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Effects of a digitally delivered low-dose physical activity intervention on academic burnout and student engagement in university students

Efectos de una intervención de actividad física de baja dosis implementada mediante sistemas digitales sobre el burnout académico y el compromiso estudiantil en estudiantes universitarios

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Abstract

This research looked into the impacts of a digital and low-intensity physical activity intervention on first year college students' physical activity levels, academic burnout, and student engagement. To achieve this, a quantitative single-group pretest-posttest method was utilized, and out of the entire student population of PATHFIT 1 in a public university situated in the Philippines, 120 students were randomly selected. During the 8-week intervention period, participants received daily digital prompts that encouraged them to engage in 30 minutes of low to moderate physical activities. The participants were required to record their activities using the MyFitnessPal application. Modified versions of the International Physical Activity Questionnaire, the student version of the Maslach Burnout Inventory, and the Utrecht Work Engagement Scale were used to assess physical activity, academic burnout, and student engagement, respectively. To analyze the data, Paired Samples t-test and Pearson Correlation were used. The results showed that participants' levels of physical activity and student engagement, emotional exhaustion, and academic burnout showed a statistically significant change in the negative direction. This was attributed to the fact that physical activity was found to be positively correlated to student engagement and negatively correlated to academic burnout. The results of this study are indicative that in the context of higher education, providing low-intensity and flexible physical activity coupled with digital prompts can promote student wellbeing, even with a pre-experimental design.

Keywords: academic burnout; student engagement; low-dose physical activity; digital health intervention; higher education

Resumen

Este estudio examinó los efectos de una intervención de actividad física de baja dosis implementada mediante sistemas digitales sobre los niveles de actividad física, el burnout académico y el compromiso estudiantil en estudiantes universitarios de primer año. Se empleó un diseño cuantitativo de un solo grupo con mediciones pretest–postest, con la participación de 120 estudiantes seleccionados mediante muestreo aleatorio simple del curso PATHFIT 1 en una universidad pública filipina. La intervención tuvo una duración de ocho semanas y consistió en recordatorios digitales diarios que promovían aproximadamente 30 minutos de actividad física de intensidad baja a moderada, apoyados por el registro mediante la aplicación MyFitnessPal. La actividad física se evaluó con el Cuestionario Internacional de Actividad Física–Formato Corto; el burnout académico con el Inventario de Burnout de Maslach–Encuesta para Estudiantes; y el compromiso estudiantil con la Escala de Compromiso Académico de Utrecht–Versión para Estudiantes. Se aplicaron pruebas t para muestras relacionadas y análisis de correlación de Pearson. Los resultados mostraron incrementos significativos en la actividad física y en las dimensiones del compromiso estudiantil, junto con reducciones significativas en el agotamiento emocional y el cinismo, así como mejoras en la eficacia académica (tamaños del efecto pequeños a pequeños–moderados). La actividad física se asoció negativamente con el burnout académico y positivamente con el compromiso estudiantil. Aunque la inferencia causal está limitada por el diseño preexperimental, los hallazgos sugieren que intervenciones estructuradas de actividad

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física de baja dosis apoyadas por sistemas digitales pueden contribuir al bienestar académico en educación superior.

Palabras clave: burnout académico; compromiso estudiantil; actividad física de baja dosis; intervención digital en salud; educación superior

Introduction

Academic burnout has been defined as a multidimensional syndrome with three constructs; emotional fatigue, feelings of academic cynicism, and belief in diminished academic self-efficacy. It is a result of chronic academic demands and performance expectations (Baati et al. 2025). Burnout is more than just fatigue. It hampers students' ability to learn and to recuperate. It is related to poor sleep and academic dysfunction (Figueiredo & Ferreira, 2024). University students' burnout is a dominant phenomenon explained by the unaltered academic environment + self-regulated/lifestyle factors (Xie et al. 2023). Burnout is the normal by-product of academic life. It is an expectation rather than an outlier. Student engagement is the positive side of the academic experience continuum. It encompasses students' interest, enthusiasm and participation in the learning process. It correlated with persistence and attainment in higher education (Trolian, 20224).

Internationally, academic burnout has become a common issue for first-year university students, especially when coping with the challenges that come with switching to higher education. For instance, the first-year medical students in Brazil showed considerable instances of emotional exhaustion and cynicism which demonstrates their vulnerability early on (Boni et al, 2018). The same situation is seen in Serbia where burnout is prevalent in the early stages of training for profession, especially amongst veterinary students (Živojinović et al, 2020). In addition to these single-institution studies, one large-scope meta-analysis has found academic burnout to be a common issue in medical education across the world (Almutairi et al, 2022). The first of its kind, top-level data from various regions of China demonstrates that burnout is not an issue limited to the higher demanding fields of study. A considerable number of undergraduates reported burnout symptoms, and these symptoms occurred from the simple daily requirements set by their academic studies (Xie et al, 2023). Research from Italy also illustrates that the

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students with specific learning disorders are amongst the highest burnout individuals, showing early vulnerabilities associated with learning (Camia et al, 2025).

Academic burnout, a recurring issue in Philippine higher education, has been shown to affect students in the first years of colleges the most. Recent findings from Bulacan indicate that first-year students are already showing significant burnout symptoms (Maloloy-On et al., 2023). In the case of Davao City, most studies have found an emotionally exhausting burnout that leads to a disengaged and burned-out, isolated individual (Villalon & Nebria, 2024). In the case of Davao Del Sur, the emotional exhaustion from the pressure of the academic system is highlighted qualitatively (Algones, 2024). Cagayan State University–Carig Campus has documented a widespread lack of adequate academic and psychosocial adjustment (Ternora, 2025). This is the evidence burnout is worth studying in the higher education system of the Philippines.

Physical activity has an unquantifiable connection to academic burnout, and the complexity is evident from the data. Engagement in leisure-time physical activity has shown to have psychologically positive impacts on burnout profiles (Tian & Yang, 2024). Regular physical activity provides students with the opportunity to be psychologically and socially better, and exercise directly or indirectly aggregates all the social adaptive functions that are protective in the academic environment (Xie et al., 2023). Many researchers assert that physical activity is a contributory factor to better recovery, quality of life, and academic success (Allegretti, 2025; Teuber et al., 2024). All the above studies indicate that you should use physical activity as a behavioral resource to help you with your academic life.

In addition to physical exercise, self-monitoring and smartphone-based prompts have been considered as potential scalable methods for changing health-related behaviors in university students. A recent review found that mobile and wearable technology, as well as self-monitoring, have shown some improvements in daily step counts (Bi et al., 2024). Ellison et al., (2024) found smartphone-based well-being interventions improved mental health but participant engagement often declined over time. Although mobile and wearable technology and self-monitoring have shown some improvements in physical activity, sustained behavioral change does not occur (Teuber et al., 2022) and mobile prompts and self-monitoring have shown modest improvements in daily step counts. (Bi

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et al., 2024). As a result, there is a need to understand how structured digital prompts function in academic settings.

This study utilizes self-regulation and resource-based frameworks. Student burnout can be considered as the detachment of emotional and cognitive resources, as a result of prolonged and continuous academic pressure, whereas psychological energy and cognitive resources are invested in Student Engagement. A slight increase in the frequency of exercise may also be considered as a restorative activity which promotes the renewal of emotional and psychological resources, and reduces emotional fatigue, and enhances academic constructive activity. At the same time, prompts that are delivered via smartphone may play a role in self-regulatory and behavioral cueing mechanisms, which help to reduce the barriers to the initial step of the activity, and reinforce the habit of activity. All these methods, in addition to the above-mentioned exercise, create a theoretically justified way to understand why, in the context of digital support, structured exercise may reduce academic burnout and increase academic engagement.

There is a plethora of empirical studies made in the fields of burnout, engagement, digital interventions, etc. However, there are still scarce studies when it comes to the empirical evidence of integrating all those fields at once. Coupled with the ambiguous studies/a sparse body of literature in the field that examines smartphone prompted physical activity, academic burnout, and student engagement in first-year college students, this study attempts to answer the following question: what is the relationship between smartphone prompted physical activity, academic burnout, and student engagement in first-year college students? With the intent of answering this question, this study is attempting to provide practical and academically relevant evidence to assist students during the transition from being in high school to being in college in a manner that is scalable.

Methods

Research Design

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This study utilized a quantitative methodology involving a single-group pretest–posttest pre-experimental design to determine the relationship of a low-dose physical activity intervention with smartphone prompts and changes in academic burnout and student engagement among university students. According to Creswell and Creswell (2018), quantitative research is characterized by systematic and objective identification and statistical analysis of numerical data to determine relationships, differences, and changes among measurable variables.

The measurement of changes in academic burnout and engagement after the intervention and the measurement of the relationship(s) among participation in physical activity, burnout, and student engagement was possible due to the pretest–posttest design. However, the design without a control group does provide experimental control and weakens the causal claims to the piece (Shadish et al., 2002). Thus, the findings are to be considered associative and exploratory and not causal.

Respondents and Sampling

The research took place at Western Mindanao State University (WMSU), a public education institution in the Philippines. First-year undergraduate students enrolled in PATHFIT 1 for the semester in which the data was gathered comprised the target population (N = 1,850). Simple random sampling was used to select 120 students from the population, as detailed in the official PATHFIT enrollment list, guaranteeing that all students in the sample were equally likely to be chosen (Noor et al. 2022).

Participants included in the study had to meet the following inclusion criteria: (a) they must be enrolled in PATHFIT 1, (b) they must possess a smartphone capable of receiving push notifications, and (c) they must consent to participation. Exclusion criteria included students whose medical conditions limited them from any form of physical activities. Although the smartphone ownership criterion may create an issue for generalizability, it is reasonable to assume that there is minimal coverage bias in this demographic because smartphone usage among university students is prevalent.

Sensitivity power analysis (G*Power 3.1; α = .05, power = .80) suggested a minimum of 34 participants to detect a medium effect (d = 0.50). The final sample of 120 surpassed this threshold, demonstrating sufficient statistical power.

Research Instrument

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To address methodological rigor and consistency with global research standards, this study used validated and highly cited tools.

The level of physical activity was measured using the International Physical Activity Questionnaire- Short Form (IPAQ-SF), which assesses walking, moderate, and vigorous physical activities within 7 days (Craig et al., 2003). IPAQ-SF has shown acceptable criterion validity and acceptable test-retest reliabilities (Spearman's $\rho \approx .80$). With the present study, internal consistency of the total physical activity scores is acceptable (Cronbach's $\alpha = .78$).

In the study, academic burnout is assessed using the Maslach Burnout Inventory-Student Survey (MBI-SS) which assesses emotional exhaustion, cynicism, and academic efficacy (Schaufeli et al., 2002). In research done within the higher education contexts, the MBI-SS have demonstrated good psychometric properties with the Coefficient of Cronbach's alpha being ranged from .74 to .88 within the subscales. In this sample, internal consistency coefficients were 0.86 for Emotional Exhaustion, 0.82 for Cynicism, and 0.79 for Academic Efficacy which means that reliability is adequate.

Student engagement was measured using the Utrecht Work Engagement Scale-Student Version (UWES-S), which assesses scales of vigor, dedication, and absorption (Schaufeli et al., 2006). The UWES-S shows high internal consistency ($\alpha = .80$ - $.90$) and factorial validity among university students, varying across different cultures and searches. In this study, Cronbach's alpha values were .84 for Vigor, .88 for Dedication, and .83 for Absorption, which shows reliability.

The digitally delivered smartphone-based self-monitoring intervention was designed to prompt participants to do short, low-dose physical activity (like walking or light aerobics) at brief and standardized intervals. The prompts were designed to be of minimal physical and time expense, informational and motivational, and aimed at facilitating routine engagement in physical activity.

Intervention Protocol

The first academic semester of the 2025–2026 academic year saw the implementation of the intervention spanning 8 weeks. Each participant was added to a separate Facebook Messenger group made for the study. In the group, Messenger was used to send standard prompts every evening, at the same time, to all group members.

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During the intervention, 183 prompts were sent to all group members, broken down into 3 prompts sent each day for 61 days at the following times: 7:00 PM, 8:00 PM, and 9:00 PM (GMT+8).

The evening prompts served different purposes. The 7:00 PM prompt was termed a 'preparatory' reminder where participants were encouraged to set aside time for the planned physical activity later that evening. The 8:00 PM prompt was the exercise time where participants were encouraged to do at least 30 minutes of physical activity of their own choice (given that it was safe for them) that was of at least a moderate intensity and recorded in the MyFitnessPal app. Activities included walking and light aerobics. The 9:00 PM prompt was meant to reinforce the activity and provide appreciation and motivational words.

The 30-minute recommendation aimed to accommodate the students' educational commitments while focusing on the demands of the associated approved physical activities. Elements of the message were tailored to offer brief motivational and informational suggestions based on the principles of behavioral activation and self-regulation, stress-related issues, academic recovery, and the consistency of routines related to the regulation of health.

The 30-minute recommendation aimed to accommodate the students' educational commitments while focusing on the demands of the associated approved physical activities. Elements of the message were tailored to offer brief motivational and informational suggestions based on the principles of behavioral activation and self-regulation, stress-related issues, academic recovery, and the consistency of routines related to the regulation of health.

The absence of individual coaching, automated monitoring, or live feedback on performance meant that this was purposely designed to be a low-cost, scalable approach to digital prompting that focused on a behavioral cueing approach to prompting.

Engagement was self-tracked and monitored by the participants through weekly activity reports applied to MyFitnessPal. Each participant recorded the activities to which they were engaged, and the reports were described to assess the level of participation for the entire intervention. While this data was self-reported and there was no objective

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measurement to support the evidence, the monitoring addressed a level of structure to the process and encouraged responsibility and sustained participation.

Statistical Analysis

In the present study, two sets of data analysis techniques were employed: descriptive techniques, using frequency distributions, mean, and standard deviation for demographic characteristics of respondents and the level of their physical activities, academic burnout, the dimensions of student engagement, and inferential analyses to determine the mean composite burnout and engagement score of individual subscales for ease of interpretation.

For these analyses, the paired sample t-test was used to examine the changes that the intervention had and to determine the difference between the two sets of test score results both pre and post the test for the level of physical activities, academic burnout, and student engagement. The strength and direction of physical activity, burnout, and engagement levels were examined using the Pearson Product Moment Correlation Coefficient. As all the variables were measured at the level of continuous data and satisfied the criteria of normality, linearity, and were of statistically significant at $p < .05$. All the statistical analyses were done using a software program. JASP (Version 0.18.3; JASP Team, 2024) was used for all the statistical computations.

Ethical Considerations

This research study did not violate any ethical principles relating to research involving human participants. Data collection began after obtaining ethical approval from the committee for research ethics at the respective institution. All participants were provided with the study purpose, study procedures, any possible risks, and benefits and were asked to sign an informed consent form.

The participants were free to choose whether or not to take part in the study and were told they could withdraw from the study at any time without any consequences. Participant codes were kept confidential and the research team was the only group with access to the password protected files in which the data was stored. The study had an active component to it which meant participants were encouraged to take part in any activities to which they were physically able, and in order to reduce participants' risk, the intervention was designed to focus on self-paced, low intensity activities.

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Results

Physical Activity Levels

Table 1 presents the physical activity levels of the respondents before and after the low-dose physical activity intervention supported by smartphone prompts. Descriptive statistics (mean and standard deviation) were computed for physical activity levels measured using the International Physical Activity Questionnaire (IPAQ-SF).

Table 1

Physical Activity Levels of the Respondents (Pretest and Posttest)

Measurement Period	Mean (MET-min/week)	SD
Pre-test	1,350.40	620.15
Posttest	1,675.30	680.22

Figure 1

Mean Physical Activity Levels of the Respondents (Pretest vs Posttest)

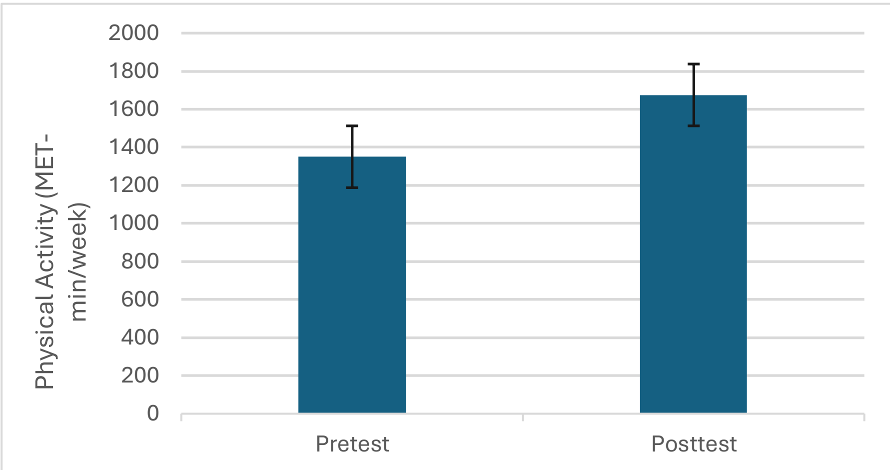

Figure 1 illustrates the increase in mean physical activity levels (MET-min/week) from pretest to posttest.

Academic Burnout Dimensions

Table 2 presents the descriptive statistics for academic burnout dimensions at pretest and posttest. Mean scores and standard deviations were computed for emotional exhaustion, cynicism, and academic efficacy.

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Table 2

Academic Burnout Dimensions of the Respondents

Academic Burnout Dimensions	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Emotional Exhaustion	3.55	0.68	3.20	0.66
Cynicism	3.30	0.64	2.98	0.63
Academic Efficacy	3.05	0.60	3.28	0.58

Figure 2

Academic Burnout Dimensions of the Respondents (Pretest vs Posttest)

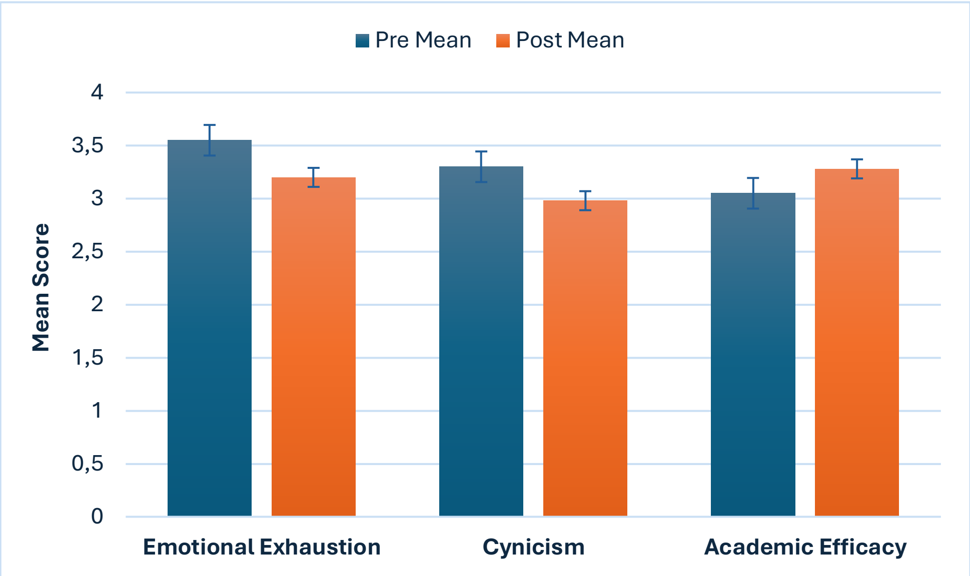

Figure 2 presents the pretest and posttest differences across academic burnout dimensions.

Student Engagement Dimensions

Table 3 presents the descriptive statistics for student engagement dimensions before and after the intervention. Mean scores and standard deviations were calculated for vigor, dedication, and absorption.

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Table 3

Student Engagement Dimensions of the Respondents

Student Engagement Dimensions	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
Vigor	3.02	0.62	3.28	0.60
Dedication	3.12	0.60	3.40	0.57
Absorption	3.05	0.61	3.26	0.59

Figure 3

Student Engagement Dimensions of the Respondents (Pretest vs Posttest)

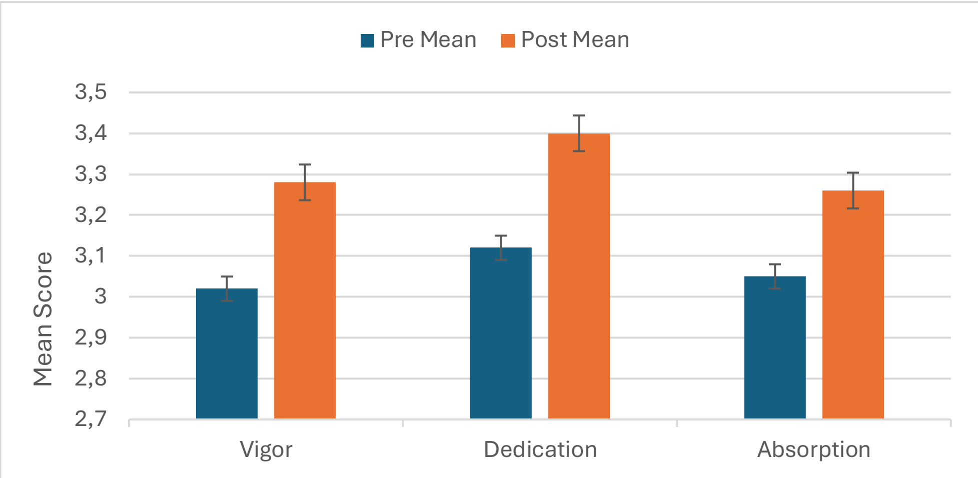

Figure 3 displays the changes in student engagement dimensions following the intervention period.

Pretest–Posttest Differences

Table 4 presents the results of the paired-samples t-tests comparing pretest and posttest scores for physical activity, academic burnout dimensions, and student engagement variables. In addition to statistical significance, effect sizes (Cohen's d) were calculated to determine the magnitude of observed changes.

Table 4

Paired-Samples t-Test Results for Physical Activity, Academic Burnout, and Student Engagement

Variables	Mean Difference	t-value	p-value	Cohen's d	Interpretation
Physical Activity	324.90	4.19	< .001	0.38	Small–Medium
Emotional Exhaustion	−0.35	−4.79	< .001	0.44	Small–Medium
Cynicism	−0.32	−4.18	< .001	0.38	Small–Medium
Academic Efficacy	0.23	3.62	< .001	0.33	Small
Vigor	0.26	4.06	< .001	0.37	Small–Medium

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Dedication	0.28	4.54	< .001	0.41	Small–Medium
Absorption	0.21	3.48	.001	0.32	Small

Results indicated statistically significant increases in physical activity and student engagement dimensions, alongside significant reductions in emotional exhaustion and cynicism and an increase in academic efficacy. Effect sizes ranged from small to small–to–moderate (d = 0.32–0.44).

Relationships Among Physical Activity, Academic Burnout, and Student Engagement

Table 5 presents the Pearson product–moment correlation coefficients examining the relationships among physical activity, academic burnout, and student engagement.

Table 5

Test of Relationship Among Physical Activity, Academic Burnout, and Student Engagement

Paired Variables	Pearson r	p-value	Interpretation
Physical Activity x Academic Burnout	-0.24**	.008	Significant
Physical Activity x Student Engagement	0.27**	.003	Significant
Academic Burnout x Student Engagement	-0.46**	<0.001	Significant

Physical activity was significantly and negatively correlated with academic burnout ($r = -.24$, $p = .008$) and positively correlated with student engagement ($r = .27$, $p = .003$). Academic burnout demonstrated a significant negative correlation with student engagement ($r = -.46$, $p < .001$).

Discussion

Respondents' Physical Activity Engagement

There have been significant changes in different levels of distribution in physical activity levels following the intervention. Students who had low physical activity reduced from 31.7% to 21.7% while moderate and high activity levels increased. The intervention was low resource and non-intrusive yet the changes toward higher activity levels indicate that digitally prompting users may lead to changes in behavior in activity levels in demanding scholarly environments.

There was a notable shift in the physical activity levels of participants following the eight-week intervention. The proportion of participants that displayed low levels of

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physical activity reduced from 31.7% to 21.7% while the proportion of participants that displayed moderate and high levels of activity increased. Even though the intervention was low resource and non-intrusive, the changes toward higher levels of activity indicate that digitally prompting users in demanding scholarly environments may lead to changes in behavior that positively impact the activity levels of the users. The shift may also have been a result of the intervention's emphasis on routine formation, and other external cueing strategies. The smartphone delivery system probably eliminated cognitive barriers activities, like exercise, through lower initiation energy, and competing academic demands. For sedentary university populations, even small changes can lead to larger changes in behavior. This behavior may reduce sedentary behavior and encourage consistent activity over time. The findings indicate that even simple physical activity interventions can encourage changing behavior in sedentary university populations. This behavior may reduce sedentary behavior and encourage consistent activity over time. The findings indicate that even simple physical activity interventions can encourage changing behavior in sedentary university populations.

Recent studies show the success of interventions using structure and guidance to increase the physical activity of university students. Malagodi et al. (2025) published a systematic review of 72 university-based physical activity interventions. Malagodi et al. found that physical activity programs targeted at university students improve participants' mental health and wellbeing. This is especially true if the intervention is at least 8 weeks long and includes a moderate intensity component. The current intervention is 8 weeks long to include daily structured prompting - one of the characteristics identified as beneficial to university students.

In addition to length, the amount of exercise and a structured approach are effective in bringing about behavioral changes. Wang et al. (2023) found that low-dose and moderate-dose high intensity interval training (HIIT) produced improvements in executive functioning of university students. Moderate-dose HIIT produced greater improvements than low-dose HIIT. Although the current intervention used low-to-moderate intensity activity and not HIIT, it is still within the reasoning that structured and repeated exposure (especially minimally) is likely to be behavioral and cognitive changes in students.

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Furthermore, research shows that digital health platforms improve compliance and consistency in behavior change through self-monitoring and feedback (Ernsting et al., 2017; Martin, 2026; Kratzke & Cox, 2012). While reviewing mobile health (mHealth) applications, Martin (2026) asserts that app-based tracking encourages self-control through behavioral awareness which, in turn, positively influences health-related fitness. Most literature in the field of mHealth regards mobile app notifications as behavioral prompts that diminish the barriers to start a task and facilitate the establishment of a habit. For this study, we assume scheduled prompts combined with activity logging enhanced self-monitoring and daily activity tracking.

Additionally, prior research shows that even a small amount of physical exercise can have a positive impact on mental health and can significantly reduce fatigue symptoms in university students (Herbert, 2022). This finding, along with systemic reviews, indicates that structured interventions consistently increase overall physical activity (Fang et al., 2024). Research shows a high degree of digital reinforcement in maintaining physical activity in various student populations (Sofro et al, 2023). In summary, the literature indicates that digital prompts lead to positive behavioral change in the level of physical activity when comparing the low, moderate, and high activity categories.

The present findings add to evidence that structured digitally delivered physical activity interventions can impact activity engagement behaviors of university students. As modest as the change in activity engagement may be, the shift from low to moderate and high activity levels and categories is of practical importance in settings, such as academic contexts, that are characterized by sedentary behavior. These findings further strengthen the case for low-cost digital prompting systems as health promotion resources in higher education.

Academic Burnout Dimension

The present results show that participants in an eight-week digitally delivered physical activity program who previously showed emotional exhaustion and cynicism also experienced an increase in their sense of academic efficacy. These results reflect an improvement in academic-related well-being as it shows less emotional drain and less detachment from their studies and strengthens their sense of control in handling their

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academic tasks. Those changes are incremental in nature, and are not expected to be transformative, but rather positively contribute to the inner workings of a potentially stressful academic environment.

The positive changes are the results of applying recovery-based and resource-oriented strategies. Through physical activity, the body is naturally prepared for emotionally stressful situations, and as a result, the activities allow participants to detach from the academic demands of their studies and thus decrease their emotional strain. Tian and Yang (2024) showed academic burnout to be a result of a lack of stress-recovery and lack of resilience, and their study continues to show the positive effects of physical activity on emotional wellbeing. Moreover, participants in that study moved from stress to physical activity in less than 10 minutes. This creates a condition for emotional stress and mental exhaustion to be relieved and regain the ability to think and control, as well as increase psychomotor activity. Light to moderate physical activity also results in increased cognitive performance and decreased fatigue related to the studies, among students in the University (Vries et al., 2016). Along with the findings, the increase in academic efficacy can also be explained.

Physical activity has positive effects on mental health apart from regulating stress. In their study, Chen et al. (2022) found exercise has a direct and indirect effect on academic burnout of college students by increasing self-efficacy and resilience. Increased self-efficacy can reduce feelings of academic deficiency which can reduce feelings of cynicism and emotional exhaustion. This is consistent with burnout resource-based theories that identify psychological and physiological resource replenishment as a buffer against exhaustion from stress.

The study's use of specific timing and structured smartphone prompts may have helped reinforce the development of consistent behaviors and routines. It is likely that external digital cues relied less on self-directed motivation and more on adherence to prescribed activities, especially when academic fatigue sets in. While the digital component’s impact is inseparable from that of physical activity, it is likely to have contributed as a behavioral scaffold that enhanced the intervention's psychological impact and feasibility.

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The impact was small to small-moderate. However, such effect sizes are common with behavioral changes seen during naturalistic academic environments. Studies show that context-specific exercise programs have small but positive reductions on symptoms of burnout (Ochentel et al., 2018). In university students, where academic stressors are persistent, even small changes in exhaustion and cynicism are likely to be beneficial to the overall functioning of students in the long term. All the studies considered point to the fact that about the academic burnout of university students, exercise should be seen as a psychologically restorative activity.

Student Engagement Dimension

The pretest mean for vigor, dedication, and absorption showed moderate levels for each of the three constructs, and posttest means for each of the constructs showed growth after the low-dose physical activity smartphone prompt intervention. Vigor leads the charge at M = 3.02 and posttest mean of 3.28, followed by dedication, M = 3.12; 3.40, and absorption, M = 3.05; 3.26. These modest gains might suggest that even the most limited, and most temporary, structured physical activities do work to develop students' psychological engagement in the academic tasks at hand.

The vigor increase indicates more energized and mentally resilient, two vital pillars for the sustainability of academic persistence. Dedication, which denotes positive and high value sentiment toward the academic activities and studies of the students, exhibited the largest posttest means, which is suggestive for the amplified academic devotion of students. Similarly, the increased absorption means that there is a positive increment in overall attention and cognitive presence devoted to academic activities. Each and all these changes cumulatively suggest that engagement in physical activity is likely to be positively correlated to the engagement in and the functioning of cognitive and motivational mechanisms, aside from its health benefits in the perspective of academic activity.

The impact of pep interventions on students' engagement is consistent with existing studies on Physical Education which show that structured and motivationally framed interventions improve student engagement. Though many of the studies included in the review had lower quality designs, systematic studies on gamified elements in Physical Education show improvement in students' motivation and engagement (Arufe-

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Giradaez et al, 2022). The current intervention did not include gamification, but the structured sequence of prompts may have served as motivational and behavioral cues for routine formation. Thus, the increase in energy, engagement, and immersion the participants experienced drew on the theory that improved physical frameworks positively impact on the outer or psychological engagement of participants.

In addition, engagement in physical activity is positively related to motivational beliefs and self-efficacy for academics. Adigue and Adigue (2025) found that physically active students were more self-efficacious for their learning and viewed academically related tasks as less burdensome. Since self-efficacy is related to positive regulation, persistence, and resilient, the igniting and sustaining of engagement that was observed can be attributed to the improvement of motivational regulation. The engaged and sustained psychological and physical activity has also been attributed to goal orientation, self-perceived competence, and intrinsic motivation toward the activity (Martinek et al. 2019).

These results imply that students' energy, engagement, and cognitive involvement in learning activities may be improved through digitally delivered physical activity interventions. When incorporated into a physically inactive, high workload academic setting, accessible digital cues to structured physical activity may be a practical and effective way to enhance student health and academic engagement.

Pretest–Posttest Differences

The results of the paired-samples t-test for pretest post-test scores show valid differences for levels of physical activity, burnout in academics, and student engagement. In the two periods physically active students and engaged students grew, but emotionally exhausted and cynical students decreased and academically efficacious students improved.

Such a dose of physical activity intervention likely then caused low levels of positive behavior and psychology. In plus physical activities and the core dimensions of burnout, especially emotional exhaustion and cynicism, then academically engaged and efficacious students improved. Added movement is likely to enhance energy and reduce stress through the encouragement of active resources, thus protecting students from defeatism and strengthening their engagement at school.

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While the amount of change is being argued here, small and yet meaningful differences are being documented in the frameworks of intervention and education within the behavioral sciences. In fact, the criteria for most school and university-based interventions are the feasibility of being minimally disruptive, which is why most are devoid of large effect sizes. Given the low cost and the potential for large scale implementation of behavioral interventions, statistically reliable small changes are often the most relevant.

These results are consistent with meta-analytic results that show physical activity interventions in educational contexts have small to moderate impacts on psychological or behavioral outcomes (Fernández-Espínola et al., 2022). Similarly, Aadland et al. (2019) noted small yet positive outcomes about cognitive and psychological well-being after participants engaged in organized physical activity. Some longitudinal studies have also shown that remaining interventions, even with small, short term effects, can produce significant results in the long run (Gasana et al., 2023). Therefore, these results, together with other studies, advocate for the inclusion of organized physical activity in education to enhance psychological and academic performance of students.

There is need to consider the results in the context of the pre and post setup with no other control group to draw causal conclusions on this matter. Future designs that are randomized or controlled are warranted to draw conclusions on the efficacy of the interventions.

Relationships Among Physical Activity, Academic Burnout, and Student Engagement

The relationships between academic burnout, student engagement, and exercise and surveyed via Pearson’s correlation are represented in Table 5. Exercise has a small, negative correlation with academic burnout ($r = -.24$, $p < .01$) and a small, positive correlation with student engagement ($r = .27$, $p < .01$). Academic burnout has a negative correlation with student engagement ($r = -.46$, $p < .001$). Although small in magnitude, the relationships constitute the inverse problem between the two psychological variables.

The small correlation between exercise and engagement and burnout suggests that exercise alone is not a most of academic well-being. In an educational setting, psychology and the surrounding social context can impact the academic process in multifaceted ways.

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Exercise can be viewed as one of many variables that are protective and offer motivation spots and not a principal one. The moderate negative correlation between engagement and burnout suggests psychological investment in learning diminishes exhaustion and cynicism.

These outcomes are like earlier studies that suggest an encouraging link between physical activity and the level of student engagement in the classroom while also reducing the risk of burnout. Wang et al. (2023) found that there is a positive relationship between the level of physical activity a student partakes in and the level of academic engagement, while sedentary activity is associated with lower levels of engagement. Additionally, Tian and Yang (2024) propose that burnout may be influenced by physical activity, although the actual impact of physical activity may be psychological.

Teuber et al. (2024) argue that there is positive longitudinal data that backs the claim that physical activity helps in the management of stress and in recovery from emotional distress which is the core of the definition of burnout and a definition of sustained engagement. Overall, the present outcomes agree with theories that posit that physical activity is a tool that is available to students that enhances student perseverance towards their studies.

Smartphone Critical Reflection

Engagement by participants with the digital platform itself was not assessed in the current study. Though a structured prompting system most likely assisted in the establishment of routine and consistent behavior, the contribution of the smartphone medium, by itself, cannot be separated from the activity dimension. Consequently, it is uncertain whether other, non-digital cueing methods would yield similar results. Future studies are warranted on the role that digital prompting plays on the academic and wellbeing interventions by incorporating objective measurements of app engagement, different formats of delivery, and randomized controlled studies.

Conclusions

The increased levels of physical activity due to low-dose physical activity intervention supplemented by smartphone prompts, accompanied by a drop-off in academic burnout symptoms and improvement in student engagement, demonstrates the efficacy of the intervention. The upgrade in physical activity ratings from low, to

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moderate, to high demonstrates that brief, organized, and electronically assisted methods have the potential to produce large and meaningful changes in behavior in the context of high-level academic engagement.

The reduction in burnout, emotional exhaustion, academic cynicism, and increased academic efficacy burnout supports the study of lifestyle behavior changes and the potential psychological impact resiliency of students. The evidence of physical activity and psychosocial activity balance of strain in the academic load supports the case physical activity needs the become a manageable and expandable behavior change in the context of academic burnout and psychologically stress in the student population. The study reiterated the need for a psychosocial balance of strain and to broaden the change of behavior. In the context of academic stress, the psychosocial balance of strain needs to be the focus to manage the stress in student population. It demonstrates that the psychological burnout and emotional exhaustion in the multiple discipline stress can be psychosocially managed in students.

Limitations of the Study

Reliance on subjective measures for defining physical activity, academic burnout, and student engagement create possible response bias and recall errors caused by social desirability. The lack of physical activity monitors for objective measures makes estimating any behavioral changes very difficult. The single group pretest-posttest design without any control group creates a design deficiency in terms of causal inference, because changes can be associated with influences other than time, or in this case the outside variables have a large influence on the outcome. This study is limited in scope because it relies on a single institution of higher education, which limits its outside validity in academic environments, and student populations. The academic workload, lifestyle behaviors, and individual differences were all uncontrolled for in this study and, as such, may have contributed to the outcomes. The study, with all of its limitations, is a significant contribution to the understanding of low-dose, digitally delivered physical activity interventions, and how academic engagement and well-being may be positively impacted.

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References

Aadland, K. N., Ommundsen, Y., Anderssen, S. A., Brønnick, K., Moe, V. F., Resaland, G. K., Skrede, T., Stavnsbo, M., & Aadland, E. (2019). Effects of the Active Smarter Kids (ASK) Physical Activity School-based Intervention on Executive Functions: A Cluster-Randomized Controlled Trial. *Scandinavian Journal of Educational Research*, *63*(2), 214–228. https://doi.org/10.1080/00313831.2017.1336477

Adigue, M. L. P., & Adigue, N. H. (2025). From motion to motivation: The relationship of physical activity on Filipino students' self-efficacy for learning. *Sportis. Scientific Journal of School Sport, Physical Education and Psychomotricity, 11*(4), 1–18. https://doi.org/10.17979/sportis.2025.11.4.11967

Algones, C. J. (2024). Understanding the transition from high school to college: A phenomenological study of first-year students of Davao del Sur. *International Journal of Novel Research in Education and Learning*. https://doi.org/10.5281/zenodo.14561135

Allegretti, A. (2025). Relationship Between Burnout & Physical Activities in Health Professions Graduate Students: A Survey Study. *American Journal of Occupational Therapy*, *79*(Supplement_2), 7911500363p1. https://doi.org/10.5014/ajot.2025.79s2-po348

Almutairi, H., Alsubaiei, A., Abduljawad, S., AlShatti, A., Fekih-Romdhane, F., Husni, M., & Jahrami, H. (2022). Prevalence of burnout in medical students: A systematic review and meta-analysis. *International Journal of Social Psychiatry*, *68*(6), 1157–1170. https://doi.org/10.1177/00207640221106691

Arufe-Giráldez, V., Sanmiguel-Rodríguez, A., Ramos-Álvarez, O., & Navarro-Patón, R. (2022). Gamification in Physical Education: A Systematic Review. *Education Sciences*, *12*(8), 540. https://doi.org/10.3390/educsci12080540

Baati, I., Regaieg, N., Trigui, H., Ben Jemaa, M., Chérif, F., Féki, I., Guermazi, F., & Masmoudi, J. (2025). Assessement of educational burnout among medical students. *European Psychiatry*, *68*(S1), S989. https://doi.org/10.1192/j.eurpsy.2025.2006

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ISSN-e 2386-8333

Bi, S., Yuan, J., Wang, Y., Zhang, W. T., Zhang, L., Zhang, Y., Zhu, R., & Luo, L. (2024). Effectiveness of Digital Health Interventions in Promoting Physical Activity Among College Students: Systematic Review and Meta-Analysis. *Journal of Medical Internet Research*, *26*, e51714. https://doi.org/10.2196/51714

Boni, R. A. dos S., Paiva, C. E., de Oliveira, M. A., Lucchetti, G., Fregnani, J. H. T. G., & Paiva, B. S. R. (2018). Burnout among medical students during the first years of undergraduate school: Prevalence and associated factors. *PLOS ONE*, *13*(3), 1–15.

Camia, M., Reho, M., Ferrari, E., Boni, C. D., Ferretti, V., Guaraldi, G., Genovese, E., Varallo, G., Benassi, E., Scarano, A., Baldini, V., Ciaramidaro, A., & Scorza, M. (2025). Academic Burnout in University Students with Specific Learning Disorders: The Mediating Role of Anxiety in the Relationship Between Burnout and Depression. *Stomatology*, *14*(18), 6400. https://doi.org/10.3390/jcm14186400

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U. L. F., Yngve, A., & Sallis, J. F. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise,* *35*(8), 1381–1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Cressy, J. (2011). The Roles of Physical Activity and Health in Enhancing Student Engagement: Implications for Leadership in Post Secondary Education. *College Quarterly*, *14*(4), n4.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

de Vries, J. D., van Hooff, M. L. M., Geurts, S. A. E., & Kompier, M. A. J. (2016). Exercise as an intervention to reduce study-related fatigue among university students: A two-arm parallel randomized controlled trial. *PLOS ONE*, *11*(3). https://doi.org/10.1371/JOURNAL.PONE.0152137

Ellison, O. K., Bullard, L. E., Lee, G. K., Vazou, S., Pfeiffer, K. A., Baez, S., & Pontifex, M. B. (2024). Examining efficacy and potential mechanisms of mindfulness-

Original article. Effects of a digitally delivered low-dose physical activity intervention on academic burnout and student engagement in university students Vol. 12, n. º 2; p. 1-28, April 2026
.https://doi.org/10.17979/sportis.2026.12.2.12972

based cognitive therapy for anxiety and stress reduction among college students in a cluster-randomized controlled trial. *International Journal of Clinical and Health Psychology*, *24*(4), 100514. https://doi.org/10.1016/j.ijchp.2024.100514

Ernsting, C., Dombrowski, S. U., Oedekoven, M., O'Sullivan, J. L., Kanzler, M., Kuhlmey, A., & Gellert, P. K. (2017). Using smartphones and health apps to change and manage health behaviors: A population-based survey. *Journal of Medical Internet Research, 19*(4), e101. https://doi.org/10.2196/jmir.6838

Fang, Y., Peng, S., Khairani, A. Z., & Liang, J. (2024). A Systematic Review and Meta-Analysis of the Efficacy of Physical Activity Interventions among University Students. *Sustainability*, *16*(4), 1369. https://doi.org/10.3390/su16041369

Fernández-Espínola, C., Almagro, B. J., Tamayo-Fajardo, J. A., Paramio-Pérez, G., & Sáenz-López, P. (2022). Effects of Interventions Based on Achievement Goals and Self-Determination Theories on the Intention to Be Physically Active of Physical Education Students: A Systematic Review and Meta-Analysis. *Sustainability*, *14*(22), 15019. https://doi.org/10.3390/su142215019

Figueiredo, S., & Ferreira, S. (2024). Vulnerability and academic burnout in the university context: Interaction events, social exchanges, and resilience behaviours. *Higher Education Quarterly*. https://doi.org/10.1111/hequ.12562

Gasana, J., O'Keeffe, T., Withers, T. M., & Greaves, C. (2023). A systematic review and meta-analysis of the long-term effects of physical activity interventions on objectively measured outcomes. *BMC Public Health*, *23*(1). https://doi.org/10.1186/s12889-023-16541-7

Herbert, C. (2022). Enhancing Mental Health, Well-Being and Active Lifestyles of University Students by Means of Physical Activity and Exercise Research Programs. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.849093

Koca, B. B., & Karadağ, E. (2025). Relationships between student engagement in higher education and academic success and desire to attend university. *Journal of International Students*, *15*(10), 137–152. https://doi.org/10.32674/p5v42952

Original article. Effects of a digitally delivered low-dose physical activity intervention on academic burnout and student engagement in university students Vol. 12, n. º 2; p. 1-28, April 2026 .https://doi.org/10.17979/sportis.2026.12.2.12972

Kratzke, C., & Cox, C. C. (2012). Smartphone technology and apps: Rapidly changing health promotion. *International Electronic Journal of Health Education, 15*, 72–82.

Malagodi, F., Findon, J. L., Gardner, B., & Dommett, E. J. (2025). A systematic review of the effectiveness of physical activity interventions for improving mental health and wellbeing in university students. *Journal of College Student Mental Health*. Advance online publication. https://doi.org/10.1080/28367138.2025.2566914

Maloloy-on, E., Aquino, A. S., Marcelino, M. M., Mateo, M., Plaza, C. A., Endrina, S., & Tus, J. (2023). Procrastination and its relationship to the academic burnout of first-year college students in a state university. *Zenodo*. https://doi.org/10.5281/zenodo.8185961

Martin, B. J. M. (2026). Effectiveness of MyFitnessPal application among senior high school students. *The Physical Educator, 83*(2), 189–209. https://doi.org/10.18666/TPE-2026-V83-I2-12823

Martinek, T., Holland, B., & Seo, G. (2019). Understanding physical activity engagement in students: Skills, values, and hope. *RICYDE. Revista Internacional de Ciencias del Deporte, 15*(55), 88–101. https://doi.org/10.5232/ricyde2019.05506

Mateo-Orcajada, A., Vaquero-Cristóbal, R., Mota, J., & Abenza-Cano, L. (2023). The loss of achieved effects on physical activity, body composition and fitness variables in adolescents after a period of mandatory and promoted use of step tracker mobile apps when their use becomes non-mandatory and non-promoted: a randomized controlled trial (Preprint). *Jmir Mhealth and Uhealth*. https://doi.org/10.2196/51206

Noor, S., Tajik, O., & Golzar, J. (2022). Simple random sampling. *International Journal of Education & Language Studies, 1*(2), 78–82.

Ochentel, O., Humphrey, C., & Pfeifer, K. (2018). Efficacy of Exercise Therapy in Persons with Burnout. A Systematic Review and Meta-Analysis. *Journal of sports science & medicine*, *17*(3), 475–484. https://pmc.ncbi.nlm.nih.gov/articles/PMC6090391/

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Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students: A Third Decade of Research. Volume 2*. Jossey-Bass, An Imprint of Wiley. 10475 Crosspoint Blvd, Indianapolis, IN 46256.

Rodríguez-Izquierdo, R. M. (2020). Service learning and academic commitment in higher education. *Revista De Psicodidactica*, *25*(1), 45–51. https://doi.org/10.1016/J.PSICOE.2019.09.001

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. https://doi.org/10.1177/0013164405282471

Schaufeli, W. B., Martínez, I. M., Marques Pinto, A., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464–481. https://doi.org/10.1177/0022022102033005003

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin.

Sofro, Z. M., Wibowo, R. A., Wasityastuti, W., Kusumadewi, A. F., Utomo, P. S., Ekawati, F. M., Putri, R. E., Aldrin, E., Fatmawati, J. S., Chang, T. C., Pratista, M. I., & Agustiningsih, D. (2023). Physical activity virtual intervention for improving mental health among university students during the COVID-19 pandemic: A Co-creation process and evaluation using the Behavior Change Wheel. *Heliyon*, *9*. https://doi.org/10.1016/j.heliyon.2023.e18915

Ternora, E. C. (2025). College adjustment among university students: A basis for psychosocial intervention. *AIDE Interdisciplinary Research Journal, 11*, 34–54. https://journal.aide-inc.net/index.php/aide-irj/article/view/169/140

Teuber, M., Leyhr, D., & Sudeck, G. (2024). Physical activity improves stress load, recovery, and academic performance-related parameters among university students: a longitudinal study on daily level. *BMC Public Health*, *24*. https://doi.org/10.1186/s12889-024-18082-z

Teuber, M., Leyhr, D., Moll, J., & Sudeck, G. (2022). Nudging digital physical activity breaks for home studying of university students—A randomized controlled trial

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Scientific Technical Journal of School Sport, Physical Education and Psychomotricity

during the COVID-19 pandemic with daily activity measures. *Frontiers in Sports and Active Living*, *4*. https://doi.org/10.3389/fspor.2022.1024996

Tian, Y., & Yang, S. (2024). The chain mediating effect of mindfulness and self-esteem in the relationship between leisure-time physical activity and academic burnout among college students. *Dental Science Reports*, *14*(1). https://doi.org/10.1038/s41598-024-83906-2

Trolian, T. L. (2024). *Student Engagement in Higher Education: Conceptualizations, Measurement, and Research* (pp. 265–324). Springer Nature (Netherlands). https://doi.org/10.1007/978-3-031-38077-8_6

Villalon, J., & Nebria, E. (2024). Moderating effect of demographic variables on college students' stress and burnout. *European Journal of Education Studies, 11*(3). https://doi.org/10.46827/ejes.v11i3.5243

Wang, X., Liu, Z., Zhang, H., & Ji, C. (2023). Effects of high-intensity interval training on executive functions in college students: Evidence from different doses. *Brain Sciences, 13*(4), Article 571. https://doi.org/10.3390/brainsci13040571

Wang, Z., He, Z., & Cai, Y. (2023). Can Moving More and Sitting Less Improve the Academic Engagement of Adolescents?- A Study Based on Junior High School Students in Shanghai, China. *Psychology Research and Behavior Management*. https://doi.org/10.2147/prbm.s427214

Wefald, A. J., & Downey, R. G. (2009). Construct dimensionality of engagement and its relation with satisfaction. *The Journal of Psychology*, *143*(1), 91–111. https://doi.org/10.3200/JRLP.143.1.91-112

Xie, Y., Liu, D., & Shi, L. (2023). Factors associated with academic burnout and its prevalence among university students: a cross-sectional study. *BMC Medical Education*, *23*(1). https://doi.org/10.1186/s12909-023-04316-y

Zhu, L., Hou, J., Zhou, B., Xiao, X., Wang, J., & Jia, W. (2023). Physical activity, problematic smartphone use, and burnout among Chinese college students. *PeerJ*, *11*. https://doi.org/10.7717/peerj.16270

Živojinović, J. B. I., Backovic, D., Belojevic, G., Valčić, O., Soldatovic, I., & Janković, J. (2020). Predictors of burnout among Belgrade veterinary students: A cross-

Original article. Effects of a digitally delivered low-dose physical activity intervention on academic burnout and student engagement in university students Vol. 12, n. º 2; p. 1-28, April 2026
.https://doi.org/10.17979/sportis.2026.12.2.12972

sectional study. *PLOS ONE*, *15*(3), 1–12. https://doi.org/10.1371/JOURNAL.PONE.0230685

Zou, C., Zhao, Y., Garza, K. B., Hollingsworth, J. C., Murrah, W. M., Westrick, S. C., & Fox, B. I. (2023). Text Message Interventions for Physical Activity among University Students: A Systematic Review and Meta-Analysis. *The American Journal of Pharmaceutical Education*, *87*(8), 100538. https://doi.org/10.1016/j.ajpe.2023.100538