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The Effectiveness of the *Stairs&Cigarettes* Game in Anti-Smoking Education for High School Students

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Abstract

Smoking among adolescents remains a health issue that requires serious attention, particularly through educational approaches that align with students' characteristics. This study aims to analyze the effectiveness of the Stairs & Cigarettes game in anti-smoking education among senior high school students. The study employed a quasi-experimental method with a one-group pretest–posttest design. The research subjects were senior high school students who received treatment in the form of a gamification-based educational game. The research instrument consisted of a questionnaire measuring students' understanding of the dangers of smoking, developed based on the Health Belief Model constructs, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Data were analyzed using inferential statistics to determine differences in scores before and after the intervention. The results showed a significant increase in students' understanding after participating in the Stairs & Cigarettes game. This improvement reflected positive changes in perceptions of smoking risks, the benefits of anti-smoking behavior, and strengthened self-efficacy in refusing smoking invitations. These findings indicate that the Stairs & Cigarettes game not only enhances cognitive aspects but also strengthens students' psychosocial readiness.

Keywords: Anti-smoking, Educational Game, Health Belief Model, Senior High School, Gamification

Abstrak

Merokok pada remaja masih menjadi permasalahan kesehatan yang perlu mendapat perhatian serius, khususnya melalui pendekatan edukatif yang sesuai dengan karakteristik peserta didik. Penelitian ini bertujuan untuk menganalisis efektivitas permainan Stairs & Cigarettes dalam edukasi anti-merokok pada peserta didik Sekolah Menengah Atas. Penelitian menggunakan metode kuasi-eksperimen dengan desain *one group pretest–posttest*. Subjek penelitian adalah peserta didik SMA yang diberikan perlakuan berupa permainan edukatif berbasis gamifikasi. Instrumen penelitian berupa angket pemahaman bahaya merokok yang disusun berdasarkan konstruk *Health Belief Model, meliputi perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, dan self-efficacy.* Data dianalisis menggunakan statistik inferensial untuk mengetahui perbedaan skor sebelum dan sesudah perlakuan. Hasil penelitian menunjukkan adanya peningkatan pemahaman siswa yang signifikan setelah mengikuti permainan *Stairs & Cigarettes.* Peningkatan tersebut mencerminkan perubahan positif pada persepsi risiko merokok, manfaat perilaku anti-merokok, serta penguatan efikasi diri dalam menolak ajakan merokok. Temuan ini menunjukkan bahwa permainan *Stairs & Cigarettes* tidak hanya meningkatkan aspek kognitif, tetapi juga memperkuat kesiapan psikososial peserta didik.

Kata kunci: Anti-Merokok, Edukatif, *HealthBeliefModel*, Permainan, SMA

Introduction

Smoking is a public health issue that remains a global concern, particularly among adolescents. The World Health Organization (WHO) reports that the prevalence of adolescent smoking continues to rise, impacting long-term health risks and the economic burden on health systems (Saptono, 2022). In Indonesia, data from the Basic Health Research (Riskesdas) shows an increase in the number of teenage smokers over the past decade. Recent research in Batam showed that before education on the dangers of smoking, only 56% of teenagers had a good understanding, but after the educational intervention, this figure increased to 88% (Pramadhani et al., 2025). This phenomenon is influenced by various factors, including environmental influences, social interactions, and the low effectiveness of anti-smoking education implemented in schools (Saptono, 2022). The limited passive nature of anti-smoking education in schools, with minimal active participation from students, has contributed to their low understanding of the dangers of smoking. The lack of interactive educational interventions makes it difficult for students to develop a resistance to smoking. This requires serious attention, given that adolescents are an age group highly vulnerable to social influences, including encouragement to smoke (Samsugito et al., 2024).

Interview results indicate that students at SMA Negeri 9 Banjarmasin have a basic understanding that smoking is harmful to health. However, their understanding tends to be general and not yet in-depth, particularly regarding the long-term consequences on lung function, cancer risk, nicotine dependence, decreased academic achievement, and overall health productivity. Many students only know that smoking is "bad" without a detailed understanding of its scientific and psychosocial impacts. Furthermore, interviews also revealed that some students still view smoking as a normal part of adolescent social life, indicating the normalization of this behavior among their peers. This finding is supported by statements from guidance and counseling (BK) teachers who stated that smoking practices are still found in the school environment. In one incident, approximately 20 students were caught smoking together in a school restroom out of a total of 750 students enrolled. Although this percentage is relatively small, this incident indicates that smoking behavior persists and has the potential to spread if not addressed through systematic education and preventive interventions. This situation emphasizes the need for more comprehensive efforts to improve understanding through health education programs so that students not only understand the general dangers of smoking but also develop a strong awareness and attitude of rejection towards smoking. This study aims to determine the effectiveness of the Stairs & Cigarettes educational game in promoting anti-smoking attitudes among high school students. The focus of this study is to observe changes in students' understanding and attitudes toward the dangers of anti-smoking before and after participating in the educational game. Furthermore, this study aims to provide recommendations for more effective anti-smoking education methods for educational institutions. Through this study, it is hoped that findings will support the development of innovative approaches to health education in schools, particularly in efforts to prevent anti-smoking behavior among adolescents. Through this approach, this study aims not only to compare the effectiveness of the method but also to provide updates in the form of innovative educational methods that are more contextual and engaging for adolescent students.

This behavioral psychology phenomenon can be analyzed through Social Cognitive Theory (SCT) developed by Bandura. This theory emphasizes the importance of the interaction between individuals, behavior, and the environment, with self-efficacy as its primary component. Self-efficacy refers to an individual's belief in their ability to control certain actions, including refusing to smoke or maintaining a healthy lifestyle (Samsugito et

al., 2024)Students with high self-efficacy demonstrate healthy behaviors and resistance to social pressure to smoke. In line with this concept, research (Widiya Sari, 2022)Research shows that peer support has a positive effect on increasing adolescents' motivation to quit smoking. Educational activities involving peer support have been shown to foster students' self-confidence and confidence in resisting invitations to smoke from their environment. This approach also aligns with the Health Belief Model (HBM), which highlights how individuals' perceptions of perceived susceptibility and severity of health risks influence their decision to act. If students perceive smoking as harmful to their health and understand the perceived benefits of quitting, they will be more motivated to avoid the habit. However, perceived barriers and low self-confidence in changing are often key barriers, with self-efficacy again playing a key role (Tosun et al., 2023). This self-efficacy is closely correlated with Ajzen's Theory of Planned Behavior (TPB), which explains that Perceived Behavioral Control—the main component of TPB—can be equated with self-efficacy (Ajzen, 1991), and this relationship is also strengthened through TPB-based research in Indonesia which developed a smoking cessation behavior instrument (Narmawan & Narmi, 2021)When students feel able to control their behavior, their intention to act will be stronger, and their likelihood of actually avoiding cigarettes will increase (Awan & Zakir, 2024). Study (Aprilia et al., nd)also showed that providing simple education about the dangers of smoking at SMPN 27 Padang significantly increased students' knowledge of the harmful effects of smoking. These results suggest that interactive and contextualized health education can help students better understand the dangers of smoking.

The educational game Stairs & Cigarettes is a learning medium based on the concept of a ladder of awareness that delivers material in a gradual and interactive manner. Gamification, as the foundation of this game's development, is the application of game design elements such as points, challenges, and badges in a non-game context. The goal is to increase user motivation and participation in completing learning activities (Nyman et al., 2024).In the realm of education, the application of gamification has been proven to be effective in making the learning process more interesting and meaningful. Research by(Yıldız et al., 2024)showed that the use of gamification in health education, particularly in the context of smoking prevention, can increase student engagement and strengthen their understanding of the material presented. This approach encourages self-reflection and strengthens students' self-efficacy in refusing smoking, in accordance with the principles of Bandura's Social Cognitive Theory, which is also emphasized in studies on motivation and social-emotional learning (Korpipää et al., 2020)Stairs & Cigarettes offers a unique learning experience, where students don't just passively receive information but actively engage in the gameplay. The game presents a simulation through visual stairs, where players face challenges, make decisions, and experience the consequences of each choice. This approach encourages self-reflection and strengthens students' self-efficacy in resisting the urge to smoke, in accordance with the principles of Social Cognitive Theory (Lin et al., 2023). This game has been officially registered in the Registration Letter of Creation of the Directorate General of Intellectual Property of the Republic of Indonesia with: Registration Number: 000864083, Application Number: EC00202524720, Application Date: February 22, 2025, Title of Creation: Stairs & Cigarettes. With this legality, the game media is worthy of being used as a legitimate and accountable educational intervention. Research by(Irfan et al., 2020)found that the snakes and ladders game was effective in increasing junior high school students' knowledge about the dangers of smoking. This quasi-experimental study showed a significant increase in the average knowledge score of students in the intervention group after being educated through the snakes and ladders game, with a p-value of 0.002 (≤0.05) (Riski Ilahi et al., nd). A study at SMP Negeri 21 in Bengkulu City also found that the use of flashcards significantly increased students' knowledge about the dangers of smoking. Based on strong theory and empirical evidence, Stairs & Cigarettes is believed to be effective in

increasing students' understanding and developing positive attitudes toward the dangers of smoking. This research is expected to contribute to innovative approaches to health learning that are more contextual and enjoyable for adolescents (St Rosmanely et al., 2025).

Method

This study used a quasi-experimental method with a one-group pretest–posttest design. Data were collected through pretest and posttest measurements on one group of research subjects. The analysis used a paired sample t-test to determine significant differences between conditions before and after treatment was administered.(Putri Novita et al., 2025)Through this analysis, the impact of the Stairs & Cigarettes game on improving students' understanding of the dangers of smoking can be objectively measured. This quantitative analysis approach is commonly used in evaluating school-based health education programs.(Thomas et al., 2013). Based on the results of interviews with guidance counselors at SMA Negeri 9 Banjarmasin, the intervention objectives were formulated according to the students' conditions. Although they were aware of the dangers of smoking, their understanding was still general and had not yet touched on personal awareness regarding health risks, social impacts, and the dangers of passive smoking. Students were given a pretest to measure their initial understanding, followed by a treatment in the form of the Stairs & Cigarettes game, and then a posttest to objectively determine changes in understanding and anti-smoking attitudes, so this design was effective for assessing the direct impact of educational interventions in a real classroom context.

Table 1.*Research Design*

Group	Pretest(O1)	Treatment(X)	Posttest(O2)
Student Group	O1	X (Stairs&Cigarettes Game)	O2

Information:

O_1(Pretest) : Initial measurement of students' level of understanding regarding the dangers of smoking using a questionnaire.

X (Treatment) : Classical guidance services using the educational game Stairs & Cigarettes which is carried out in two meetings.

O_2(Posttest): Final measurement of students' level of understanding regarding the dangers of smoking using the same questionnaire as the pretest.

The study began with a pretest questionnaire to determine students' initial understanding of the dangers of smoking. Treatment was provided through a classical tutoring service based on the educational game Stairs & Cigarettes, conducted over two sessions, involving 34 students divided into eight small groups. After the treatment was completed, students completed a posttest questionnaire using the same instrument to determine changes in understanding and anti-smoking attitudes. Pretest and posttest data were then analyzed to determine improvements in student understanding. The research instrument, an anti-smoking educational questionnaire, was compiled based on the Health Belief Model (HBM) with a Likert scale and underwent validity and reliability testing before use. The questionnaire instrument in this study was compiled based on the Health Belief Model (HBM) indicators proposed by Rosenstock et al. (1988), which include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. The HBM model is widely used in health behavior research, including in studies of smoking behavior, because it is able to explain cognitive factors that influence individual decision-making regarding healthy behavior (Diyah Nur Muizzah & Luqman Effendi, 2025).

Table 2.*Reliability*

Reliability Statistics

Cronbach's Alpha	N of Items
,976	74

Case Processing Summary

		N	%
Cases	Valid	30	100,0
	Excluded[a]	0	,0
	Total	30	100,0

a. Listwise deletion based on all variables in the procedure.

Based on the results of the instrument reliability test using the Cronbach's Alpha coefficient, a value of 0.976 was obtained with a total of 74 statement items. This value indicates that the instrument has a very high level of reliability, so it can be declared consistent and reliable in measuring students' understanding and attitudes regarding the dangers of smoking. In addition, the results of the Case Processing Summary show that all respondent data of 30 students (100%) were declared valid and could be used in the analysis, with no data having to be excluded. This indicates that the data collection process went well and the instrument is suitable for use as a measuring tool in this study.

Results and Discussion

Based on the results of descriptive analysis of 34 students, it was found that there was an increase in students' understanding scores after being given treatment in the form of the educational game Stairs & Cigarettes.

Table 3.*Pretest*

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre Test Pemahaman Bahaya Merokok	34	182,00	333,00	265,0882	35,16573
Valid N (listwise)	34				

Table 4. Posttest

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Post Test Pemahaman Bahaya Meroko	34	266,00	353,00	309,8529	14,84696
Valid N (listwise)	34				

The average pretest score was 265.09 with a standard deviation of 35.166, while the average posttest score increased to 292.18 with a standard deviation of 32.716. This indicates an increase in the average score of 27.09 points after students participated in the educational game activities.

Table 5.*Normality Test*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre Test Pemahaman Bahaya Merokok	,105	34	,200*	,977	34	,678
New Post Test Pemahaman Bahaya Merokok	,145	34	,066	,964	34	,323

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results of the data normality test using Shapiro–Wilk, it was found that the pretest and posttest score data on understanding the dangers of smoking were normally distributed. In the pretest data, the Kolmogorov–Smirnov significance value was 0.200 and Shapiro–Wilk was 0.678, while in the posttest data, the Kolmogorov–Smirnov significance value was 0.066 and Shapiro–Wilk was 0.323. All significance values were greater than 0.05, so it can be concluded that the pretest and posttest data met the assumption of normality. Thus, the next inferential analysis used a parametric statistical test, namely the paired sample t-test.

Table 6.*Paired T-test*

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pre Test Pemahaman Bahaya Merokok - Post Test Pemahaman Bahaya Meroko	-44,76471	27,26087	4,67520	-54,27647	-35,25294	-9,575	33	<,001

The analysis results using a paired sample t-test were conducted to determine the differences in the level of understanding of the dangers of smoking among students before (pretest) and after (posttest) being given treatment in the form of the educational game Stairs & Cigarettes. The average difference value (mean difference) was obtained at -44.76471. This negative value appears because the calculation of the difference is done in the order of pretest minus posttest (Pretest - Posttest), so that when the posttest score is higher than the pretest, the difference result becomes negative. Thus, the negative sign does not indicate a decrease, but rather indicates that the posttest score is higher, or there is an increase in the average understanding of students by 44.76 points after the treatment is given.

The standard deviation value of 27.26087 indicates a variation in score increases between students, but in general all students experienced a trend of improvement. The relatively small standard error of the mean of 4.67520 indicates that the estimated average difference is quite accurate and stable. The results of the statistical test show a value of $t = -9.575$ with degrees of freedom (df) = 33. The df value in the paired t test is calculated using the formula $df = n - 1$, because the analysis is based on the difference in scores from the same data pair. In this study, the number of students was 34 people, so $df = 34 - 1 = 33$. This degree of freedom represents the amount of free information used to estimate the variance of the score difference. The large absolute t value ($|9.575|$) indicates that the difference between the pretest and posttest scores is quite strong.

Furthermore, the 95% confidence interval ranges from −54.27647 to −35.25294. Since the entire interval range does not cross zero, this further confirms that there is a significant difference between the two measurements. The significance value (Sig. 2-tailed) obtained is $p < 0.001$, which means it is much smaller than the significance limit of 0.05. Thus, the null hypothesis (H_0) which states that there is no difference is rejected, while the alternative hypothesis (H_1) is accepted. Overall, these results indicate that the educational game Stairs & Cigarettes is statistically effective in improving students' understanding of the dangers of smoking, as evidenced by a significant increase in scores after the treatment was given.

The results of the study indicate that the effectiveness of the Stairs & Cigarettes Game in anti-smoking education for high school students can be explained through changes in students' perceptions based on the Health Belief Model (HBM) construct. The results of the questionnaire compiled based on the Health Belief Model (HBM) construct showed that before the intervention, students' understanding of the dangers of smoking was still dominated by general knowledge without a strong personal awareness of health risks and psychosocial impacts, as also revealed in the interview results. After being given treatment in the form of the Stairs & Cigarettes educational game, there was a significant increase in

understanding scores in the aspects of perceived susceptibility, perceived severity, perceived benefits, cues to action, and self-efficacy, which was reflected in the increase in the average posttest score compared to the pretest and the results of the paired t-test which were statistically significant. These findings are in line with theoretical foundations, especially the Health Belief Model, Social Cognitive Theory, and the Theory of Planned Behavior, which emphasize the importance of perceptions of risk, benefits, and self-confidence in shaping health attitudes and behaviors. Thus, the questionnaire results not only reinforce the quantitative findings in the results section but also support the article's conceptual argument that game-based and gamification-based educational approaches can improve students' cognitive understanding and psychosocial readiness to reject smoking behavior. This finding aligns with the study(Diyah Nur Muizzah & Luqman Effendi, 2025)which confirms that increasing the perception of vulnerability, seriousness, and benefits is an important factor in shaping adolescents' awareness and attitudes toward smoking. On the other hand, the research results also show that students still face perceived barriers, particularly in the form of peer pressure and concerns about social acceptance when refusing cigarettes. However, through the Stairs & Cigarettes game, students receive cues to action in the form of visual messages, gameplay, and group discussions that encourage reflection and healthy decision-making. This condition is followed by increased self-efficacy, namely students' confidence in their ability to refuse invitations to smoke even in risky environments. This indicates that the game contributes to strengthening students' psychosocial readiness to face environmental pressures. These results are in line with the findings of(Laisyah Shava Zein Haryanto & Luqman Effendi, 2025)which states that the combination of reducing barriers, having triggers for action, and strengthening self-efficacy plays an important role in the success of anti-smoking education for adolescents based on the Health Belief Model.

Based on these findings, it can be understood that improving students' risk perception and self-efficacy is not only related to the content of the material presented, but also to the way the learning is designed and implemented. The success of the Stairs & Cigarettes game as an anti-smoking educational medium is also closely related to the characteristics of active and participatory learning. This aligns with research.(Iqbal Rezky et al., nd)A study in the Journal of Evaluation and Learning showed that activity-based learning and active participation significantly improved student learning outcomes. This game encourages direct student involvement through simulations, discussions, and reflection, preventing passive learning. These findings align with research(Aprausa Sieltiel et al., 2024)which shows that experiential learning and active participation can significantly increase student motivation and interest. Although the research was conducted in a higher education context, the principle of active learning that places students as the main subject is highly relevant to the design of the Stairs & Cigarettes game, which relies on direct student involvement in understanding the consequences of smoking behavior. With increased engagement and motivation to learn, educational messages become more easily understood and internalized by students. This active student involvement is inseparable from the structured and systematic learning design. The effectiveness of the Stairs & Cigarettes game can also be understood through a contextual learning approach that is designed in a planned and validated manner.(Rachman et al., 2024)In their publication in the Heliyon journal, they emphasized that systematically structured, project-based learning experiences supported by valid instruments can significantly improve students' understanding and competency. This principle aligns with the design of the Stairs & Cigarettes Service Implementation Plan (RPL), which is structured from the orientation stage, behavioral consequence simulations, to group reflection. This approach allows students not only to receive information but also to construct understanding through direct learning experiences, making anti-smoking education more contextual and relevant to their daily lives. The impact of game-based learning on students' psychological readiness is also supported by international research

findings.(Nyman et al., 2024)A study published in Health Education & Behavior reported that a game-based educational intervention significantly increased smoking refusal self-efficacy in early adolescents. These results indicate that games can strengthen adolescents' self-confidence in refusing smoking through interactive and enjoyable learning experiences. These findings align with the Stairs & Cigarettes study, which demonstrated increased student self-efficacy after participating in the game, particularly in dealing with social pressures related to smoking. These findings further strengthen the relevance of using a theoretical framework to explain the mechanisms of change in students' perceptions and behavior. In addition to game-based approaches, educational approaches that explicitly utilize the Health Belief Model (HBM) framework have also been shown to be effective in changing adolescents' perceptions and attitudes toward smoking.(Sayar & Çapik, 2025)A study in the Public Health Nursing journal showed that HBM-based education resulted in significant changes in students' smoking perceptions and health locus of control. These results support the findings of this study, where the Stairs & Cigarettes game was designed to strengthen all components of the HBM through consequence simulations, visual messages, and reflective discussions. Theoretically, these results align with the Health Belief Model (HBM), particularly in the aspects of perceived susceptibility and perceived severity.

The results also showed that the educational game Stairs & Cigarettes had a significant impact on improving students' understanding of the dangers of smoking. The significant increase in pretest to posttest scores indicates that the intervention through the game Stairs & Cigarettes contributed significantly to students' cognitive changes. This finding confirms that a game-based educational approach can be an effective alternative to conventional counseling methods, which tend to be passive and one-way. This is consistent with the finding that educational games can significantly improve students' knowledge and understanding of the dangers of smoking.(Rosidah et al., nd)The success of this intervention is inseparable from the systematic design of the Stairs & Cigarettes Service Implementation Plan (RPL), with a series of interactive learning stages ranging from orientation through icebreakers, core learning based on behavioral consequence simulations, to group reflection. This service structure provides a contextual and meaningful learning experience for students, because it not only presents information but also invites students to be directly involved in the learning process. These results reinforce the strategy in the Stairs & Cigarettes Service Implementation Plan (RPL), which places active learning and student experience as core elements, so that educational messages are understood not only conceptually but also practically. In addition, the Service Implementation Plan (RPL)'s focus on the use of visual media and props combined with feedback sessions and group discussions also strengthens student engagement in the health learning process. This is in line with the findings(Sopianti Nurhidayani & Handayani, 2025)which shows that health education using visual aids for eighth-grade students significantly increased their knowledge of the dangers of smoking, with a median score changing from 9.00 to 18.00 after the intervention (Wilcoxon Signed-Rank Test $p = 0.000$). These data empirically reinforce the choice of material design in the Service Implementation Plan (RPL), which emphasizes visual and interactive experiences to maximize students' understanding of health issues, particularly smoking prevention. Through game stages that display the consequences of smoking, students not only receive verbal information but also experience visual and situational simulations that make them more aware of the vulnerability and serious impact of smoking on health. Within the HBM framework, awareness of risk is an important prerequisite in forming an intention to avoid smoking. An interactive and contextual educational approach has also been proven in national research to increase students' awareness and knowledge of the dangers of smoking after game-based counseling.(Hamidah et al., 2025).Furthermore, the game's content, which emphasized the perceived benefits of quitting smoking and strategies for dealing with social pressure, strengthened students'

belief that healthy behaviors could be realistically implemented in everyday life. The findings of this study can also be explained through Social Cognitive Theory (SCT), which places self-efficacy as a key factor in behavioral change. The Stairs & Cigarettes game was designed to encourage students to make decisions, face challenges, and receive feedback on their choices. This process indirectly trained students' self-confidence in refusing smoking and maintaining healthy behaviors, especially in social environments that are permissive of smoking. The large effect size (Cohen's d = -1.081) supported the hypothesis that this intervention was not only statistically effective but also practically meaningful in building students' confidence in their ability to avoid smoking. The findings, as reported in the MANGKOK game study, demonstrated an increase in students' knowledge and motivation regarding smoking prevention through the game (Rosmini et al., 2023).

The results of this study are also consistent with previous research demonstrating the effectiveness of game-based learning media in health education. Research using snakes and ladders media showed an increase in students' knowledge and attitudes about the dangers of smoking after the educational game was presented (Rosidah et al., nd).Similarities These findings support the argument that interactive and visual approaches are more readily accepted by adolescents than traditional lecture methods. However, the strength of Stairs & Cigarettes lies in the integration of gamification concepts and behavioral theory, enabling the game not only to convey information but also to facilitate self-reflection and strengthen students' internal motivation. Furthermore, the gamification approach implemented in this game has been shown to increase student engagement during the learning process. The elements of challenge, consequence simulation, and group interaction encourage students to actively discuss, ask questions, and share their perspectives on smoking behavior. This is consistent with reports of the use of game-based evaluations as part of interactive outreach programs that enhance students' understanding of health materials.(Hamidah et al., 2025).With greater engagement, the internalization of anti-smoking values becomes more profound and extends beyond the cognitive level. Overall, the results of this study indicate that the educational game Stairs & Cigarettes is an effective medium for enhancing students' understanding and shaping positive attitudes toward the dangers of smoking. The integration of a gamification approach and a behavioral theory foundation makes this game relevant as an innovation in health education in schools. These findings provide practical implications for guidance counselors and schools to adopt more interactive and contextual learning methods in efforts to prevent smoking behavior among adolescents.

Conclusion

This study shows that the educational game Stairs & Cigarettes is effective in improving understanding and anti-smoking attitudes among high school students. Before the intervention, students' understanding of the dangers of smoking was still general and not accompanied by personal awareness of the health risks and psychosocial impacts. After being given treatment through a gamification-based game, there was a significant increase in understanding scores, as indicated by an increase in the average post-test score compared to the pre-test and a statistically significant paired t-test result ($p < 0.05$). This increase reflects positive changes in the Health Belief Model constructs, including perceptions of vulnerability, seriousness, benefits of healthy behavior, cues to action, and self-efficacy in refusing smoking invitations. These findings confirm that the game-based educational approach not only improves cognitive aspects but also strengthens students' psychosocial readiness in making healthy decisions. Therefore, the game Stairs & Cigarettes is recommended as an innovative and interactive media that can be integrated into guidance and counseling services and health education programs in schools as a preventive effort against smoking behavior in adolescents.

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