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Digital Learning of Health Promotion Media to Achieve Quality Education Through Sustainable Development (SDGs).

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Abstract: Health promotion media is a communication tool designed to accelerate education towards sustainable development (SDGs) in the health sector. Digital learning is an option to reduce limitations in the learning process. This study aims to determine the effectiveness of knowledge of health promotion media before and after digital learning. The research method is a pre-experiment with a one-group pretest-posttest design without control. The number of samples was 38 Level I students in the odd semester of the 2026/2027 academic year, obtained by purposive sampling. The data collection method used a critical knowledge instrument in the form of a questionnaire. The results of the normality test showed that the data were not normally distributed, with a Wilcoxon pairwise correlation test p-value <0.05, meaning there was a difference in the average ability of participants in knowledge of health promotion media before and after digital learning. The average grouping of student knowledge based on the N-Gain value ≥0.30, namely 0.33 - 1.00, concluded that students' abilities in knowledge of health promotion media after effective digital learning improved better (medium category). This is because digital learning is a supporting factor in the health education movement.

Keywords: Digital Learning, Media, Health Promotion, SDGs

Introduction

The importance of digital platforms that contain health information in an interesting, concise, and relevant way for all levels of society is a media preference that is needed today (Herdanindita et al., 2025). Low health knowledge will affect a person's health behavior, which will have an impact on the incidence of diseases that can be prevented by healthy behavior. The increasing number of cases of non-communicable diseases (NCDs) globally concludes that people's behavior in implementing healthy behaviors is still low (Iqbal et al., 2024; Troisi et al., 2024). Healthy behaviors, including factors that can be changed, such as increasing physical activity, not smoking, managing stress, getting enough rest and fulfilling a balanced diet (Jumadewi et al., 2023). To reduce the limitations of knowledge, attitudes and healthy actions, an information media is needed that contains health messages in preventing and promoting healthy behaviors. One of them is learning in the field of health promotion for the purpose of improving health in the digital era (Martias & Daswito, 2024). Digital health learning increases the opportunity for innovative interventions to improve health, (Nurleli et al., 2025) and accelerates education on health values (Jumadewi et al., 2024; Notoatmodjo, 2022).

Health promotion media is an effective communication tool for conveying health messages. Information obtained through health messages will encourage changes in unhealthy public behavior to healthy behavior (Iqbal et al., 2024). The importance of maintaining health by providing education, health counseling, providing health information and applications in the form of healthy living practices (Keren Stelin Maliangkay et al., 2023; Sarwoyo et al.,

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2024). The findings show that students exposed to digital approaches will achieve higher conceptual understanding (Nurbaya, 2026). Teacher professionalism is required to improve digital age capabilities (Masruroh et al., 2024; Rahma et al., 2023). Digital learning is reported to be effective and strategic in attracting students' interest in increasing knowledge (Nursafitri & Ansori, 2024) and implementing health learning (Elisa et al., 2022; Hasibuan et al., 2024). Health education through digital learning can design educational and preventive programs in the community, by offering various applications that are easily accessible and free (Fernanda et al., 2025; Hadiansyah et al., 2025). This learning all aims to provide a comprehensive education and learning format integrated with information technology, (Afriani et al., 2024) to achieve sustainable development (SDGs) in the health sector, (Martias & Daswito, 2024) including media practices that can exploit health messages in order to improve public health efforts (Sembada et al., 2022).

According to Lawrence Green's theory (1980), health education is a combination of predisposing, supporting, and reinforcing factors. The availability of media and facilities is a supporting factor for health education. Health education efforts not only change people's behavior but are a combination that involves the environment or surrounding facilities as a means of supporting health behavior change movements (Nurmala et al., 2020). The term health promotion has developed more broadly to include strategies such as advocacy and public policy through the 1986 Ottawa Charter (Ryadi, 2016). The term health promotion as processes that enable people to increase control over, and improve their health, namely controlling behavior and improving one's health to achieve a degree of health. Health supporters must be followed by environmental factors, behavior, heredity, and health services that are conducive to achieving health. The Ministry of Health program places health promotion under the control of the Directorate of Health Promotion and Community Empowerment. The performance of health promotion officers at each community health center will serve the community directly as an important part in supporting the government's health movement campaign.

Choosing media as a communication tool is certainly a concern, (Rinadevi et al., 2025; Suriyanto et al., 2025) with digitally integrated media such as infographics, motion graphics, podcasts, or social media content being the choices of the digital era (Hanifah et al., 2025; Sari et al., 2025). Digital learning with the concept of health promotion adapts cultural values to support the public health movement. The younger generation is the main key in preparing themselves and the nation towards a golden Indonesia 2045, this effort can be achieved through improving the quality of education, developing digital and technology-based skills. Without eliminating national cultural values and becoming agents of change in the digital era. Digital learning technology will be a factor in supporting massive health campaigns.

Method

This pre-experimental study, with a one-group pretest-posttest design, involved one experimental class without a control class. This study used a quantitative approach to measure participants' critical thinking skills in applying knowledge of health promotion media. The subjects of this study consisted of 38 first-year students majoring in TLM at the Poltekkes Kemenkes Aceh in the odd semester of the 2025/2026 academic year. Learning used the DIA (delivery, interaction, and assessment) method, focusing on health prevention and promotion materials. The assessment instrument used a questionnaire with critical knowledge indicators. Students were given pre- and post-digital learning tests to measure changes in their knowledge abilities. Statistical tests used the Wilcoxon paired-sample test of pre- and post-digital learning scores with a comparison of N-Gain scores (Nugroho, 2014; Wahyuni & Rosana, 2025).

Table 1. N-Gain Criteria N-Gain Score

N-Gain Score	Criteria
N-Gain ≥ 0.70	High
0.70 > N-Gain ≥ 0.30	Medium
0.30 > N-Gain	Low

(Hake, 1999)

The flow of this research is shown in the chart below:

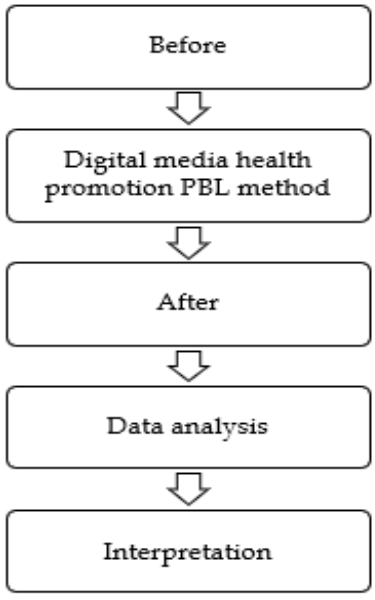

Figure 1. Research chart

Result and Discussion

The research results obtained show that the characteristics of the participants were dominated by those aged 19 years (86.8%) and female (89.5%), as shown in the following figure:

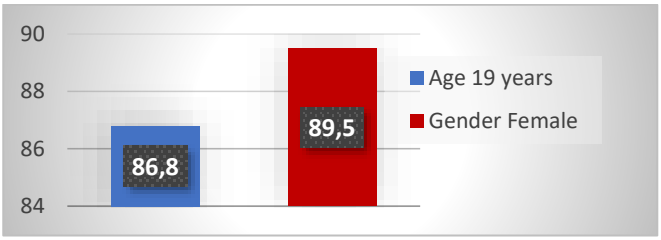

Figure 2. Characteristics of dominant participants

Descriptive Analysis

The results of the descriptive analysis of health promotion media carried out by participants before and after digital learning are as follows:

Table 1. Results of Descriptive Analysis

Digital learning	N	Min	Max	Mean	Std. Deviation
Before	38	30	80	50.26	14.423
After	38	60	100	90.26	14.794
Valid N (listwise)	38				

A normality test was conducted to determine whether the data on respondents' ability to apply knowledge of health promotion media before and after digital learning was normally distributed. The normality test is shown in the following table:

Table 2. Results of Data Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Before	.270	38	.000	.877	38	.001
After	.403	38	.000	.670	38	.000

The results of the normality test using Kolmogorov-Smirnov and Shapiro-Wilk obtained p<0.05, meaning that the data obtained in this study were not normally distributed. Data analysis will be continued with a paired sample correlation test using a non-parametric test with the Wilcoxon paired correlation test and compared with the N-Gain correlation test.

Table 3. Results of the Wilcoxon Pairwise Correlation Test

	Media postest - media pretest
Z	-5.417[b]
Asymp. Sig. (2-tailed)	.000

The results of the paired sample correlation through the Wilcoxon Test concluded that there was a significant influence between health promotion media before and after digital-based learning because the values obtained were Z = 542 and p = 0.00.

Table 4. Results of the N-Gain Correlation Test

	N	Min	Max	Mean	Std. Deviation
Ngain_score	38	.33	1.00	.8262	.26025
Ngain_persen	38	33.33	100.00	82.6190	26.02504
Valid N (listwise)	38				

A further comparative test was conducted to determine the effectiveness of the average differences obtained by students. The N-Gain correlation test obtained a mean value of 0.8262, which means N-Gain ≥ 0.70. This concludes that digital learning is effective in increasing student knowledge. The increase in student knowledge is indicated by a minimum value of 0.33 and a maximum of 1.00, based on the N-Gain score criteria, namely N-Gain ≥ 0.30, which means that digital learning is effective in increasing student knowledge about health promotion media with an effectiveness category of medium.

Discussion

The role of digital learning can improve participants' knowledge in health promotion media skills. The results of the study showed that participants' abilities in health promotion media knowledge before and after digital learning experienced a significant increase, because the Wilcoxon p-value test value <0.05. Digital learning can increase students' independence and motivation in the digital environment globally (Baitasheva et al., 2025). The development of digital media is better known for being interactive in delivering teaching materials and being an innovative solution in improving learning outcomes (Rinadevi et al., 2025). Digital learning from research results Mawardi & Nur, (2022); and Muliaman et al., (2022) concluded that there is a significant influence in using a quantum learning model assisted by digital media on the results of scientific literacy and student efficacy (Zamista & Azmi, 2023).

The students' abilities from the results of the health promotion media answers before and after digital learning show different effectiveness results in each assessment indicator. Where, the results obtained are based on the N-Gain score=0.8262 (rounded to 0.83). The difference in each learning group is indicated by the minimum result=0.33 and maximum=1.00. The difference in the values obtained is at the N-Gain value≥0.30. These results conclude that there is a difference in the abilities of participants in health promotion media after digital learning shows an effective increase, with an average increase in the

medium category (N-Gain≥0.30). This is because digital learning can improve a person's knowledge and skills in receiving and practicing learning. In accordance with research that has been conducted, digital learning is effective in increasing changes in participants' knowledge to an increase in the medium category with an average value of 65.14 in the experimental class (N. W. Putri & Rahmah, 2020; Sholihah et al., 2023). This learning is a strategy for implementing inquiry-based learning, a learning model with a strategy that prioritizes active and independent student involvement (Heksa, 2020; Mawardi & Nur, 2022; G. H. S. Putri et al., 2025). The increase in student knowledge after digital learning, in addition to digital learning being proven effective, also improves critical, creative, and problem-solving thinking skills. Thus, it can be an alternative learning method in the digital era (Rosydiana et al., 2023).

The challenges of the digital era must be accompanied by teacher support in the application of digital technology. As teachers, the learning process must be integrated with technological advances to enable digital learning to play a role as a source of teaching materials. Teachers' readiness to optimize digital integration is crucial for the success of this learning process, in addition to the availability of adequate facilities to support digital device facilities (Anjarwati et al., 2025; Masruroh et al., 2024). Digital innovation is recognized as attracting more interest and talent from students, making digital teaching materials suitable for use in the learning process, including health promotion media. The appearance of digital platforms is attractive, practical, and easily accessible, as is the presence of artificial intelligence (AI) which is now increasingly developing and becoming an option (Martias & Daswito, 2024; Yulihendri & Evanita, 2023) and has become a current necessity as a form of implementing the independent curriculum (Pratama et al., 2021; Prihantoro & Hidayat, 2019). The implementation of the independent curriculum with advances in digital technology greatly assists the learning process (Utami et al., 2025; Yunita et al., 2023). Advances in digitalization can enhance the role of teachers in developing the quality of learning and actively enhance the role of students (Dewi & Sunarni, 2024). The health sector is also experiencing a transformation in learning, especially in the field of health promotion. Health messages delivered as a source of information are crucial to the success of health promotion, both preventive and curative, which can increase compliance for both prevention and treatment (Mustara et al., 2025). Health promotion media is an effective and efficient choice of information source in encouraging the public to behave healthily. Even just a mobile phone can be a source of smart health media (Pohan et al., 2024). Digital progress is developing rapidly in every aspect of life and can be reached by all levels of society, including sick people who can utilize digital health as a health media media. Where, digital education presents new knowledge and insights that are integrated and real-time (Abernethy et al., 2022).

Before digital learning developed rapidly, the most common and frequently used health promotion media to convey health messages were still conventional (Jatmika et al., 2019). In contrast to today, learning health promotion media has undergone many changes, both in terms of learning methods and methods. With the help of online digital technology, it can facilitate the limitations of learning that was previously carried out conventionally. The number of digital platforms in the health sector continues to grow, one of which is the digital platform of the Aceh Ministry of Health Polytechnic. The platform used is an internal platform that offers a digital learning process. Official digital platforms at the Ministry of Health can also be accessed using mobile applications, such as SATUSEHAT Mobile, AyoSehat, JKN Mobile Application, SehatPedia, Indonesia Health Facility Finder (IHeFF), telemedicine applications and other social media applications. One application that has been successfully used for health promotion education purposes and can detect sexually transmitted infections (STIs) is through the "SIMANIS" application (Hanifah et al., 2025). These various digital health platforms have offered a wealth of health information that can improve basic health knowledge easily and for free. This digital platform contains many messages that serve as information to the public, making it more effective and in line with current health issues (Jubaedah et al., 2020; Masthura et al., 2020). This digital media can improve operational efficiency and expand the reach of health services(Sarwoyo et al., 2024) In addition, it has proven effective as a means of health promotion education, (Sembada et al., 2022) and is in line with current developments, which are all digital and can be reached by many target audiences, including adolescents (Hadiansyah et al., 2025). Digital technology has even become a significant area of interest among academics as part of the global digital transformation. This technology plays a vital role in improving student performance and increasing teaching effectiveness (Wang et al., 2024). The reach of digital learning expands access to global resources, as well as facilitating collaboration-based learning (Hildayanti et al., 2025), with a project-based learning model (Rizaldi & Fatimah, 2023).

The problem of students' ability to apply knowledge of health promotion media is certainly influenced by strong and integrated insights from the communication and health promotion materials obtained to achieve the effectiveness of the learning

process (Dian, 2021). These skills can be improved through digital learning, digital media innovation as a transformation of health information contains learning about the importance of promotive and preventive actions for a disease that aims to improve the health status of individuals, groups and the wider community (Notoatmodjo, 2022). According to existing research, digital learning through social media can improve health promotion and build public opinion in increasing health insight such as the case of the COVID-19 pandemic (Lyu et al., 2021). The Covid-19 period is evidence of educational reform by continuing to learn and effectively improving student abilities (Listiani et al., 2022).

A person's abilities are influenced by health promotion knowledge(Chasanah & Supriani, 2016) and the implementation of health promotion(Said et al., 2020) Health promotion can influence changes in personal behavior and community behavior in general (Herawati et al., 2019). The resulting media application is an important part of the supporting facilities for health promotion media programs (Febriawan & Sari, 2019; Hasibuan et al., 2024). Health promotion media also serves as a tool to help the community improve knowledge, attitudes, and actions for healthy behavior movements (Jubaedah et al., 2020; Suhertusi et al., 2015). Digital learning of health promotion media is significant in showing differences in motivation (Ferasinta & Dinata, 2020) and is effective in increasing knowledge (Wahyuni & Rosana, 2025).

Conclusion

The characteristics of the health promotion learning participants were mostly 19 years old and female. Data analysis revealed a significant increase in students' abilities in health promotion media after digital learning was conducted based on the Wilcoxon test value. Data on differences in student abilities were indicated by values between 0.33-1.00, when compared with the N-Gain score value, indicating that the average effectiveness of student abilities was in the medium category because the N-Gain score>0.30.

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Asri Jumadewi: Contributed to conceptualization, A, and F; Methodology; A,F,As,P; Investigation; A;Writing the original draft ; Validation A.; All authors have read and approved the published version of the manuscript.

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The authors declare that there is no conflict of interest.

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