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EduHealth Time Application for Enhancing Nutrition and Health Knowledge and Skills among Junior High School Students

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ABSTRACT

Background: Adolescents often acquire health knowledge through traditional education but frequently face challenges in sustaining healthy behaviors due to a range of social, environmental, psychological, and developmental factors.
Contribution: We developed "EduHealth Time," an Android application co-designed with educators and health personnel to deliver on-demand health education videos and integrated screening modules (anthropometry, anaemia risk, illness monitoring), with built-in functionality for exporting data to support School Health Unit documentation.
Method: A one-group pretest-posttest design was implemented during a community-service pilot at SMPIT As-Salam Malang (October–November 2024), involving 65 junior high school students. The app development followed the Plan–Act–Observe–Reflect cycle. Usability and feasibility were evaluated through a seven-item structured survey.
Results: EduHealth Time was made publicly available on Google Play. Usability outcomes were highly positive: 92% of participants reported ease of data entry, 100% experienced no system errors, and 100% completed screening tasks without difficulty. The educational and screening functions were rated feasible by 92% of users. Significant improvements were observed in knowledge scores: +5.2 points for balanced diet, +21.4 points for physical activity, and +7.4 points for reproductive health.
Conclusion: The EduHealth Time application is a scalable and contextually relevant mHealth platform that enhances adolescent health knowledge and supports self-monitoring. Its integration of multimedia learning and screening features provides a model for continuous school-based health education.

1. Introduction

The Adolescence is a formative period characterized by rapid physical, cognitive, and social changes, during which health behaviours established can persist into adulthood. Although traditional education effectively imparts knowledge about nutrition, physical activity, and reproductive health, many adolescents struggle to sustain healthy habits over time. This disconnect arises from intersecting social, environmental, psychological, and developmental factors. Peer influence remains a powerful driver of behaviour: adolescents seeking autonomy and social acceptance may adopt unhealthy practices such as smoking or poor dietary choices despite understanding long-term risks [1], [2]. Socioeconomic disparities further limit access to healthy foods and safe recreational spaces, while engaged parental support has been shown to reinforce positive health actions [3], [4]. Individually, low self-efficacy and a preference for immediate gratification undermine the translation of health knowledge into consistent behaviour, especially in areas like reproductive health where stigma and misinformation persist [5], [6].

In Indonesia, adolescent health challenges remain acute, particularly regarding nutritional status, anaemia, and early reproductive health behaviours. The School Health Unit (UKS) program is tasked with addressing these issues, yet often lacks innovative, youth-centred tools to meet students' needs in an engaging and practical manner. Current health promotion efforts are fragmented and heavily reliant on periodic campaigns, limiting sustained impact.

Mobile health (mHealth) applications offer a compelling solution by delivering interactive, multimedia educational content directly to adolescents' smartphones. School-based digital interventions have demonstrated promise across multiple domains: USSD-based apps improved access to sexual and reproductive health information in resource-limited settings [7], telehealth mobile platforms increased STI testing rates [8], and mental health apps enhanced engagement and cognitive outcomes in teletherapy for social anxiety [9], [10]. Similarly, physical activity and obesity prevention apps have yielded favourable self-reported behaviour changes and quality-of-life improvements [11], [12].

Despite these advances, many existing mHealth tools separate educational modules from practical health-screening functionalities, limiting users' ability to apply knowledge through self-monitoring. Integrating multimedia learning with in-app screening such as symptom checklists or anthropometric assessments has shown enhanced knowledge retention, self-efficacy, and empowerment in reproductive health, cardiovascular wellness, and oral hygiene interventions [13]–[15].

Previous studies have demonstrated the potential of mHealth apps to deliver health content effectively, but few have integrated real-time screening tools that allow adolescents to track their own health status within the same platform [16]. Moreover, localized co-design practices are rarely employed, resulting in tools that do not reflect the digital literacy, cultural context, or health priorities of Indonesian adolescents [16], [17]. This presents a clear research gap.

The novelty of this study lies in its development of an integrated mHealth application, "EduHealth Time" that combines high-quality video education, adolescent health screening features, and direct data linkage with School Health Units. It is co-designed with school stakeholders, tailored to the Indonesian context, and evaluated through real-world implementation in a junior high school setting.

Accordingly, this study aims to evaluate the feasibility and usability of EduHealth Time, and assess its impact on students' health knowledge in three key areas: balanced diet, physical activity, and reproductive health. The findings are expected to contribute to scalable strategies for school-based mHealth deployment in Indonesia.

2. Method

The study employed a one-group pre-test-post-test design as part of a community service initiative at SMPIT As-Salam Malang, conducted from October to November 2024. A total of 65 junior high school students participated. The implementation process followed an action research model using the Plan–Act–Observe–Reflect (PAOR) cycle, which emphasizes iterative co-design and feedback integration with school stakeholders. The overall workflow is illustrated in Figure 1.

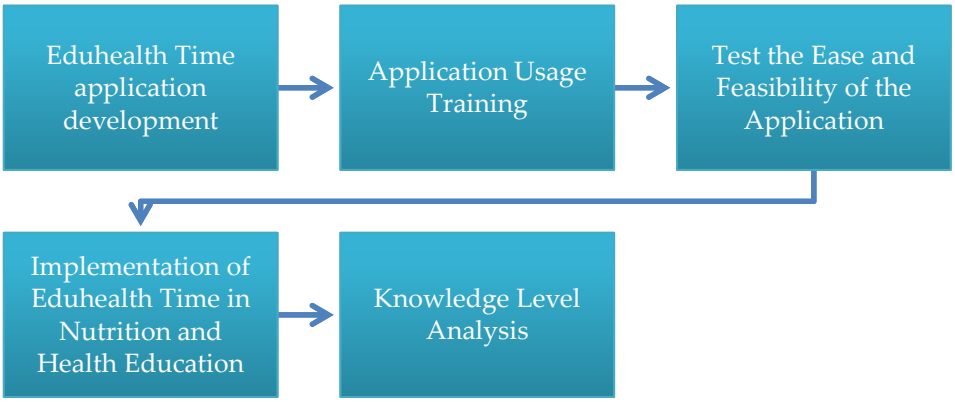

Figure 1. Community Service Activity Flow

The development of the EduHealth Time application began with the planning phase, during which coordination meetings were held with school personnel to identify the specific needs of both students and the School Health Unit in the domains of nutrition, physical activity, and reproductive health. This was followed by the action phase, where the team designed and developed the application's prototype and integrated its core functions, as summarized in Table 1.

The application features four primary menus:

1. Educational health videos (covering topics such as nutrition, mental health, and reproductive health),
2. Screening tools for anthropometry and anaemia,
3. Illness monitoring records,
4. Frequently asked questions and contact support information.

All health data entries, including nutritional status assessments, anaemia symptom checklists, and illness logs and can be exported in Microsoft Excel format for integration into School Health Unit records, supporting administrative efficiency and follow-up health planning.

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Table 1. Overview of the EduHealth Time application

No.	Application Menu	Sub Menu	Description
1	Health Videos		Let's Be Physically Active Meeting Adolescent Nutritional Needs Adolescent Mental Health Healthy and Balanced Diet Body Image Reproductive Health
2	Student Records	Student Data	School ID Number Name
		Anthropometry and Nutritional Status	Gender (man, woman) Weight (kg) Height (cm) Age (year), (month) Conclusion Body Mass Index Nutritional Status
		Anemia Screening	5 Ls symptoms headache/dizziness, pale appearance on face, hands, eyes, lips, skin, nails Conclusion At risk/Not at risk
		Illness Monitoring	Day Illness Treatment
3	QnA	What is EduHealth? Who can use EduHealth? How can I use EduHealth? Contact information for support or questions	
4	About the App	Authors Email	

Following development, the observation phase included preliminary usability testing to verify functionality and identify necessary refinements. The final phase involved reflection and formal evaluation of the application's feasibility and usability using a validated seven-item questionnaire, administered after the intervention.

In addition to the digital intervention, the community service activities delivered structured health education sessions using the EduHealth Time video modules. These sessions addressed three key topics which are healthy and balanced diet, adolescent physical activity, and reproductive health, identified as priority areas based on student needs assessments.

To evaluate the effect of the intervention on knowledge acquisition, a 30-item multiple-choice questionnaire was administered before and after the intervention. This instrument was adapted from validated educational materials and tested for content validity by three public health experts.

Internal consistency was assessed using Cronbach's alpha ($\alpha = 0.83$), indicating acceptable reliability. Data analysis was performed using SPSS version [insert version]. Paired sample t-tests were conducted to determine the statistical significance of pre-test and post-test score differences across each topic area. A p-value of <0.05 was considered statistically significant.

3. Results and Discussion

The EduHealth Time application has been officially published on the Google Play Store as shown in Figure 2. This application is available at https://play.google.com/store/apps/details?id=nutrisoftbank.android.eduhealth. All application features are currently only available in Indonesian.

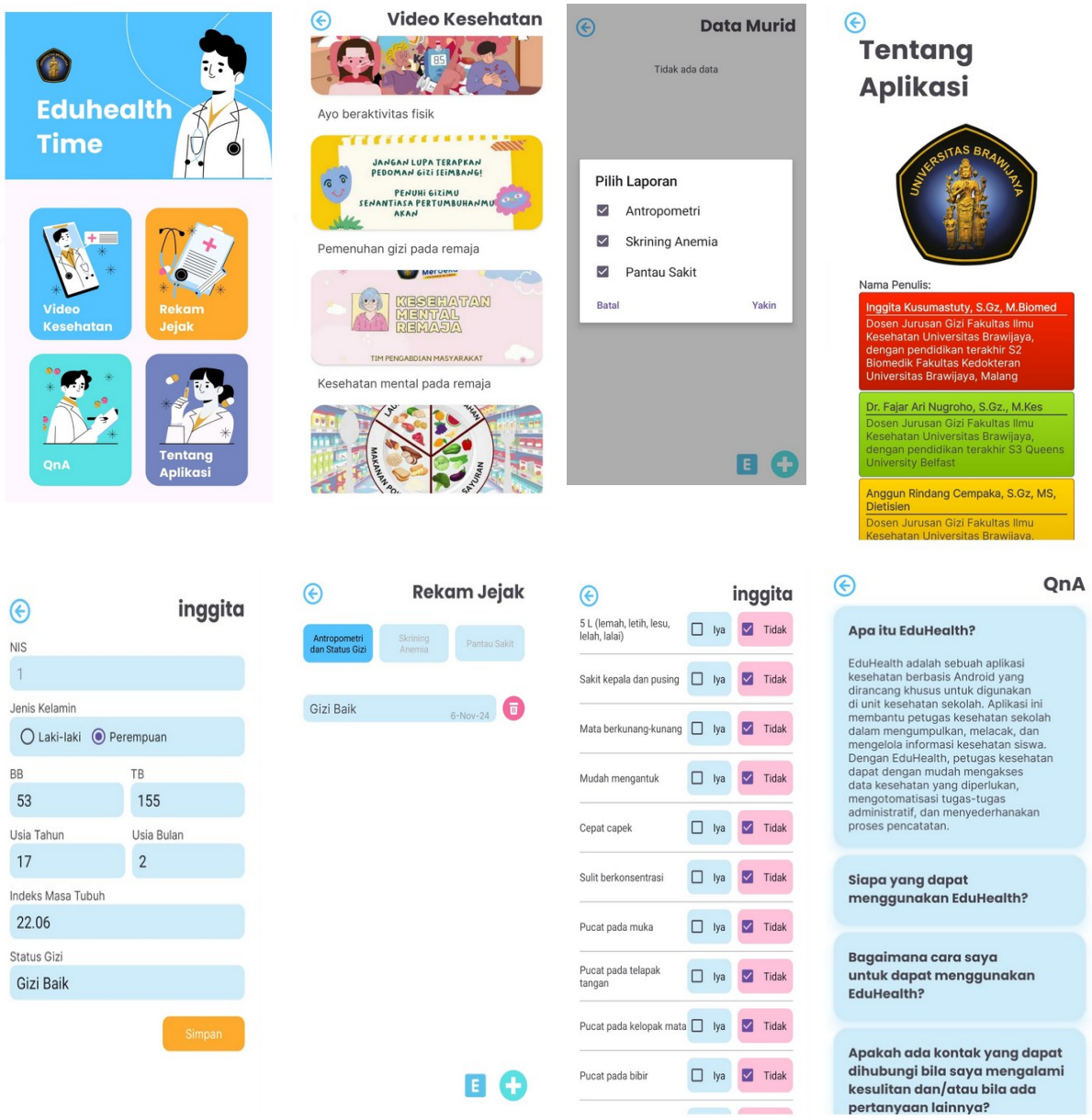

Figure 2. EduHealth Time Application

As seen in Table 2, The training component consisted of nutritional status assessment, anaemia screening, and health data recording using the application. This training involved 65 students, the majority of whom were female (55.4%).

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Table 2. Characteristics Of Community Service Participants

Characteristic		n	%
Gender	Male	29	44.6
	Female	36	55.4
Grade	7	22	33.9
	8	29	44.6
	9	14	21.5
Total		**65**	**100**

The results from the application's usability and feasibility assessment were highly satisfactory in Table 3. 92% of participants rated data entry as "easy", 100% reported no system errors, and all participants completed data entry tasks without difficulty. Additionally, 92% of students found the app feasible for educational delivery, nutrition screening, anemia detection, and illness monitoring.

Table 3. Level of Usability and Feasibility of the EduHealth Time Application

No	Parameter	Result	
		n	%
1	Ease of data entry		
	Easy	60	92
	Difficult	5	8
2	Error frequency		
	None (0)	65	100
	Rare (<3)	0	0
	Often (3-5)	0	0
	Very Often (>5)	0	0
3	Completion of data entry		
	Easy	65	100
	Difficult	0	0
4	Feasibility for education function		
	Feasible	60	92
	Not Feasible	5	8
5	Feasibility for nutrition screening		
	Feasible	60	92
	Not Feasible	5	8
6	Feasibility for anemia screening		
	Feasible	60	92
	Not Feasible	5	8
7	Feasibility for illness monitoring		
	Feasible	60	92
	Not Feasible	5	8

The application was developed in response to school stakeholder input and consists of four primary menus which are health education videos, anthropometric and anemia screening tools, illness monitoring, and a Q&A/help section. Screening data can be exported for School Health Unit documentation. Six educational videos including "Let's Be Physically Active," "Meeting Adolescent Nutritional Needs," "Adolescent Mental Health," "Healthy and Balanced Diet," "Body Image," and "Reproductive Health", are available on demand or can be used by staff in classroom-based health instruction.

Students also received in-person education aligned with the app content. Knowledge assessments showed clear improvements across all three areas: +5.2 points for balanced diet, +21.4 points for physical activity, and +7.4 points for reproductive health in Table 4. All improvements were statistically significant ($p < 0.001$).

Table 4. Mean Pretest and Posttest Scores

Topic	Score (Mean)		p
	Pre-test	Post-test	
Healthy and Balanced Diet	86.5	91.7	< 0.001
Physical Activity in Adolescents	66.1	87.5	< 0.001
Reproductive Health	90.8	98.2	< 0.001

This study evaluated the usability, feasibility, and initial educational impact of EduHealth Time, a co-designed, multimedia-integrated mHealth platform for junior high school students. The application achieved high ratings for usability (92% ease of data entry) and 100% task completion, suggesting that the interface was well-aligned with adolescent digital literacy levels. These results support the Cognitive Theory of Multimedia Learning (CTML), which emphasizes minimizing extraneous cognitive load to facilitate user engagement [18].

The co-design process, based on the Plan–Act–Observe–Reflect cycle, likely contributed to functionality that met user expectations. Prior studies on adolescent mHealth tools have reported usability barriers due to poor navigation or unclear layouts [19], [20], but our study indicates that collaborative development enhances alignment with user needs. The embedded tools (e.g., BMI calculator, anaemia checklist) were not only completed by all users but were also deemed highly feasible (92%), supporting findings that real-world task integration increases perceived utility and long-term retention [21].

Post analysis confirmed statistically significant knowledge gains in all modules. The largest gain (+21.4 points) occurred in the physical activity module, potentially reflecting lower baseline familiarity among students. According to CTML, pairing verbal explanations with visual demonstrations (as seen in this module) enhances processing and recall. Additionally, the use of teach-back features, where students are prompted to review and articulate key points, likely reinforced learning, consistent with constructivist learning theory [22]. A recent review of studies on the effectiveness of health apps in reducing anaemia in adolescent girls also reported results that support the findings of this study [23].

Our findings also align with Social Learning Theory, which holds that observing and measuring one's own behaviour, especially with real-time feedback, can strengthen self-efficacy [24]. The inclusion of in-app screening functions allowed students to interact with their own health data, promoting reflective behaviour. Usage analytics (e.g., average of 3 checklist uses over two weeks) indicate recurring engagement, a positive predictor of behaviour change. This finding is in line with recent innovation in game-based adolescent mHealth platform [25].

From a theoretical standpoint, the application supports Health Literacy Framework principles by simplifying technical health information through short videos, glossaries, and interactive assessments [26]. Affective responses also played a role: mean enjoyment scores of 4.3/5 suggest strong engagement, which can enhance motivation and long-term use. This is consistent with the Affective Domain model and the Social-Ecological Framework, which emphasizes the importance of emotional, interpersonal, and community-level influences on adolescent behaviour [27], [28].

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From a policy integration perspective, the app's automatic Excel export function enables seamless data transfer to school health records. This digital feature can help address documentation gaps in the School Health Unit (UKS) system, which currently relies heavily on manual tracking. Based on usability results and stakeholder feedback, EduHealth Time could be embedded into regular UKS programming as a digital complement to traditional health promotion activities. Doing so would promote sustained, measurable engagement rather than one-off campaigns, in line with national efforts to strengthen adolescent health education [29].

4. Conclusion

This study highlights the potential of EduHealth Time as a co-designed, contextually relevant mHealth platform that integrates multimedia learning with practical health screening features to support adolescent health education in school settings. Its alignment with existing School Health Unit structures demonstrates a promising model for scalable, technology-enhanced health promotion. The application fosters student engagement and self-monitoring, offering a strategic pathway for strengthening continuous school-based health interventions. While limited by a short implementation period and the absence of behavioural outcome data, the findings lay important groundwork for future studies to assess long-term effectiveness, behavioural impact, and broader applicability across diverse educational contexts.

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