JTIKOR
(Jurnal Terapan Ilmu Keolahragaan)

e-ISSN: 2549-6360 | homepage: ejournal.upi.edu/index.php/JTIKOR/index
email: jtikor@upi.edu | DOI: 10.17509/jtikor.v10i1

Original Arcticle | JTIKOR 10(1): 32-37 (May 2025) | DOI: 10.17509/jtikor.v10i1.84056

The Effectiveness of A Smartphone-Based Fitness Application in Enhancing Physical Activity Participation

Faiz Adji Musfika[1]*, Yunyun Yudiana[2], Adang Suherman[3],Jajat[3], Kuston Sultoni[3]

[1]Study Program of Sport Education, Universitas Pendidikan Indonesia, Indonesia
[2]Departement of Physical Education, Health and Recreation, Universitas Pendidikan Indonesia, Indonesia
[3]Departement of Sport Science, Universitas Pendidikan Indonesia, Indonesia

Article Info

Article History
Submitted: May 22, 2025
Accepted: May 24, 2025
Published: May 31, 2025

Article Access

Correspondence
*Faiz Adji Musfika
Address: Jalan Setiabudhi No. 229, Kota Bandung, Jawa Barat 40154, Indonesia
E-mail: faizadjimusfika@gmail.com

Abstract

The decline in participation in physical activity occurred in all age groups, one of which was among adolescents. This study aims to examine the effect of using a fit student application on increasing sports participation. This study used a randomized control trial method with a pre-test and post-test control group design. The sample consisted of active students at the Indonesian Universitas pendidikan indonesia . The study was conducted for 8 weeks. The number of samples participating in this study was 62 people. with a sample of 18 men and 44 women. The Participation Motivation Questionnaire (PMQ) instrument is used to measure the level of sports participation. The results showed that there was an increase in exercise participation with results ($p = 0.003 < 0.05$) after being treated for 8 weeks and differences in the level of participation in physical activity between the control group and the treatment group with results ($p = 0.018 < 0.05$). This indicates that the use of applications for physical activity participation interventions among college students is relatively effective.

Keywords: fitness app; physical activity; smarthphone based; participation.

Copyright © 2025 The author(s). You are free to share (copy and redistribute the material in any medium or format) and adapt (remix, transform, and build upon the material for any purpose, even commercially) under the following terms: Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use; ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original (https://creativecommons.org/licenses/by-sa/4.0/)

Introduction

Increasing participation in sports is an important goal for global health (Deelen et al., 2018). Sports participation can be defined as active involvement in any kind of physical activity related to sports, typically done during leisure time (Deelen et al., 2018). There is substantial evidence that engaging in sports offers both physical and non-physical health benefits (Westerbeek & Eime, 2021). Participation in organized sports, in particular, has been shown to improve overall health by enhancing physical fitness, mental well-being, and social engagement (Eime et al., 2013); (Coleman et al., 2008). However, many people still do not participate regularly or at levels sufficient to gain these health benefits (Eime et al., 2013) .Physical inactivity is also one of the main contributors to various chronic diseases and premature mortality (Ding et al., 2016).

According to Badan Pusat Statistik (BPS, 2020) through the 2020 Socio-Cultural Education Module, the national sports participation rate was only 31.39%. This means only about one-third of the Indonesian population engages in regular sports activity. Statistical trends show a significant decline in sports and physical activity participation, particularly among adolescents (Lubans et al., 2007). According to the World Health Organization, adolescents should engage in moderate-to-vigorous physical activity for at least 60 minutes daily. Unfortunately, nearly 81% of adolescents are not sufficiently active (WHO, 2016).

Studies have shown that the decline in physical activity often starts in high school and continues through college (D. et al., 2011). This decrease is often associated with the transition into adult life, where students face new responsibilities, tight schedules, and academic demands (Bhochhibhoya et al., 2020) .This is concerning, as the college years are critical for developing long-term healthy behaviors (Barnett et al., 2014). Low physical activity levels at this stage can lead to adverse health consequences (Racette et al., 2008) ,and habits developed during this time often persist into adulthood (D. et al., 2011).

University life is closely tied to digital device usage. Teaching, learning, and many daily activities are increasingly conducted via smartphones. According to Indonesia's Telecommunication Statistics, over the past five years, the use of Information and Communication Technology has significantly increased, especially household internet use. Smartphone ownership reached 63.53% and continues to rise.

This high smartphone usage presents an opportunity to leverage mobile-based health interventions (Tate et al., 2013), such as fitness applications. A survey reported that 58% of smartphone users with health-related apps use them for sports and fitness purposes (Gür et al., 2020). Compared to in-person activities, fitness apps offer flexibility, adaptability to user needs, and can be accessed anytime and anywhere, making them effective and cost-efficient (Tate et al., 2013). These apps are particularly useful for helping users maintain physical activity and improve physical fitness (Zhang & Xu, 2020).

A previous study by Emma J. Adams (2015) examined how web-based interventions could enhance motivation for physical activity, especially in adults. The results showed an increase in motivation for sports participation through web-based platforms.

In this study, we focus on increasing physical activity participation through a smartphone-based fitness application. Smartphones offer additional features such as telecommunications, real-time sensing/monitoring, and access regardless of time and location (Mollee et al., 2017). This study targets university students because, as shown in previous research, many of them do not meet the recommended physical activity guidelines (Martens et al., 2012). Based on this evidence, the present study aims to examine the effect of the "Mahasiswa Bugar" fitness app intervention on increasing motivation for physical activity participation among college students.

Methods

Research Design

This study employed a randomized controlled trial method using a pretest-posttest control group design to observe the intervention effects of the "Mahasiswa Bugar" application on increasing physical activity participation, and to examine differences in physical activity levels between the treatment and control groups. This study has been conducted in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist for cohort studies.

Participants

The participants in this study were active students at Universitas Pendidikan Indonesia. A total of 62 students participated in the research, consisting of 18 males and 44 females, with an average age of approximately 20 years. The sample was divided into two groups: 31 students in the control group and 31 students in the treatment group. All participants were asked to provide their consent by signing an informed consent form before participating in the study. Those who agreed to participate were asked to follow the intervention for a duration of 8 weeks.

Instrument

The instrument used in this study was the Participation Motivation Questionnaire (PMQ), which has been widely used in several studies on motivation to participate in sports (Gill et al., 1983). The questionnaire was translated and validated into Indonesian by a language expert. The PMQ consists of 30 items that assess various potential reasons for participating in sports. A study by Zaharidis (2006) identified six key motivational factors: skill development and competition, sport-related action, popularity, fitness and health, social status, sport events, and relaxation. A five-point Likert scale was used, ranging from 1 (Not Important at All) to 5 (Very Important), to rate the importance of each reason for participating.

Procedure

The research procedure served as the foundation for implementing the study process. In this study, the Participation Motivation Questionnaire (PMQ) was distributed online to the initial sample of 88 participants. By the end of the study, only 62 participants had completed the full process.

The research began by distributing an informed consent form to obtain participants' agreement and willingness to take part in the study. Once consent was obtained, baseline data (Pretest) were collected through the PMQ questionnaire. Participants were guided during the questionnaire completion to ensure accuracy and understanding.

After the initial test, the experimental group was instructed to download the "Mahasiswa Bugar" application from the Google Play Store. The experimental group then received an 8-week treatment involving the use of the application, following training guidelines provided in a physical activity and fitness handbook.

After the 8-week intervention period, post-intervention data (Posttest) were collected by re-administering the PMQ to all participants.

Data Analysis

Data analysis was conducted using IBM SPSS Statistics version 22, with a significance level set at 0.05. Descriptive statistics were used to present the results of the data analysis. The One-Sample Kolmogorov–Smirnov Test was used to determine whether the data followed a normal distribution. The Independent Samples T-Test was applied to assess whether there was a difference in physical activity participation levels between the control and treatment groups. The Paired Samples T-Test was used to determine whether there were significant differences in the mean scores within the control and treatment groups between the pretest and posttest measurements

Results

Based on the data collection conducted through the distribution of the Participation Motivation Questionnaire (PMQ), this study obtained a total of 88 participants during the pre-test phase, with only 62 participants completing the study through to the post-test phase.

As shown in Table 1, the treatment group that received the Mahasiswa Bugar application intervention demonstrated a notable increase in mean scores from 119.13 (SD = 9.394) in the pre-test to 127.65 (SD = 11.834) in the post-test, while the control group showed a decrease from 122.13 (SD = 10.194) to 119.58 (SD = 14.252). The combined sample's mean score also increased from 120.63 (SD = 9.838) to 123.61 (SD = 13.612). A Paired Sample T-Test indicated a statistically significant improvement within the treatment group ($p = 0.003$, $p < 0.05$), whereas the control group did not show a significant change ($p = 0.401$, $p > 0.05$). Additionally, the Independent Sample T-Test revealed a significant difference in physical activity participation between the two groups after the intervention ($p = 0.008$, $p < 0.05$), suggesting that the Mahasiswa Bugar application had a meaningful and positive effect on participants' physical activity levels.

Table 1

To test the effect on the group given the Fit Student application intervention & The difference in physical activity participation levels between the control group and the treatment group.

	Mean	SD	Std. Error Mean	t	Sig. (2-tailed)	Cohen's d
Pretest T Posttest T	-8,516	14,949	2,685	-3,172	,003	0.57
Pretest C Posttest C	2,548	16,643	2,989	,853	,401	0.15
differences between control group and treatment group	*(Mean Difference)* -11.065		*(Std Error Difference)* *4.018*	-2.754	0,008	-0.70

Discussion

This study was conducted to examine the effect of using a fitness application on participation in physical activity, and to determine whether there was a difference in physical activity participation levels between the two groups after the "Mahasiswa Bugar" application intervention over a period of eight weeks.

The results showed a positive impact of the Mahasiswa Bugar application on increasing sports participation. Hypothesis testing revealed that the treatment group experienced a significant improvement, while the control group, which did not receive any intervention, showed little to no improvement. These findings are consistent with the study by (Pradal-Cano et al., 2020), which demonstrated that the use of fitness apps can be an effective intervention tool, helping individuals achieve moderate to vigorous levels of physical activity.

To further analyze the differences in participation levels, an Independent Samples T-Test was conducted. The results indicated a significant difference in physical activity and exercise participation between the group that received the Mahasiswa Bugar app intervention and the group that did not. This finding aligns with research by Emma J. Adams (2015), which also reported increased sports participation among participants who completed an eight-week training program. Adams' findings support the results of the present study, where an increase in sports participation was observed among participants who completed the full eight-week program and testing procedures.

Smartphone-based fitness applications are shown to be an effective and promising tool for increasing participation in physical activity (Srivastav et al., 2021). Based on the findings above, it can be concluded that the Mahasiswa Bugar application intervention is likely effective in enhancing physical activity participation, particularly among university students. This is consistent with the explanation by (Coughlin et al., 2016), who found that smartphone-based fitness apps are effective in promoting physical activity, even when the intervention effects are relatively simple

Conclusionss

Based on the results of the data analysis, it can be concluded that the use of a fitness application as an intervention tool to promote physical activity participation among university students is relatively effective. The findings of this study are also expected to provide input, particularly for university students, to consider using fitness applications as a practical means to help them achieve adequate levels of physical activity participation.

However, this study has certain limitations, particularly the gender imbalance in the sample, which was predominantly composed of female students. To address this, future research should aim to involve a more gender-balanced sample to examine whether gender differences influence the effectiveness of fitness app interventions. Additionally, extending the duration of the intervention beyond 8 weeks is recommended to assess the long-term sustainability of increased physical activity. Incorporating wearable fitness devices in future studies could also enhance the accuracy of physical activity tracking and increase user engagemen.

Acknowledgment

The author would like to express sincere gratitude to all students who participated in the study and contributed their time and commitment throughout the 8-week intervention. Special thanks are also extended to the academic staff and research supervisors for their valuable guidance and feedback during the research process. Appreciation is given to all individuals and parties named and unnamed whose support helped make this study possible.

References

Barnett, N. P., Ott, M. Q., Rogers, M. L., Loxley, M., Linkletter, C., & Clark, M. A. (2014). Peer associations for substance use and exercise in a college student social network. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *33*(10), 1134–1142. https://doi.org/10.1037/a0034687.

Bhochhibhoya, A., Branscum, P., Taylor, E. L., & Hofford, C. (2020). Exploring the Relationships of Physical Activity, Emotional Intelligence, and Mental Health Among College Students. *American Journal of Health Studies*, *29*(2). https://doi.org/10.47779/ajhs.2014.215

BPS, B. P. S. (2020). Survei Sosial Ekonomi Nasional. *Socio-Economic/Monitoring Survey*, 1–10.

Coleman, L., Cox, L., & Roker, D. (2008). Girls and young women's participation in physical activity: Psychological and social influences. *Health Education Research*, *23*(4), 633–647. https://doi.org/10.1093/her/cym040

Coughlin, S. S., Whitehead, M., Sheats, J. Q., Mastromonico, J., & Smith, S. (2016). A Review of Smartphone Applications for Promoting

Physical Activity. *Jacobs Journal of Community Medicine*, *2*(1), 1–14. http://www.ncbi.nlm.nih.gov/pubmed/27034992%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4811195

D., M., J., T., & A., B.-A. (2011). Using the web to increase physical activity in college students. *American Journal of Health Behavior*, *35*(2), 142–154. http://www.atypon-link.com/PNG/doi/pdf/10.5555/ajhb.2011.35.2.142%5Cnhttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed11&NEWS=N&AN=21204677

Deelen, I., Ettema, D., & Kamphuis, C. B. M. (2018). Sports participation in sport clubs, gyms or public spaces: How users of different sports settings differ in their motivations, goals, and sports frequency. *PLoS ONE*, *13*(10). https://doi.org/10.1371/journal.pone.0205198

Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., Finkelstein, E. A., Katzmarzyk, P. T., van Mechelen, W., & Pratt, M. (2016). The economic burden of physical inactivity: a global analysis of major non-communicable diseases. *The Lancet*, *388*(10051), 1311–1324. https://doi.org/10.1016/S0140-6736(16)30383-X

Eime, R. M., Harvey, J. T., Sawyer, N. A., Craike, M. J., Symons, C. M., Polman, R. C. J., & Payne, W. R. (2013). Understanding the contexts of adolescent female participation in sport and physical activity. *Research Quarterly for Exercise and Sport*, *84*(2), 157–166. https://doi.org/10.1080/02701367.2013.784846

Emma J Adams, H. M. (2015). Increasing sports participation in inactive employees: evaluation of a national eight week web-based sport and physical activity initiative in workplaces in England. *International Society for Behavioural Nutrition and Physical Activity Annual Meeting*. https://www.researchgate.net/publication/293174711_Increasing_sports_participation_in_inactive_employees_evaluation_of_a_national_eight_week_web-based_sport_and_physical_activity_initiative_in_workplaces_in_England

Gill, D. L., Gross, J. B., & Huddleston, S. (1983). Participation Motivation in Youth Sports. *International Journal of Sports Psychology*, *14*(1), 1–14. https://madison.hosts.atlas-sys.com/shib/illiad.dll?Action=10&Form=75&Value=3306028

Gür, F., Gür, G. C., & Ayan, V. (2020). The Effect of the ERVE Smartphone App on Physical Activity, Quality of Life, Self-Efficacy, and Exercise Motivation for Inactive People: A Randomized Controlled Trial. *European Journal of Integrative Medicine*, *39*(March), 101198. https://doi.org/10.1016/j.eujim.2020.101198

Lubans, D. R., Sylva, K., & Morgan, P. J. (2007). Factors associated with physical activity in a sample of British secondary school students. *Australian Journal of Educational and Developmental Psychology*, *7*(January 2007), 22–30.

Martens, M. P., Buscemi, J., Smith, A. E., & Murphy, J. G. (2012). The short-term efficacy of a brief motivational intervention designed to increase physical activity among college students. *Journal of Physical Activity and Health*, *9*(4), 525–532. https://doi.org/10.1123/jpah.9.4.525

Mollee, J. S., Middelweerd, A., Kurvers, R. L., & Klein, M. C. A. (2017). What technological features are used in smartphone apps that promote physical activity? A review and content analysis. *Personal and Ubiquitous Computing*, *21*(4), 633–643. https://doi.org/10.1007/s00779-017-1023-3

Pradal-Cano, L., Lozano-Ruiz, C., Pereyra-Rodríguez, J. J., Saigí-Rubió, F., Bach-Faig, A., Esquius, L., Xavier Medina, F., & Aguilar-Martínez, A. (2020). Using mobile applications to increase physical activity: A systematic review. *International Journal of Environmental Research and Public Health*, *17*(21), 1–16. https://doi.org/10.3390/ijerph17218238

Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2008). Changes in Weight and Health Behaviors from Freshman through Senior Year of College. *Journal of Nutrition Education and Behavior*, *40*(1), 39–42. https://doi.org/10.1016/j.jneb.2007.01.001

Tate, E. B., Spruijt-Metz, D., O'Reilly, G., Jordan-Marsh, M., Gotsis, M., Pentz, M. A., & Dunton, G. F. (2013). mHealth approaches to child obesity prevention: Successes, unique challenges, and next directions. *Translational Behavioral Medicine*, *3*(4), 406–415. https://doi.org/10.1007/s13142-013-0222-3

Westerbeek, H., & Eime, R. (2021). The physical activity and sport participation framework—a policy model toward being physically active across the lifespan. *Frontiers in Sports and Active Living*, *3*(May), 1–11. https://doi.org/10.3389/fspor.2021.608593

WHO. (2016). WHO Guidelines on physical activity and sedentary behaviour. In *Routledge Handbook of Youth Sport*.

Zhang, X., & Xu, X. (2020). Continuous use of fitness apps and shaping factors among college students: A mixed-method investigation. *International Journal of Nursing Sciences*, *7*, S80–S87.

https://doi.org/10.1016/j.ijnss.2020.07.009