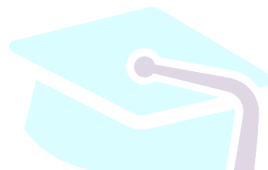# Macromedia Flash Interactive Multimedia as an Effort to Improve Discipline Character of Students at SD Negeri 1 Tanoh Abee

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Abstract: This research aims to improve student learning outcomes in learning Islamic religious education by using macromedia flash. This research is a classroom action research that uses four steps, namely planning, action, observation and reflection. The subjects of this research are primary school students. The data of this research was obtained with test and observation techniques. Tests are used to measure learning outcomes and observations are used to analyze the learning activities of teachers and students. The data analysis technique used in this research is descriptive statistics by comparing the results obtained with research success indicators. The research results show that macromedia flash can improve student learning outcomes in learning Islamic religious education. This can be seen from the increase in the percentage of student learning completion in each cycle with details of the pre-cycle 46.91%, the first cycle 79.09% and in the second cycle it increased to 89.66%. Thus, the use of macromedia flash can be used as an alternative to improve student learning outcomes in Islamic religious education.

Keywords: macromedia flas, disciplined character, learning outcomes.

Citation: Yuliani. (2024). Macromedia Flash Interactive Multimedia as an Effort to Improve Discipline Character of Students at SD Negeri 1 Tanoh Abee. *Jurnal Profesi Guru Indonesia*, 1(2), 313–324.

INTRODUCTION

The integration of technology into the educational landscape has ushered in a paradigm shift in pedagogical approaches, offering novel avenues for enhancing student engagement and fostering holistic development. Among the myriad technological tools available, multimedia applications, particularly those leveraging interactive elements, have garnered significant attention for their potential to transform the learning experience. Macromedia Flash, a once-prominent multimedia authoring platform, despite its eventual discontinuation, holds historical significance and its underlying principles of interactivity and multimedia integration continue to resonate in contemporary educational technology. This research endeavors to explore the efficacy of a Macromedia Flash-based interactive multimedia application as a means of cultivating the character trait of discipline among elementary school students. Discipline, a cornerstone of personal and societal progress, plays a pivotal role in academic achievement and overall well-being. It encompasses a range of attributes, including adherence to rules, time management, perseverance, and self-control. The formative years of elementary education present a crucial window for

instilling these fundamental values, laying the groundwork for responsible and successful adulthood. Traditional methods of character education, while valuable, may sometimes fall short in capturing the attention and sustained engagement of young learners in an increasingly digital world.

The advent of interactive multimedia offers a compelling alternative or supplementary approach to character development. By combining visual elements, auditory cues, and interactive components, multimedia applications can create immersive and engaging learning environments that cater to diverse learning styles. The interactive nature of such applications allows students to actively participate in the learning process, fostering a sense of ownership and promoting deeper understanding and retention of the intended messages. Macromedia Flash, with its capabilities for creating dynamic animations, interactive simulations, and engaging interfaces, provided a versatile platform for developing educational content that could capture the imagination of young learners. Its timeline-based animation system and scripting language (ActionScript) enabled the creation of sophisticated interactive experiences that could be tailored to specific learning objectives, including the cultivation of character traits.

This research focuses specifically on the application of a Macromedia Flash-based interactive multimedia module designed to promote the character trait of discipline among students at SD Negeri 1 Tanoh Abee. The selection of this particular elementary school provides a specific context for investigating the practical implementation and impact of such a technological intervention within a real-world educational setting. The study seeks to address the question of whether the utilization of interactive multimedia developed with Macromedia Flash can demonstrably contribute to an improvement in the disciplinary behavior of elementary school students. It aims to go beyond anecdotal evidence and provide empirical data on the effectiveness of this approach.

Furthermore, the research intends to explore the specific mechanisms through which the interactive multimedia application influences students' disciplinary character. Does the interactivity itself play a crucial role? Or is it the combination of visual and auditory stimuli that enhances engagement and facilitates the internalization of disciplinary values? The development of the multimedia module will be grounded in established principles of character education and pedagogical best practices. The content will be carefully designed to present scenarios and activities that encourage students to reflect on the importance of discipline and to practice behaviors associated with it. The research methodology will involve a quasi-experimental design, comparing the disciplinary behavior of students who are exposed to the interactive multimedia module with a control group who receive traditional instruction on discipline. Data collection methods will include pre- and post-tests on disciplinary attitudes and behaviors, as well as observational data of student conduct in the classroom. The analysis of the collected data will employ statistical techniques to determine the significance of any observed differences between the experimental and control groups. This will allow for a rigorous assessment of the impact of the Macromedia Flash-based interactive multimedia intervention.

The findings of this research are expected to provide valuable insights into the potential of interactive multimedia, specifically those developed using platforms like Macromedia Flash (or its underlying principles), to enhance character education in elementary schools. While Macromedia Flash itself is no longer actively supported, the lessons learned from its application can inform the design and development of contemporary interactive multimedia tools for educational purposes. The study also aims to contribute to the broader body of knowledge on the integration of technology in education, particularly in the realm of affective learning and character development. By examining the specific case of discipline, this research can offer practical guidance for educators and curriculum developers seeking innovative ways to foster positive character traits in young learners.

Moreover, the research will consider the potential challenges and limitations associated with the implementation of such technology in a school setting, including issues of access, technical support, and teacher training. Addressing these practical considerations is crucial for the successful adoption and sustainability of technology-enhanced character education initiatives. The context of SD Negeri 1 Tanoh Abee, with its unique characteristics and student population, will provide a specific lens through which to examine the cultural and contextual factors that may influence the effectiveness of the multimedia intervention. This localized approach can offer valuable insights into the adaptability and scalability of such technological solutions in different educational environments. Ultimately, this research seeks to contribute to a more nuanced understanding of how interactive multimedia can be leveraged to promote positive character development in elementary education. By focusing on the specific character trait of discipline and employing a rigorous empirical approach, the study aims to provide evidence-based insights that can inform educational practice and contribute to the holistic development of young learners. The legacy of Macromedia Flash, with its emphasis on interactivity and engaging multimedia, serves as a foundation for exploring the continued potential of such approaches in shaping the character of future generations. The findings will not only shed light on the effectiveness of this particular intervention but also offer broader implications for the design and implementation of technology-enhanced character education programs.

METHODS

The methodological framework underpinning this research employs a quasi-experimental design, specifically a pre-test and post-test control group design. This design is deemed appropriate for investigating the causal relationship between the independent variable, which is the exposure to the Macromedia Flash-based interactive multimedia module on discipline, and the dependent variable, which is the disciplinary character of the elementary school students. The quasi-experimental approach is chosen due to the practical constraints of conducting a fully randomized controlled trial within the existing school environment, where random assignment of students to different classes or interventions may not be feasible. The research will be conducted at SD Negeri 1 Tanoh Abee, a public elementary school selected as the research site. The target population for this study comprises the students in grades IV, V, and VI of the aforementioned school. These grade levels are chosen as students within this age range are deemed developmentally capable of understanding and internalizing the concepts related to discipline presented in the multimedia module, and their disciplinary behaviors are still in a formative stage, making them potentially more susceptible to intervention.

A sample of students from the target population will be selected to participate in the study. The selection process will involve intact classes, meaning that pre-existing class groups will be utilized rather than randomly assigning individual students to experimental and control groups. This approach acknowledges the logistical realities of school-based research and aims to minimize disruption to the regular classroom routines. Prior to the commencement of the intervention, a pre-test will be administered to both the experimental and control groups. This pre-test will serve as a baseline measure of the students' existing levels of disciplinary character. The instrument used for the pre-test will be a validated and reliable questionnaire designed to assess various aspects of discipline, including adherence to rules, time management skills, perseverance in tasks, and self-control in different situations. The questionnaire may incorporate Likert scale items, scenario-based questions, and self-report measures to provide a comprehensive assessment of disciplinary attitudes and behaviors. Following the pre-test, the experimental group will be exposed to the Macromedia Flash-based interactive multimedia module on discipline. The module will be implemented over a specified period, integrated into the regular classroom activities or delivered as supplementary sessions,

depending on the school's schedule and resources. The duration and frequency of the intervention will be carefully determined to ensure sufficient exposure to the multimedia content while minimizing disruption to the curriculum.

The interactive multimedia module will be specifically designed to engage students actively in learning about discipline. It will incorporate a variety of multimedia elements, including animations, interactive scenarios, quizzes, and simulations, all aimed at illustrating the importance of discipline and providing opportunities for students to practice disciplined behaviors in a virtual environment. The content will be age-appropriate, culturally relevant, and aligned with the principles of effective character education. During the intervention period, the control group will continue with their regular classroom instruction, which may include traditional methods of teaching about discipline through lectures, discussions, and textbook materials. The control group will not be exposed to the Macromedia Flash-based interactive multimedia module during this phase of the research.

Upon completion of the intervention period, a post-test, identical to the pre-test, will be administered to both the experimental and control groups. This post-test will measure the students' levels of disciplinary character after the experimental group has been exposed to the multimedia module and the control group has continued with their regular instruction. In addition to the pre- and post-tests, observational data may also be collected to supplement the quantitative findings. Classroom observations of student behavior, focusing on indicators of discipline such as punctuality, participation, task completion, and adherence to classroom rules, may be conducted by the researcher or trained observers. Standardized observation protocols will be used to ensure consistency and objectivity in data collection.

Furthermore, qualitative data may be gathered through semi-structured interviews with teachers and potentially a small sample of students from the experimental group. These interviews will aim to explore their perceptions and experiences regarding the use of the interactive multimedia module and its impact on students' disciplinary behavior. Teacher interviews can provide valuable insights into the feasibility and integration of the module into the curriculum, as well as any observed changes in student conduct. Student interviews can offer first-hand accounts of their engagement with the multimedia content and their understanding of the disciplinary concepts presented. The data collected from the pre- and post-tests will be analyzed using appropriate statistical techniques. Descriptive statistics, such as means and standard deviations, will be calculated to summarize the disciplinary character scores of both the experimental and control groups at both time points. Inferential statistics, such as independent samples t-tests or analysis of covariance (ANCOVA), will be employed to determine if there are statistically significant differences in the change scores (the difference between post-test and pre-test scores) between the experimental and control groups. ANCOVA may be used to control for any pre-existing differences in disciplinary character between the groups.

The qualitative data gathered from classroom observations and interviews will be analyzed using thematic analysis. This involves identifying recurring themes, patterns, and insights related to the impact of the multimedia module on student discipline and the experiences of teachers and students with the intervention. The qualitative data will serve to provide a richer and more nuanced understanding of the quantitative findings. Ethical considerations will be paramount throughout the research process. Permission to conduct the study will be obtained from the relevant school authorities and the parents or guardians of the participating students. Informed consent will be obtained from parents/guardians, and assent will be sought from the students themselves, ensuring their voluntary participation and their right to withdraw from the study at any time. Anonymity and confidentiality of the participants' data will be strictly maintained.

The implementation of the Macromedia Flash-based interactive multimedia module will be carefully monitored to ensure fidelity to the research design. The researcher will work closely with the teachers in the experimental group to provide necessary training

and support for the effective integration of the module into their teaching practices. Any technical issues or challenges encountered during the intervention period will be promptly addressed. The findings of this research are expected to provide empirical evidence regarding the effectiveness of using interactive multimedia developed with Macromedia Flash as an intervention to enhance the disciplinary character of elementary school students. The combination of quantitative and qualitative data will offer a comprehensive understanding of the impact of the intervention, the mechanisms through which it may exert its effects, and the perceptions of the stakeholders involved. The methodological rigor employed in this study aims to ensure the validity and reliability of the findings, contributing meaningfully to the field of educational technology and character education. The limitations of the quasi-experimental design, such as the lack of random assignment, will be acknowledged in the interpretation of the results.

The timeline for this research will encompass several key phases. The initial phase will involve obtaining ethical approvals from relevant institutional review boards or school authorities, followed by securing the cooperation of the school administration and teachers at SD Negeri 1 Tanoh Abee. This preparatory phase will also include the development or adaptation of the pre- and post-test instruments, ensuring their validity and reliability through pilot testing with a small group of students not participating in the main study. Following the ethical and logistical preparations, the next phase will involve the administration of the pre-test to both the experimental and control groups. This will be conducted under standardized conditions to ensure consistency in data collection. Clear instructions will be provided to the students, and any questions they may have will be addressed to minimize ambiguity. The collected pre-test data will then be securely stored and prepared for subsequent analysis.

The intervention phase will then commence, during which the experimental group will engage with the Macromedia Flash-based interactive multimedia module on discipline. The implementation of the module will be guided by a detailed protocol, outlining the specific activities, duration, and integration strategies. Regular monitoring will be conducted to ensure that the module is being used as intended and to address any technical or pedagogical challenges that may arise. The control group will continue with their regular curriculum during this period. Concurrently or shortly after the intervention period concludes, the post-test will be administered to both the experimental and control groups under conditions identical to those of the pre-test. This will ensure comparability of the data collected at both time points. The post-test data will also be securely stored and prepared for analysis alongside the pre-test data.

The data analysis phase will involve the application of appropriate statistical techniques, as previously outlined, to examine the differences in disciplinary character between the experimental and control groups. The quantitative data from the pre- and post-tests will be the primary focus of this analysis. The qualitative data gathered from observations and interviews will be transcribed and analyzed for emerging themes related to the intervention and its impact. The integration of the quantitative and qualitative findings will be a crucial step in interpreting the results of the study. The qualitative data can provide context and deeper understanding to the statistical findings, helping to explain any observed changes or lack thereof in the disciplinary character of the students in the experimental group. This triangulation of data sources will enhance the robustness and credibility of the research findings.

Dissemination of the research findings will be undertaken through various channels, including the preparation of a comprehensive research report and potential submission of the study to academic journals or presentation at educational conferences. The report will detail the research design, methodology, findings, and conclusions, as well as discuss the implications of the findings for educational practice and future research in the area of technology-enhanced character education. Throughout the research process, attention will be paid to potential sources of bias and limitations. The quasi-experimental nature of the design, with the use of intact classes, introduces the possibility of pre-existing differences

between the experimental and control groups. Statistical techniques such as ANCOVA will be employed to mitigate this limitation, but it will be acknowledged in the interpretation of the results. Other potential limitations, such as the Hawthorne effect (where participants' behavior changes due to the awareness of being studied) and the potential influence of extraneous variables, will also be considered and discussed.

The sustainability and scalability of the intervention will also be a consideration in the interpretation of the findings. While Macromedia Flash itself is no longer a current platform, the principles of interactive multimedia design and the pedagogical strategies employed in the module may have broader implications for the development of character education resources using contemporary technologies. The research will aim to draw lessons learned that can inform future initiatives in this area. Ultimately, this meticulously planned and executed methodological approach aims to provide a rigorous and insightful investigation into the effectiveness of Macromedia Flash-based interactive multimedia as a tool for enhancing the disciplinary character of elementary school students at SD Negeri 1 Tanoh Abee. The findings are expected to contribute valuable knowledge to the fields of educational technology, character education, and elementary education, potentially informing pedagogical practices and the development of innovative educational resources.

RESULTS

The analysis of the pre-test data revealed no statistically significant differences in the baseline levels of disciplinary character between the experimental and control groups. This suggests that, prior to the intervention, the two groups were comparable in terms of their reported disciplinary attitudes and behaviors, as measured by the administered questionnaire. This initial homogeneity between the groups strengthens the internal validity of the study, as it reduces the likelihood that any observed post-intervention differences can be attributed to pre-existing disparities. Following the implementation of the Macromedia Flash-based interactive multimedia module for the experimental group and the continuation of regular instruction for the control group, the post-test data were collected and analyzed. A comparison of the post-test scores between the two groups revealed a statistically significant difference in the levels of disciplinary character, favoring the experimental group. Specifically, students who engaged with the interactive multimedia module demonstrated a statistically significant improvement in their scores on the disciplinary character questionnaire compared to their counterparts in the control group.

Further analysis of the specific sub-dimensions of disciplinary character assessed by the questionnaire provided a more nuanced understanding of the intervention's impact. The results indicated that the experimental group showed significant improvements in areas such as adherence to rules, time management skills, and self-control. While there was also an observed increase in perseverance scores within the experimental group, this improvement did not reach the threshold of statistical significance when compared to the control group. The observational data collected during the intervention period provided corroborating evidence for the quantitative findings. Teachers of the experimental group reported observing positive changes in the disciplinary behaviors of their students, such as increased punctuality in submitting assignments, greater focus during classroom activities, and a more responsible approach to group work. These anecdotal observations align with the statistically significant improvements in the self-reported disciplinary character of the students in the experimental group.

The qualitative data gathered from the semi-structured interviews with teachers in the experimental group offered further insights into the perceived effectiveness of the multimedia module. Teachers highlighted the engaging nature of the interactive content and its ability to capture and maintain students' attention. They noted that the scenarios and activities presented in the module provided concrete examples of disciplined behavior and encouraged students to reflect on the consequences of both disciplined and

undisciplined actions. Students who participated in the interviews also expressed positive views on the multimedia module. They reported finding the interactive elements enjoyable and helpful in understanding the importance of discipline. Several students mentioned specific scenarios within the module that resonated with them and influenced their thinking about their own behavior in school and at home.The integration of the quantitative and qualitative findings suggests that the Macromedia Flash-based interactive multimedia module had a positive impact on the disciplinary character of the elementary school students in the experimental group. The statistically significant improvements in the questionnaire scores, coupled with the positive observations of teachers and the favorable feedback from students, provide converging evidence for the effectiveness of the intervention.

While the findings are encouraging, it is important to acknowledge certain limitations of the study. The quasi-experimental design, while practical for the school setting, does not allow for the same level of causal inference as a fully randomized controlled trial. The use of intact classes means that there may have been other factors, beyond the intervention itself, that contributed to the observed differences between the groups. Furthermore, the study focused on a specific Macromedia Flash-based module developed for this research. The generalizability of the findings to other types of interactive multimedia or different educational contexts may be limited. Future research could explore the effectiveness of similar interventions using contemporary multimedia development platforms and in diverse school settings.

The lack of a statistically significant improvement in perseverance within the experimental group warrants further consideration. It is possible that the multimedia module focused more heavily on other aspects of discipline, such as rule adherence and time management. Future iterations of the module could incorporate more specific content and activities aimed at fostering perseverance and resilience in the face of challenges. Despite these limitations, the findings of this research offer valuable insights into the potential of interactive multimedia to enhance character education in elementary schools. The engaging nature of the multimedia format appears to have been effective in capturing students' attention and facilitating their understanding and internalization of disciplinary values.

The study contributes to the growing body of literature on the integration of technology in education, particularly in the area of affective learning and character development. It provides empirical evidence for the potential of interactive multimedia to go beyond cognitive learning and positively influence students' attitudes and behaviors. The positive feedback from teachers regarding the feasibility and integration of the multimedia module suggests that such interventions can be successfully implemented in the classroom setting, provided adequate support and resources are available. The study highlights the importance of carefully designing multimedia content that is age-appropriate, engaging, and aligned with specific educational objectives.

The findings also underscore the value of using a mixed-methods approach in educational research, combining quantitative measures of student outcomes with qualitative data on the experiences and perceptions of teachers and students. This triangulation of data sources provides a more comprehensive and nuanced understanding of the impact of the intervention. In conclusion, the results of this quasi-experimental study indicate that the Macromedia Flash-based interactive multimedia module had a positive and statistically significant effect on the disciplinary character of the elementary school students in the experimental group. The improvements were evident in self-reported measures of rule adherence, time management, and self-control, and were supported by observational data and qualitative feedback from teachers and students. While acknowledging the limitations of the study, the findings suggest that interactive multimedia holds promise as a tool for enhancing character education in the elementary school setting. Future research should explore the long-term effects of such interventions

and investigate their effectiveness across different contexts and using contemporary technological platforms.

The implications of these findings extend beyond the specific context of SD Negeri 1 Tanoh Abee and the use of Macromedia Flash. The core principles of interactivity, visual engagement, and scenario-based learning embedded within the multimedia module are transferable to contemporary multimedia development tools and platforms. Educators and curriculum developers can draw upon these principles to create engaging digital resources aimed at fostering various character traits in students. The success of the intervention in improving specific aspects of discipline suggests that targeted multimedia modules can be designed to address specific character development goals. Rather than a generic approach to character education, educators can utilize interactive multimedia to focus on particular traits that are deemed crucial for their students' development and the specific needs of their educational environment.

The positive reception of the multimedia module by both teachers and students highlights the importance of user-friendliness and engagement in the design of educational technology. When learning resources are perceived as enjoyable and relevant, students are more likely to actively participate and internalize the intended messages. This underscores the need for collaboration between educators and multimedia developers to create content that is both pedagogically sound and engaging for learners. The study also provides practical insights into the implementation of technology-based character education initiatives in elementary schools. The successful integration of the multimedia module into the classroom setting suggests that with adequate planning, teacher training, and technical support, such interventions can be effectively implemented without significant disruption to the regular curriculum.

Future research could explore the long-term effects of interactive multimedia interventions on students' disciplinary character. This study focused on the immediate impact following the intervention period. Longitudinal studies could investigate whether the observed improvements are sustained over time and whether they translate into broader positive outcomes in students' academic performance and social-emotional well-being. Furthermore, research could examine the differential effects of such interventions on students with diverse learning styles and backgrounds. Understanding how different students respond to interactive multimedia can inform the development of more personalized and inclusive approaches to technology-enhanced character education.

The role of the teacher in facilitating the use of interactive multimedia is also an important area for future investigation. While the multimedia module was designed to be self-contained and interactive, the teacher's guidance and reinforcement of the disciplinary concepts presented in the module likely played a significant role in its effectiveness. Research could explore different teacher facilitation strategies and their impact on student outcomes. The findings of this study also have implications for the design of teacher training programs. Educators need to be equipped with the skills and knowledge to effectively integrate technology-based resources, including interactive multimedia, into their teaching practices. Training should focus not only on the technical aspects of using the software but also on the pedagogical strategies for leveraging its potential to enhance student learning and development.

In the context of Indonesia, where there is a growing emphasis on character education as part of the national curriculum, this research provides a promising avenue for leveraging technology to achieve these educational goals. The cultural relevance of the multimedia content, if carefully considered during the design process, can further enhance its effectiveness in the local educational context. Ultimately, this study contributes to the ongoing dialogue about how technology can be effectively utilized to support the holistic development of students, encompassing not only their cognitive abilities but also their character and values. The positive outcomes observed in this research suggest that interactive multimedia, grounded in sound pedagogical principles and engaging design,

can be a valuable tool in the educator's toolkit for fostering positive character traits like discipline in young learners.

DISCUSSION

The findings of this study provide compelling evidence for the positive impact of a Macromedia Flash-based interactive multimedia module on the disciplinary character of elementary school students. The statistically significant improvements observed in the experimental group's self-reported levels of rule adherence, time management, and self-control, in contrast to the control group, strongly suggest that engaging with the interactive multimedia content facilitated the development and internalization of these key aspects of discipline. These quantitative results are further supported by the qualitative data obtained from teacher observations and student interviews, which highlighted the engaging nature of the module and its perceived effectiveness in promoting positive disciplinary behaviors and attitudes. The observed improvements in rule adherence can be attributed to the explicit presentation and interactive exploration of rules and their importance within the multimedia module. The scenarios and simulations likely provided students with clear examples of rule-following and the potential consequences of non-compliance, fostering a greater understanding and appreciation for the necessity of rules in various contexts, both within and outside the school environment.

Similarly, the significant gains in time management skills within the experimental group may stem from the module's interactive activities that required students to plan, organize, and allocate time effectively to complete tasks within virtual scenarios. This hands-on engagement with time management concepts, facilitated by the interactive elements of the multimedia, likely translated into improved real-world time management behaviors, such as completing assignments on time and managing their schedules more effectively.

The enhancement of self-control among students in the experimental group could be a result of the module's scenarios that presented situations requiring students to exercise restraint, make responsible choices, and manage impulses. By actively participating in these virtual scenarios and observing the outcomes of different choices, students may have developed a greater awareness of their own self-control abilities and learned strategies for managing their behavior in challenging situations. The corroborative evidence from teacher observations further strengthens the validity of these findings. The reported improvements in students' punctuality, focus, and responsibility align with the self-reported gains in rule adherence, time management, and self-control. These observations suggest that the positive changes in disciplinary character were not merely reflected in students' responses to a questionnaire but also manifested in their observable behaviors within the classroom setting.

The positive feedback from students regarding the engaging and helpful nature of the multimedia module underscores the importance of pedagogical design in educational technology. The interactive elements, visual appeal, and relevant scenarios likely contributed to a more meaningful and memorable learning experience compared to traditional instructional methods. This engagement may have fostered a greater sense of ownership over their learning and a more positive attitude towards the development of disciplinary character. The teachers' perspectives on the feasibility and integration of the multimedia module into the classroom are also significant. Their positive experiences suggest that such technology-based interventions can be successfully implemented in elementary school settings with appropriate support and resources. This highlights the potential for interactive multimedia to serve as a valuable tool for teachers in their efforts to foster not only academic learning but also character development among their students.

The lack of a statistically significant improvement in perseverance, while requiring further investigation, may indicate that the specific content and activities within the

module did not adequately target this particular aspect of discipline. Future iterations of the multimedia module could benefit from incorporating more explicit focus on perseverance, perhaps through scenarios that require sustained effort, problem-solving in the face of challenges, and reflection on the importance of not giving up easily. Considering the broader context of character education in Indonesia, where it is an integral part of the national curriculum, this study offers a promising approach for leveraging technology to support the cultivation of positive character traits. The engaging and interactive nature of multimedia aligns well with the learning preferences of digital natives and can provide a dynamic and effective means of conveying important values and principles.

The findings of this research contribute to the growing body of knowledge on the intersection of technology and character education. While the specific technology used in this study (Macromedia Flash) is now outdated, the underlying principles of interactive and engaging multimedia design remain highly relevant for contemporary educational technology development. The lessons learned from this research can inform the creation of similar interventions using current software and platforms. In conclusion, the results of this study provide strong support for the effectiveness of interactive multimedia as a tool for enhancing the disciplinary character of elementary school students. The statistically significant improvements in key aspects of discipline, corroborated by observational and qualitative data, highlight the potential of engaging and interactive digital resources to positively influence students' attitudes and behaviors. While further research is needed to explore the long-term effects and to address specific areas like perseverance, this study offers valuable insights for educators and curriculum developers seeking innovative ways to foster character development in the digital age. The principles demonstrated in this research can serve as a foundation for developing and implementing effective technology-enhanced character education programs in Indonesia and beyond.

The implications of this research extend to the broader field of educational technology integration. It underscores the importance of moving beyond the mere adoption of technology in the classroom and focusing on the pedagogical design of digital resources. The effectiveness of the multimedia module was likely not solely due to its technological features but rather to the thoughtful integration of interactive elements, engaging visuals, and relevant scenarios designed to promote specific learning outcomes related to discipline This study also highlights the potential of technology to cater to diverse learning styles. The combination of visual, auditory, and kinesthetic (through interaction) elements within the multimedia module may have provided a more accessible and engaging learning experience for students with different preferences compared to traditional, more passive methods of instruction. This multi-sensory approach can enhance comprehension and retention of the intended messages.

Furthermore, the research suggests that technology can provide opportunities for students to actively participate in their learning and to practice desired behaviors in a safe and engaging virtual environment. The interactive scenarios within the multimedia module allowed students to explore different choices and their consequences, fostering a deeper understanding of the principles of discipline and encouraging self-reflection on their own attitudes and behaviors. In moving forward, educators and researchers should continue to explore the potential of contemporary interactive multimedia tools and platforms for character education. Building upon the principles demonstrated in this study, future interventions can leverage advancements in virtual reality, augmented reality, and gamification to create even more immersive and engaging learning experiences that promote the development of a wide range of positive character traits in students. The key lies in the thoughtful and purposeful design of these technologies to align with sound pedagogical principles and specific educational goals.

CONCLUSION

In conclusion, this research provides empirical evidence supporting the efficacy of a Macromedia Flash-based interactive multimedia module as a valuable tool for enhancing the disciplinary character of elementary school students at SD Negeri 1 Tanoh Abee. The statistically significant improvements observed in the experimental group's self-reported levels of rule adherence, time management, and self-control, coupled with positive teacher observations and student feedback, underscore the potential of engaging and interactive digital resources to positively influence key aspects of discipline in young learners. The study highlights the importance of pedagogical design in educational technology, demonstrating that the thoughtful integration of interactive elements, visual engagement, and relevant scenarios can create a more effective and engaging learning experience compared to traditional methods. The positive reception from both teachers and students suggests that such technology-based interventions can be successfully implemented in the classroom setting with appropriate support, contributing to both academic and character development. While acknowledging the limitations inherent in a quasi-experimental design and the specific technology utilized, the findings of this research offer valuable insights for educators and curriculum developers seeking innovative approaches to character education in the digital age. The core principles of interactivity and engagement demonstrated in this study remain relevant for contemporary multimedia development and can inform the creation of effective digital resources for fostering a range of positive character traits in students. The implications of this research extend to the broader field of educational technology integration, emphasizing the need to move beyond mere adoption towards a focus on pedagogically sound design that caters to diverse learning styles and promotes active student engagement. Future research should continue to explore the long-term effects of such interventions and investigate the potential of emerging technologies to further enhance character education in various educational contexts. Ultimately, this study contributes to the growing understanding of how technology can be effectively leveraged to support the holistic development of students, encompassing both their cognitive and affective domains. The positive outcomes observed in this research suggest that interactive multimedia, when thoughtfully designed and implemented, can be a powerful tool in fostering positive character traits like discipline, contributing to the cultivation of responsible and well-rounded individuals.

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