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# Technology-Based Intervention for Building Healthy Campus: Health Promoting Lifestyle in the Universities

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### ABSTRACT

In the last few decades, "Health Promoting Universities" have become attractive and have their place in various education sectors, especially universities. Therefore, higher education institutions must be concerned about promoting health for their academic community. A health promotion-based approach has the potential to enhance a university's contribution to improving health and to deliver meaningful values to populations by protecting the health and enhancing the well-being of students, staff, and the broader community through university policies; enhancing health promotion through teaching and research; developing health promotion by doing community service. This study aims to promote a healthy lifestyle by conducting a cross-sectional study to assess the relationship between the learner use of technology with health-related behavior and physical activity of the community at the University, which consists of students, lecturers, and education staff with technology-based interventions for building healthy campus: health-promoting lifestyle in the universities. The data analysis shows a significant correlation between the use of digital and information technology and health-related behavior (In addition, the data also shows a significant correlation between the use of digital and information technology and physical activity. This study concludes that using digital and information technology as a medium for interventions for building a healthy campus has a high correlation with health-related behavior and physical activity. Thus, technology-based intervention for building a healthy campus will improve university health-promoting lifestyles.

## 1. Introduction

The university is the highest educational institution, where the education system for students is implemented with an andragogical approach. The andragogy approach is a learning process that involves adults in the structure and learning experience. Conditions and learning experiences at universities tend to be more complex than educational institutions at lower levels because they must consider many external and internal aspects and factors in the learning process. One of the things that must be considered in university life is a health policy for the entire campus community. Health issues have long been a concern among higher education institutions, including health promotion

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among the campus community [1]. This health promotion-based approach has the potential to increase the university's contribution to improving the health of its population. Universities can do many things to promote and protect the health of students and the entire academic community. This must be done to create a work environment, learning, and education conducive to health [2]. Furthermore, this strategy is also expected to contribute to the surrounding environment, help promote health in teaching research, and become a resource for public health in general [3]. However, this strategy is not necessarily implemented properly. The challenge is developing and building a healthy campus to realize all these aspects. Enthusiasm and interest in "health-promoting universities" are quite large in line with the demands and expectations regarding improving public health in the campus environment [4].

Health Promoting Universities is a project supported by WHO, which is studied based on conceptual, field experience, and a framework for action. During 2000, all living settings and social activities in cities, schools, workplaces, and home environments, should provide greater opportunities to promote health [5]. However, in real conditions, especially in Indonesia, awareness and participation in promoting health are still very low [6]. This is indicated by the high rate of sedentary behavior and the low participation rate in sports/physical activity [7-10]. This condition has a high risk of hypokinetic diseases (53% of heart and stroke) [11, 12]. The same condition occurs in the university environment; several health problems occur for physical and mental health. Some students experience weight gain to the point of obesity, and around 24.9% of students experience anxiety [13]. Unhealthy lifestyles and eating patterns cause negative emotions and are risk factors for eating disorders and excessive weight gain [14]. The relationship between mental health and obesity is very complex, based on the results of a 2010 systematic review finding a relationship that people who experience depression have a 58% increased risk of becoming obese [15, 16].

To overcome these conditions and problems, it is necessary to carry out strategies and solutions. One way is by promoting a healthy lifestyle, especially at universities, using media and information technology facilities. Electronic media such as TV, radio, and the internet can drive awareness of behaviors related to health problems [17]. On the other hand, types of media, such as computers or video games, may be more effective in promoting improvement and awareness of a healthy lifestyle because physical activity carried out through these media will be more enjoyable [18]. Interventions through digital media and technology have been successfully designed to overcome barriers to physical activity and become a means of maintaining a healthy lifestyle. Given the widespread use and interactive capabilities of computers and video games, these media are becoming increasingly popular for promoting health interventions and managing chronic medical illnesses (for example, obesity and diabetes) in adolescents. The study results indicated that almost 17% of children and adolescents were obese [19]. Meanwhile, children and adolescents are very close to using digital media and technology, so physical activity interventions will be effective using this approach.

Video games are one of the most used technologies and have become a hobby for children to adults. Several types of video games seriously offer active innovation for promoting an active lifestyle [20]. Research systematic reviews state that computer-based interventions effectively increase the consumption of good nutrition and healthy lifestyles among children [21]. Produce significant improvements in nutritional knowledge and dietary habits [22-25]. Digital technologies, such as wearable devices, smartphone applications, and health websites, can contribute to health promotion and disease prevention in the general population [26]. Adolescents are more educated and adept at using digital technology to promote healthy lifestyles and report higher perceived digital health literacy [27]. This study aims to promote a healthy lifestyle by conducting a cross-sectional study to assess the relationship between the learner use of technology the health-related behavior and

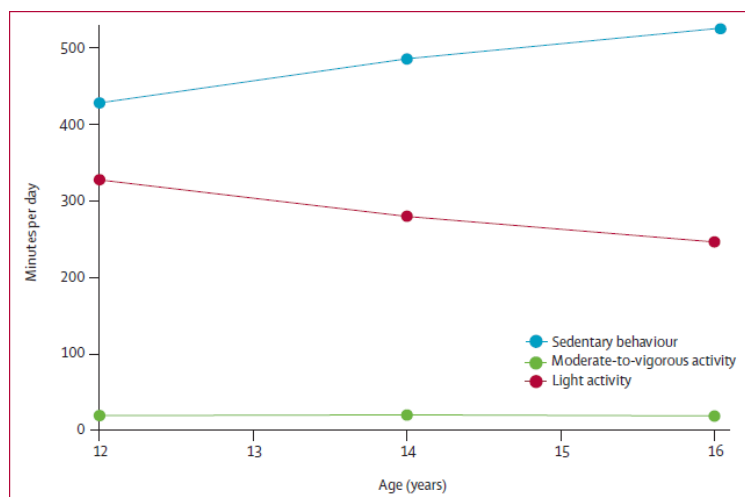
physical activity of the community at the University, which consists of students, lecturers, and education staff with technology-based interventions for building healthy campus: health-promoting lifestyle in the universities.

## **2. Technology-Based Intervention**

Digital technologies, such as wearable devices, smartphone applications, and health websites, could contribute to health promotion [28]. Younger and more educated members of the general population use digital technologies for healthy lifestyle promotion and report higher perceived digital health literacy [29]. Due to the aging of the world population, digital technologies for healthy lifestyle promotion should also target the specific needs of people. However, it is unclear if and what digital technologies exist for this population. Sustained engagement with the technologies is necessary for their successful use. Adequate digital health literacy and human support [30] are required to operate and potentially benefit from digital technologies. Furthermore, evaluation of cost-effectiveness and user outcomes in health promotion and disease prevention [31] is required to understand better if and how digital technologies work. The most common health target of digital interventions for health promotion and disease prevention is physical activity [32]. The terminology in digital health promotion and disease prevention is highly diverse. Therefore, a new scoping review is required to identify any available digital technologies targeting healthy aging more broadly in nonclinical settings (for example, daily life) [33]. Technology promoting physical activity in all ages includes traditional and recently developed tools. Short text messages (SMS) sent to mobile phones are one of the most traditional systems for encouraging PA and motivating people to foster behavioural changes toward an active lifestyle [34]. Another traditional way of exploiting technology to promote Physical activity is represented by self-monitoring devices such as heart rate (HR) monitors, pedometers, and accelerometers, which can motivate to increase Physical activity by providing instantaneous feedback] In very recent years, technology advancements have allowed the development of innovative digital tools, which may be grouped into two categories: web/mobile application and games [35]. The most recent smartphone app released is called the “Recess and Exercise Advocacy Program” (REAP). The live-streaming platform of REAP allows users to record and share short videos and photographs related to their PA [36-37]. Research identifies children and adolescents as the age groups with the highest risk for declining PA levels and MVPA. Therefore, technological devices can represent innovative and targeted health interventions for motivating positive changes in these vulnerable subjects [38-39]. New technologies have also been developed to support older at home, induce positive changes, and reduce the time spent by their children in sedentary activities [40].

## **3. Physical Activity**

Physical activity is any bodily movement produced by skeletal muscles that result in energy expenditure [41]. Physical activity is closely related to an increased risk of non-communicable diseases such as stroke, heart disease, diabetes, and cancer. On the other hand, regular physical activity positively impacts physiological, psychological, and cognitive functions. Regular physical activity should be an integral part of an active lifestyle and proper use of time [42]. The recommended physical activity is at least 60 minutes daily for ages 5-17 years, 150 minutes for ages 18-64, and 150 minutes for ages 65 and over. The intensity of physical activity must be moderate to high for health benefits to be obtained. With increasing age, the tendency to do moderate to vigorous physical activity is relatively stable (at a low position). While doing light activities decrease with age, conversely, that sedentary behavior increases, as shown in Figure 1.



**Fig. 1.** The intensity of Physical activity by age

Physical activity that is carried out regularly has a positive effect on physiological health conditions and psychological and cognitive abilities. A systematic review study concluded that nine out of eleven studies reported a significant relationship between increased physical activity levels and adolescents' health status [43]. High physical activity and low sedentary time in adolescents are correlated with high physiological health status, psychological health, social health, and low sleep quality. Adolescents who engage in moderate to high physical activity by meeting the available guidelines have a good mental health status and avoid depressive symptoms. High levels of physical activity and cardiorespiratory fitness in adolescent boys and girls are closely related to good health self-assessment [44, 45]. Meanwhile, lower health risks were found in boys who did less than 4 hours/week of physical activity than those who did more than 4 hours/week. There is a strong association between lifestyle behaviors and the prevention and treatment of type 2 diabetes [46]; greater research must be directed to issues related to the development of healthy eating and physical activity habits and strategies to modify unhealthy eating habits and healthy behavior. The focus should be on changing eating and physical activity behaviors from an individual and a broader environmental perspective.

## 4. Methodology

### 4.1 Study Design and Setting

This study aims to promote a healthy lifestyle by conducting a cross-sectional study to assess the relationship between the learner use of technology the health-related behavior and physical activity of the community at the University, which consists of students, lecturers, and education staff with technology-based interventions for building healthy campus: health-promoting lifestyle in the universities. This research explored the correlation of health-promoting lifestyles in the university community of lecturers, academic staff, and students by involving technology-based interventions for building a healthy campus. The intervention was not carried out specifically by certain treatments. Still, the campus community had already implemented health-promoting lifestyle programs provided by the university using digital technology facilities and web-based applications. This study adopted a cross-sectional research method with a convenience sampling technique. The sample was chosen to represent the components of the campus community, namely lecturers, academic staff, and students. The instruments used were the Questionnaire on learner Use of Technology, the Health-Promoting Lifestyle Profile (HPLP), and the Global Physical Activity Questionnaire (GPAQ) collected through face-to-face interviews conducted by researchers and research assistants from the

Indonesian University of Education (UPI) who had received training on standard data collection procedures. The interviewer described the aims and interests of the research to the participants, as well as guaranteed the process and confidentiality of participant data.

#### *4.2 Participants*

This research was conducted on 395 participants in the university environment consisting of lecturers, academic staff, and students. Participants provided informed consent before completing the questionnaire. Participants have the criteria of participating in the health-promoting lifestyles program by using digital technology facilities and web-based applications provided by the university for at least six months.

#### *4.3 Instruments*

##### *4.3.1 Questionnaire on Learner Use of Technology*

The instruments used are adaptations of technology-enabled learning environments and enabling policies, consisting of access to media and technology, their nature of use, and preferences for adopting technologies for learning in educational institutions.

##### *4.3.2 The health-Promoting Lifestyle Profile (HPLP)*

Variable Habits and eating Behavior were measured using the Eating behavior pattern questionnaire (EBPQ) by Schlundt *et al.*, [47], The EBPQ consists of 51 item statements developed from six indicators, including Low-fat Eating, Emotional Eating, Snacking on Sweets, Cultural/Lifestyle behaviors, Haphazard Planning, and Meal Skipping. This instrument uses a Likert scale with a reliability coefficient of 0.84. Data were collected during pre and post-tests on the same sample; then, the results were processed using statistical analysis.

##### *4.3.3 Global Physical Activity Questionnaire (GPAQ)*

The GPAQ is an instrument in the form of a questionnaire adopted by the World Health Organization (WHO), which measures people's physical activity levels worldwide. Measurement of the level of physical activity is based on the MET (Metabolic Equivalent), which is the value used to determine the level of physical activity based on the Global Physical Activity Questionnaire (GPAQ). This questionnaire is used to fill out statements on the questions provided in the questionnaire. Questions lead to three domains: activities at work, travel from place to place, and recreational activities. Respondents were asked to complete statements regarding their daily activities and the intensity of time required. GPAQ has Cronbach Alpha 0.73.

#### *4.4. Data Analysis*

Data analysis was used to explore descriptive analysis and non-parametric spearman rho to test the correlation between the learner use of technology with the health-related behavior and physical activity of the Indonesian University community consisting of students, lecturers, and education staff with technology-based intervention for building a healthy campus. Data analysis using SPSS version 26 with a significant value of 0.05.

## 5. Results

Analysis of the data shows participant descriptions of the variables studied, which are the learner use of technology, health-related behavior, and physical activity based on being active in using technology and participant status at the University of Education (UPI) shown in tables 1, 2, 3, and 4 below.

**Table 1**

Description of the learner use of technology on participants' status

Component	Status	N	Mean	Std. Deviation
Technology use	Lecturer	135	24.08	10.094
	Staff	127	22.59	10.406
	Student	133	26.88	21.295

**Table 2**

Description of Health-related Behavior based on participants' status

Component	Status	N	Mean	Std. Deviation
Health-related Behavior	Lecturer	135	21.192	10.094
	Staff	127	21.101	10.406
	Student	133	21.964	11.097

**Table 3**

Description of the Physical activity based on participants' status

Component	Status	N	Mean	Std. Deviation
Physical activity	Lecturer	135	23.924	112.074
	Staff	127	23.901	12.606
	Student	133	25.964	13.197

The Kolmogorov-Smirnov test was carried out to test the normality of the data, as shown in Table 4 below.

**Table 4**

Normality test of the variables

Component	Test Statistic	Sig
The learner's use of technology	1.032	0.02
Health-related Behavior	0.079	0.04
Physical activity	0.086	0.195

Subsequent data analysis used Spearman's Rho to examine the correlation between the use of digital and information technology as a medium for interventions for building a healthy campus with Health-related behavior and physical activity. The results of the data analysis are shown in table 5 below.

From Table 5, the data analysis results show a significant correlation between the use of digital and information technology and health-related behavior ( $r = 0.689$ ,  $p = 0.007$ ). In addition, the data also shows that there is a significant correlation between the use of digital and information technology and physical activity ( $r = 0.853$ ,  $p = 0.01$ ). Physical activity guidelines reaffirm that investment in physical activity continues to be the best buy for public health and promoting a healthy lifestyle. They reaffirm the importance of physical activity and provide an ever-growing list of health benefits that can reduce the burden of non-communicable disease (NCD) and improve daily functioning, mental health, and well-being. A recent conservative estimate showed that 3.9 million

death are already prevented annually because of a physically active lifestyle. However, earlier estimates suggest the potential is even greater and that an additional 5.3 million global deaths could be averted annually by supporting people to be more active. Worldwide demographic changes, including aging workforces and populations, as well as the COVID-19 pandemic, have made it clear there is a dire need for all countries to strengthen efforts in the prevention and management of chronic disease and invest in population-based prevention through public health systems and services. However, guidelines are just the first policy step. They must now be used to strengthen and accelerate inclusivity in all physical activity policies and actions to close the inequities in opportunities for people of all ages and abilities to be regularly, safely, and enjoyably active, especially those living with disability and chronic disease. This is a well-overdue priority focus for researchers and policymakers alike. This is in line with current research regarding physical activity [48-62].

**Table 5**  
 Spearman's Rho test for learner use of technology Health-related behavior and physical activity  
 Correlation

			<b>Use of Technology</b>	<b>Health-related behavior</b>
Spearman's Rho	<b>Use of Technology</b>	Correlation Coefficient	1.000	0.689
		Sig. (2-tailed)	0.00	0.007
		N	395	395
	<b>Health-related behavior</b>	Correlation Coefficient	0.689	1.000
		Sig. (2-tailed)	0.007	0.00
		N	395	395
			<b>Use of Technology</b>	<b>physical activity</b>
Spearman's Rho	<b>Use of Technology</b>	Correlation Coefficient	1.000	0.853
		Sig. (2-tailed)	0.00	0.01
		N	395	395
	<b>physical activity</b>	Correlation Coefficient	0.853	1.000
		Sig. (2-tailed)	0.01	0.00
		N	395	395

## 6. Conclusions

This study concludes that using digital and information technology as a medium for interventions for building a healthy campus has a high correlation with health-related behavior and physical activity. Thus, technology-based intervention for building a healthy campus will improve university health-promoting lifestyles.

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