The Effectiveness of X Lab Book Based on Science Technology Engineering Mathematics in Reducing Doomscroling with Gamification

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Abstract

The phenomenon of doomscrolling, which is increasingly prevalent among adolescents, has become a new challenge in the digital era. The habit of constantly scrolling and consuming negative information excessively without considering time can seriously impact mental health, reduce concentration ability, and affect academic performance. This condition requires effective and sustainable educational interventions. This community service program aims to reduce doomscrolling behavior among adolescents. The program partners are students aged 12–15 years at SMP Negeri 7 Jambi City. This program employed a Quasi-Experimental method (One Group Pre-test Post-test Design) to evaluate the effectiveness of the intervention. The intervention was carried out through counseling and socialization, along with the implementation of the X-Lab Book based on STEM Builders and Gamification Therapy, supported by group-based science experiment demonstrations as a positive alternative to excessive gadget use. Evaluation was conducted by comparing pre-test and post-test results. The findings demonstrated a decrease in doomscrolling behavior, shown by a reduction in cumulative scores from 935 to 812 after the intervention, indicating improved self-control and healthier digital behavior among participants.

Keywords: Doomscrolling, Adolescents, X-Lab Book

Abstrak

Fenomena doomscrolling, yang semakin marak di kalangan remaja, telah menjadi tantangan baru di era digital. Kebiasaan terus-menerus menggulir dan mengonsumsi informasi negatif secara berlebihan tanpa mempertimbangkan waktu dapat berdampak serius pada kesehatan mental, mengurangi kemampuan konsentrasi, dan memengaruhi prestasi akademik. Kondisi ini membutuhkan intervensi pendidikan yang efektif dan berkelanjutan. Program pengabdian masyarakat ini bertujuan untuk mengurangi perilaku doomscrolling di kalangan remaja. Mitra program adalah siswa berusia 12-15 tahun di SMP Negeri 7 Kota Jambi. Program ini menggunakan metode Kuasi-Eksperimental (Desain Pre-test Post-test Satu Kelompok) untuk mengevaluasi efektivitas intervensi. Intervensi dilakukan melalui konseling dan sosialisasi, bersamaan dengan implementasi Buku X-Lab berbasis STEM Builders dan Terapi Gamifikasi, didukung oleh demonstrasi eksperimen sains berbasis kelompok sebagai alternatif positif terhadap penggunaan gadget yang berlebihan. Evaluasi dilakukan dengan membandingkan hasil pre-test dan post-test. Temuan menunjukkan penurunan perilaku doomscrolling, yang ditunjukkan oleh pengurangan skor kumulatif dari 935 menjadi 812 setelah intervensi, yang mengindikasikan peningkatan pengendalian diri dan perilaku digital yang lebih sehat di antara para peserta.

Kata Kunci: Doomscrolling, Remaja, X-Lab Book

A. INTRODUCTION

The rapid development of digital technology has had a significant impact on the lives of adolescents, particularly in terms of digital behavior. Data shows that more than 19% of adolescents in Indonesia are addicted to gadgets, with average internet usage increasing from 7.27 hours to 11.6 hours per day. (Riyanto et al., 2021) This condition also gives rise to the phenomenon of doomscrolling, namely the habit of excessively accessing negative content which impacts mental health and reduces focus on learning (Brek, 2024; Rajeshwari & Meenakshi, 2023).

The doomscrolling phenomenon is also supported by global findings showing a strong link between excessive media consumption and depressive symptoms, sleep disturbances, and decreased academic engagement in adolescents. (Mascia et al., 2023; Twenge et al., 2022) Meanwhile, in-depth research during the pandemic found that repeated exposure to negative content increases psychological stress and hinders students' ability to maintain focus on learning (Bendau, 2021).

A similar situation was found at SMP Negeri 7 in Jambi City, which has 1,032 students, the majority aged 12–15. Observations and interviews showed that many students tended to spend long periods of time browsing negative or sensational content, resulting in decreased participation in learning, concentration, and academic readiness. Teachers emphasized that traditional learning approaches were unable to capture the attention of students accustomed to interactive digital content. Excessive social media use was also linked to academic burnout and decreased learning motivation (Liu, 2024).

To address these challenges, the implementation of the STEM Builders-based X-Lab Book, combined with gamification therapy elements, is an appropriate and relevant intervention in this context. STEM learning has been shown to improve students' conceptual understanding, engagement, creativity, and critical thinking skills through the integration of Science, Technology, Engineering, and Mathematics. (Li et al., 2020) Meanwhile, gamification adds an immersive dimension to the learning process through the use of points, levels, challenges, and rewards that effectively increase intrinsic motivation, focus, and student participation (Shofiyah & Anwar, 2024; Zainuddin, 2020).

Previous research has shown that gamification has proven effective in improving digital literacy and student learning participation (Alnuaim, 2024; Husen, 2025). Through this community service activity, students are encouraged to actively participate in experiment-based learning that fosters critical, collaborative, and creative thinking skills. The results of the activity demonstrate increased student awareness of healthy digital behaviors and a renewed enthusiasm for participating in learning activities.

Thus, this program is expected to strengthen digital literacy skills, foster a culture of active learning, and serve as a model for developing interactive learning media in junior high schools. This effort aligns with the goal of developing a wise, adaptive, and productive young generation to face the challenges of the digital era.

B. METHODS

This community service activity is a Student Creativity Program in the Field of Community Service (PKM-PM) which aims to overcome the habit of doomscrolling in adolescents. The approach used is educational intervention through Counseling and Socialization combined with innovative learning methods based on STEM Builders and Gamification Therapy. This activity was carried out at SMP Negeri 7 Jambi City in three meetings, namely the first meeting on October 9, 2025, the second meeting on October 16, 2025, and the final meeting on October 24, 2025, with a structured program duration during that period.

The main target of this program is students of SMP Negeri 7 Jambi City who are in the adolescent age range (12–15 years old) who are indicated to be actively using gadgets excessively and are potentially experiencing doomscrolling. In addition to students as the main subjects, teachers are also involved as key partners for the sustainability of the program. The initial stage of implementation begins with licensing activities and socialization to the school, followed by the design and production of the main intervention media, namely the X-Lab Book. This book is designed as a guide for simple science experiments equipped with a gamification system to stimulate student motivation and creativity.

The next step, after the X-Lab Book design was finalized, was for the implementation team to procure the tools and materials relevant to the experiments outlined in the book. Supporting experimental equipment was manufactured to ensure the smooth running of all demonstrations. This process verified the alignment of the X-Lab Book guidelines with practical implementation in the field, ensuring that the developed media was truly ready for use as a substitute for passive digital activities.

The implementation phase of the activity involved students and teachers directly in the school environment. The first step was to administer a pre-test to students to measure gadget usage frequency and doomscrolling habits.

Figure 1. Pre-test distribution

Next, the team provided an educational session on doomscrolling, starting from the definition, causes, signs and symptoms, dangers and how to overcome it.

Figure 2. Doomscroling education

After that, the team provided an explanation of the X-Lab Book usage guide. After providing the guide, we conducted an experimental demonstration using the X-Lab Book, as well as briefings on the gamification system as a behavioral therapy and conducted direct experiments with students in groups. Teachers also provided support.

Figure 3. Explanation of the use of the X lab Book

Figure 4. Demonstration of the X Lab BooB Experiment

The final stage of this activity is to measure the success of the program through mixed evaluation techniques (quantitative and qualitative). Quantitative measurements are carried out by comparing the results of the post-test with the pre-test to see the extent to which students' understanding has improved post-intervention. Meanwhile, qualitative evaluations are carried out through Observation Sheets to assess student engagement during the experiment and Evaluation Questionnaires aimed at measuring participants' responses to the effectiveness of the X-Lab Book, the impact of the program on their interest in learning science, and changes in their doomscrolling behavior. Documentation of activities in the form of photos and videos is also collected as physical evidence of implementation. After that, a report is compiled containing an evaluation of the effectiveness of the training, a summary of all activities, and suggestions for future program development. The report is then submitted to the PKM organizers. In addition to being compiled as an internal report, the results of the activity are also planned to be published through scientific articles. In addition, the X-Lab Book is in E-ISBN and disseminated so that it can be accessed by many people. With this systematic workflow, this community service program is expected to be able to make a real contribution to efforts to prevent doomscrolling habits in adolescents.

C. RESULTS

1. Analysis of Students' Gadget Usage Frequency

Based on the questionnaire data obtained, the frequency pattern of gadget use by students can be seen in Table 1, which shows a comparison of the number and percentage of students based on the intensity of gadget use. This analysis describes how often students use gadgets in their daily lives, ranging from low to high frequency use, so that it can

provide an initial picture of students' digital habits and their potential impact on their learning activities and daily lives.

Table 1. Frequency of student gadget use

Category	Criteria	Amount	Presentation
Gedget usage 1-6 hours/day	Low usage 6 – 12	3	9.375%
Gedget usage 7-12 hours/day	Moderate use 13 – 18	9	28.125%
Gadget Usage >12 Hours/Day	High usage > 18	20	62.5%
Total		32	100%

Based on the total score of the gadget usage questionnaire, students were categorized into three groups: low, medium, and high usage. The "high gadget usage" category was determined if the total score was greater than 18, while the "low gadget usage" category was determined if the score was in the range of 6–12. The analysis results showed that the majority of students were in the high gadget usage category, which indicates a significant intensity of smartphone use in daily activities, including in terms of usage duration, bedtime habits, and physical complaints arising from gadget use.

2. Analysis of Average Values Pre-test Post-test Doomscrolling Behavior

The results of the community service are described first, followed by a discussion section. This is similar to a template. Articles may include tables and/or figures. They should not be too long, numerous, or too extensive. Authors use a variety of table and figure presentations, which are then referenced in the text. Images must be of good quality and should be part of the manuscript and not stand alone.

Table 2 Pretest and Posttest Values of Doomscroling Behavior

Statistical Description	Pre-Test Score	Post Test Score
Number of Respondents (n)	32	32
Total Cumulative Score	935	812
Minimum Score	17	14
Maximum Score	56	48
Average (Mean)	29.22	25.38

Based on the pre-test and post-test results of 32 participants, the average score decreased from 29.22 to 25.38, with a difference of 3.84 points. The minimum score decreased from 17 to 14, while the maximum score decreased from 56 to 48. Cumulatively, the total score of all participants decreased from 935 to 812 after the implementation of the educational intervention regarding doomscrolling behavior. This decrease in scores indicates an improvement in digital behavior and self-control in participants in consuming excessive negative information through social media or the internet. The lower post-test score indicates that participants are increasingly able to limit doomscrolling activities and divert time to more productive activities.

D. CONCLUSION

Doomscrolling educational intervention and the implementation of X-LAB Book with Gamification have proven effective in reducing doomscrolling behavior in adolescents, as seen from the decrease in the average score from 29.22 to 25.38 and the decrease in the minimum and maximum scores after the intervention. This proves that X-LAB Book not only plays a role as an educational media or a diversion material for gadget use, but also as an effective strategy to build healthier and more adaptive digital behavior in adolescents. As a suggestion, further research is expected to involve a wider number of participants and a longer intervention duration to see the long-term effectiveness of X-LAB Book.

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