Journal of Multidisciplinary Research of Education
https://jomre.unimika.ac.id/index.php/jomre/index

Analysis of ICT Literacy Among Users of E-Education with Case Study: Review of the Edlink Application

Santanam Wishal[1], Muhammad Fadhli Majid[2], Iwan Brian Bijaksono[3], Intan Puji Nur Hirdian[4], Ahmad Chusyairi[5]
[1,2,3,4,5] Universitas Siber Asia, Indonesia
santawishal17@gmail.com*

Article Information:
Received November 15, 2025
Revised January 28, 2026
Accepted March 30, 2026

Keywords: *ICT Literacy, E-Education, Learning Management System (LMS), Edlink, Sentiment Analysis*

Abstract

Digital transformation has driven the adoption of E-Education, with Learning Management Systems (LMS) serving as the primary platform for online learning. This study analyzes the level of Information and Communication Technology (ICT) literacy among users of the Edlink application based on 2,523 reviews on the Google Play Store, using a descriptive quantitative approach and zero-shot classification. The analysis includes the identification of problem topics, ICT literacy levels, user sentiment, and emotions. The results indicate that the majority of users have a high level of ICT literacy; therefore, the issues that arise are predominantly related to technical problems with the application, particularly access to classes and learning materials, bugs or errors, and notifications. The most frequently expressed emotions are frustration and confusion due to functional disruptions and the application's user interface. These findings emphasize the importance of improving system stability and user experience quality to support the effectiveness of E-Education.

INTRODUCTION

The development of digital technology has driven the transformation of education towards E-Education, where the Learning Management System (LMS) has become the main tool in the learning process, especially in higher education. LMS enables the management of materials, assignments, and learning interactions online, thereby increasing the flexibility and efficiency of the learning process. However, the effectiveness of LMS usage is not only determined by the quality of the system, but also by the ability of users to utilize the technology optimally.

The Edlink application, as one of the most widely used LMS in Indonesia, still receives various reviews from users that reflect their experiences, obstacles, and emotional responses during the usage process. User reviews on digital platforms can be a representative source of empirical data for analyzing the effectiveness of LMS, the level of users' Information and Communication Technology (ICT) literacy, as well as the sentiments and emotions that arise due to the problems encountered.

How to cite: Wishal, S., Majid, MF., Bijaksono, IB., Hirdian, IPN., Chusyairi, A (2026). Analysis of ICT Literacy Among Users of E-Education with Case Study: Review of the Edlink Application. *Journal of Multidisciplinary Research of Education, 2*(1), 1-10.
E-ISSN: 3109-0303
DOI: https://doi.org/10.34125/jomre.v2i1.39
Published by: Journal of Multidisciplinary Research of Education

Based on these conditions, this study aims to analyze the level of ICT literacy of Edlink application users through user reviews on Google Play Store, identify dominant problem topics, and examine user sentiments and emotions. The results of this study are expected to contribute to LMS developers and educational institutions in improving system quality and ICT literacy support to support the effectiveness of E-Education.

1. Background

The development of information and communication technology (ICT) has driven significant transformation in the education system, particularly through the implementation of E-Education. The use of digital technology in learning enables the teaching and learning process to be flexible, interactive, and not bound by space and time (Evariani et al., 2025). In this context, the Learning Management System (LMS) acts as the main infrastructure that integrates learning materials, communication, and evaluation online.

Although LMS technology continues to evolve, the success of E-Education implementation is not only determined by the quality of the system, but also by the ICT literacy of users. ICT literacy includes an individual's ability to access, operate, understand, evaluate, and utilize technology effectively and responsibly (Sulistiyarini & Sabirin, 2025). Several studies show that low levels of ICT literacy can hinder the effectiveness of digital learning, even when the technology used is adequate (Walsh et al., 2021).

One of the LMSs widely used in Indonesian universities is Sevima Edlink. This application provides various learning support features, such as material distribution, discussion forums, assignment collection, and academic evaluation. A number of previous studies have shown that Edlink is quite effective as an online learning medium, but there are still obstacles in terms of feature utilization and user experience (Wahyuddin et al., 2025), (Fatihahsari & Darujati, 2021).

User reviews on the application platform are an interesting source of data for analysis, as they reflect the real experiences, perceptions, and level of understanding of users regarding the technology used. Through these reviews, aspects of users' ICT literacy—in terms of technical skills, understanding of functions, and attitudes toward technology—can be implicitly identified. Therefore, analyzing users' ICT literacy based on Edlink application reviews is important for gaining a deeper understanding of the quality of user interaction with e-education systems.

2. Problem Identification

a. What is the level of Information and Communication Technology (ICT) literacy of Edlink app users based on user reviews on the Google Play Store?

b. What are the main issues that most frequently arise in user reviews of the Edlink application?

c. What are the sentiments and emotions of Edlink app users regarding the problems they encounter?

d. What is the relationship between ICT literacy levels, application problems, and user sentiment in the context of E-Education?

3. Research Objectives

This study aims to:

a. Analyze the ICT literacy level of Edlink app users based on user reviews.

b. Identify the dominant issues in the use of the Edlink application.

c. Analyze user sentiment and emotions towards their experience using the Edlink application.

d. Examine the relationship between users' ICT literacy and technical issues with the application in supporting the effectiveness of E-Education.

LITERATURE REVIEW

1. ICT Literacy

Literacy is defined as the ability to use language and images in rich and diverse forms to read, write, listen, speak, see, present, and think critically about ideas in early development. This allows us to exchange information and interact with others. Literacy is a complex process that involves applying prior knowledge, culture, and experience to develop new knowledge and deeper understanding. Literacy serves to unite individuals and communities, and is an important tool for individuals to develop and actively participate in a democratic society (Ariani & Helsa, 2024). According to the KBBI (Big Indonesian Dictionary) and Law Number 3 of 2019 concerning the Book System, literacy is defined as the ability to critically interpret information in order to improve the quality of life and access to science and technology.

Information and Communication Technology (ICT) is a collection of technologies used to process, manage, and convey information, including computers, the internet, and digital communication media. UNESCO defines ICT as technology that enables the effective creation, management, and distribution of information. ICT literacy refers to an individual's ability to use digital technology to access, manage, integrate, evaluate, and create information responsibly.

ICT literacy encompasses three main dimensions, namely knowledge, skills, and behavior. The knowledge dimension relates to users' awareness and understanding of the functions and roles of ICT. The skills dimension reflects technical abilities in using technology to obtain and process information. Meanwhile, the behavioral dimension relates to critical and ethical attitudes in utilizing technology. Therefore, ICT literacy emphasizes not only technical skills, but also cognitive abilities and critical interpretation of information in the context of digital life.

2. E-Education and Learning Management System (LMS)

E-Education or electronic education is an educational process that utilizes electronic technology as the main means of delivering learning. E-education includes e-learning activities, which are the process of transferring formal and informal knowledge through various electronic media such as the internet, intranet, and other digital devices. This concept enables flexible distance learning that can be accessed without space and time limitations.

One important element in the implementation of e-education is the Learning Management System (LMS). LMS is software designed to manage administration, documentation, reporting, and delivery of learning materials online. LMS functions as an e-learning platform that integrates various learning activities, such as class management, material distribution, assignment collection, evaluation, and communication between lecturers and students.

Various definitions emphasize that e-learning is the use of electronic technology, particularly the internet, to support, improve, and optimize the learning process. LMS enables lecturers to manage learning systematically and efficiently, while students can access materials, complete assignments, and interact online. Thus, LMS is a crucial instrument in supporting the effectiveness of distance learning in the digital era, as it is capable of integrating academic and administrative functions into a single technology-based learning system.

RESEARCH METHOD

1. Type of Research

This study uses a descriptive quantitative approach with machine learning-based text analysis methods. This approach is used to process user review data of the Edlink application on Google Play Store to identify problem topics, users' ICT literacy levels, emotions, and sentiment trends that arise in user interactions with the Edlink application as an E-Education platform (Albert et al., 2024).

2. Data

The data source in this study is user reviews of the Edlink application taken from the Google Play Store platform. A total of 2,523 reviews were obtained, containing information in the form of review text, application ratings, application versions, and review upload times.

This data is considered representative because it is direct feedback from users who have had real interactions with the Edlink application.

3. Data Collection Technique

Data was collected using the google-play-scraper library (Python), which allows the retrieval of all public reviews of an application. The scraping parameters used include:

a. App ID: id.co.sevima.edlink
b. Language: Indonesian
c. Country: Indonesia
d. Number of reviews: maximum (2,523 reviews successfully retrieved)
e. Sort: Most Relevant

Scraping is performed using a Python script, and the results are stored in a DataFrame and exported to a CSV file.

4. Data Analysis Techniques

Data analysis is carried out in several stages, namely text preprocessing, topic classification, ICT literacy level classification, emotion analysis, and sentiment categorization based on ratings.

4.1. Data Preprocessing

The preprocessing stage is carried out to ensure that the data is ready to be processed by the classification model. The steps taken are:

a. Removing duplicate reviews.
b. Removing empty data in the review column.
c. Light text normalization (lowercase, removal of excess whitespace).
d. Restructuring the data for zero-shot classification purposes.

The preprocessing process is kept to a minimum so that the original context of the reviews is not lost (Hakim, 2021).

4.2. Topic Classification

To identify the dominant topics in reviews, this study uses the Zero-Shot Classification technique with the multilingual XLM-RoBERTa model (Wiciaputra et al., 2021). Zero-Shot Classification is a machine learning technique that allows models to classify data into new classes without prior training on examples of those classes (Bergmann, 2024). This model is able to categorize text without additional training by utilizing Natural Language Inference (NLI) [(Kumar, 2022).

The topic labels used include:

a. Access to classes and materials
b. Notification not appearing
c. Task upload

d. Login or SSO
e. Application navigation
f. Incomplete features
g. Video conferencing issues
h. Application bugs or errors
i. Performance issues or slowness
j. Confusing display or UI

Each review is automatically classified into the most relevant topic.

4.3. Data Preprocessing

To assess the extent to which user barriers stem from digital literacy aspects, reviews are classified using the following categories:

a. Low ICT literacy
b. Medium ICT literacy
c. High ICT literacy
d. Technical issue (not ICT literacy)

This classification helps distinguish whether the problems experienced by users stem from low technological capabilities or from technical errors in the application (Siahaan & Gunawan, 2021).

4.4. Emotion Classification

In addition to topics and ICT literacy, the study also analyzed users' emotional responses. The emotion labels used were:

a. frustration
b. confusion
c. annoyance
d. overwhelmed
e. stress
f. satisfaction
g. neutral

Emotion classification helps understand the extent to which digital experiences influence users' perceptions and reactions to applications (Gaurav et al., 2024).

4.5. Sentiment Categorization Based on Ratings

Since the Google Play Store provides star ratings for each review, this study uses direct conversion of ratings as an indicator of sentiment:

a. Rating 4–5 → positive
b. Rating 3 → neutral
c. Rating 1–2 → negative

This approach maintains consistency between user evaluations and data analysis.

5. Data Visualization Techniques

The visualization of analysis results is performed using the matplotlib library. Visualization includes:

a. Distribution of review topics
b. Distribution of ICT literacy levels
c. Distribution of user emotions
d. Sentiment distribution based on ratings

Visualization is used to clarify the interpretation of results and present findings in a more informative and comprehensive manner.

6. Methodology Summary

This research methodology combines digital data collection techniques, zero-shot NLP-based text analysis, and a descriptive quantitative approach to produce a comprehensive mapping of issues, ICT literacy, emotions, and user sentiment regarding the Edlink application as an electronic learning platform. With this approach, the study can describe the digital barriers experienced by students from various dimensions of user experience.

RESULTS AND DISCUSSION

1. Descriptive Statistics of Reviews

This study used a total of 2,523 reviews from Edlink app users obtained from the Google Play Store. The review data consisted of review text, rating scores, upload times, and the app version used. Based on the rating distribution:

a. Positive reviews (4–5 stars) dominate most of the data.

b. Neutral reviews (3 stars) accounted for a smaller portion.

c. Negative reviews (1–2 stars) still appear in significant numbers and indicate problems with the user experience.

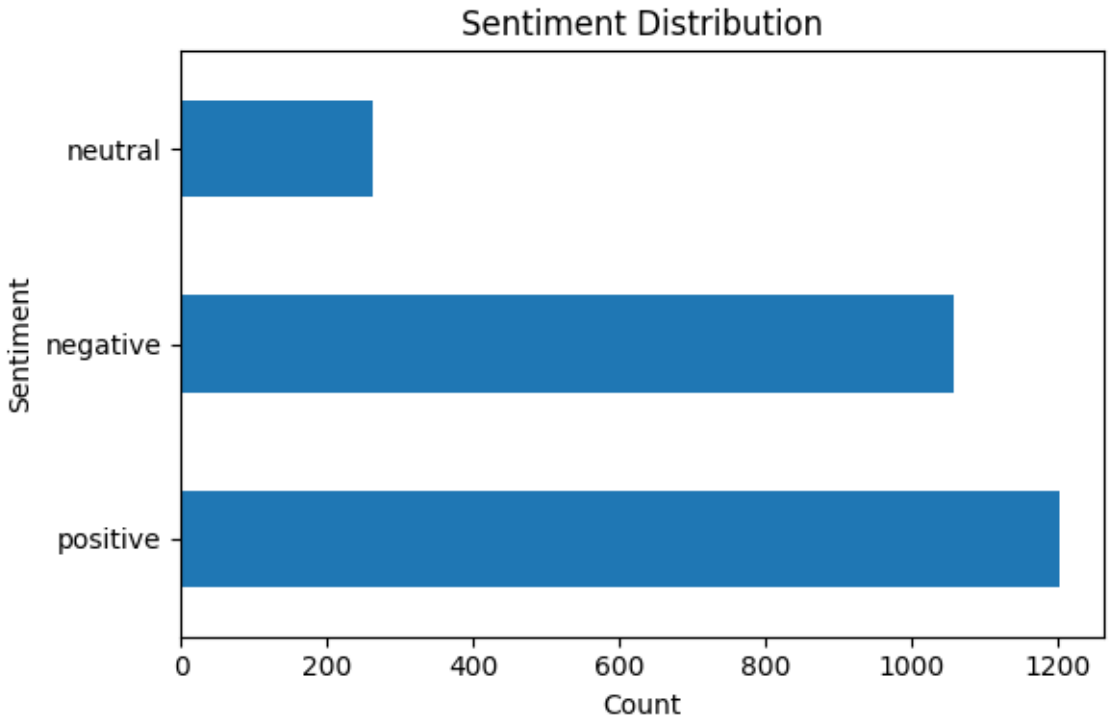

Figure 1. Sentiment Distribution

This distribution provides an initial overview of user perceptions of Edlink as an e-learning platform. Although the application has a large user base, there are still various complaints and obstacles reflected in the reviews.

2. Analysis of Problem Topic Distribution

Topic classification using the Zero-Shot Classification method shows that Edlink user reviews can be grouped into ten main categories, including:

a. Access to classes and materials (the largest category)

b. Application bugs or errors

c. Notifications not appearing

d. Incomplete features

e. Confusing display or UI

f. Performance issues or slowness
g. Login or SSO
h. Task upload
i. Application navigation
j. Video conferencing issues

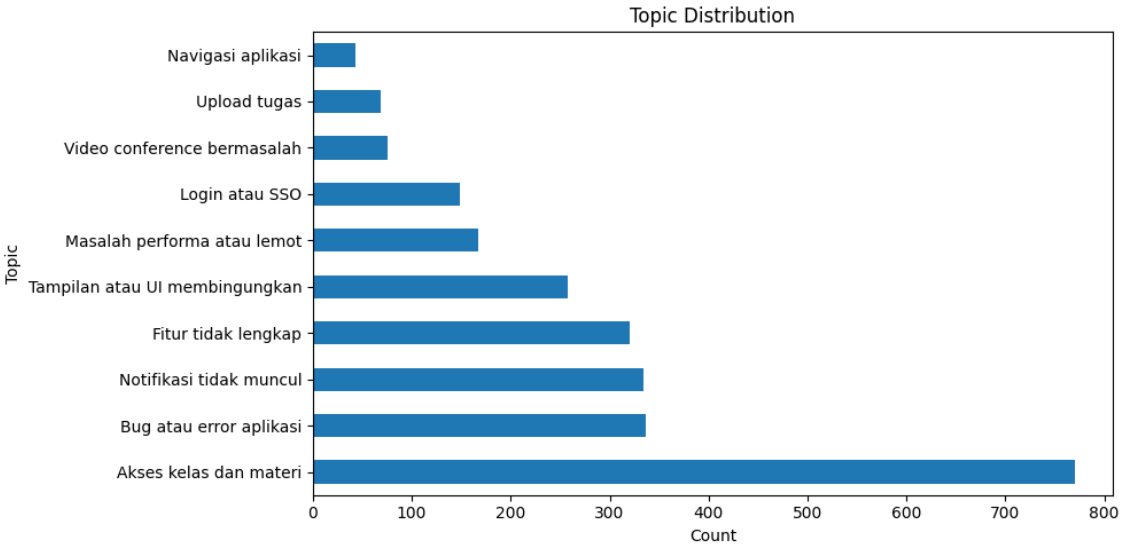

Figure 2. Topic Distribution

This distribution indicates that most users experience direct obstacles related to basic e-learning functionality, such as access to materials, application stability, and notifications. Complaints related to UI and navigation indicate a need for improvements to the interface design to make it more intuitive.

3. ICT Literacy Level Analysis

The results of the ICT literacy level classification show four main categories:

a. High ICT literacy: The majority of reviews fall into this category, indicating that most users have sufficient digital competence to use the application.

b. Medium ICT literacy: Some users can operate the application but still experience certain difficulties.

c. Low ICT literacy: A small number of users experience fundamental barriers in using digital features.

d. Technical issue (not ICT literacy): A number of reviews indicate that the problem stems from the application itself, not the user's abilities.

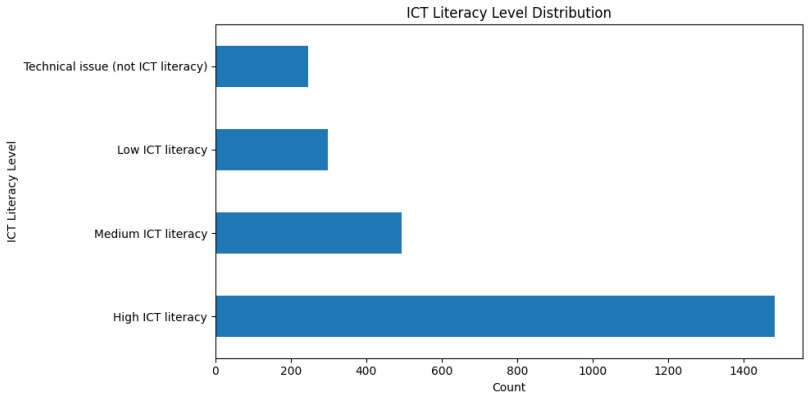

Figure 3. ICT Literacy Level Distribution

These findings confirm that user barriers are not only caused by low digital literacy, but also by technical issues with the application itself. The large proportion of "High ICT literacy" indicates that complaints usually stem from system issues, not user incompetence.

4. Analysis of User Emotion Distribution

Emotion analysis using Zero-Shot Emotion Classification shows the main emotions that appear in reviews, namely:

a. Frustration
b. Confusion
c. Annoyance
d. Stress
e. Overwhelmed
f. Neutral
g. Satisfaction

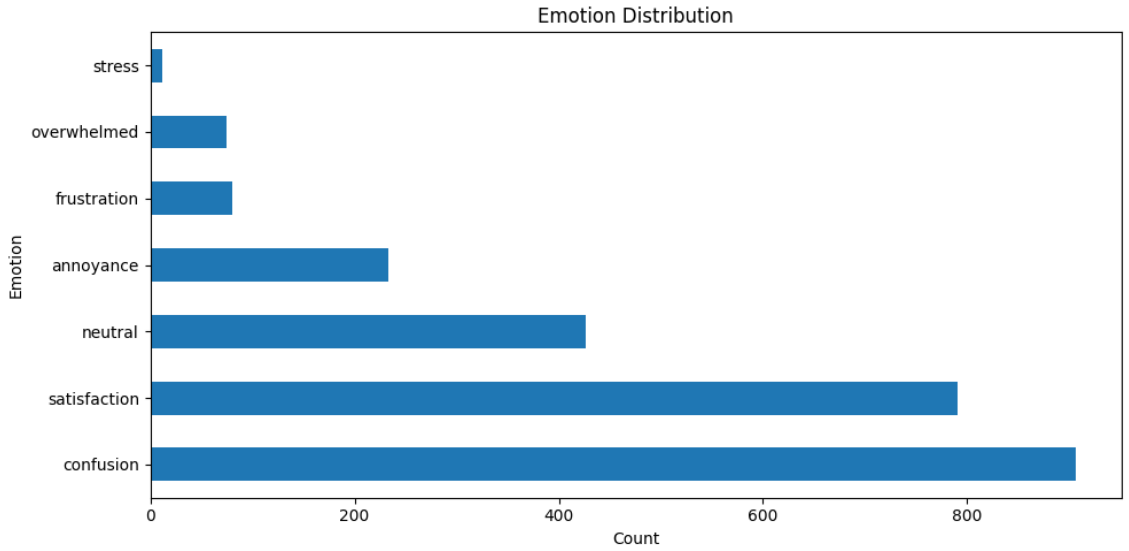

Figure 3. ICT Literacy Level Distribution

The majority of negative reviews show that the emotions of confusion and overwhelmed appear frequently in reviews related to confusing UI or unintuitive navigation. Meanwhile, the emotion of frustration correlates with technical obstacles such as bugs and application errors. Users with low ICT literacy tend to show these emotions in their reviews.

The emotion of satisfaction is found in positive reviews, indicating that despite problems, some users still feel helped by the features provided by Edlink. The large number of neutral emotions indicates that there are many users with intermediate ICT literacy, as users can only use the application properly but cannot provide additional features or constructive suggestions to developers.

CONCLUSION

Based on the results of research on 2,523 user reviews of the Edlink application on Google Play Store using the Zero-Shot Classification approach and sentiment analysis, it can be concluded that the majority of users have a high level of Information and Communication Technology (ICT) literacy. This shows that the problems reported by users are generally not caused by limitations in their ability to use technology, but are more predominantly triggered by technical problems with the application.

The analysis also shows that the most dominant problems are related to the main functionality of E-Education, particularly in accessing classes and learning materials, followed by application bugs or errors and notification function incompatibility. These

findings indicate the need to improve system stability and optimize basic functions as a top priority to support the continuity of the online learning process.

In addition, sentiment and emotion analysis revealed that feelings of frustration were strongly related to technical problems with the application and consistently generated negative sentiment, regardless of the user's level of ICT literacy. Feelings of confusion and overwhelm also appeared in reviews that highlighted weaknesses in the application's interface design and navigation. The fact that users with high ICT literacy levels still provide negative reviews confirms that technical quality and system reliability are key factors in determining the effectiveness of E-Education implementation through the Edlink application.

REFERENCES

Ariani, Y., & Helsa, Y. M. (2024). ICT-based numeracy literacy in digital learning in elementary schools. International Journal of Information and Education Technology, 11(1), 88–102. https://doi.org:10.18178/ijiet.2024.14.3.2060

Albert, J., Mintawati, H., Sipayung, I., Pradesa, K., & Verianti, G. (2024). Analysis of the satisfaction level of accounting students regarding the use of Edlink at Nusa Putra University. Journal of Vocational Education and Training, 4(1), 22–31. https://doi.org/10.51878/vocational.v4i1.3936

Bergmann, D. (2024). What is zero-shot learning? IBM Think. https://www.ibm.com/id-id/think/topics/zero-shot-learning

Evariani, E. R., Saputra, M. I., & Sutabri, T. (2025). The effectiveness of e-learning as a learning media system (evaluative study of e-learning use with the Edlink Sevima application at STIK Bina Husada). Journal of Information Systems and Telematics. 4(1). 12-15, vol. 16, no. 1, pp. 1–8, 2025.http://dx.doi.org/10.36448/jsit.v14i1.3093

Fatihahsari, F., & Darujati, C. (2021). Analysis of the usability of Edlink mobile apps using heuristic evaluation. Journal of Computing and Information Technology. 20(2). (2-8), vol. 10, no. 2, pp. 373–382, 2021. https://doi.org/10.32520/stmsi.v10i2.1263

Gaurav, A., Gupta, B. B., Sharma, S., Bansal, R., & Chui, K. T. (2024). XLM-RoBERTa based sentiment analysis of tweets on Metaverse and 6G. In Proceedings of the 2024 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS). 238(6). 902–907. https://doi.org/10.1109/ANTS61957.2024.10826955

Hakim, B. (2021). Sentiment analysis of text preprocessing data in data mining using machine learning. JBASE – Journal of Business Strategy and Entrepreneurship, 4(2), 170–178. https://doi.org/10.30813/jbase.v4i2.3000

Kumar, P. (2022). Zero-shot text classification with BART and XLM-RoBERTa. C# Corner. https://www.c-sharpcorner.com/article/zero-shot-text-classification-with-bart-and-xlm-roberta

Siahaan, Y. A., & Gunawan, F. E. (2021). Measuring the level of information and communication technology literacy among students in Indonesia. JTIM: Journal of Information Technology and Multimedia, 3(2), 70–81. https://doi.org/10.35746/jtim.v3i2.131

Sulistiyarini, D., & Sabirin, F. (2025). 21st century literacy skill of information technology and computer education students. Indonesian Education Journal, 9(4), 582–590, https://doi.org/10.23887/jpi-undiksha.v9i4.24432

Wahyuddin, W., et al. (2025). Analysis of the use of Sevima Edlink features in the academic process at IAIN Parepare. Journal of Communication Studies Dissemination. 3(2). 45–52, 2025, https://doi.org/10.30596/judika.v3i2.9694

Walsh, A. M., et al. (2021). The relationship between ICT literacy and academic achievement among students: A meta-analysis. Computers & Education, 173(104271). 12-20. https://doi.org/10.1016/j.compedu.2021.104271

Wiciaputra, Y., Young, J., & Rusli, A. (2021). Bilingual text classification in English and Indonesian via transfer learning using XLM-RoBERTa. International Journal of Advanced Soft Computing and Applications. 13(3). 73–84. https://doi.org/10.15849/ijasca.211128.06