



Digital Literacy Gamification: The Effectiveness of Crossword Puzzles (TTS) in Improving Students' Digital Security Understanding

Rizky Amalia Syahrani¹, Putri Syam², Dony Arung Triantoro³, Ashabul Yamin Asgha⁴, Raudhatun Nafisah⁵, Aulia Risky⁶, Fathayatul Husna⁷, Mirza Adia Nova⁸, Ainal Fitri⁹, Ismu Ridha¹⁰

¹⁻¹⁰Universitas Teuku Umar

Email: futrisyam@utu.ac.id

Abstrak

Era digital menuntut kemampuan literasi digital yang mencakup keterampilan mengakses, mengevaluasi, dan memanfaatkan informasi secara kritis dan bertanggung jawab. Namun, maraknya misinformasi dan rendahnya pemahaman siswa terhadap keamanan digital (seperti pengaturan privasi dan penanganan cyberbullying) menjadi tantangan utama. Penelitian ini bertujuan untuk meningkatkan literasi digital siswa MAN 1 Aceh Barat melalui Teka-Teki Silang (TTS) berbasis konten literasi digital. Metode yang digunakan adalah partisipatif-edukatif dengan tahapan: identifikasi kebutuhan siswa, penyusunan TTS berisi istilah literasi digital, pelaksanaan kegiatan, dan evaluasi. Peserta terdiri dari 40 siswa yang dibagi dalam dua kelompok. Hasil menunjukkan TTS terbukti efektif dalam meningkatkan pemahaman istilah teknis literasi digital siswa, mendorong kolaborasi dan diskusi antarsiswa, melatih berpikir kritis melalui analisis petunjuk dan pencarian jawaban, dan menciptakan pembelajaran yang interaktif dan menyenangkan.

Kata Kunci: Keamanan Digital; Literasi Digital; Teka-Teki Silang; Pembelajaran Interaktif

Abstract

The digital age demands digital literacy skills that include the ability to access, evaluate and utilise information critically and responsibly. However, the rise of misinformation and students' lack of understanding of digital safety (such as privacy settings and handling cyberbullying) are major challenges. This study aims to improve the digital literacy of MAN 1 Aceh Barat students through a digital literacy content-based crossword puzzle (TTS). The method used was participatory-educative with stages: identification of student needs, preparation of TTS containing digital literacy terms, implementation of activities, and evaluation. Participants consisted of 40 students divided into two groups. The results showed that the TTS proved effective in improving students' understanding of digital literacy technical terms, encouraging collaboration and discussion among students, training critical thinking through clue analysis and searching for answers, and creating interactive and fun learning.

Keywords: Digital security; digital literacy; crossword puzzles; interactive learning.

Research Background

The Internet is a product of the progress of civilization that is ideally utilized to encourage behaviors and activities that reflect civilized values. However, in practice, the internet not only brings positive influences, but also potential negative

impacts. The positive side appears when the internet is used as a learning medium, a means of innovation, a source of inspiration, and a tool in human life. On the contrary, negative impacts occur when the internet is used as a medium to spread harmful propaganda, intimidate, distribute

pornographic content, divide society based on SARA, and support acts of terrorism, drug trafficking, and various forms of crime and other immoral behavior.

In today's digital era, individuals are faced with an abundant flow of information through various digital devices. This phenomenon poses challenges in sorting and evaluating the information received. Literacy (Livingstone, 2004) Information becomes an essential skill, encompassing the ability to access, understand and utilize information effectively. According to (Putrayasa et al., 2024), digital literacy involves not only technical skills, but also critical thinking and information evaluation. This ability is important to avoid the spread of misinformation and bias. Thus, the development of comprehensive information literacy is an urgency in facing the ever-evolving challenges of information and communication technology.

The exposure of such massive information from various media often causes confusion among the public in distinguishing between valuable and misleading information. In this context, media literacy is an important competency that every individual must have. Media literacy not only includes the ability to understand media content, but also the ability to select, criticize, and utilize information wisely according to personal and social needs (Potter, 2018). Individuals who have a high level of media literacy will be better able to ward off disinformation and be more selective in accessing and using the media productively.

Access to increasingly widespread digital media is not always accompanied by an individual's ability to obtain and process information for self-development. The public, especially students, is now faced with information flows that are very diverse in form, relevance, and level of validity. In this

situation, social media has become an integral part of daily life, but without adequate information literacy, users are vulnerable to misinformation and unproductive use of media (Livingstone, 2004). Therefore, strengthening digital literacy is very important in equipping the community to be able to filter information and use it for personal and social progress.

The ability to utilize digital media in reading and writing refers to the skill of using information technology to understand, create, and communicate information to acquire new knowledge (Irhandayaningsih, 2020). Digital literacy also includes the ability to navigate and utilize information connected through sequential texts in a digital system, which can ultimately be used to build new knowledge (Kurnianingsih et al., 2017).

Digital literacy also forms a critical and creative mindset in solving problems. Individuals with good digital literacy are able to think reflectively and adjust to various information contexts faced. This ability includes the process of creating, discussing, evaluating, and assembling information into a useful form of knowledge (Nurjanah et al., 2017). In the context of a digital society, digital literacy also has an important role in shaping character and social values that are in accordance with the challenges of the times (Dewi et al., 2021).

Research conducted by (Syahrani & Boer, 2022) revealed that there is a significant shift in student behavior in meeting information needs. The majority of students now prefer online media as the main source of finding news, even though they still access television and print media, but the frequency is not as intense as the use of online media. This shift shows that students tend to rely on digital platforms to obtain information, which demands improved

digital literacy skills in order to be able to filter and evaluate information critically.

Digital literacy knowledge is a key competency that must be possessed by students in the current digital information era. Digital literacy includes not only technical skills in using technological devices, but also critical thinking skills to evaluate, process, and use information wisely and responsibly (Ng, 2012).

Thus, increasing digital literacy among students is very important to ensure that information technology can be effectively integrated in learning activities. This activity directed the focus on counseling and debriefing for students at MAN 1 West Aceh using crossword puzzles. The goal is to improve students' understanding and skills in accessing, understanding, and evaluating digital information in a fun and interactive way.

Research Methods

This activity was held at MAN 1 West Aceh, Jl. Sisingamangaraja, Drien Rampak, Kec. Johan Pahlawan, West Aceh Regency, Aceh which was attended by 40 students from regular classes and *boarding classes*. The method of implementing community service activities at MAN 1 West Aceh is designed by focusing on a participatory and educational approach. This activity will include stages that involve the active participation of various parties, ranging from teachers, principals, students, students, to lecturers as facilitators. The following are the stages of the proposed implementation:



Figure 1. Series of Community Service Activities

Schedule adjustments are made in line with the dynamics and developments that occur during the implementation of the program. Through a systematic approach and involving the active role of various parties, this activity is expected to have a positive impact on the students of MAN 1 West Aceh. The implementation of this activity adopts a method that integrates elements of education, active participation, and cross-sectoral collaboration. The approach used can be explained as follows:

1. Identify initial needs

The initial stage involves identifying concrete goals and an in-depth analysis of the student's needs. Based on the results of observations and interviews with the school and students, the program of activities is carefully planned, covering various aspects such as counseling, crossword puzzle games, and discussions.

2. Preparation of the plan

At this stage, lecturers and students set fun and interactive material, such as including terms related to digital literacy, hoaxes, digital ethics, or words related to information technology. Furthermore, the design is made in digital format using the Canva application and then printed with a size of 1x3m. In addition, lecturers also prepare guidelines for work and assessment rubrics for *pre* and *post-tests* related to digital literacy.

3. Implementation of activities

Lecturers and students socialize the program, distribute *pre-test* and *post-test questions*, material presentations, literacy crossword puzzle games (TTS), reflection and discussion, *post-test*.

4. Monitoring and evaluation

Monitoring is carried out during the activity to ensure that each stage runs as planned. The evaluation of the results focuses

on the impact of activities on improving student literacy.

In addition, the implementation of this activity is in accordance with the schedule that has been agreed with partners, namely on October 8, 2024 at MAN 1 West Aceh. This community service program involved 40 participants. The parties involved and their roles can be seen in table 1.

Table 1. Related parties in community service activities

No.	Partners	Role
1	MAN 1 West Aceh	Inviting resource persons, providing a place for implementation, becoming a participant
2	Communication Science Study Program, Teuku Umar University	Providing a letter of introduction to the LPPM of Teuku Umar University
3	LPPM Teuku Umar University	Providing a letter of assignment to carry out community service activities
4	Lecturer and Students of Communication Science Study Program, Teuku Umar University	Become a resource person to improve digital literacy for students

RESULTS AND DISCUSSION

This activity succeeded in increasing students' understanding of the concept of digital literacy as a whole, especially in the aspect of using technology for positive and productive purposes. Through learning

media in the form of crossword puzzle games (TTS), students are not only introduced to important terms in digital literacy, but also trained to recognize and use various digital applications and devices that support the improvement of language skills and the development of general knowledge. In addition, the game encourages students to be more skilled in searching and evaluating information from various digital sources efficiently and responsibly. An interactive approach like this has proven to be effective in improving students' digital literacy, as it combines cognitive, collaborative, and technological aspects in one fun learning method (Ng, 2012).



Figure 2. MAN 1 West Aceh Student Service Team

The use of crossword puzzle games (TTS) as a learning medium has been proven to be effective in increasing students' interest in reading as well as critical thinking skills. Through these activities, students are encouraged to understand the clues available and formulate appropriate answers, which indirectly train them in logical, analytical, and reflective thinking. The TTS completion process also triggers students' curiosity, so they are more active in seeking information from both print and digital sources. In addition, activities involving crossword puzzles also have a positive effect on students in understanding the material given, because students are required to connect the knowledge they already have with new contexts that are presented in a fun way (Gulo & Muhid, 2024).

Crossword puzzles (TTS) as a learning tool have encouraged the creation of healthier

and more meaningful digital interactions among students. Through this medium, learning activities are no longer monotonous, but become more interactive and fun because they combine elements of entertainment with education. The interactions that occur in this process not only improve students' understanding of digital literacy content, but also strengthen their skills in operating technological devices in a more thoughtful and efficient way. In addition, a conducive and fun learning atmosphere also encourages active participation and collaboration between students. The game-based learning approach is able to form positive digital behavior because it creates an exploratory space that is stress-free but still educational.

Improving Students' Digital Literacy Through Crossword Puzzles (TTS)

The TTS game was carried out after the delivery of material by the community service team. Students are first given an understanding of general information about digital literacy. When the material was



delivered, students were first given several questions about literacy, but they did not know the settings of social media and cyberbullying. The result is that there are still many students who do not understand how to report acts of violation on social media, how to deal with someone's threats on social media, and how to set privacy restrictions on social media. The author assumes that these students have not fully received education about digital security that can encourage students to understand digital literacy and security.

The author hopes that the form of education delivered to them will not only understand them but also train them to be alert and sensitive to digital literacy issues. Therefore, the author and the community service team agreed to provide education from an early age to students as the first step to increase awareness and understanding of digital literacy. This effort can be done using fun methods, such as Crossword Puzzles.

Crossword Puzzle (TTS) is a word game by filling in blank boxes according to the directions that have been given by the drafting team. The blank boxes must be filled in based on the number of boxes provided and connected to the other answer boxes. In general, TTS uses two indicators, namely horizontal and descending indicators. The community service team made TTS in accordance with the topic of digital literacy and adjusted to the abilities of students at MAN. The form of TTS design for activities to improve students' digital literacy is as follows.

Figure 3. Crossword Puzzle Design

The instructions above contain various digital literacy skills such as digital security, recognizing social media names, hoaxes, and mastery of digital information. In the following blank boxes, students must fill in the answers according to the horizontal or descending instructions. The questions that students must answer are as follows: **Table 2. Horizontal and Descending Column Questions**

Horizontal Ex. 1
and Descending

Ex. 2

Horizontal

One of the impacts of cyberbullying	√	√	interaction through cyberspace		
Famous male Youtuber names	√	√	IKN stands for Capital City....	√	X
Another smart name is?	√	√	Respecting the copyright and privacy of others is..... Digital	√	√
UTU logo background color	√	√	Tsunami in Aceh occurred on the moon?	√	√
In order to be safe in using online media, we must use.... Powerful	√	√	Rude, derogatory or insulting comments are called....	√	X
One of the well-known social media apps among gen-z	√	√	The ability to effectively search, evaluate, use, and share information in the digital world is..... Digital	√	√
Internet citizens are commonly referred to as?	√	√			
Need a connection.... to surf the virtual world		√			√
Downward					
Fake news is commonly referred to?	√	√			
What is the covid-19 period called?	√	X			
Media..... is an online media that supports	√	√			

Note: √ (true)/X (false)

Source: Researcher's processed data



Figure 4. Both Groups with TTS Banners
The results show that students' ability to understand digital literacy is very good. They can understand the material well and

can answer the TTS as a whole. If measured based on the percentage of all students who participated in the activity (40 people), it can be seen that almost 80% of students have understood the basic concept of digital literacy. Based on the results of the TTS answers, group I filled in all the answers correctly, while 3 incorrect answers were found from group II. Based on the following results, it can be seen that 100% of the students who are members of group I have 100% understood the material. For comparison, group II has achieved 81% understanding of digital literacy.

The use of crossword puzzle media (TTS) as a learning medium has a significant positive influence on the student learning process in understanding material about digital literacy. This media not only makes it easier for students to understand the material delivered by the team, but also encourages the creation of interactive discussions between students. In addition, TTS also plays a role in increasing students' active participation during learning, as well as training their critical thinking skills when involved in teaching and learning activities. This is in line with the opinion (Triantoro et al., 2023) which proves that the approach through TTS is suitable for students, because it suits their stage of development which is still close to the world of the game, so that the material is easier to understand.

Conclusion

Based on the discussion above, it can be concluded that the use of crossword puzzles (TTS) as a learning medium has proven to be effective in improving students' digital literacy through an interactive and fun approach. This activity succeeded in improving students' conceptual understanding, where students more easily understood digital literacy terms, including digital security, hoaxes, and social media

management. Almost 80% of students show good understanding, with some groups even achieving 100% accuracy of answers in TTS. TTs is also an educational solution as well as entertainment for students in internalizing complex material more easily.

Based on the results and discussions obtained in this study, the author suggests that game-based approaches such as TTS are worthy of being developed more widely because they are in accordance with the learning culture of the digital generation. For optimization, it is necessary to integrate TTS with more diverse digital literacy content, develop similar media variations such as digital quizzes, interactive puzzles to maintain student interest. Thus, TTS is not only a learning tool, but also an effective strategy in shaping a digitally capable generation.

Bibliography

- Dewi, D. A., Hamid, S. I., Annisa, F., Oktafianti, M., & Genika, P. R. (2021). Growing students' character through the use of digital literacy. *Basicedu Journal*, 5(6), 5249–5257.
- Gulo, C. D. M., & Muhid, A. (2024). The Effectiveness of Crossword Puzzle-Based Learning to Improve Critical Thinking Skills in Students: Literature Review. *PINUS: Journal of Learning Innovation Research*, 10(1), 11–22.
- Irhandayaningsih, A. (2020). *Measuring digital literacy in online learning participants during the covid-19 pandemic*.
- Kurnianingsih, I., Rosini, R., & Ismayati, N. (2017). Efforts to improve digital literacy skills for school librarians and teachers in the central Jakarta area through information literacy training. *Journal of Community Service*, 3(1), 61–76.
- Livingstone, S. (2004). Media literacy and the challenge of new information and

- communication technologies. *The Communication Review*, 7(1), 3–14.
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education*, 59(3), 1065–1078.
- Nurjanah, E., Rusmana, A., & Yanto, A. (2017). The relationship between digital literacy and the quality of e-resource use. *Lantern Pustaka: Journal of the Study of Library, Information and Archives*, 3(2), 117–140.
- Potter, W. J. (2018). *Media literacy*. Wise publications.
- Putrayasa, I. M., Suwindia, I. G., & Winangun, I. M. A. (2024). Literacy transformation in the digital era: challenges and opportunities for the younger generation. *Education and Social Sciences Review*, 5(2), 156–165.
- Syahrani, R. A., & Boer, K. M. (2022). Students' Digital Literacy Ability in Receiving Hoax News. *SOURCE: Journal of Communication Sciences*, 132–150.
<http://jurnal.utu.ac.id/jsourc/article/view/5569>
- Triantoro, D. A., Nafisah, R., Husna, F., Syam, F., Syahrani, R. A., Fitri, A., Asgha, A. Y., Nova, M. A., & Ridha, I. (2023). Enhancing disaster communication literacy based on traditional games among West Aceh students. *Transformation: Journal of Community Service*, 19(2), 330–343.