

Illustrated Stories against Online Gambling (Experimental Research for Education Media)

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ABSTRACT

The rapid growth of online gambling in Indonesia, marked by an 8,136.77% increase in transactions since 2018, highlights the urgent need for effective preventive communication targeting adolescents. This study aimed (1) to develop an illustrated story-based educational medium about online gambling and (2) to examine its effectiveness in improving adolescents' knowledge and attitudes toward online gambling. A Research and Development (R&D) design was employed, combining expert validation of the media with a one-group pre-test–post-test experiment. Three experts in media design and online gambling content assessed the feasibility of the illustrated story using a validation questionnaire. Effectiveness testing involved 12 adolescents in Cilebut Village, Bogor, who completed knowledge and attitude questionnaires before and after exposure to the illustrated story. The results showed that the medium achieved an average expert validation score of 87.5%, indicating that it is feasible for educational use. Paired sample t-test analysis revealed a significant increase in knowledge scores from a mean of 6 to 9.16 ($p = 0.001$) and in attitude scores from 23.41 to 29.16 ($p = 0.001$) after the intervention. These findings conclude that illustrated story-based media is an effective tool to enhance adolescents' knowledge and strengthen their attitudes against online gambling, and it holds promise for broader application in preventive education campaigns.

Keywords: educational media; illustrated stories; online gambling; research and development

ABSTRAK

Pertumbuhan pesat judi online di Indonesia, yang ditandai dengan peningkatan jumlah transaksi sebesar 8.136,77% sejak tahun 2018, menegaskan perlunya komunikasi pencegahan yang efektif dan berfokus pada kalangan remaja. Penelitian ini bertujuan (1) mengembangkan media edukasi berbasis cerita bergambar tentang judi online dan (2) menguji efektivitasnya dalam meningkatkan pengetahuan dan sikap remaja terhadap judi online. Desain penelitian yang digunakan adalah Research and Development (R&D) dengan menggabungkan uji validasi ahli terhadap media dan eksperimen satu kelompok dengan desain pre-test–post-test. Tiga orang ahli di bidang desain media dan konten judi online menilai kelayakan media cerita bergambar menggunakan kuesioner validasi. Uji efektivitas melibatkan 12 remaja di Desa Cilebut, Bogor, yang mengisi kuesioner pengetahuan dan sikap sebelum dan sesudah mendapatkan intervensi melalui media cerita bergambar. Hasil penelitian menunjukkan bahwa media memperoleh skor rata-rata validasi ahli sebesar 87,5%, yang mengindikasikan bahwa media tersebut layak digunakan sebagai media edukasi. Analisis uji t berpasangan menunjukkan peningkatan yang signifikan pada skor pengetahuan dari rata-rata 6 menjadi 9,16 ($p = 0,001$) dan pada skor sikap dari 23,41 menjadi 29,16 ($p = 0,001$) setelah intervensi. Temuan ini menyimpulkan bahwa media berbasis cerita bergambar efektif untuk meningkatkan pengetahuan remaja dan memperkuat sikap mereka menentang judi online, serta berpotensi untuk diterapkan secara lebih luas dalam berbagai kampanye edukasi pencegahan.

Kata-kata Kunci: cerita bergambar; judi daring; media edukasi; riset pengembangan

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INTRODUCTION

The rapid development of communication technology has brought not only positive impacts but also adverse consequences, such as facilitating public access to various types of illegal activities, one of which is gambling. Online gambling, in particular, can be carried out as easily as looking at the screen of one's device with the availability of the internet. The ongoing process of digitalization, which has increasingly permeated almost every aspect of global life, has further accelerated the expansion of gambling activities on the internet, now widely referred to as online gambling (Zurohman et al., 2016).

According to data from the Indonesian Financial Transaction Reports and Analysis Center (PPATK), the number of online gambling transactions by Indonesian citizens has increased dramatically by 8,136.77% since 2018. PPATK further reported that within just one year, the volume of online gambling transactions surged by 213%, from IDR 104.41 trillion in 2022 to IDR 327 trillion in 2023. In addition, PPATK highlighted that the number of online gambling players reached 2.76 million, among whom 2.19 million were categorized as low-income individuals (Aprilia, 2024).

The Indonesian Ministry of Communication and Informatics (Kominfo), through Press Release No. 327/HM/KOMINFO/09/2023, has undertaken comprehensive efforts to combat online gambling. Minister of Communication and Informatics, Budi Arie Setiadi, stated that Kominfo would continue to coordinate with various institutions, digital platforms, mobile operators, internet service providers, and financial service providers to address the issue of online gambling. Similarly, the Director General of Informatics Applications, Semuel Abrijani Pangerapan, emphasized the need for enhanced collaboration with external stakeholders to support eradication efforts. However, these measures remain insufficient, as the number of online gambling players in Indonesia continues to rise.

Previous studies highlighted the negative consequences of online gambling participation, most notably the dependency induced by substantial wins, which motivates individuals to keep playing. Many participants initially engaged in online gambling out of curiosity. The desire to repeat the sweetness of early victories eventually trapped them in addictive behaviors, especially as they increased their stakes over time. They often ignore the fact that the higher the stakes, the greater the risk of losses (Addiyansyah & Rofi'ah, 2023).

Reinforcement Theory explains that a specific behavior tends to be repeated or strengthened when accompanied by rewarding outcomes. Thus, the learning factor plays a crucial role in reinforcing the desire to gamble. For adolescents, the primary motivation to continue gambling lies in the initial gains they receive, which entrap them with the urge to replicate their prior victories, even when subsequent attempts result only in losses (Addiyansyah & Rofi'ah, 2023). In many cases, the very first attempt at online gambling may already serve as the starting point of a broader problem. Hence, preventive actions are urgently needed to educate adolescents so that they never engage in such practices. Adolescents are very close to entertainment media such as comics, one of study states that games can also be educational regarding research introduction (Zhahira & Mutiaz, 2023).

Comics or illustrated stories are a form of visual communication media that hold distinct advantages in conveying information in a more comprehensible manner. Illustrated stories are easier to understand because they combine images and text within a coherent narrative, thereby making the information easier to follow and remember. They also provide a simple yet engaging way to explain complex matters. As a communication tool, illustrated

stories deliver clear, structured, and enjoyable messages. Thus, illustrated stories have strong potential to serve as an effective medium for learning and education (Waluyanto, 2005).

Recent studies have consistently demonstrated the effectiveness of illustrated stories or comics in enhancing knowledge and shaping attitudes. (Topkaya et al., 2023) conducted a meta-analysis and found that educational comics yielded medium effect sizes for both academic achievement ($g = 0.71$) and attitudes ($g = 0.70$), indicating their broad educational value. Similarly, (Fitria et al., 2023) reported that digital comic teaching materials significantly improved students' scientific literacy, narrative skills, and creativity in elementary classrooms. In the context of health communication, (Sabri et al., 2024) highlighted that comics serve as powerful visual narratives that enhance engagement, memory retention, and emotional involvement, thereby making public messages more persuasive. A bibliometric study by (Suprapto et al., 2024) also confirmed a growing trend in the use of digital comics, animations, and cartoons in education, emphasizing their role in improving learning motivation and outcomes. Collectively, these findings underscore that illustrated stories are effective media for both knowledge acquisition and attitude transformation.

Studies on online gambling in Indonesia have largely focused on describing its prevalence, negative consequences, and psychosocial determinants among adolescents, with limited attention to the design and empirical testing of preventive educational media specifically targeting this issue (Addiyansyah & Rofi'ah, 2023). At the same time, research on comics and illustrated stories has mostly been applied to school subjects and general health topics, rather than to behavioral addictions such as online gambling (Fitria et al., 2023; Sabri et al., 2024; Suprapto et al., 2024; Topkaya et al., 2023). The novelty of the present study lies in bridging this gap by designing an illustrated story grounded in visual communication principles and tailored to the mechanisms of online gambling and empirically testing its impact on adolescents' knowledge and attitudes through expert validation and a one-group pre-test–post-test experiment.

In light of the aforementioned issues, this study seeks to design an educational medium in the form of illustrated stories. The research further aims to analyze the influence of illustrated story-based educational media on adolescents' knowledge and attitudes regarding online gambling. The central focus of this study is to develop illustrated story media and evaluate its effectiveness in enhancing adolescents' knowledge and attitudes toward online gambling.

RESEARCH METHOD

This study employed a Research and Development (R&D) design aimed at producing and testing the effectiveness of an illustrated story-based educational medium to reduce adolescents' interest in online gambling (Apriliani & Radia, 2020; Sugiyono, 2013). The use of a pre-experimental one-group pre-test–post-test design was considered appropriate for this study for several reasons. First, the primary aim was to develop and conduct an initial effectiveness test of a newly designed illustrated story medium within an R&D framework. At this early stage, emphasis is placed on product feasibility, clarity of messages, and preliminary evidence of impact, rather than on strong causal inference or broad generalization. Second, ethical and logistical considerations in the community setting, including the small accessible population and the need to maintain community trust, made random assignment and the creation of a control group difficult. A single-group design allowed the researchers to provide

the potentially beneficial educational intervention to all adolescents who agreed to participate. Data collection instruments shows in Table 1.

Table 1. Summary of Data-Collection Instruments

Instrument	Respondent	Variable Measured	Format (Scale & Item Type)	Score Range	Validity / Reliability Evidence
Media validation questionnaire (experts)	3 experts (media design academic, design practitioner, anti-online gambling activist)	Feasibility and design quality of illustrated story medium	10 indicators rated on a 4-point rating scale (1–4), covering typography, image quality, colour composition, image–text consistency, and overall layout.	Raw scores converted to percentages (1–100%); media considered feasible at $\geq 61\%$. Mean expert validation score = 87.5% (Good–Excellent).	Content validity established through expert judgment; high mean percentage (87.5%) indicates good agreement that the media is feasible for educational use. Reliability not calculated (focus on expert consensus in early-stage R&D).
Knowledge questionnaire (adolescents)	12 adolescents in Cilebut Village, Bogor Regency	Knowledge about online gambling (definition, mechanisms, risks)	Multiple-choice knowledge test with Guttman-type scoring (correct = 1, incorrect = 0); total score is sum of correct answers.	Total score 0–10; observed means: pre-test = 6.00, post-test = 9.16.	Items drafted from literature on online gambling and adolescent risk behaviours, then reviewed by content expert for relevance and clarity. Formal internal consistency (e.g., Cronbach's alpha) not yet analysed due to small, exploratory sample.
Attitude questionnaire (adolescents)	Same 12 adolescents in Cilebut Village, Bogor Regency	Attitudes toward online gambling and its prevention	Multi-item attitude scale rated on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree), including positively and negatively worded statements.	Total score 8–32; observed means: pre-test = 23.41, post-test = 29.16.	Items developed based on social-psychological attitude concepts and reviewed by content expert. No formal reliability coefficient reported; this is acknowledged as a limitation and suggests the need for larger-sample psychometric testing in future studies.

Source: Researcher Processed

Three validators were involved to assess the feasibility of the illustrated story-based educational medium. They were selected using purposive sampling based on their expertise and professional experience relevant to the content and format of the media. The panel consisted of:

1. **One academic expert in digital media design**, a university lecturer specializing in communication and digital media;
2. **One professional media design practitioner**, actively working in the creative industry and experienced in visual communication and illustration;
3. **One content expert on online gambling prevention**, an activist engaged in public campaigns and educational initiatives against online gambling.

Validators were required to (a) hold at least an undergraduate degree in a relevant field, (b) have substantive experience in either media design or online gambling-related issues, and (c) be willing to provide written feedback on the prototype.

Media validation was conducted using a structured media validation questionnaire, which included rating-scale items and open-ended questions. The rating-scale items assessed aspects such as font size, font type and color, neatness of text, image form and size, image variation, color composition, image-text consistency, and overall layout. Each item was scored on a 4-point rating scale (1 = very poor, 4 = excellent). The percentages obtained from each validator were interpreted using the validation category proposed by (Sari & Wardani, 2021), where scores $\geq 61\%$ indicate that the media is at least “Good” and thus feasible for further testing. Open-ended questions allowed validators to provide qualitative suggestions used for revising the media prior to field implementation. The study sample consisted of 12 adolescents who resided in the Bumi Pertiwi Housing area, specifically at Jalan Sumatera, RT01/RW13, Cilebut Bumi Pertiwi Housing, Bogor Regency.

The **inclusion criteria** were:

1. Living in Cilebut Village, Bogor Regency;
2. Being in the adolescent age range as defined locally (11-18 years);
3. Able to read and understand Indonesian;
4. Willing to participate and complete both pre-test and post-test questionnaires.

The **exclusion criteria** were:

1. Adolescents who reported severe reading difficulties;
2. Adolescents who were unable to attend the full intervention session (pre-test, exposure to the media, and post-test).

RESULTS AND DISCUSSION

Visual communication, as defined by Kroeger, is the practice of applying theories and concepts through visual themes utilizing color, form, line, and juxtaposition. The illustrated story-based educational medium developed in this study not only conveys information through text but also integrates images and narrative structures that serve as analogies for the intended messages. One of its primary goals is to educate adolescents on the mechanisms of online gambling, represented through the analogy of a “lottery game” depicted within the storyline.

The illustrated story features two characters: an older sibling and a younger sibling. The older sibling acts as the information provider, delivering guidance based on knowledge of how online gambling operates. The younger sibling, as the recipient, represents adolescents with limited understanding of such mechanisms. The storyline unfolds as the older sibling deceives the younger sibling by organizing a rigged lottery, mirroring the manipulative structure of online gambling. This form of narrative aligns with previous findings that comics and illustrated stories can effectively combine visualization with metaphor and character-driven narration, thereby enhancing comprehension and retention (Mahendra et al., 2021; Topkaya et al., 2023).

The choice of pastel colors in the medium was motivated by their visual softness and ease on the eyes, qualities that symbolize gentleness (Mahdalena et al., 2023). The older sibling character was predominantly illustrated in shades of red or pink, symbolizing energy, warmth, and affection, while the younger sibling was illustrated in cooler tones such as blue, signifying calmness and reflection. Such symbolic use of color is consistent with color theory

in visual communication, where contrasts between warm and cool tones strengthen message clarity and emotional resonance (Karja, 2021). Similarly, international studies in visual design highlight that deliberate use of color in educational comics significantly influences learners' emotional engagement and message retention (Sabri et al., 2024).

Typography choices also played an essential role in delivering the messages. The "CC Wild Words" font was applied in most dialogues to create a light and approachable tone, suitable for adolescent audiences, while serif fonts were used in sections addressing the legal aspects of online gambling, conveying seriousness and authority. Typography is not only aesthetic but also expressive, as appropriate font selection supports readability and strengthens message interpretation (Yadav et al., 2014). This finding echoes research emphasizing that typographic variation in educational media enhances audience engagement and facilitates differentiated cognitive processing (Fitria et al., 2023).

Overall, the combination of narrative analogies, symbolic color application, and context-appropriate typography demonstrates that illustrated stories provide an effective multimodal approach to education. These design elements align with prior international evidence confirming that illustrated stories and comics improve both knowledge and attitudes across various contexts, including health education and behavioral change campaigns (Suprapto et al., 2024; Topkaya et al., 2023).

International evidence on educational comics suggests that such integration of visual and textual cues enhances engagement, memory retention, and emotional involvement, which in turn supports both knowledge acquisition and attitude change. Meta-analytic and empirical studies have shown that comics yield medium-to-large effects on academic achievement and attitudes, improve scientific literacy, and make health messages more persuasive. The present results, substantial gains in knowledge and stronger anti (online gambling attitudes) align with this broader body of work and demonstrate that these visual communication principles remain effective when applied to the specific issue of online gambling prevention.

By combining Reinforcement Theory with visual communication principles, this study contributes to health and risk communication literature in three ways. First, it shows that narrative-based illustrated stories can pre-emptively disrupt the reinforcement cycle associated with gambling by reshaping adolescents' expectations about reward and loss. Second, it empirically demonstrates that well-designed visual media, validated by experts and grounded in colour and typography theory, can quickly move adolescents from partial knowledge to near-complete understanding in a single session. Third, it confirms that illustrated stories are not only cognitively effective but also affectively powerful, strengthening adolescents' support for preventive campaigns in a way that aligns with international evidence on comics and education.

At the same time, the discussion must be read alongside the methodological limitations already noted (pre-experimental design, small non-random sample, and short-term measurement). These limitations mean that the present findings should be considered strong preliminary evidence, which now needs to be tested in more rigorous designs and broader populations. Nonetheless, within the scope of this study, the results provide a coherent picture: illustrated stories that are theoretically informed and visually well-crafted can serve as a promising communication strategy to prevent adolescents from engaging in online gambling.

Image 1, the illustrated story-based educational medium developed in this study subsequently underwent a validation process conducted by experts. Validation questionnaires were administered to both media and content experts to assess the feasibility of the illustrated story as an educational medium. The evaluation focused on the clarity of messages, appropriateness of visual elements, and alignment between the narrative and intended

learning objectives. Expert validation is a critical step in Research and Development studies to ensure that the developed product meets academic, pedagogical, and design standards before its implementation.

Image 1. Media Design of Illustrated Story





An educational medium can be considered feasible for further field testing if the results of expert validation reach at least 61%, which falls into the categories of “Good” to “Excellent” (Sari & Wardani, 2021) on Table 2. This study analyzed all feedback, suggestions, critiques, and comments obtained during the validation process, which served as the basis for revisions should the validation results fail to reach the minimum threshold of 61%.

The validation process involved three experts: Ahmad Zakki Abdullah, a media design lecturer at Universitas Pembangunan Nasional Veteran Jakarta specializing in digital media; Rusty Ilyanov, a media design practitioner and founder of the fine arts studio *Panic at 3AM Studio*; and Pratama Putra, an anti-online gambling activist who served as the content expert.

Table 2. Validation Category

No.	Percentage	Category
1	81-100%	Excellent
2	61-80%	Good
3	41-60%	Fair
4	21-40%	Poor
5	1-20%	Very Poor

Source: Sari & Wardani, 2021

The validation results indicated an average score of **87.5%**, we can see Table 3, placing the illustrated story-based educational medium within the “Good–Excellent” category. This suggests that the medium is considered feasible for use as an educational tool for adolescents, particularly in raising awareness of the risks of online gambling. Similar findings have been reported in prior international studies. For instance, (Topkaya et al., 2023) confirmed through a meta-analysis that educational comics demonstrate medium to large effects on both achievement and attitudes, underscoring their pedagogical reliability. Likewise, (Fitria et al., 2023) highlighted that digital comic teaching materials achieved expert validation before showing significant improvements in students' literacy and creativity. In the context of health communication, (Sabri et al., 2024) also demonstrated that comics, once validated for clarity and engagement, can effectively enhance public knowledge and attitudes. These studies collectively support the conclusion that the illustrated story developed in this research is not only valid but also holds strong potential as an effective educational medium for adolescents.

Table 3. Validation of Experts

No.	Indicator	Score			Mean
		Academic Expert	Practitioner	Content	
1	Font size selection	3	4	4	3.67
2	Font color selection	3	4	4	3.67
3	Font type selection	3	4	4	3.67
4	Neatness of text	2	4	4	3.33
5	Image form/shape	4	3	4	3.67
6	Image size	4	4	3	3.67
7	Image variation	3	3	4	3.33
8	Color composition	4	3	4	3.67
9	Image–text consistency	2	4	4	3.33

10	Image balance and layout	3	2	4	3
Score		31	35	39	35
Percentage		77.5	87.5	97.5	87.5
Category	Good	Excellent	Excellent	Excellent	

Source: Researcher Processed, 2025

Adolescents in Cilebut are not exempt from the issue of online gambling addiction, which has become a matter of serious concern (Addiyansyah & Rofi'ah, 2023). This highlights the urgency of designing preventive interventions specifically targeted at young people in this area. To this end, effectiveness questionnaires were administered to adolescents in Cilebut Village to measure their knowledge and attitudes toward the illustrated story-based educational medium developed in this study. The questionnaires consisted of two parts: a knowledge questionnaire and an attitude questionnaire.

This local finding aligns with international research indicating that adolescents are highly vulnerable to online gambling behaviors due to accessibility, peer influence, and psychological reinforcement mechanisms (Derevensky & Gupta, 2005). Educational interventions, particularly those employing engaging visual narratives, have been shown to improve adolescents' understanding of risks and foster healthier attitudes toward addictive behaviors (Fitria et al., 2023; Topkaya et al., 2023). Moreover, comics and illustrated stories have proven to be effective in delivering preventive health messages, enhancing both knowledge retention and attitude change (Sabri et al., 2024). Thus, situating this study within both the local context of Cilebut and the broader international evidence underscores the potential of illustrated story media as a culturally relevant and pedagogically sound approach to combating online gambling among adolescents.

Table 4. Adolescents' Knowledge Test Results

Variable	Knowledge Category					
	Poor		Good		Excellent	
	n	%	n	%	n	%
Pre-test	3	25%	8	66,6%	1	0,08%
Post-test	0	0	1	0,08%	11	91,6%

Source: Researcher Processed, 2025

Table 4 show that before the adolescents were provided with the intervention using the illustrated story-based educational medium, the pre-test results showed that 25% of the participants had poor knowledge regarding online gambling, while the majority, 66.6%, demonstrated only a fair level of knowledge. However, in the post-test stage, the proportion of adolescents with good knowledge of online gambling increased dramatically from 0.08% to a majority of 91.6%. This significant improvement highlights the effectiveness of illustrated story media in enhancing adolescents' understanding.

These findings are consistent with previous international studies. For example, (Fitria et al., 2023) demonstrated that digital comic teaching materials substantially improved students' scientific literacy and comprehension of biological concepts. Similarly, (Topkaya et al., 2023), through a meta-analytic study, confirmed that educational comics have medium-to-large effects on academic achievement and knowledge acquisition. Moreover, (Sabri et al., 2024) emphasized the role of visual narratives in simplifying complex issues and

strengthening message retention, particularly in the context of health communication. Collectively, this evidence underscores the capacity of illustrated stories to serve as powerful educational tools that effectively enhance adolescents' knowledge.

Table 5. Adolescents' Attitude Test Results

Variable	Attitude Category							
	Strongly Disagree		Disagree		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%
Pre-test	0	0	0	0	6	50%	6	50%
Post-test	0	0	0	0	1	0,08%	11	91,6%

Source: Researcher Processed, 2025

Table 5 show that Before the adolescents were provided with the intervention using the illustrated story-based educational medium, the pre-test results showed that their attitudes were evenly distributed, with 50% indicating *Agree* and 50% indicating *Strongly Agree* toward anti-online gambling campaigns. After the intervention, the post-test results revealed a substantial increase, with 91.6% of adolescents expressing *Strongly Agree*, while only one participant remained in the *Agree* category.

These findings are supported by international studies emphasizing the effectiveness of illustrated stories and comics in influencing adolescents' attitudes. For instance, (Altayyar et al., 2025) reported that educational comics on epilepsy significantly improved knowledge, attitudes, and practices among schoolchildren in Mauritius. Similarly, (Matin et al., 2025) demonstrated that comic-based interventions produced higher levels of knowledge and more positive attitudes toward menarche compared to lecture-based methods. (Spiegel et al., 2013) also found that comics were more engaging than traditional essays in shaping teenagers' attitudes and interest in science. These studies reinforce the present results, suggesting that illustrated story media is not only effective in increasing knowledge but also in strengthening adolescents' supportive attitudes toward preventive campaigns.

To further analyze these findings, a paired sample t-test was conducted to compare the mean scores of the two related groups before and after the intervention. The paired sample t-test is used to assess whether there is a significant difference between the means of two related samples subjected to different treatments. The results are interpreted through the p-value, where a value of less than 0.05 indicates a statistically significant difference in respondents' knowledge or attitudes following the intervention (Ghozali, 2018).

Table 6. Paired Sample T-Test

Variabel	N	Mean	SD	Min	Max	P-Value
Knowledge						
Pre-test	12	6	1,206	4	8	
Post-test	12	9,16	1,029	7	10	0,001
Attitude						
Pre-test	12	23,41	3,872	18	30	
Post-test	12	29,16	3,069	23	32	0,001

Source: Researcher Processed, 2025

The findings of this study (Table 6) demonstrated that the illustrated story-based educational medium was effective in significantly improving both knowledge and attitudes of adolescents toward online gambling. The paired sample t-test results indicated a substantial

increase in knowledge, with mean scores rising from 6 ($SD = 1.154$) in the pre-test to 9.16 ($SD = 1.029$) in the post-test, and a significant difference confirmed by a p-value of 0.001 (< 0.05). Similarly, attitudes showed notable improvement, with mean scores increasing from 23.41 ($SD = 3.872$) to 29.16 ($SD = 3.069$), also with a significant p-value of 0.001 (< 0.05). These findings provide empirical evidence that illustrated stories are effective educational tools for addressing adolescent vulnerabilities to online gambling.

This study's results are consistent with and extend international literature on the use of comics and illustrated stories in education and behavioral interventions. (Altayyar et al., 2025) demonstrated that an educational comic intervention in Mauritius significantly improved students' knowledge, attitudes, and practices regarding epilepsy, highlighting the broader utility of comics in health-related education. Similarly, (Matin et al., 2025) reported that comic media was more effective than lectures in improving both knowledge and attitudes about menarche among elementary school girls. These results underscore the unique potential of illustrated narratives to engage adolescents emotionally and cognitively, thereby influencing both their comprehension and their behavioral dispositions.

The present study also aligns with findings from (Topkaya et al., 2023), whose meta-analysis concluded that educational comics exert medium-to-large effects on academic achievement and attitudinal outcomes across diverse educational contexts. Furthermore, (Spiegel et al., 2013) showed that comics are more engaging and effective than traditional texts in influencing teenagers' interest and attitudes toward science. These studies collectively reinforce the present findings that illustrated story-based media is a highly feasible and effective approach for adolescent education and preventive campaigns.

Importantly, the use of illustrated stories in this study did not only provide information but also employed character-based narratives, metaphors, and visual symbolism that enhanced relatability and retention. This multimodal approach resonates with theories of visual communication, where the integration of text, imagery, and narrative has been shown to strengthen message clarity and emotional impact (Sabri et al., 2024). As such, the significant improvements observed in both knowledge and attitudes affirm that illustrated story media can serve as a culturally sensitive and pedagogically robust strategy for preventing online gambling among adolescents.

CONCLUSION

This study concludes that illustrated story-based educational media is effective in improving adolescents' knowledge and attitudes toward online gambling. The pre-test and post-test results, supported by paired sample t-test analysis, showed significant increases in both domains, with knowledge rising from 6 to 9.16 and attitudes from 23.41 to 29.16 ($p < 0.05$). These findings affirm that illustrated stories, through their combination of visual elements, narrative structures, and character-driven messages, serve as a powerful medium for preventive education.

Given the rising prevalence of online gambling among adolescents, illustrated stories can be considered a feasible and impactful tool for awareness campaigns and school-based interventions. However, future studies should address the current study's limitations by involving larger and more diverse samples, adopting more rigorous research designs, and evaluating long-term effects to strengthen the evidence base for broader application.

While this study provides significant evidence regarding the effectiveness of illustrated story-based media in improving adolescents' knowledge and attitudes toward

online gambling, several limitations should be acknowledged. First, the study employed a pre-experimental one-group pre-test–post-test design without a control group, which restricts the ability to generalize findings and may not fully account for external factors influencing the outcomes. Second, the sample was limited to adolescents from a single village in Cilebut, Bogor Regency, which reduces the representativeness of the results for broader adolescent populations across different regions or cultural contexts. Third, the study measured short-term effects immediately after the intervention; thus, the long-term sustainability of knowledge gains and attitude changes remains uncertain.

Future research should therefore consider employing more rigorous experimental designs, such as randomized controlled trials, involving larger and more diverse samples. Longitudinal studies would also be valuable to assess the durability of the intervention's effects over time. Additionally, comparative studies examining illustrated story-based media alongside other digital or traditional educational tools could provide further insights into the relative effectiveness and adaptability of such media in various adolescent education and prevention contexts.

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