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Mobile Apps Foster Student Self-Awareness and Empathy in Technology Education

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This research aims to explore the effectiveness pertaining to utilizing mobile applications in enhancing self-awareness in addition to empathy among students within the domain of character education. The research employs a quantitative approach with a survey methodology. The study involved 48 students and learners, along with 14 educators from primary, secondary, and higher education levels. The instrument for research used was a Likert Scale questionnaire, encompassing 14 items for teachers and 20 items for students. The data analysis, conducted using a t-test, revealed a difference between teacher and student responses of 0.953, with a significance (Sig.) value set at 0.345. Meanwhile, the difference between male and female students was 0.423, with a Sig. score of 0.674, indicating no significant difference between the responses provided by educators and students regarding the use of mobile applications in developing self-awareness and empathy. Similarly, no significant difference was found between male and female students in terms of their responses to the application. This research contributes significantly to the understanding of the potential use of technology, particularly mobile applications, in the context of character education. The practical implications of this study suggest that educators can effectively utilize mobile applications as a tool for character development, regardless of gender. Future research could further explore the factors influencing responses to mobile applications and investigate more specific strategies for implementing character education through technology.

Keywords: character education, empathy, mobile applications, self-awareness

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INTRODUCTION

Character education plays a crucial role in equipping adolescents with the skills and moral values needed to face moral and social challenges in the modern era (Sugara & Mutmainnah, 2020). Amidst technological advancements and rapid social changes, adolescents often encounter situations requiring the right moral decisions (Hayati & Mappanyompa, 2020). Therefore, character education becomes a critical foundation in shaping a strong and responsible personality (Sayyidati, 2018). Through character education, adolescents are taught to develop traits such as integrity, empathy, honesty, and cooperation, which help them overcome negative pressures and temptations around them (Syahnaz dkk., 2023). Thus, character education is not only about providing academic knowledge but also about shaping a strong character and morals, which are the main foundations for living in a complex society with diverse values.

Technological development has played a significant role in the daily lives of today's adolescents, with the increased use of mobile applications and digital devices being a hallmark of this era (Adiansah dkk., 2019). Adolescents today grow up in an environment filled with advanced technology, which influences various aspects of their lives. The use of mobile applications has become a daily routine for teenagers, from communicating with friends to accessing news, entertainment, and online shopping (Boiliu, 2020). Moreover, digital devices such as smartphones and tablets have become an integral part of modern teenagers' lives, providing quick and easy access to information and entertainment. In this context, adolescents are not only consumers of digital content but also producers and contributors in the digital ecosystem, with various social media platforms and applications enabling them to share their experiences, ideas, and creativity (Warsihna, 2016) (Sunarwan, 2017). However, along with its benefits, the use of technology also brings new challenges, including the risk of dependency, exposure to inappropriate content, and privacy issues. Therefore, a deep understanding of responsible technology use and digital literacy is essential to help adolescents face these challenges and wisely harness the potential of technology (Efendi, 2019) (Alawi dkk., 2022)

Self-awareness and empathy play a central role in the formation of positive character in adolescents. Through participation in activities that allow for self-image expression, particularly in the context of multicultural art education, adolescents can develop a deeper understanding of themselves and experience changes in self-perception (Park & Kim, 2023). Additionally, the ability to feel and understand the emotions of others, known as empathy, has a significant impact on forming healthy interpersonal relationships and pro-social behavior (Simonyi, 2022). The development of empathy in adolescents can be fostered through interactions with siblings and authority figures, as well as in supportive environments (Bris dkk., 2021). The importance of empathy is reflected in the correlation between a lack of empathy and negative behaviors such as bullying, while high levels of empathy are associated with quality peer relationships and strong emotional bonds (Portt dkk., 2020). Understanding the dimensions of empathy, including affective, cognitive, and behavioral aspects, can provide a clearer picture of adolescent mental well-being (Cherewick dkk., 2022). Overall, fostering self-awareness and empathy in adolescents can begin at an early age, particularly during elementary school, as it plays a crucial role in strengthening positive aspects of their character and enhancing their overall mental well-being.

The use of mobile applications and technology has been recognized as a potential tool in facilitating character education (Kuntadi & Hidayat, 2022) (Eka dkk., 2020) (Hidayat dkk., 2022) (Ammatulloh dkk., 2022). Game applications for example can serve as interactive and visual media for learning history, making it more engaging and challenging for students (Triarisanti dkk., 2022). Character education can be defined as a an initiative that is deliberately designed to support individuals understand and apply fundamental ethical principles in everyday life. The use of mobile learning, including smartphone applications, has been increasingly utilized in the context of character development. Mobile technology-based learning media, such as applications, can effectively enhance character education by providing content and interfaces that meet students' needs and interests. The flipped learning method, combined through the application of technology, has proven capable of instilling character values such as responsibility, independence, curiosity, creativity, cooperation, activity, and critical thinking. Teachers play a crucial role in designing learning activities that not only promote language skills but also develop students' character.

Innovative approaches in character education are crucial for effectively reaching adolescents in the digital era. Significant changes have occurred in adolescents' interaction patterns and information consumption due to advancements in digital technology . Therefore, adjusting character education strategies is necessary to address the challenges and leverage the opportunities offered by this digital landscape. This includes fostering awareness of responsibility in the use of modern technology, teaching ethics in social media usage, and integrating Information and Communication Technology (ICT) into the learning process to enhance understanding of character education (Insyirah dkk., 2023) (Tantri dkk., 2023) (Manullang dkk., 2022). Character education needs to be comprehensive, encompassing knowledge, skills, and attitude changes, with the aim of developing individuals who are disciplined, honest, responsible, confident, creative, innovative, tolerant, and capable of social interaction (Irhas dkk., 2022). By adopting innovative approaches aligned with the dynamics of the digital world, educators can more effectively help adolescents develop the character traits

needed to survive and thrive in this digital age.

(Khotimah, 2018) emphasizes the significance of character education at all levels learning, including this role of counselors and teachers in understanding and addressing students' needs. (Ananda dkk., 2022) further discuss the impact of technology on character development, highlighting the need for a deeper understanding of character education and its principles. (Pandia & Ekarina, 2020) provide empirical evidence on the influence of smartphone use on students' character education, suggesting a significant impact. However, the specific role of mobile applications in character education is not directly addressed in these studies.

The research findings indicate that self-awareness and empathy have a significant role in shaping positive character traits in elementary school children, who are also transitioning into early adolescence. Self-awareness helps adolescents understand their own identity, strengths, and weaknesses, while empathy allows them to comprehend and experience the emotions of others. The study also highlights the role of technology, particularly mobile applications, as a potential tool in facilitating character education. Mobile applications can provide interactive and engaging learning experiences, enabling adolescents to develop their social and emotional skills. However, despite research integrating technology into character education, there is still a need for more comprehensive and innovative approaches to reach adolescents in the digital age. A brief review of previous studies shows that the application of technology in character education has not been fully explored, and there remains a gap in understanding how mobile applications can be effectively utilized to enhance self-awareness and empathy among adolescents.

Based on the analysis, there exists a gap in the literature concerning the use of mobile applications to develop self-awareness and empathy among adolescents. Therefore, the aim the aim of this study is to investigate the implementation of project-based learning in primary education with a focus on enhancing student engagement and conceptual understanding. This research will attempt to address this gap by exploring how Project-based learning can serve as an innovative approach to develop self-awareness and empathy in students. Thus, the study aims to provide deeper insights into how technology, particularly mobile applications, can be effectively utilized to facilitate character education among adolescents in the context of primary education.

METHOD

The research the method employed in this study is quantitative with a survey approach. This research aims to investigate the responses of students and teachers to character education in the context of technology, specifically the use of mobile applications to enhance self-awareness and empathy among adolescents. The research subjects include 48 students and 14 teachers from 21 elementary, middle, and high schools in the West Nusa Tenggara Province. The research procedure comprises several phases as outlined in Figure 1.

[Figure 1. about here]

Figure 1 illustrates that this research is conducted in several structured stages. First, an initial analysis is performed to assess the baseline conditions of teachers and students in the field. Second, the preparation of the instruments. The tool employed in this study is a questionnaire specifically designed with 14 questions for teachers and 20 questions for students. The questionnaire uses a Likert scale comprising five response options: strongly disagree (score 1), disagree (score 2), neutral (score 3), agree (score 4), and strongly agree (score 5). The questionnaire was developed based on the research variables indicators (questionnaire link: https://bit.ly/AngketGuruSiswa). The questionnaire was then distributed to respondents, namely students and teachers, through social media. Third, after data collection, the data is tabulated and analyzed using descriptive statistical techniques to identify general patterns in the responses. Fourth, Regression analysis is then performed to evaluate the significance of students' and teachers' responses to character education in the context of technology with the use of mobile applications. Additionally, a t-test is conducted to compare responses across elementary, middle, and high school levels. The JASP software is used for data analysis, with conclusions drawn based on significance values (Sig) less than 0.05, indicating the rejection of the null hypothesis (H0) and the presence of an effect of character education in the context of technology on self-awareness and empathy among adolescents.

RESULT AND DISCUSSION

Description and Distribution of Teacher and Student Responses

This study was carried out to analyze the responses of teachers and students from 21 primary, secondary, and high schools in the West Nusa Tenggara Province. Data collection was conducted through the distribution of questionnaires to study participants. The total participants in this study comprised 48 students and 14 teachers. The gathered data were then analyzed to achieve a deeper understanding of the perceptions and responses of both groups regarding specific aspects within the context of education. The average scores for teachers and students in each category can be observed in Table 1.

[Table 1. about here]

Table 1, which presents the Descriptive Statistics, illustrates the distribution of responses from teachers and students in a study. The analysis reveals that the average response score from teachers for a particular phenomenon is 75.306, with a relatively low degree of variation, as demonstrated by a

standard deviation of approximately 9.500. This indicates that most teacher responses are stable and clustered around the average value. Additionally, the range of teacher responses, from minimum to maximum, spans from 55.710 to 90.000, indicating a moderate variation in their perceptions of the observed phenomenon.

On the other hand, student responses have a slightly lower average compared to teacher responses, at 70.479, with a much higher standard deviation of 18.169. This indicates significant variation in students' perceptions of the same phenomenon. The range of student responses is also broader, from 20.000 to 100.000, showing greater diversity in students' reactions to the discussed topic. These results provide important insights for researchers or educational practitioners to understand the differences in perceptions and responses among teachers and learners, and to plan teaching strategies more effectively to meet the needs of each group.

Comparison of Teacher and Student Perceptions on the Use of Mobile Applications for Character Building

This study seeks to compare the perceptions of educators and students concerning the use of mobile applications in student character development. Data collection was conducted through the distribution of questionnaires at 21 elementary, middle, and high schools in West Nusa Tenggara Province, involving 48 students and 14 teachers. The collected data was processed and analyzed to evaluate both groups' views on the effectiveness of using mobile applications to strengthen student character. The findings of the t-test between teachers and students can be observed in Table 2.

[Table 2. about here]

Table 2, which presents the results of the T-test between teachers and students using Independent Samples T-Test in the framework of character education with the use of technology, shows a t-test statistic of 0.953 with a significance level (sig.) value of 0.345. Although the average character scores show variation between teacher and student responses, the t-test results do not indicate a statistically significant difference. This means that the observed differences might be ascribed to other factors that were not investigated in this study. This result indicates The analysis reveals no substantial distinction between the responses provided by teachers and students with respect to the use of mobile applications for building self-awareness and empathy. Statistically, there is an indication of insufficient evidence that demonstrates a substantial difference in the perceptions of teachers and students concerning the effectiveness of mobile applications in achieving the character education goals set forth in this study. The interpretation of this T-test result suggests that in the realm of character education using mobile applications, the perceptions of teachers and students are generally aligned. This can furnish important information to support the progression of additional holistic along with outcome-oriented character education programs. Thus, this study provides a solid foundation for educational approaches that integrate technology with character education goals and accentuates the critical role of collaboration and consistent perceptions between educators and stakeholders learners in achieving desired educational outcomes. The findings from the t-test analysis conducted between male along with female students is discernible in Table 3.

[Table 3. about here]

Table 3, which illustrates the results of the T-test between male and female participants in the study using Independent Samples T-Test Analysis in the context of character education utilizing technology, shows a t-test statistic of 0.423 with a significance level (sig.) value of 0.674. Although the average character scores show variation between male and female participants, the t-test findings do not indicate a statistically significant difference, meaning that the observed variation could be due to other factors not examined in this study. This result indicates that there is no statistically significant difference in the responses of male and female students regarding the use of mobile applications for building self-awareness and empathy. Statistically, there is insufficient evidence to suggest a statistically significant difference in the perceptions concerning male and female students concerning the particular effectiveness associated with mobile applications within the context of achieving the specific character education goals set in this study. The interpretation of this T-test result indicates that, in the context of using mobile applications for character education, the responses of male and female students are generally aligned. This information is important for designing inclusive and equitable educational programs that do not differentiate between students based on gender in terms of their responses to technology used for building self-awareness and empathy. Thus, this study provides valuable insights for developing a comprehensive character education approach that can account for the diverse characteristics and needs of students, without gender-based differentiation.

Analysis of Character Development Based on Student Gender

The average character development through the use of mobile applications shows a slightly higher value for male students (72.07) compared to female students (69.86). Additionally, among the 13 character traits observed, male students scored highest in Empathy with a percentage of 77.5%, while female students scored highest in Social Skills with a percentage of 78.13%. However, there are differences in the lowest scores for each gender, with male students having the lowest score in Time Management (63.75%), and female students having the lowest score in Caring (62.5%).

Character development is a crucial aspect of education that requires careful attention (Fitriani, 2019). The

results indicate that the use of mobile applications significantly contributes to character development in students, although there are variations in the traits expressed by male and female students (Syukur, 2021). This highlights the importance of a holistic approach to character education that considers individual and gender differences (Irayanti & Komalasari, 2023). Furthermore, these findings can function as a foundation aimed at developing more efficient teaching methodologies to maximize students' potential in fostering positive and sustainable character traits. The data analysis results are illustrated in Figure 2.

[Figure 2. about here]

Figure 2 shows that The average character score for male students is 72.07. Some of the traits that exceed the average for male students include Motivation (74.38), Social Skills (75), Self-Awareness (75), Critical Thinking (76.25), Caring (76.25), Self-Confidence (76.25), and Empathy (77.5). On the other hand, the average character score for female students is 69.86. Several traits exceed the average for female students, including Self-Awareness (70), Empathy (71.25), Motivation (71.88), Problem-Solving (73.75), Creativity (77.5), and Social Skills (78.13).

The results indicate variations in character development between male and female students. Male students tend to excel in characteristics such as motivation, critical thinking, and self-confidence, while female students are generally stronger in self-awareness, empathy, and social skills. This information is crucial for designing responsive and inclusive character education programs that take into account individual and gender differences. By understanding these tendencies, educators can develop more effective approaches to help students realize their positive and sustainable character potential.

CONCLUSION

Data analysis reveals that the t-test value between teacher and student responses is 0.953, with a significant implication (Sig.) significance of 0.345. Additionally, the t-test between male and female students shows a significance of 0.423, with a significance (Sig.) level of 0.674. There is also a difference in the average character development scores between male students of 72.07 and female students of 69.86. The study concludes that there is no statistically significant difference between teacher along with student responses provided regarding the implementation of mobile applications aimed at developing self-awareness and empathy. Similarly, there is no statistically significant difference between male along with female students with respect to the effectiveness of the applications. Although the specific data indicates that the average character scores for male students are slightly higher than for female students, statistical tests do not support a significant difference. Therefore, there is an absence of statistically statistically significant difference in the effectiveness of the applications for character development.

Future research should explore additional factors that may influence responses to mobile applications in the context of character education, such as variations in socio-economic backgrounds, levels of technological literacy, and prior user experience. Qualitative research methodologies, including in-depth interviews or focus group discussions can provide more nuanced insights regarding users' experiences and perceptions of the applications. Longitudinal studies could offer a better understanding of the long-term impact of mobile applications on character development. Additionally, testing the applications in diverse educational and cultural contexts could broaden the understanding of their effectiveness in various environments. Considering individual differences based on gender and other factors is also crucial to ensure that the applications are optimized for all student groups.

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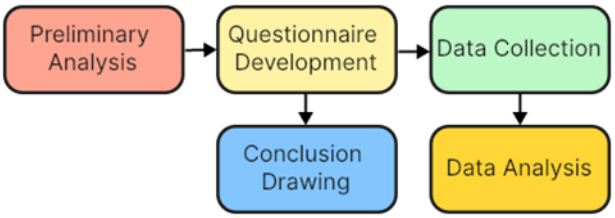

Figure 1 / Research Procedure

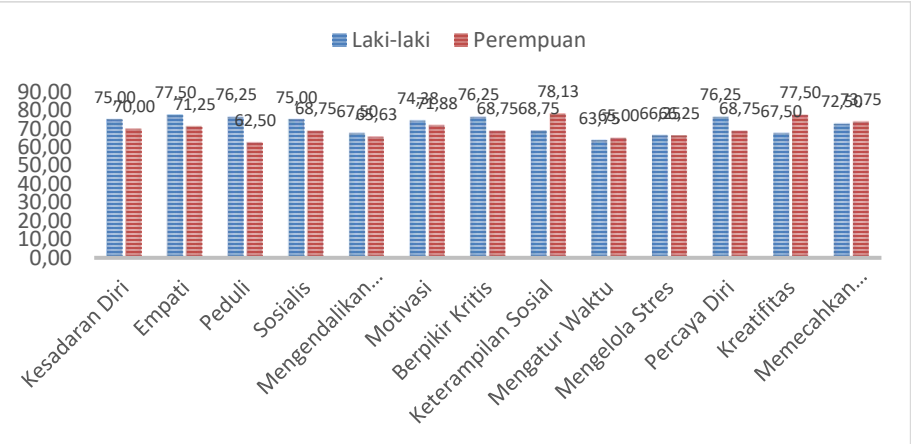

Figure 2 / Analysis of Character Development Based on Student Gender

LIST OF TABLE

Table 1 / Descriptive Statistics

	X1-Guru	X2-Siswa
Valid	14	48
Mode	75.411 [a]	73.381
Median	75.710	72.500
Mean	75.306	70.479
Std. Deviation	9.500	18.169
Variance	90.257	330.127
Minimum	55.710	20.000
Maximum	90.000	100.000

Table 2 / T-Test Results Between Teachers and Students

Independent Samples T-Test

	t	df	p
T-test [GS]	0.953	60	0.345 [a]

Note. Student's t-test.

[a] The Brown-Forsythe test is significant ($p < .05$), indicating a violation of the equal variance assumption

Table 3 / T-Test Results Between Male and Female Learners

Independent Samples T-Test Analysis

	t	df	p
T-test [SS]	0.423	46	0.674

Note. Student's t-test.