowledge. The andragogical approach positions learners as active subjects in the learning process, rather than passive objects as in traditional pedagogical approaches. In this context, lecturers act as facilitators, helping students identify learning needs, design learning strategies, and independently evaluate learning outcomes.

The concept of andragogy is based on the assumption that adult learners possess prior experiences, self-awareness, and the capacity to take responsibility for their own learning. Consequently, learning in higher education should be designed to encourage autonomy and active engagement. The andragogical approach positions learners as active subjects in the learning process, rather than passive objects as in traditional pedagogical approaches. In this context, lecturers act as facilitators, helping students identify learning needs, design learning strategies, and independently evaluate learning outcomes. Adult learning is also problem-centered and directly relevant to students' lives or work

(Knowles, 1980; Blaschke, 2019). Therefore, the implementation of learning in higher education should no longer be teacher-centered, but rather student-centered, based on experience and reflection

Along with the development of digital technology, the concept of andragogy has also expanded through integration with digital learning. Digital literacy has become a key competency that adult learners must possess to adapt to changing times. Digital literacy encompasses not only technical skills in using technology but also cognitive, social, and emotional aspects in understanding and critically utilizing digital information (Anisah et al., 2020). Therefore, adult education in the digital era must be able to integrate the principles of andragogy with the development of digital literacy systematically and sustainably. However, various studies show that students' digital literacy is still suboptimal. Many students are accustomed to using digital technology but lack the critical skills to evaluate information, manage digital learning resources, and produce digital content effectively. This condition indicates a gap between technology usage (digital usage) and understanding of digital literacy (digital literacy). This is reinforced by the finding that learning in higher education still focuses solely on cognitive aspects and has not optimally integrated digital skills into the learning process (Kusumawati et al., 2022; Sharma et al., 2023). Therefore, these challenges highlight the urgent need for an andragogy-based digital learning model that not only promotes technology use but also fosters critical thinking, self-directed learning, and the effective development of digital literacy competencies among higher education students.

In the context of Indonesian language education, particularly in the subject of teaching materials development, digital literacy plays a crucial role. Students are not only required to understand the concept of teaching materials development but also to be able to design digital-based teaching materials that are innovative, interactive, and appropriate to the needs of 21st-century learning. This aligns with the curriculum's demands that educators be able to utilize technology in the learning process. Therefore, developing students' digital literacy is highly relevant in this subject. However, learning practices in teaching materials development courses in higher education still tend to be oriented towards conventional products, such as printed modules or text-based teaching materials. The use of digital technology in teaching materials development is still limited, resulting in students lacking experience in developing innovative digital teaching materials. This situation indicates the need for a learning model that can integrate andragogical principles with the optimal use of digital technology.

One learning model that has the potential to address these needs is the Ignatian Cybergogical Experience (ICE) model. This model integrates the Ignatian Pedagogical Paradigm and the concept of cybergogy in digital learning. The Ignatian Pedagogical Paradigm emphasizes reflective and holistic learning through five stages: context, experience, reflection, action, and evaluation (ICAJE, 1993; Tardiff, 2021). Meanwhile, cybergogy focuses on active learner engagement in digital environments by integrating cognitive, social, and emotional dimensions of learning (Wang & Kang, 2006). Together, these approaches create a learning environment that encourages meaningful learning experiences, critical reflection, collaboration, and learner autonomy.

The integration of these two approaches in the ICE model provides opportunities for students to engage actively with digital technologies while reflecting on their learning experiences. As a result, students can develop not only technical competencies but also critical thinking, ethical awareness, and responsible digital practices. By combining experiential, reflective, and technology-enhanced learning, the ICE model offers a comprehensive framework for strengthening students' digital literacy in higher education.

From an andragogical perspective, the ICE model is also relevant because it accommodates the characteristics of adult learners. Students are given the opportunity to learn independently, explore learning experiences, and relate learning to their needs and life contexts. Furthermore, the reflection process in the ICE model allows students to internalize learning experiences and develop self-awareness as adult learners. This aligns with andragogical principles that emphasize self-directed and experiential learning (Knowles, 1980; Merriam, 2018). However, despite the ICE model's significant potential, empirical studies on its effectiveness in improving students' digital literacy are still limited. Most existing research focuses on model development or implementation in specific contexts, without systematically testing its effectiveness in improving digital literacy. Furthermore, research integrating the ICE model with an andragogical perspective is still rare, particularly in the context of Indonesian language education.

This research gap highlights the need for studies examining the effectiveness of the Ignatian Cybergogical Experience (ICE) model in improving students' digital literacy through an andragogical approach. Despite the growing emphasis on digital literacy in higher education, limited research has explored learning models that simultaneously promote self-directed learning, critical reflection, and meaningful engagement with digital technologies. This research is therefore important because it contributes to the development of learning models that are more closely aligned with the characteristics of adult learners and the demands of the digital era. Furthermore, it has practical implications for higher education by providing evidence on how digital learning can be designed to be more effective, meaningful, and responsive to students' needs. Such efforts support the ongoing transformation of higher education toward more innovative and adaptive learning environments.

Based on this discussion, digital literacy can be regarded as a crucial competency for students as adult learners in the digital era. However, its development continues to face challenges, particularly due to learning approaches that often emphasize technology use without sufficiently fostering critical, reflective, and self-directed learning skills. The ICE model offers a promising solution to these challenges by integrating the experiential and reflective principles of Ignatian pedagogy with the interactive and technology-enhanced features of cybergogy. Through this integration, students are encouraged not only to use digital technologies but also to critically evaluate information, reflect on their learning experiences, and develop responsible digital practices. Therefore, investigating the effectiveness of the ICE model is essential to determine its potential in strengthening students' digital literacy and addressing the identified gaps in contemporary higher education learning.

This study aims to test the effectiveness of the Ignatian Cybergogical Experience model from an andragogical perspective in improving students' digital literacy in a course on teaching materials development. Specifically, this study

is expected to contribute to the development of adult learning theory and practice in the digital era, as well as provide recommendations for lecturers in designing more effective and innovative learning. Thus, this research has high urgency in supporting the development of higher education based on the principles of andragogy and digital literacy, as well as in improving the quality of graduates who are ready to face the challenges of the digital era.

RESEARCH METHODOLOGY

This study employed a quantitative method using a quasi-experimental approach to examine the effect of the andragogy-based Ignatian Cybergogical Experience (ICE) model on students' digital literacy. A nonequivalent control group design was used, involving an experimental group and a control group. The experimental group received learning through the ICE model, while the control group participated in conventional learning activities. To evaluate the effectiveness of the intervention, both groups completed pretests and posttests measuring their digital literacy levels before and after the learning process (Creswell, 2018).

The research design is presented as follows:

Experimental Group: $O_1 - X - O_2$

Control Group: $O_1 - - - O_2$

Where O_1 = Pretest, O_2 = Posttest, and X = treatment using the andragogy-based ICE model.

The research subjects were fifth-semester students taking the Teaching Materials Development course. Subject selection was conducted using a purposive sampling technique, based on certain considerations, such as the suitability of the course and the students' readiness as adult learners (Etikan et al., 2016).

The number of research subjects consisted of two classes: Experimental class: 30 students and Control class: 30 students. The total number of research subjects was approximately 60 students. Students as research subjects are categorized as adult learners because they have characteristics of learning independence, previous learning experiences, and contextual learning needs (Knowles, 1980; Merriam, 2018). This study involved two types of variables, namely:

1. Independent variable: The independent variable in this study is the Ignatian Cybergogical Experience learning model based on andragogy.
2. Dependent variable: The dependent variable is students' digital literacy, which includes several indicators, namely:
 - a. Ability to access digital information
 - b. Ability to understand and evaluate information
 - c. Ability to use digital technology
 - d. Ability to create digital content
 - e. Critical thinking skills in the use of digital media

These digital literacy indicators are compiled based on digital literacy frameworks developed by various experts (Ng, 2012; Hague & Payton, 2021; UNESCO, 2018). This research was conducted in several stages, namely:

1. Preparation Stage

At this stage, the researcher does:

- a. Preparation of learning devices based on the ICE model
- b. Preparation of research instruments (tests and questionnaires)
- c. Instrument validation by experts (expert judgment)
- d. Instrument trial to determine validity and reliability

3. Implementation Stage

The implementation stage is carried out for one semester with the following steps:

- a. Pretest
Before the treatment was given, both groups (experimental and control) were given a pretest to determine students' initial digital literacy abilities.

b. Providing Treatment

The experimental group was given learning using the andragogy-based ICE model which includes the following stages:

1. Context: identifying student learning needs
2. Experience: students are involved in digital activities
3. Reflection: students reflect on their learning experiences
4. Action: students apply learning outcomes
5. Evaluation: assessment of the learning process and results

The control group was given conventional learning in the form of lectures, discussions, and assignments without systematic integration of digital technology.

c. Posttest

After the treatment was completed, both groups were given a posttest to determine the increase in students' digital literacy.

Data collection technique

The data in this study were collected using several techniques, namely:

1. Test
The test was used to measure students' digital literacy skills before and after the treatment. The test consisted of multiple-choice and descriptive questions that reflected digital literacy indicators.
2. Questionnaire
A questionnaire was used to measure students' perceptions of digital literacy and learning experiences using the ICE model. The scale used was a Likert scale.
3. Observation
Observations were conducted to observe student activities during the learning process, especially in terms of involvement, independence, and use of technology.

Research Instruments

The research instruments used include:

1. Digital literacy test instrument
 - a. Compiled based on digital literacy indicators
 - b. Content validity has been tested by experts
 - c. Empirical validity was tested using product moment correlation.
 - d. Reliability was tested using Cronbach Alpha
2. Questionnaire instrument
 - a. Using a Likert scale (1-5)
 - b. Measuring cognitive, affective, and digital skills aspects
3. Observation sheet
Used to record student activities during learning

Data Analysis Techniques

Data analysis was carried out quantitatively with the following steps:

1. Prerequisite Analysis Test
Before conducting a hypothesis test, a prerequisite test is carried out, namely:
 - a. Normality test using the Kolmogorov-Smirnov test
 - b. Homogeneity test using Levene's test
 - c.
2. Hypothesis Testing
To test the effectiveness of the ICE model, the following were used:
 - a. The t-test (independent sample t-test) is used to compare the posttest results between the experimental and control groups.
 - b. Paired sample t-test to see the improvement in each group

3. Calculation of Gain Score

To determine the level of increase in digital literacy, the N-Gain formula is used (Hake, 1999), namely:

$$\text{N-Gain} = (\text{Posttest score} - \text{Pretest score}) / (\text{Maximum score} - \text{Pretest score})$$

N-Gain results are categorized into:

- High (>0.7)
- Moderate (0.3-0.7)
- Low (<0.3)

4. Effectiveness Analysis

The effectiveness of the ICE model is determined based on:

- a. Significant differences between the experimental and control groups
- b. Gain value (N-Gain)
- c. Student responses to learning
- d. Validity and Reliability Test

Instrument validity is carried out through:

- a. Content validity by experts
- b. Construct validity through statistical tests

The reliability of the instrument is calculated using the Cronbach Alpha coefficient with the following criteria:
 $\alpha > 0.70$ (reliable) (Hair et al., 2019)

RESULTS AND DISCUSSION

Results

This study aims to test the effectiveness of the andragogy-based Ignatian Cybergogical Experience (ICE) model in improving students' digital literacy in the Teaching Materials Development course. Based on data collected through pretests and posttests, a general overview was obtained showing differences in digital literacy skills improvement between the experimental and control groups.

The experimental group receiving the ICE model showed significantly more improvement than the control group using conventional learning methods. This was evident in the average pretest and posttest scores for both groups.

In the initial stage (pretest), the average digital literacy score for students in the experimental group was 62.40, while the average score for the control group was 61.87. This indicates that the initial abilities of both groups were relatively equal and in the moderate category. This equivalency is important because it indicates there was no initial bias that could influence the research results.

After receiving treatment for one semester, significant improvement occurred. The experimental group achieved an average posttest score of 85.73, while the control group only achieved 72.15. The gain score difference for the experimental group was 23.33, while the control group only achieved 10.28.

The data shows that the ICE model contributes significantly to improving digital literacy compared to conventional learning. This improvement is not only quantitative but also reflects changes in the quality of students' abilities in accessing, understanding, evaluating, and producing digital information. Prior to conducting the hypothesis test, prerequisite analysis tests were conducted, including normality and homogeneity tests. The results of the normality test using the Kolmogorov-Smirnov test showed that the significance value of all data was greater than 0.05. This indicates that the data is normally distributed, thus meeting the requirements for parametric statistical tests. This normal distribution indicates that the data does not experience extreme deviations and can validly represent the population. Therefore, further analysis using the t-test can be conducted validly.

The results of the homogeneity test using Levene's Test showed a significance value of 0.321 (>0.05). This indicates that the variances of the two groups are homogeneous. This homogeneity condition is important because it indicates that the differences in results obtained are not caused by differences in variance between groups, but rather by the treatment given, namely the ICE model.

A Paired Sample t-Test was conducted to assess the improvement in each group. The results showed that both groups experienced significant improvement (sig. $0.000 < 0.05$). However, the t-value in the experimental group (12.876) was significantly higher than the control group (6.432). This indicates that the improvement in the experimental group was statistically significantly stronger. In other words, learning using the ICE model has a greater impact on improving students' digital literacy.

An Independent Sample t-test was used to compare posttest results between the two groups. The results showed a significance value of $0.000 (<0.05)$, indicating a significant difference between the experimental and control groups. This finding confirms that the andragogy-based ICE model is empirically more effective than conventional methods in improving students' digital literacy.

N-Gain analysis was used to determine the effectiveness of improving learning outcomes. The results showed that the experimental group had an N-Gain value of 0.72 (high category) and the control group had an N-Gain value of 0.34 (moderate category). These values indicate that the ICE model is capable of providing optimal improvements in students' digital literacy. The high category indicates that the majority of students experienced significant improvements, not just a small percentage.

Discussion

The findings demonstrate that the andragogy-based Ignatian Cybergogical Experience (ICE) model significantly improved students' digital literacy compared to conventional learning. The higher posttest scores and N-Gain values

achieved by the experimental group suggest that the effectiveness of the ICE model lies not merely in the integration of digital technology, but in the way technology is embedded within an experiential and reflective learning process. This finding indicates that digital literacy development requires more than exposure to digital tools; it requires learning experiences that encourage students to critically engage with information, reflect on their actions, and apply knowledge in authentic contexts.

From an andragogical perspective, the superiority of the ICE model can be explained by its alignment with the characteristics of adult learners. Adult learners tend to be self-directed and learn more effectively when learning activities are relevant to their experiences and future professional needs (Knowles, 1980; Merriam, 2018). In the Teaching Materials Development course, students were not merely introduced to digital technologies but were actively involved in designing and evaluating digital teaching materials. This experiential engagement likely contributed to the stronger learning gains observed in the experimental group. Therefore, the improvement in digital literacy can be interpreted as the result of meaningful participation rather than technology use alone.

An important finding of this study is that the improvement occurred not only in students' technical abilities but also in their cognitive and critical dimensions of digital literacy. This result is particularly significant because previous studies have reported that university students are often proficient in using digital technologies but lack the ability to critically evaluate digital information (Kusumawati et al., 2022). The ICE model appears to address this challenge through its reflection stage, which encourages students to analyze their experiences, evaluate the reliability of information sources, and consider the ethical implications of technology use. Consequently, digital literacy development becomes a process of critical meaning-making rather than simple skill acquisition.

The reflection component may be one of the key mechanisms explaining the effectiveness of the ICE model. Within Ignatian pedagogy, reflection serves as a bridge between experience and action, enabling learners to construct deeper understanding from their learning experiences (Tardiff, 2021). The findings suggest that students who engaged in systematic reflection were better able to connect digital learning activities with broader academic and professional contexts. This supports the argument that reflective learning enhances higher-order thinking skills, which are essential for digital literacy in contemporary higher education.

Another important interpretation concerns the role of cybergogy within the ICE model. While conventional learning often positions technology as a supplementary tool, the ICE model integrates technology as an essential component of collaborative knowledge construction. According to Wang and Kang (2006), effective digital learning should simultaneously engage cognitive, social, and emotional dimensions. The significant improvement observed in the experimental group suggests that students benefited from opportunities to collaborate, communicate, and solve problems through digital environments. Thus, the effectiveness of the ICE model may stem from its ability to create a holistic digital learning experience rather than focusing solely on technological proficiency.

The relatively lower improvement observed in the control group also provides important insights. Although conventional instruction contributed to some growth in digital literacy, the gains were substantially smaller. This finding suggests that lecturer-centered approaches may be insufficient for developing the complex competencies required in the digital era. Digital literacy involves active information evaluation, content creation, collaboration, and problem-solving, all of which require learners to participate actively in the learning process. Consequently, instructional approaches that emphasize passive knowledge transmission may not adequately support the development of these competencies.

The findings also contribute to the broader discussion on digital literacy in higher education. Much of the existing literature emphasizes technology integration as a means of improving student competencies. However, the present study suggests that the effectiveness of technology-enhanced learning depends on the pedagogical framework underpinning its implementation. The success of the ICE model indicates that combining experiential learning, reflection, learner autonomy, and digital engagement can produce stronger learning outcomes than technology integration alone. This extends previous research by demonstrating how andragogical principles can strengthen the educational value of digital learning environments.

From a practical perspective, the results imply that higher education institutions should move beyond simply

increasing access to digital technologies. Instead, learning designs should intentionally incorporate opportunities for experience, reflection, collaboration, and self-directed learning. For courses related to teaching materials development, this approach can help students become not only competent technology users but also critical creators of digital educational content. Therefore, the ICE model offers a promising framework for supporting the development of digital literacy and other 21st-century competencies in higher education.

CONCLUSION

Based on the research results and discussion, it can be concluded that the andragogy-based Ignatian Cybergogical Experience (ICE) model has proven effective in improving students' digital literacy in the Teaching Materials Development course. This effectiveness is demonstrated by a significant increase in the posttest results of the experimental group compared to the control group, which is reinforced by the results of the statistical test (t-test) with a significance value <0.05 and the N-Gain value of the experimental group which is in the high category. The increase in students' digital literacy does not only occur in the technical aspects of technology use, but also includes cognitive and critical abilities, such as evaluating digital information, utilizing technology appropriately, and creating relevant digital content. This shows that the ICE model is able to develop digital literacy comprehensively through the integration of learning experiences, reflection, and technology use.

The success of the ICE model is inseparable from its alignment with the principles of andragogy, which emphasize experiential learning, self-directed learning, and the relevance of learning to students' real needs as adult learners. The stages in the ICE model—context, experience, reflection, action, and evaluation—create an active, reflective, and meaningful learning process, thereby increasing student engagement and motivation. Furthermore, the integration of technology in the ICE model makes a significant contribution to developing 21st-century skills, particularly digital literacy, critical thinking, creativity, and collaboration. Compared with conventional learning, which tends to be lecturer-centered and lacks digital experience, the ICE model provides more space for students to explore, create, and develop digital competencies independently. Thus, the andragogy-based Ignatian Cybergogical Experience model can be used as an alternative, innovative and relevant learning model in higher education. This model is not only effective in improving students' digital literacy but also supports the transformation of learning toward a more adaptive, participatory approach that is in line with the demands of the digital era.

REFERENCES

- Anisah, A., Suryani, N., & Nugraheni, A. (2020). Digital literacy skills of students in higher education: A case study. *Journal of Education and Learning*, 14(3), 450–458.
- Blaschke, L. M. (2019). Self-determined learning (heutagogy) and digital media: Creating integrated educational environments for developing lifelong learning skills. *International Journal of Educational Technology in Higher Education*, 16(1), 1–17. <https://doi.org/10.1186/s41239-019-0154-y>
- Creswell, J. W. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Etikan, I., Musa, SA, & Alkassim, RS (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Ghozali, I. (2018). *Multivariate analysis application with IBM SPSS 25 program*. Diponegoro University Publishing Agency.
- Hair, JF, Black, WC, Babin, BJ, & Anderson, RE (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Hague, C., & Payton, S. (2021). Digital literacy across the curriculum. *Curriculum Journal*, 32(2), 1–12.
- Hake, R.R. (1999). *Analyzing change/gain scores*. Indiana University.
- ICAJE. (1993). *Ignatian pedagogy: A practical approach*. International Commission on the Apostolate of Jesuit Education.
- Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy* (2nd ed.). Cambridge Books.
- Kusumawati, E., Wibowo, A., & Prasetyo, ZK (2022). Digital literacy among university students in Indonesia: Challenges and opportunities. *Journal of Technology and Vocational Education*, 28(2), 150–160.
- Merriam, S. B. (2018). *Adult learning theory: Evolution and future directions*. Jossey-Bass.
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education*, 59(3), 1065–1078.

- Sharma, R., Gupta, P., & Verma, S. (2023). Digital literacy in higher education: A systematic review. *Education and Information Technologies*, 28(4), 4567–4585
- Sugiyanto, & Wahyuni, S. (2020). Andragogical approach in adult learning. *Journal of Nonformal Education*, 15(2), 120–130.
- Sugiyono. (2019). *Quantitative, qualitative, and R&D research methods*. Alfabeta.
- Tardiff, C. (2021). Ignatian pedagogy in the digital age: Reflection and learning. *Journal of Jesuit Education*, 10(1), 25–38.
- UNESCO. (2018). *A global framework of reference on digital literacy skills for indicator 4.4.2*. UNESCO.
- Wang, M., & Kang, M. (2006). Cybergogy for engaged learning: A framework for creating learner engagement through information and communication technology. In D. Hung & MS Khine (Eds.), *Engaged learning with emerging technologies* (pp. 225–253). Springer.
- Witono, A. (2025). Development of the Ignatian Cyberlogical Experience model in language learning. *Journal of Language Education*, 12(1), 45–60.