Challenges of Digital Literacy among Urban and Rural Pre-University Students

Hamid, Hamidah[1], Roslyza bt Abd. Ruahim[2], and Siti Hajar bt Abdullah[3]

[1,2,3] Kementerian Pendidikan Malaysia, Putrajaya, Malaysia
[2] hamidahhamid1979@gmail.com

Abstract. The digital transformation is a critical foundation for pre-university students as they navigate educational and career challenges in this new era. However, there is a significant disparity in digital literacy between pre-university students in urban and rural areas. This study investigates the primary challenges students face in both contexts, including access to technology, levels of digital literacy proficiency, the quality of existing education, motivation towards technology, and digital ethics. A substantial gap exists between rural students and their urban counterparts. The objective of this study is to identify and analyze the key challenges in achieving optimal digital literacy competence. The focus is on the factors influencing these challenges. Descriptive analysis provides an in-depth understanding of the digital literacy challenges among pre-university students in urban and rural areas. Education policymakers can use the findings to develop high-impact strategies and initiatives to bridge the digital divide between these two groups of students.

Keywords: Digital literacy, pre-university students, technology access, quality of education, digital divide.

1 Introduction

The transformation of the digital world has had a significant impact on the educational landscape in Malaysia. Hasin said, advancing the current education system places technology as a cornerstone [1]. In this dynamic era, pre-university students, whether in urban or rural areas, must be prepared to face the challenges of the digital age. This is not only due to educational transformation but also because of the rapid progress in digitalization that aligns with the demands and needs in various aspects of education, steering towards the career development of pre-university students. The rapid and swift evolution of digital technology has been supported by human ingenuity and economic advancement [2].

In this rapidly advancing digital transformation era, digital literacy has become crucial in education and career development. Pre-university students, as future leaders, must be equipped with adequate digital literacy skills to compete in a high-tech global world. Bilal, said that, classroom learning is no longer the primary choice in the learning process [3]. Various interactive learning mediums are now available to assist students in accessing and delivering educational content online through Online Learning Platforms. These platforms allow students to access learning modules,

Z. Rarastesa et al. (eds.), *Proceedings of the Third International Conference on Communication, Language, Literature, and Culture (ICCoLLiC 2024)*, Advances in Social Science, Education and Humanities Research 883,
https://doi.org/10.2991/978-2-38476-321-4_31

participate in discussion forums, and submit assignments online. Digital content such as Interactive Modules, E-Books, and Online Reading Materials can enhance the learning process, making it more engaging and effective. Similarly, application services, social media, and immersive technology enable more flexible learning, collaboration, and simulation in relevant subjects. However, the significant gap in digital literacy achievement between students in urban and rural areas means that technology cannot be utilized optimally. This raises important questions about how our education system strives to provide equal opportunities to all students, regardless of their geographic background.

This study aims to investigate the main challenges faced by pre-university students in urban and rural areas in achieving optimal and holistic digital literacy. These challenges include access to technology, the level of digital literacy proficiency, existing education quality, motivation towards technology use, and digital ethics. Access to technology is a critical issue, where rural students face infrastructure deficits that should ideally support the application of technology in their educational tasks. This, in turn, impacts their level of digital literacy compared to urban students who have better access to technological resources. Maon said, highlight the inability of rural students to create digital content and solve digital problems [4]. Furthermore, motivation and attitudes towards technology use also play a crucial role in shaping students' digital literacy levels. These factors and challenges provide a comprehensive view of the digital divide between urban and rural students. Therefore, this study will offer an in-depth analysis of the factors influencing digital literacy among pre-university students. The findings are expected to assist education policymakers in devising more effective strategies and initiatives to bridge the digital gap and ensure that all students have equal opportunities to achieve a robust level of digital excellence.

Thus, it is essential for pre-university students in both urban and rural areas to master this field, despite facing various challenges. Previous studies have shown a significant difference in digital literacy levels between students living in urban and rural areas due to factors such as access to technology, education quality, and infrastructure support.

2 Research Problem

The research problem highlights a significant gap in digital literacy between pre-university students in urban and rural areas. Despite the broad evolution of digital transformation and its fundamental role in educational and career success, students in rural areas face greater challenges in accessing technology, achieving sufficient digital literacy, and receiving quality education compared to their urban counterparts. From a broader perspective, the critical demand for digital literacy in higher education clearly prioritizes stakeholder attention [5].

Educational equity and the ability of all students to compete in an increasingly high-tech world are influenced by differences in digital literacy levels between pre-

university students in urban and rural areas, raising deep concerns in education. Although digital transformations like e-learning, AI tools, and other interactive learning methods offer significant opportunities for learning and career development, students in rural areas often lack sufficient access to the necessary technology. The level of digital literacy among students shows significant geographic disparities, with urban pre-university students having broader exposure to digital technology applications compared to their rural peers. This disparity is due to better access to technological resources and more educational opportunities in urban areas. Conversely, rural students may face resource shortages and challenges in obtaining equal exposure to digital technology, which can affect their digital literacy proficiency.

Additionally, motivation and attitudes towards technology play a crucial role in determining students' digital literacy levels. Digital literacy skills, learning tools, and culture are related to student motivation [6]. Students who are less motivated or have low interest in technology may not fully utilize available opportunities to enhance their digital skills. This indicates that personal motivation and attitudes towards technology affect technology use and students' willingness to develop the digital skills needed to succeed in future educational and professional environments. In rural areas, limited access exacerbates this issue. Without consistent digital literacy, students' competencies will be impaired in responding to the current interactive technological evolution. This situation poses a significant problem as it prevents rural students from achieving comparable digital literacy fluency. These limitations constrain their academic potential and act as barriers to competitive opportunities in the job market. A lack of awareness and encouragement to use technology in learning can result in an even larger digital literacy gap. Therefore, this study aims to identify and analyze the key challenges in digital literacy among pre-university students in urban and rural areas, with the hope that stakeholders can outline more effective interventions to bridge the digital divide between these two groups of students.

3 Research Objectives

- Identify the Issues Faced by Pre-University Students in Urban and Rural Areas in Mastering Digital Literacy.

- Analyze the Key Challenges Encountered by Students in Achieving Digital Literacy Competency.

4 Literature Review

The use of materials through digital media is more convenient, faster, and effective compared to traditional methods. In digital media, materials, especially teaching and

learning resources, can be downloaded in various formats, colors, and with engaging illustrations such as 3D images, charts, and maps of different types and shapes, as well as easily readable fonts. Furthermore, knowledge gained through this media does not require a specific location and can be accessed anywhere as long as there is a good internet connection.

According to Siaw, several factors influence the use of digital media in teaching and learning activities [7]. There are many factors and issues to discuss when considering digital transformation. In this study, the researcher focuses on the factors and challenges faced by pre-university students in urban and rural areas. Dorasamy, who studied the application of digital media among Tamil language teachers in primary schools, also discuss the level of digital media application based on teachers' knowledge, skills, and attitudes [8].

Rohani have listed teacher skills, internet facilities, teacher knowledge, teacher attitudes, and administrative support as determinants of video usage [9]. However, in the context of this study, the researcher focuses more on the challenges experienced by students, specifically pre-university students. The study aims to compare the level of digital transformation proficiency between urban and rural students.

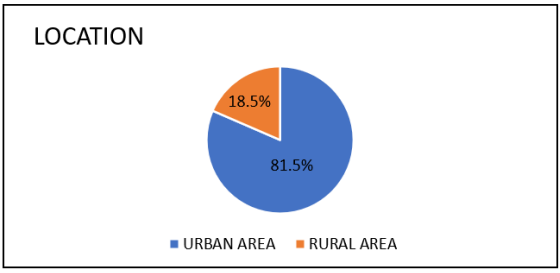
5 Research Methodology

This study employs a descriptive analysis method. The researcher prepared and distributed a questionnaire link to respondents using the Google Forms platform, which allows for systematic and structured data collection. The questionnaire is designed to gather data on respondents' demographic information. It includes several key dimensions, such as access to technology, level of digital literacy proficiency, existing quality of education, students' motivation towards technology, and digital ethics among pre-university students in urban and rural areas.

6 Findings

This study investigates the main challenges faced by pre-university students in urban and rural areas. The findings of this study are derived from pre-university respondents representing urban areas from Kolej Tingkatan Enam Tuanku Muhriz, Negeri Sembilan, and rural areas from SMK Ayer Hitam, Kedah. The respondents' ages range from approximately 18 to 20 years.

The study investigates the primary challenges pre-university students face in urban and rural areas. The findings are based on data from pre-university respondents representing urban areas from Kolej Tingkatan Enam Tuanku Muhriz, Negeri Sembilan, and rural areas from SMK Ayer Hitam, Kedah. The respondents are aged between approximately 18 and 20 years.



This study employed various questioning techniques to gather comprehensive and accurate data. Likert scale questions were used to assess respondents' opinions on specific statements by rating them on a scale from "very unskilled" to "very skilled." This approach allowed the study to collect data on skill levels related to the questions. Additionally, open-ended questions were used to obtain specific or detailed answers from respondents, allowing them to provide more nuanced and personal responses. Finally, multiple-choice questions were applied to gather quantitative information by allowing respondents to select one or more answers from a list of options. The questionnaire was designed using Bloom's Taxonomy to ensure questions covered various cognitive levels, from basic understanding to analysis and critical evaluation.

The questions were organized according to Bloom's Taxonomy, including:

6.1 **Knowledge and Understanding**: Questions that measure the extent to which students recognize and understand digital literacy concepts.

6.2 **Application**: Questions that assess students' ability to apply digital literacy concepts in real-world situations.

6.3 **Analysis**: Questions requiring students to analyze technology-related issues and evaluate their impact on learning.

6.4 **Evaluation**: Questions that require students to make critical judgments about the use of technology in education.

Respondents were invited to participate in the survey through a link distributed via the school's official WhatsApp application and social media to ensure broad engagement from the selected schools.

7 Discussion

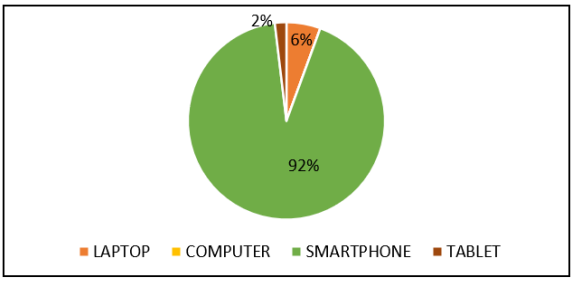
Table 1 shows the statistics of respondents, with a total of 163 pre-university students from both urban and rural areas providing responses.

7.1 Respondents Demographic Information

Table 1 : Respondents Demographic Information

	SEX	AGE	LOCATION
Valid	163	163	163
Missing	0	0	0

7.2 Access to Technology Facilities



Regarding device usage, 92.6% of respondents have chosen smartphones as their primary medium due to their portability and flexibility in functionality. Meanwhile, 5.6% use laptops, and 1.8% use tablets.

Table 2 : Access to Technology Facilities

	N	Minimum	Maximum	Mean	Standard Deviation
1. What is the most commonly used device by students to access technology?	163	1	3	1.96	.270
2. What is the most frequently used internet connection in urban areas?	163	1	4	1.72	.491
3. Why is internet access important for students?	163	1	4	2.02	.260
4. What are the main reasons rural students face challenges in accessing technology?	163	1	4	2.79	.859
5. How can students leverage public libraries to improve access to technology?	163	1	3	1.93	.378
6. What measures can schools take to help students gain access to technology?	163	1	4	1.99	.283
7. What are the main factors contributing to the differences in access to technology between urban and rural students?	163	1	4	2.26	.784

8. How does the lack of access to technology affect students' daily lives?	163	1	4	1.89	.923
9. How can collaboration between government, schools, and communities improve technology access for rural students?	163	1	3	2.02	.698
10. What are the best steps to reduce the digital divide between urban and rural students?	163	1	4	1.75	1.008
Valid N (listwise)	163				

Value N refers to the total number of respondents, which is 163. Each statement evaluated was used to calculate minimum, maximum, mean, and standard deviation statistics. These calculations are important for determining the reliability of the study results. A larger sample size typically provides more stable and reliable results. The consistency of the Rating Scale shows a consistent maximum value of 4 for all statements, indicating that the rating scale is uniform, facilitating comparisons between different statements. The range of minimum and maximum values shows variation in participants' responses. A higher minimum value than 1 indicates that all respondents rated no statement as irrelevant or unimportant.

The following is the analysis of technology access among respondents based on Table 2. This data highlights various aspects related to technology access experienced by 163 pre-university students from urban and rural areas. Firstly, the device most commonly used by students to access technology shows an average response of 1.96 with a standard deviation of 0.270. This indicates that most students use the same type of device with little variation in their device choices. For internet connectivity in urban areas, the average response is 1.72 with a standard deviation of 0.491, indicating a preference for a particular type of internet connection, with moderate variation in connection choices.

Next, when evaluating the importance of internet access, the average response is 2.02 with a standard deviation of 0.260, indicating that respondents generally recognize the importance of internet access with fairly consistent views. However, the main challenges faced by rural students in accessing technology are reflected by an average response of 2.79 and a standard deviation of 0.859. This suggests that there are significant challenges in rural areas, with a wider variation in views among respondents. Regarding the utilization of public libraries, the average response is 1.93 with a standard deviation of 0.378. This suggests that students agree that public libraries can help enhance access to technology with a consistent perspective. The steps that schools can take to help students access technology have an average response of 1.99 and a standard deviation of 0.283, indicating a general consensus among students on the role of schools. Views on factors contributing to the disparity in technology access between urban and rural students have an average of 2.26 and a standard deviation of 0.784, showing diverse opinions on contributing factors. The

lack of access to technology impacts students' daily lives with an average response of 1.89 and a standard deviation of 0.923, indicating varied experiences among students.

Finally, regarding collaboration between the government, schools, and communities to improve technology access for rural students, the average response is 2.02 with a standard deviation of 0.698. This reflects moderate confidence in such collaboration, although there is variation in views. Opinions on the best steps to reduce the digital divide have an average of 1.75 with a standard deviation of 1.008, showing diverse views on effective strategies. Overall, this data highlights the need for tailored solutions to address the challenges and opportunities related to technology access, particularly considering the geographical differences between urban and rural students.

7.3 Level of Digital Literacy Proficiency

Table 3 : Level of Digital Literacy Proficiency

	N	Minimum	Maximum	Mean	Standard Deviation
1. To what extent are you familiar with the basic use of computer software such as Microsoft Word or Google Docs?	163	2	4	3.07	.371
2. To what extent are you knowledgeable about the basic functions and features of the devices you use, whether in urban or rural areas?	163	3	4	3.20	.398
3. To what extent do you understand how to use the internet to find accurate and reliable information?	163	3	4	3.20	.398
4. To what extent do you understand the importance of protecting your personal information online?	163	2	4	3.42	.508
5. To what extent are you able to use software such as Microsoft PowerPoint or Google Slides to create presentations?	163	1	4	3.10	.474
6. To what extent are you able to use photo or video editing software for school assignments?	163	1	4	3.02	.509
7. To what extent can you analyze the credibility and reliability of online information sources?	163	2	4	3.03	.303
8. To what extent can you identify appropriate software or applications for specific tasks?	163	2	4	3.12	.381

9. To what extent can you use various digital tools and software to complete projects or assignments?	163	2	4	3.09	.398
10. To what extent do you assess your ability to troubleshoot technical issues you encounter while using software or digital devices?	163	1	4	2.97	.422
Valid N (listwise)	163				

Based on Table 3, the analysis of digital literacy proficiency among 163 pre-university students provides a comprehensive view of how well students master various aspects of digital literacy. For basic knowledge of using computer software like Microsoft Word or Google Docs, the average response is 3.07 with a standard deviation of 0.371. This indicates that most students have a good basic understanding of this software, with minimal variation in proficiency levels.

Regarding knowledge of the basic functions and features of the devices used, students show an average response of 3.20 with a standard deviation of 0.398, indicating a good and relatively consistent level of proficiency among students. Additionally, understanding how to use the internet to find reliable and trustworthy information also records an average of 3.20 with a standard deviation of 0.398, showing that students generally understand online information searching.

Awareness of the importance of protecting personal information online is higher, with an average response of 3.42 and a standard deviation of 0.508, indicating a deeper awareness in online security aspects. The use of software such as Microsoft PowerPoint or Google Slides for creating presentations has an average of 3.10 with a standard deviation of 0.474, suggesting that students are generally capable of using presentation software well. However, photo or video editing software for school assignments shows a slight decline in proficiency, with an average response of 3.02 and a standard deviation of 0.509, indicating greater variability in these skills.

In terms of analyzing the credibility and reliability of online information sources, students recorded an average of 3.03 with a standard deviation of 0.303, reflecting good ability with minor variation. The ability to identify appropriate software or applications for specific tasks is relatively consistent with an average of 3.12 and a standard deviation of 0.381. The ability to use various digital tools and software to complete projects or assignments shows an average of 3.09 with a standard deviation of 0.398, indicating good skills among students.

However, the assessment of problem-solving ability shows some weaknesses, with an average response of 2.97 and a standard deviation of 0.422, indicating that students might need additional support in resolving technical issues encountered.

Overall, this data suggests that pre-university students have a good level of digital literacy in most aspects but there is room for improvement, particularly in editing skills and problem-solving. This highlights the need for a more holistic approach to enhancing digital literacy among students.

7.4 Existing Quality of Education

Table 4 : Existing Quality of Education

	N	Minimum	Maximum	Mean	Standard Deviation
1. The technology facilities provided by my school are sufficient to support digital learning.	163	1	4	3.02	.503
2. The digital equipment, such as computers or other devices, provided at my school meets the needs of learning.	163	1	4	2.93	.583
3. The use of technology at school is effective in enhancing my learning.	163	1	4	3.15	.461
4. Access to technology at school positively impacts my learning.	163	2	4	3.19	.438
5. I frequently use technology to complete my school assignments.	163	1	4	3.34	.549
6. I use the internet to find information related to my studies.	163	2	4	3.45	.524
7. I find that the hardware provided at school allows me to improve my technology skills.	163	1	4	3.10	.425
8. I believe that the use of technology in my school's learning environment can be further enhanced.	163	2	4	3.28	.465
9. The quality of digital education at school is adequate to support my learning.	163	1	4	3.10	.439
10. The programs or initiatives implemented at school to	163	1	4	3.15	.466

improve digital literacy are effective.					
Valid N (listwise)	163				

Based on the analysis of Table 4 regarding the existing quality of education, pre-university students' assessment of technology facilities and their use in schools reveals several key perspectives. Students gave an average rating of 3.02 with a standard deviation of 0.503 for the technological facilities provided by the school, indicating that although the facilities are considered adequate, they may not be sufficient to fully support their digital learning. Meanwhile, the assessment of the digital equipment provided shows an average of 2.93 with a standard deviation of 0.583, suggesting student dissatisfaction with the adequacy of the equipment in meeting their learning needs. However, the technology used in learning is considered effective with an average rating of 3.15 and a standard deviation of 0.461, although there is still room for improvement in its effectiveness. Students indicated an average rating of 3.19 with a standard deviation of 0.438 regarding the positive influence of access to technology on their learning. The frequency of technology use for school assignments is high, with an average rating of 3.34 and a standard deviation of 0.549. This rating suggests that students consistently use technology in completing their tasks. The use of the internet to search for information related to lessons is rated with an average of 3.45 and a standard deviation of 0.524, indicating a good level of digital literacy among students. The hardware provided by the school received an average rating of 3.10 with a standard deviation of 0.425, showing good support in enhancing students' technological skills, although there is room for improvement.

Students believe that the use of technology in learning can be improved with an average rating of 3.28 and a standard deviation of 0.465. The quality of digital education in schools is considered adequate with an average rating of 3.10 and a standard deviation of 0.439, but it does not fully meet the students' needs. The digital literacy program implemented in schools is deemed effective with an average rating of 3.15 and a standard deviation of 0.466. Overall, this analysis indicates that although there is progress in the use of technology, there are still several aspects that require improvement to better meet the digital learning needs of students. In general, the analysis shows that students feel the quality of education and technological facilities at their school is adequate, but there is still room for improvement, especially in providing sufficient equipment and enhancing initiatives for digital literacy. Students also demonstrate frequent use of technology and the internet in their learning, reflecting a good level of digital literacy. However, there is potential to further enhance the use of technology in learning to achieve more optimal outcomes.

7.5 Student Motivation Towards Technology

Table 5 : Student Motivation Towards Technology

	N	Minimum	Maximum	Mean	Standard Deviation
1. I have sufficient knowledge about the use of digital technology for learning.	163	2	4	3.12	.391
2. I am aware of the benefits of using digital technology in learning.	163	1	4	3.29	.493
3. I understand how digital technology can help improve my academic performance.	163	1	4	3.25	.489
4. I can explain how digital technology can be used in the learning process.	163	3	4	3.13	.336
5. I regularly use digital technology to complete school assignments.	163	2	4	3.18	.434
6. I am looking for new ways to use digital technology to assist my learning.	163	2	4	3.20	.428
7. I analyze the effectiveness of using digital technology in aiding my learning.	163	1	4	3.17	.448
8. I first analyze the advantages and disadvantages of using digital technology in my learning before using it.	163	2	4	3.13	.460
9. I suggest the use of digital technology that I know to my friends to help them learn.	163	3	4	3.26	.439
10. I feel enthusiastic about learning when it involves the use of digital technology.	163	1	4	3.26	.542
Valid N (listwise)	163				

Based on Table 5, the analysis of student motivation towards technology highlights several important aspects of how students interact with and utilize digital technology in their learning. The assessment of students' knowledge about the use of digital technology shows an average of 3.12 with a standard deviation of 0.391, indicating that students feel they have sufficient knowledge of digital technology for learning, although there is room for improvement. Students gave an average rating of 3.29 with a standard deviation of 0.493 regarding their awareness of the benefits of using digital technology in learning. This suggests that they understand the advantages of technology in the learning process. The assessment of understanding how technology can enhance academic performance

shows an average of 3.25 and a standard deviation of 0.489, indicating that students believe digital technology can help them improve academic performance. Students recorded an average rating of 3.13 with a standard deviation of 0.336 regarding their ability to explain the use of technology in learning, demonstrating a good level of knowledge in this area. The regular use of technology to complete school assignments is rated with an average of 3.18 and a standard deviation of 0.434, indicating that students actively use technology in their tasks. The assessment of students' efforts to find new ways to use digital technology in learning shows an average of 3.20 and a standard deviation of 0.428, denoting student interest in seeking innovation in technology use. Students also gave an average rating of 3.17 with a standard deviation of 0.448 regarding the analysis of the effectiveness of technology in aiding their learning, showing that they analyze the extent to which technology helps them. An average rating of 3.13 with a standard deviation of 0.460 for analyzing the advantages and disadvantages of using technology indicates students' awareness in considering the pros and cons before using technology.

Students suggest the use of technology to their peers with an average rating of 3.26 and a standard deviation of 0.439, showing a proactive attitude in sharing technological knowledge. Finally, students gave an average rating of 3.26 with a standard deviation of 0.542 regarding their enthusiasm for learning involving digital technology. This indicates that using digital technology enhances their motivation in the learning process. Overall, the data suggests that students have good motivation towards using technology in learning, with some areas showing potential for further improvement and exploration.

6 Digital Ethics

Table 6 : Digital Ethics

	N	Minimum	Maximum	Mean	Standard Deviation
1. Do you know why it is important to comply with copyright laws when using digital materials?	163	1	2	1.03	.173
2. Do you know that sharing false information online can negatively affect your reputation?	163	1	2	1.02	.155
3. Do you understand why it is necessary to maintain privacy and personal information online?	163	1	2	1.01	.078
4. Do you understand how social media can influence your digital self-image?	163	1	2	1.02	.135
5. Do you practice checking the reliability of information sources before sharing on social media?	163	1	2	1.05	.217

6. Are you active in promoting responsible technology use among your peers?	163	1	2	1.31	.465
7. Can you identify the differences in digital ethics challenges between urban and rural students based on the given abstract?	163	1	2	1.20	.403
8. Are you able to suggest strategies to increase awareness of digital ethics among pre-university students?	163	1	2	1.21	.408
9. Do you assess the extent to which your online attitudes and actions comply with the required digital ethics values?	163	1	2	1.08	.272
10. Are you able to evaluate the positive and negative effects of technology use on the education and careers of pre-university students?	163	1	2	1.03	.173
Valid N (listwise)	163				

Based on Schedule 6, the analysis regarding digital ethics shows students' perceptions of various ethical aspects while using digital technology. Students gave an average rating of 1.03 with a standard deviation of 0.173 on the importance of complying with copyright laws when using digital materials. This indicates they are highly aware of the need to comply with copyright. Regarding awareness of the dangers of sharing false information online, the average rating is 1.02 with a standard deviation of 0.155, showing that students are also very aware of the negative impact of sharing false information on their reputation. Students' understanding of the importance of maintaining privacy and personal information online was rated with an average of 1.01 and a standard deviation of 0.078**,** indicating they have a strong understanding of this importance. Students also demonstrated a good understanding of how social media can affect their digital image, with an average rating of 1.02 and a standard deviation of 0.135. When asked about checking the reliability of information sources before sharing on social media, the average rating is 1.05 with a standard deviation of 0.217**,** indicating that students strive to practice this step well.

Their activities in promoting responsible technology use among peers were rated with an average of 1.31 and a standard deviation of 0.465, suggesting that this is an area that may require more attention and improvement. Students gave an average rating of 1.20 with a standard deviation of 0.403 regarding their ability to identify differences in digital ethics challenges between urban and rural students, and an average rating of 1.21 with a standard deviation of 0.408 regarding the suggestion of strategies to increase awareness of digital ethics. This indicates that students may have limited knowledge in both aspects and require more guidance. The assessment of compliance with digital ethics values, with an average of 1.08 and a standard deviation of 0.272, suggests that students generally rate their attitudes and actions online as complying with the required digital ethics.

Finally, students gave an average rating of 1.03 with a standard deviation of 0.173 regarding their ability to assess the positive and negative impacts of technology use on their education and career, showing a good understanding in this matter. Overall, the data indicates that students have a very good understanding of digital ethics, but there are some areas, such as the promotion of responsible technology use and understanding of digital ethics challenges, that may require improvement.

8 Conclusion

This study indicates that students in urban and rural areas face different challenges in accessing technology, with rural students experiencing more issues, such as a lack of equipment and inadequate internet connectivity. Although public libraries are considered helpful, various opinions on the steps needed to bridge the digital divide suggest the need for tailored solutions. In terms of digital literacy, students generally demonstrate proficiency in basic software use and personal information protection. However, there are deficiencies in photo/video editing and technical troubleshooting skills that require additional support. Evaluations of educational quality show that while the available technology and facilities are adequate, further improvements are needed.

Students exhibit high motivation towards using technology in learning, with a strong desire to explore new methods and enthusiasm when technology is involved. Regarding digital ethics, students are highly aware of copyright laws and privacy issues, but there is a lack of knowledge about promoting responsible technology use and understanding ethical challenges between urban and rural areas. Overall, the study highlights progress in technology use in education and the need for improvements in technology access, digital literacy, and digital ethics, especially in geographical differences.

References

1 Hasin, I., Othman, R., Abdullah, N. S., Mohd Yusoff, K., & Ab Rahman, M. R. (2022). Issue and challenge on national transformation of digital learning in post-Covid-19. *Jurnal Pendidikan Bitara UPSI*, 15(2), 23–32. https://doi.org/10.37134/bitara.vol15.2.3.2022

2 Kementerian Pendidikan Malaysia. (2023). Dasar Pendidikan Digital. Edisi 2023

3 Bilal, S. (2015). E-Learning Revolutionise Education: An Exploratory study. In *E-learning: A Boom or Curse* (ISBN-978-93-80748-87-0).

4 Maon, S. N., Mohd Hassan, N., Kassim, E. S., Mohamad Yunus, N., & Abdul Kader Jailani, S. F. (2018). Exploring digital competency of rural students in Malaysia. In *Proceedings of the 8th International Conference on Modern Research in Management, Economics and Accounting* (pp. 94). Munich - Germany.

5 McGuinness, C., & Fulton, C. (2019). Digital literacy in higher education: A case study of student engagement with e-tutorials using blended learning. *Journal of Information Technology Education: Innovations in Practice*, 18.

6 Abdul Rahim, N. A., Shuhidan, S. M., Husaini, H., Khadijah, U. L. S., & Bidin, M. A. F. (2023). The relationship between digital literacy skills, learning instruments, culture, and student motivation among indigenous students in Malaysia. *Journal of Information and Knowledge Management (JIKM)*, 13(2), 46.

7 Siaw, N. H., & Umbit, A. F. (2015). A pilot study on factors affecting the use of Frog Virtual Learning Environment. *Journal of Education Technology IPG KBL*, 12, 1-17.

8 Dorasamy, M., & Abu Samah, N. (2022). Tahap pengaplikasian media digital dalam kalangan guru Tamil di sekolah rendah [The application level of digital media among Tamil teachers in primary schools]. *Innovative Teaching and Learning Journal*, 6(1), 10-15.

9 Rohani, A. S., & Hamida, A. (2015). Tahap kesediaan pelajar dalam penggunaan teknologi, pedagogi, dan kandungan (TPACK) dalam pembelajaran kurikulum di IPT [Students' readiness in using technology, pedagogy, and content (TPACK) in curriculum learning at higher education institutions]. In *Proceedings of the 3rd International Conference on Artificial Intelligence and Computer Science*, October 12-13, Penang, Malaysia (pp. 1-9).