

## A Comparative Study of Digital Literacy Abilities of Junior High School Students in Urban and Rural Areas

### *Studi Komparatif Kemampuan Literasi Digital Siswa Sekolah Menengah Pertama di Wilayah Perkotaan dan Pedesaan*

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#### ABSTRACT

**Background:** Literacy is important for students as the next generation to contribute to building the future of the nation. Along with technological developments, literacy can be done digitally. Demographic conditions make a difference in the use of digital technology.

**Objective:** This study aims to examine the difference in digital literacy abilities of adolescents based on school location.

**Methods:** This study used a comparative quantitative design with a cross-sectional approach involving 320 respondents of junior high school students aged 12-14 years who were selected using cluster sampling techniques. Adolescent literacy skills are measured using digital literacy instruments. The instrument used has been proven to be valid and reliable. The data was analysed by the Mann-Whitney test.

**Results:** The results of the study showed that there were differences in digital literacy skills between junior high school students in urban and rural schools. Based on the components that make it up, only the ability to choose and obtain information makes a difference.

**Conclusion:** Interventions and policies are needed to improve digital literacy skills in both urban and rural areas.

**Keywords:** Digital literacy; Students; Schools; Urban; Rural

#### ABSTRAK

**Latar Belakang:** Literasi penting bagi siswa sebagai generasi penerus untuk berkontribusi membangun masa depan bangsa. Seiring dengan perkembangan teknologi, literasi dapat dilakukan secara digital. Kondisi demografis turut memengaruhi pemanfaatan teknologi digital.

**Tujuan:** Penelitian ini bertujuan untuk menganalisis perbedaan kemampuan literasi digital remaja di lokasi sekolah.

**Metode:** Penelitian ini menggunakan desain kuantitatif komparatif dengan pendekatan potong lintang yang melibatkan 320 responden siswa SMP berusia 12-14 tahun yang dipilih menggunakan teknik cluster sampling. Keterampilan literasi remaja diukur menggunakan instrumen literasi digital. Instrumen ini sudah diuji validitas dan reliabilitasnya. Data dianalisis dengan uji Mann-Whitney.

**Hasil:** Hasil penelitian menunjukkan adanya perbedaan keterampilan literasi digital antara siswa SMP di perkotaan dan pedesaan. Berdasarkan komponen penyusunnya, hanya kemampuan memilih dan memperoleh informasi yang membedakannya.

**Kesimpulan:** Diperlukan intervensi dan kebijakan untuk meningkatkan kemampuan literasi digital baik di wilayah perkotaan maupun pedesaan.

**Kata Kunci:** Literasi digital; siswa; sekolah; perkotaan; pedesaan

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Submitted 03 November 2025

Revised 24 April 2026

Accepted 10 May 2026

<https://jurnal.ugm.ac.id/jkesvo>  
Published online May 31, 2026

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## INTRODUCTION

Junior high school students are included in the adolescent age group, which is the next generation that determines the future of a nation. Readiness to become a resilient generation is formed by building good knowledge. Students who are currently pursuing junior high school education were born and grew up in the midst of the rapid development of digital technology (Jiao et al., 2023).

The results of the 2022 Indonesian Internet Implementation Association survey show that the age group that uses the internet the most is 13-18 years old, which is 99.16%. The majority of users access the internet using *smartphones*. Adolescents in the digital age use *smartphones* to build social networks, communicate with friends and parents, seek information, and play *online games* (García-Santillán & Espinosa-Ramos, 2021). The peculiarities possessed by the generation in this digital era have an influence on the way they learn and seek knowledge.

Knowledge can be obtained through literacy activities. It should be understood that literacy is not only the process of acquiring knowledge but also interpreting and applying knowledge (Jiao et al., 2023). Students can do literacy by reading from written reference sources or using digital media. Digital literacy includes eight components, namely, the ability to use technology, creativity, collaboration, communication, the ability to search and choose information, critical thinking and evaluation, social and cultural understanding, and the security of using digital technology (Hague & Payton, 2010).

Digital literacy is in accordance with the character of this generation of students, namely proficient in using technology and happy to search for health information digitally (Jiao et al., 2023). Students' penchant for using digital devices can also provide benefits on cognitive

development, such as faster and more accurate attention, higher spatial resolution in visual processing, greater spatial skills, more effective filtering out irrelevant information, more flexible problem-solving, and greater creativity development (Lérida-Ayala et al., 2023).

Students' ability to use digital technology can be used for positive activities such as digital literacy. Students with good digital literacy skills will be able to find information more quickly, distinguish between information that can be trusted and that which cannot, be able to express opinions in online forums, and still pay attention to security aspects. Students' creativity and critical thinking skills also increase through digital literacy.

Students in both urban and rural areas need to have strong literacy skills because literacy is a fundamental foundation for critical thinking, understanding information, and improving quality of life in the fast-paced modern era. Although the geographical contexts are different, both urban and rural students face similar challenges in terms of the need to analyze information, distinguish facts from opinions, and use technology productively.

Schools in Indonesia have literacy programs as stated in the policy of the Minister of Education and Culture Number 23 of 2015 concerning the formation of ethics. The school has implemented a strategy by providing time for students to do literacy for 15-25 minutes before learning activities (Anggraeni, 2019). This policy has been in place for a long time, but the literacy level of the Indonesian population is still low, ranking 62nd out of 70 countries (Rahmadanita, 2022). This condition is a problem that needs to be solved; therefore, it is necessary to know the development of literacy skills in adolescents, especially literacy with the use of digital technology.

Digital literacy is an important issue in student education in Indonesia. Studies on digital literacy have been carried out with various focuses. First, research on strengthening digital literacy in formal education highlights the integration of digital literacy in school curricula and national strategies to improve the digital competence of teachers and students (Novitasari et al., 2023; Afrina et al., 2024). Second, research highlighting the social and ethical dimensions of digital emphasizes the importance of character building, moral responsibility, and active participation of adolescents as critical and ethical digital citizens (Fadilla, 2025). Third, studies that link digital literacy with health aspects affirm the effectiveness of digital media in increasing adolescent students' awareness of mental health and healthy living behaviors (Yana et al., 2024; Fitriani & Djannah, 2025; Savaş et al., 2025; Tayyem et al., 2025), thus improving the physical and mental health of individuals (Yang et al., 2025). The various directions of the research show that digital literacy has become a widely developed field of study, but there is a research gap regarding the digital literacy gap between students in urban and rural schools.

Preliminary data obtained from four junior high schools in urban and rural areas showed that almost all students already have smartphones and personal social media accounts, with a fairly high intensity of use, between 3 and 10 hours per day. Students use these devices to communicate, find lesson information, and establish social relationships. On the other hand, interviews with teachers revealed that literacy activities in schools have been implemented for a long time, generally through a 15-minute reading program at the beginning of learning, although most of them are still limited to printed book-based literacy. This fact shows that there is a gap between the high intensity of digital technology use by students and the

traditional literacy approach in schools. This condition raises important questions about how students' digital literacy skills actually develop in two different social contexts, namely urban and rural schools.

This research is presented as a response to the limitations of previous studies that have not comprehensively compared the digital literacy skills of junior high school students in urban and rural areas. By utilizing empirical data from junior high school students in Banyumas Regency, this study aims to identify and analyze differences in the digital literacy abilities of junior high school students based on geographical context.

In particular, this paper focuses on how junior high school students in urban and rural areas utilize digital technology to support learning, communication, and developing digital literacy skills that include technical, cognitive, social, and digital security aspects. The final goal of this research is to provide an academic contribution in the form of a deeper understanding of the variations in digital literacy between regions, as well as to provide practical recommendations for the formulation of education policies that are more adaptive, inclusive, and relevant to the needs of students in the digital era.

## MATERIALS AND METHODS

### A. Research Design

The study used a comparative quantitative design with a cross-sectional approach.

### B. Population and Sample

The research was conducted in 4 junior high schools, 2 schools in urban areas and 2 schools in rural areas. Schools were selected using cluster random sampling techniques. The school that is the sample of this study is a junior high school under the auspices of the Banyumas Regency Education Office and is willing to participate in the research. The selection of

adolescent samples was carried out by the proportional random sampling technique.

The criteria for adolescent inclusion include adolescents aged 12-14 years, active status as junior high school students in the Banyumas Regency area, willingness to be respondents, and obtaining permission from parents/guardians. The criteria for exclusion of adolescents include active students who are participating in school activities so that it is not possible to be involved in research, not being at school at the time of data collection, being indicated as a child with special needs by BK teachers, and not having a smartphone. The number of samples was determined by the Slovin Formula, and a sample of 320 adolescents was obtained.

### C. Research Instruments

Literacy ability is measured using digital literacy instruments. This instrument consists of 8 literacy components, namely: functional skills, creativity, collaboration, communication, the ability to obtain and choose information, critical thinking and evaluation, social and cultural understanding, and E-safety. Instruments are available in Indonesian and are generally accessible. This instrument has been proven valid based on the results of a re-validity test on 60 junior high school students in Banyumas Regency who are in urban and rural areas. The results of the validity test showed that 20 items were valid, with a calculated  $r$  value in the range of 0.347–0.670. The results of the reliability test obtained a Cronbach's alpha value of 0.886.

### D. Data Analysis Techniques

The Mann-Whitney comparative test was used to compare the digital literacy abilities of adolescents in urban and rural schools on abnormally distributed data.

### E. Statistical Analysis

Ethical clearance was granted by the Research Ethics Committee of the Faculty of Nursing, Universitas Indonesia, number KET-158/UN2.F12.D1.2.1/PPM.00.02/2025.

## RESULT AND DISCUSSION

### A. Result

This study was conducted on 320 adolescents in four junior high schools in Banyumas Regency consisting of 160 students from 2 junior high schools in urban areas and 160 students from 2 junior high schools in rural areas. The following are the results of the analysis of adolescent literacy skills in Banyumas Regency.

**Table 1. Comparison of Digital Literacy Skills of Junior High School Students in Urban and Rural Areas in 2025 (N=320)**

| Digital literacy skills | School location |      |       |      | P value      |
|-------------------------|-----------------|------|-------|------|--------------|
|                         | Urban           |      | Rural |      |              |
|                         | n               | (%)  | n     | (%)  |              |
| Good                    | 89              | 55.6 | 68    | 42.5 | <b>0.019</b> |
| Poor                    | 71              | 44.4 | 92    | 57.5 |              |
| Total                   | 160             | 100  | 160   | 100  |              |

As shown in Table 1, there was a significant difference in the digital literacy ability of adolescents who went to school in urban areas and adolescents who went to school in rural areas with a  $p$  value of 0.019.

**Table 2. Comparison of Digital Literacy Skills Components of Junior High School Students in Urban and Rural Areas in 2025 (N=320)**

| No | Components of digital literacy skills | School location |      |       |      | P value |
|----|---------------------------------------|-----------------|------|-------|------|---------|
|    |                                       | Urban           |      | Rural |      |         |
|    |                                       | n               | (%)  | n     | (%)  |         |
| 1  | Functional ability                    |                 |      |       |      |         |
|    | Good                                  | 51              | 31.9 | 39    | 24.4 | 0.136   |
|    | Poor                                  | 109             | 68.1 | 121   | 75.6 |         |
| 2  | Creativity ability                    |                 |      |       |      |         |
|    | Good                                  | 107             | 66.9 | 91    | 56.9 | 0.066   |
|    | Poor                                  | 53              | 33.1 | 69    | 43.1 |         |
| 3  | Collaboration capabilities            |                 |      |       |      |         |
|    | Good                                  | 62              | 38.8 | 50    | 31.3 | 0.160   |
|    | Poor                                  | 98              | 61.3 | 110   | 68.7 |         |
| 4  | Communication skills                  |                 |      |       |      |         |
|    | Good                                  | 123             | 76.9 | 115   | 71.9 | 0.306   |
|    | Poor                                  | 37              | 23.1 | 45    | 28.1 |         |
| 5  | Information Ability                   |                 |      |       |      |         |
|    | Good                                  | 100             | 62.5 | 82    | 51.3 | 0.042   |
|    | Poor                                  | 60              | 37.5 | 78    | 48.7 |         |
| 6  | Critical thinking skills              |                 |      |       |      |         |
|    | Good                                  | 86              | 53.7 | 70    | 43.7 | 0.074   |
|    | Poor                                  | 74              | 46.3 | 90    | 56.3 |         |
| 7  | Socio-cultural skills                 |                 |      |       |      |         |
|    | Good                                  | 100             | 62.5 | 108   | 67.5 | 0.348   |
|    | Poor                                  | 60              | 37.5 | 52    | 32.5 |         |
| 8  | E-safety capabilities                 |                 |      |       |      |         |
|    | Good                                  | 94              | 58.7 | 83    | 51.9 | 0.216   |
|    | Poor                                  | 66              | 41.3 | 77    | 48.1 |         |

As shown in Table 2, comparative analysis of the digital literacy ability components showed that only information skills had a p value of  $< 0.05$ , which means that adolescents in urban and rural schools only differ in information skills. Based on the crosstab results, adolescents in urban schools have a greater percentage of good ability in almost all components. Adolescents in rural schools have a greater percentage of sociocultural abilities. The most mastered abilities are communication and creativity, while the least mastered

abilities are functional and collaborative skills.

## B. Discussion

### Differences in Digital Literacy Skills in General

The results showed that overall there was a significant difference in digital literacy skills between junior high school teenagers who attended school in urban and rural areas, with a p value of 0.019. These findings are in line with the theory of the digital divide put forward by [Van Dijk \(2006\)](#), which explains that the digital

divide includes not only access to technology (first-level digital divide), but also differences in skills and use of technology (second-level digital divide). In this context, students in urban areas generally have access to better digital infrastructure, a more stable internet network, and a learning environment that is more supportive of digital literacy, so their ability level tends to be higher than students in rural areas. Previous research has also shown that there is a significant gap in digital literacy between students in urban and rural Central Java, especially in terms of the use of online learning resources and information retrieval skills (Sari & Ahmad, 2021).

The tabulation results show that the number of adolescents who have good digital literacy skills in urban areas is not much different from those who lack such skills. These results support previous research that literacy ability is relatively moderate (Darabi et al., 2025). This study also shows that the difference is not too wide, which indicates a new equity factor in the Indonesian education system. One of the key factors is the zoning system policy in student admissions. This system changes the pattern of distribution of students' abilities, which was previously concentrated in superior urban schools, to be more evenly distributed in various regions (Kementerian Pendidikan dan Kebudayaan, 2017). Thus, rural schools now also accommodate students with varying basic abilities, so that the digital literacy gap is relatively smaller than in the era before the zoning policy.

### Analysis based on digital literacy components

The results of the analysis of the digital literacy component showed that only information skills had significant differences between urban and rural areas ( $p = 0.042$ ). Students in urban schools are superior in the skills to search, evaluate, and use digital information

(62.5% are well able) compared to students in rural areas (51.3%). Although these findings are different from those produced in the research of Simanjuntak et al. (2025), namely that information ability is the digital literacy ability with the lowest score, it is consistent with the digital literacy framework, which consists of three main dimensions: technical, cognitive, and socio-emotional (Ng, 2006). Information ability is in the cognitive dimension, which is strongly influenced by access to extensive learning resources, internet speed, and self-exploratory experiences, conditions that are more widely available in urban areas. These results are reinforced by previous research that the school environment and the availability of digital resources play an important role in shaping students' information skills (Hatlevik et al., 2015). Similarly, research by Livingstone (2018) confirms that differences in information skills are a form of second-level digital divide that is often more difficult to overcome than the technology access gap itself.

Meanwhile, for other components such as communication, creativity, collaboration, critical thinking, socio-culture, and e-safety, the difference between urban and rural students was not significant. The components with the highest mastery levels in both groups were communication and creativity, while the components with the lowest mastery were functional and collaboration. This phenomenon reflects the global trend that the generation of teenagers called digital natives (Prensky, 2001) tends to quickly master aspects of social media use and digital creative expression but is still weak in basic technical skills (e.g., file management, data processing) and online collaborative work. In Indonesia, a similar phenomenon was found by Handayani et al. (2022), who showed that students use the internet more for communication and

entertainment than for knowledge exploration or productive collaboration.

The findings of relative equality in several components of digital literacy can be explained by changes in the education system during the COVID-19 pandemic. The sudden shift from offline to online learning accelerated the mass adoption of technology across Indonesia, including rural areas. This is in line with previous findings that noted that the pandemic narrowed the gap between device and network access because all students, regardless of economic or regional background, were required to use smartphones or digital devices to study (Syafutra et al., 2022).

Although offline learning has returned, habits and exposure to digital technologies during the pandemic have become embedded in students' learning practices, expanding their basic digital skills. Although there is no significant difference, this study shows that good ability is still low in half of the digital literacy components, both in urban and rural areas. The implication is that the strategy to increase digital literacy is not enough to focus only on infrastructure development or equitable access to technology. Digital literacy training programs need to be directed at improving

functional and collaborative skills, strengthening teachers' capacity in integrating learning technologies, and mentoring groups of students with low abilities so that internal gaps can be narrowed.

## CONCLUSION

This study found that there are differences in digital literacy skills in junior high school students in urban and rural areas, but these differences only occur in the ability to choose and obtain information. More specifically, based on the cross-tabulation scores, it can be seen that the percentage of good abilities achieved by junior high school students in urban and rural areas is still relatively low. Communication is the ability with the highest achievements, followed by creativity and socio-cultural understanding. Functional and collaborative skills are the skills that adolescents rarely master.

## RECOMMENDATION

These results reinforce the findings of previous research as a basis for paying more serious attention to efforts to improve the literacy skills of junior high school students both in urban and rural areas.

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