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Enhancing Learning Achievement on E-Cigarettes among Grade 10 Students through Social Media Tools and Tangible E-Cigarette Model at Satthasamut School, Thailand

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Abstract

This study aimed to (1) develop instructional innovations by integrating social media tools with a tangible e-cigarette model, (2) compare the learning achievement of Grade 10 students at Satthasamut School before and after the implementation of the learning program, and (3) examine students' satisfaction with the learning experience. The instructional tools included a health education lesson plan, digital media such as Kahoot, Quizizz, PowerPoint, Canva, and TikTok, along with a custom-designed tangible e-cigarette model used to visualize health risks associated with vaping. The research employed a pre-experimental, one-group pretest-posttest design with a purposive sample of 40 Grade 10/2 students in the second semester of the 2024 academic year. A 15-item multiple-choice test was used to assess knowledge, attitudes, behaviors, communication skills, and media literacy, while a satisfaction questionnaire evaluated students' experiences with the program. The instruments were validated by a panel of experts with IOC values ranging from 0.67 to 1.00. Data were analyzed using the Dependent t-test with a significance level of $p < .05$.

The results revealed a statistically significant improvement in students' posttest scores (Mean = 13.85, SD = 1.44) compared to pretest scores (Mean = 12.78, SD = 1.94), $t(39) = 5.73$, $p < .05$. Students' satisfaction was rated at the highest level (Mean = 4.74, SD = 0.51), especially regarding the relevance of the content, engagement through social media, and the effectiveness of the tangible e-cigarette model. These findings underscore the effectiveness of combining digital and physical instructional innovations to enhance learning outcomes and foster positive attitudes toward e-cigarette prevention. Furthermore, students demonstrated increased behavioral intentions to avoid vaping, suggesting the intervention's potential to support long-term behavioral change.

In conclusion, the integration of social media platforms and tangible educational models

represents a promising approach in health education. This strategy not only enhances cognitive understanding and engagement but also supports emotional and behavioral development related to substance use prevention. Educators are encouraged to adopt such innovations to improve the relevance, accessibility, and impact of health education among adolescents.

Keywords: Learning achievement, Social media tools, Tangible e-cigarette model, E-cigarettes, Health education

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1. Introduction

The increasing use of e-cigarettes among Thai adolescents represents a critical public health concern. These risky behaviors adversely impact not only students' physical and mental health but also disrupt school environments and hinder academic performance (MOPH, 2024; ThaiHealth, 2024). Therefore, it is essential to design innovative tangible strategies that effectively change attitudes and enhance students' knowledge, understanding, and behavioral intentions regarding e-cigarette cessation. To address this issue, Thailand has implemented robust government measures, particularly through the Ministry of Education and the Office of the Basic Education Commission (OBEC), to prevent e-cigarettes from reaching children, and has launched campaigns to prevent the spread of cigarettes and e-cigarettes in public institutions. The goal is to ensure schools are safe, smoke-free environments where every child can truly learn well and be happy. Concrete methods have been established to address the proliferation of cigarettes and e-cigarettes in schools. (Ministry of Education, 2025; OBEC, 2025). Despite these efforts, access to and use of e-cigarettes among youth remains prevalent, primarily due to the influence of social media and a general lack of awareness, social support, and life skills (Rueanpetch, 2021; Sirithirakul, 2021; Maneekul, 2023). Based on the identified challenges, recognizing the growing trend of e-cigarette use among Thai adolescents and the influence of social media, therefore, researcher in the role of health and physical education teacher at Satthasamut school is interested in developing innovative instruction in order to enhance students' learning achievement encompassing knowledge, comprehension, attitudes and ultimately support the cessation of e-cigarette use among Grade 10 students, additional, to compare the learning achievement regarding e-cigarettes before and after the implementation of the instructional innovations among Grade 10 students and examine the students' satisfaction on the e-cigarette learning program using social media tools and the tangible e-cigarette model.

2. Methods

This research employed a pre-experimental one-group pretest-posttest design. The sample recruited through purposive random sampling consisted of 40 students in Grade 10/2 who study in the second semester of the 2024 academic year at Satthasamut school, Samut Songkhram province, Thailand. Instruments and materials included: a lesson plan for the health safety course, social media tools, Kahoot, Quizizz, PowerPoint, Canva, TikTok campaigns encouraged students to quit vaping, and a tangible e-cigarette model designed as an educational tool to enhance students' understanding of the components and health risks associated with vaping. The multiple-choice pre-

test and post-test were developed for 15 items to assess students' knowledge, attitude, practice, communication skills, and media literacy regarding e-cigarettes on the Quizizz platform, and a satisfaction questionnaire was designed in terms of Google Forms to assess the learning program. The research instruments were validated by a panel of experts, and IOC values had a range between 0.67 and 1.00. The learning program takes a total of 4 hours, with one lesson per week over 4 weeks. All data analyses were completed using Jamovi version 2.5, level of significance was defined as $p<.05$.

3. Results and Discussion

Table 1. Comparison of learning achievement regarding e-cigarette between pretest and posttest among Grade 10/2 students using the Dependent t-test

	N	$\bar{X}$	S.D.	t	*P*
Pretest	40	12.78	1.94	5.73	0.00*
Posttest	40	13.85	1.44		

** P < .05*

According to Table 1, the comparison of learning achievement regarding e-cigarette among Grade 10/2 students revealed that the mean pretest score was $\bar{X}$ = 12.78, S.D. = 1.94, while the mean posttest score was $\bar{X}$ = 13.85, S.D. 1.44. The comparison between the pre-test and post-test scores indicated that the post-test score was significantly higher than the pre-test score at the .05 level of statistical significance. According to, particularly, those incorporating real-world tools and digital platforms can effectively enhance health-related learning outcomes among adolescents (Smith & Jones, 2022; WHO, 2023). The use of Kahoot, Quizizz, and TikTok allowed students to engage through familiar social media platforms, supporting digital literacy and enhancing their attention. Furthermore, the tangible educational model of the e-cigarette, a dissected version of a real vaping device, served as a powerful visual and hands-on tool. This is relevant to experiential learning theory, which emphasizes the role of active participation in shaping cognitive and emotional learning (Kolb, 1984).

Table 2. Mean and Standard Deviation of satisfaction with the learning program regarding E-cigarette among Grade 10/2 Students

Item	**Satisfaction**	$\bar{x}$	*S.D.*	**Interpreted**
1.	Learning content was beneficial	4.85	0.36	Highest
2.	Enhancing students' knowledge.	4.75	0.54	Highest
3.	Enhancing students' understanding.	4.68	0.57	Highest
4.	Enhancing students' attitudes.	4.70	0.56	Highest
5.	Social media tools promoted creativity, initiative, and discussion	4.70	0.56	Highest

6.	Content encouraged e-cigarette cessation via TikTok, raising public awareness and attitude	4.65	0.57	Highest
7.	The e-cigarette model was an effective educational tool.	4.83	0.38	Highest
8.	Activities were diverse, a new learning experience	4.68	0.65	Highest
9.	Opportunities to express themselves	4.83	0.38	Highest
10.	Students have more actively learned.	4.78	0.52	Highest
	Mean	4.74	0.51	Highest

According to table 2, the analysis of satisfaction among Grade 10/2 students indicated that their satisfaction with the learning experience using social media tools and the tangible e-cigarette model was at the highest level, with a mean score of $\bar{x} = 4.74$, S.D. = 0.51, particularly on the usefulness of content, creative class activities, TikTok campaign effectiveness, and tangible e-cigarette model. Notably, incorporating TikTok as a platform for creating and sharing anti-e-cigarette messages empowered students to be both learners and advocates. As they perceived the content as highly relevant, practical, and aligned with their context. The integration of current health information related to e-cigarettes made the learning experience meaningful and immediately applicable, helping students understand both the risks and prevention skills.

4. Conclusion

The findings of this study revealed that the instructional innovations integrating social media tools and a tangible e-cigarette model significantly enhanced the learning achievement of Grade 10 students of Satthasamut School. This research confirms that instructional innovations integrating digital platforms and tangible models can significantly enhance students' learning outcomes related to the risks of e-cigarettes. The approach not only improves students' knowledge, understanding, and attitudes toward e-cigarette use prevention but also encourages behavioral intention to quit vaping. The use of popular platforms like TikTok, gamified learning with Kahoot, and visual design tools like Canva fostered high student engagement. The tangible e-cigarette model provides a concrete learning experience, deepening students' knowledge and understanding. Moreover, students reported the highest level of satisfaction with the learning program, appreciating the learning content, creating tangible instructional innovation tools, opportunities for active learning, and the TikTok campaign that made the content more relatable and engaging. The results suggest that educators should consider integrating digital media and tangible tools in health education, particularly on sensitive topics like substance use prevention. Doing so can foster greater student engagement, attitude, critical thinking, and long-term behavioral change.

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