MULTIDISCIPLINARY SCIENCE JOURNAL

CONFERENCE PAPER
Published Online: October 7, 2025
https://doi.org/10.31893/multiscience.2025ss0404

Integrative Medicine: Incorporating Complementary Therapies into Clinical Practice

Effects of digital interventions on physical activity among adolescents and young adults

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Abstract Understanding how to increase children's and teens' levels of exercise during the pandemic is crucial for the wellness of children. The well-being of children depends on knowing how to raise children's and teenagers' physical activity through the pandemic. The analysis aimed to investigate the effectiveness of an intervention program designed to promote physical activity among adolescents in an online learning environment. It used an experimental technique, considering a pre-test and post-test completed. Participants were seventy high school students who were assigned at random to the treatment or control groups. The intervention was structured around the principles of the independence theory, emphasizing autonomy, competence and relatedness. Although those in the control group continued to participate in normal online exercise sessions, the intervention group's members underwent a three-month intervention based on the Independence theory. Established questionnaires were used to evaluate physical activity behavior, motivation, intention, perceived autonomy support, and support. The data were analyzed using analysis of covariance's (ANCOVA). The pre-test revealed that both groups' participants' views of autonomy support, motivation, and exercise behavior were comparable in the beginning. In contrast to the individuals in the control group, the treatment group's members indicated greater levels of felt autonomy support, motivated intention, and physical activity during the post-test. The results suggest that incorporating structured interventions into online physical education can significantly enhance engagement and activity levels. Based on these findings, it is critical to create measures for enhancing teenage engagement and levels of exercise through the COVID-19 epidemic in physical education online classrooms. Future research should explore the long-term impacts of such interventions and assess their applicability in post-pandemic educational settings.

Keywords: psychological wellness, sustainable attitudes, scientific issues, nature, COVID-19 epidemic, engagement

1. Introduction

Strict isolation and seclusion were required to stem from replicating the recently identified coronavirus disease (COVID-19) (Mattioli et al., 2020). Children and teenagers spend the majority of their time at home as a result of numerous decisions to abolish educational facilities. Due to these limitations, educational institutions like schools have started using online learning. As instructors and household members worked to restructure children's daily schedules so that homeschooling wouldn't interfere with traditional school tasks, learning online became difficult (Jalongo, 2021). However, online learning curtailed possibilities for pupils to regularly interact with peers and engage in physical activity on campus (Sebire et al., 2018). According to several investigations, social isolation during the COVID-19 quarantine significantly impacted children's and teenagers' mental health and their frequency of physical activity. van Sluijs et al. (2021) spoke about the most recent global data on teenage activity levels and practical strategies to encourage youth physical activity. To determine the characteristics, viability, acceptability, and efficacy of JITAIs for physical activity, the (Hardeman et al., 2019) comprehensive review of the literature.

Devine et al. (2018) discussed the scientific backing for digital health programs aimed at patients with cancer who are adolescents and young adults (AYA). Research evaluated the available literature for the Internet, mobile health, online communities, telemedicine, and other digital treatments for AYA survivors. When implementing the Collaborative Learning paradigm in physical education, (Bodsworth & Goodyear, 2017) investigated the obstacles to and enablers of intentional technology incorporation. Martin and Murtagh (2017) thoroughly analyzed educational physical activity programs that incorporate academic material and evaluated the programmers' impact on physical activity, learning, learning instructors, and

health effects. Car et al. (2019) discussed the technique's difficulties while presenting the broad methods utilized to combine the data from the studies of online health instruction. It adhered to Cochrane's principles for conducting systematic examinations, and all information was submitted under PRISMA. The essential characteristics of efficacy, (Jacob et al., 2021) collected data on how well school-based health education programmes work to prevent overweight and lower teenage BMI.

McCallum et al. (2018) looked at how often assessments of smart watches and applications for physical activity utilize quick research designs, evaluate acceptance and acceptability as well as efficacy, utilize efficient data-gathering techniques, and identify the elements of suitability and acceptability that were evaluated. Pangrazi and Beighle (2012) programs in schools offer a distinctive atmosphere that could present several possibilities for childrens to be active outdoors within and outside of the classroom. Additionally, since physical activity is required in schools, chidrens were compelled to learn about and engage in physical activities that would enable them to continue being physically fit. Physical education instructors used a variety of online teaching techniques, including streaming live and audio recordings. However, expecting that sports sessions would be able to inspire pupils to get moving to the recommended levels was impractical Barker et al. (2018) owing to the absence of a natural environment and the absence of connection between pupils. Limitations have persisted in many nations due to the development of additional COVID-19 variants and the absence of appropriate immunization in several nations, and it is unknown when schools will be able to resume on-site instruction. Burns et al. (2020) to encourage students to engage in physical exercise and thereby enhance their mental and physical wellbeing, the standard of online physical education instruction has to be raised.

Evenepoel et al. (2023) evaluated the acceptance, satisfaction, and commitment of online self-management strategies for post-operative cancer recovery and pinpointed the commonalities across these treatments. Pritchett et al. (2017) persons who met the criteria for clinical depression were evaluated to see how well exercise reduced their depressive symptoms as compared to no therapy, placebo circumstances, or standard care. Chaabene et al. (2021) assessed the effectiveness and viability of a digital home-based exercise program carried out during a restricted period by examining its impact on survivors of breast cancer's physique, health. Chandra (2021) examined students' perceptions of the academic stress felt while pursuing modern online courses and the methods of coping used. Wang et al. (2020) looked at how 3rd-year scientific students' eating and exercise habits were affected by isolation policies in Australia's initial COVID-19 outbreak.

Research aimed to determine how a home-based intervention in virtual physical education courses affected teenagers' inspiration, intent, and exercise habits throughout the COVID-19 epidemic. The theoretical foundations of self-determination theory served as the foundation for the intervention used. The theory contends that there are three fundamental behavioral needs: autonomy, ability, and relatedness that, when met, can enable behavior. The pursuit of mastering and achievement is influenced by the multifaceted, dynamic, and dynamic idea of competency. The term relatedness relates to the sensation of interpersonal interactions and measures how much a person feels like a member of society and connected to important people. It concentrated on a strategy that supported flexibility in online physical education classrooms. The follow-up hypothesized that the intervention would increase teenagers' motivation, purpose, and engagement in exercise.

The rest of the paper is separated into the following sections. The approach given is in Part 2. While Part 4 addresses the conclusions, Part 3 presents the findings and analysis

2. Materials and Methods

It was employed a method of experimentation with a pretest and post-test carried out. The signed informed permission was given by the parents as well as the pupils.

2.1. Participants

In Table 1, the averages for Weight, Height, and weight deviations for male and female pupils at two traditional high schools, are shown. 70 male adolescents between the ages of 16 and 18 who would have been in the tenth and eleventh grades in 2020 made up the participants. Table 1 shows the participant's details.

Table 1 Participant's details.

	Mean Height (cm)	Height Variance (cm^2)	Mean Weight (kg)	Weight Standard Deviation (kg)
Boys	167.41	9.05	57.28	11.17
Girls	157.56	9.10	55.93	11.02

2.2. Measures

Reported autonomous support, an intrinsic intention to exercise, and reported exercise were the variables that were dependent on the current research.

Perceived Autonomy Support: A 5-question survey was used to gauge support in online physical education (PE) courses. The replies were rated from 1 (disapprove) to 7 (approve) on a Likert scale. The average of all the queries served as the final rating. Cronbach's alpha for the survey's initial iteration was 0.92. Using the traditional procedure of translation and

retranslation, it employed a translator for the task who spoke natively but was conversant in local and was informed about English-speaking society. The insufficient translation was then found and fixed, along with any conflicts between the translation and the original text, by an international expert panel, between the original text and the translation. The device was ultimately converted back into English by a separate translator using the same methodology as in the previous phase. The reliability of the variant of this survey was later testified to by 9 professionals (CVI=1, CVR=0.79), with a 0.97 Cronbach's alpha score.

Innate Motivating Factor: In lessons and outside of school, the 8-question Inner Motivation Scale was utilized to gauge intrinsic motivation and was rated from highly rejecting to highly supportive on a Likert scale. The average of all the items made up the overall score for the survey. The accuracy of the version of the survey was certified by 9 experts (CVI=0.89, CVR=0.77). Additionally, the questionnaire's Cronbach's alpha coefficient in the current research was 0.98.

Intention to Engage in Physical Exercise: Using two questionnaires with Likert scale ratings ranging from disagree (grade of 1) to agree (grade of 7), the intention to participate in physical exercise was evaluated. The average of all the elements made up the questionnaire's final score. In its initial version, Cronbach's alpha coefficient was 0.88. Here, the standard method of translation and retranslation was used to convert the initial questionnaire. 9 specialists participated in the data and confirmed the accuracy of the variation of this survey (CVI=1, CVR=1). Additionally, it evaluated the questionnaire's validity using its 0.88 Cronbach's alpha coefficient.

Physical Exercise: By using the Physical Activity Habits in Leisure Time Scale, which had 3 items with ratings based on an -point Likert matrix ranging from 0 to 7 days, Physical activity during downtime was assessed. The reliability and accuracy of the poll were verified in previous research. The survey's validity and reliability were supported by the participation of 12 experts, and its Cronbach's alpha coefficient was 0.92.

2.3. Procedure

To determine the effect of an intervention on students' autonomous motivation for engaging in physical activity at home, a pretest and post-test were used. The test was conducted online, utilizing the WhatsApp app in a physical education environment, recruitment, and random assignment of the four male physical education instructors to the intervention or control groups. There were thirty-three students in the treatment group and thirty-three in the control group. The training group's instructors participated in an instructional session run by the investigator before the trial. The workshop offered direction on the material taught in these sessions and attempted to improve the teachers' understanding of interacting with students in online classrooms.

The intervention group's instructors received training in various techniques to support students' autonomous motivation based on the Self-Determination theory. These techniques included speaking nonjudgmentally and informally, offering explanations, displaying patience, presenting options, and embracing uncomfortable feelings. The instructors used WhatsApp to conduct these exercises in their online training sessions. To learn more about the assignments, students were encouraged to ask questions; those in the control group continued to engage in their usual routines throughout the online training sessions. The intervention was conducted twice weekly for 3 months under the direction of the physical education instructors. In an online physical education context, this research investigated the impact of an intervention on fostering students' autonomous motivation for physical activity. While the control group members went about their normal business during the online lectures, the intervention group received specialized instruction and used certain tactics.

2.4. Data evaluation

The descriptive statistics used in this research included means and standard deviations to describe the variables. An independent t-test was employed to assess the groups' pretest mean values. The post-test findings were compared using ANCOVA. P0.06 was used as the degree of significance.

3. Result

A 70 male pupils from two ordinary high schools in the tenth and eleventh grades, ranging in age from 16 to 18 at the time. As part of the inclusion requirements, participants had to provide their agreement to participate, be enrolled in a national school, and be in good physical and mental health, free from serious bodily or mental illnesses. Concerning all of the variables, the s-test outcomes showed no statistically significant variations between the groups in the initial test (Table 2). As a result, the groups had comparable circumstances before the intervention.

Perceived Autonomy Support: The ANCOVA findings revealed substantial variations across each of the categories ($F=296.51$, $P<0.001$). The group receiving intervention greatly outperformed the control group on the post-test, as shown by the research's means (Figure 1), demonstrating that teenagers' perceptions of the intervention's encouragement of autonomy were enhanced.

Internal Motivation: ANCOVA's findings showed substantial group variations ($F=466.82$, $P<0.001$). The post-test results for the groups' means (Figure 2) show that the treatment group considerably outperformed the control group, demonstrating that the intervention raised the individuals' intrinsic motivation levels.

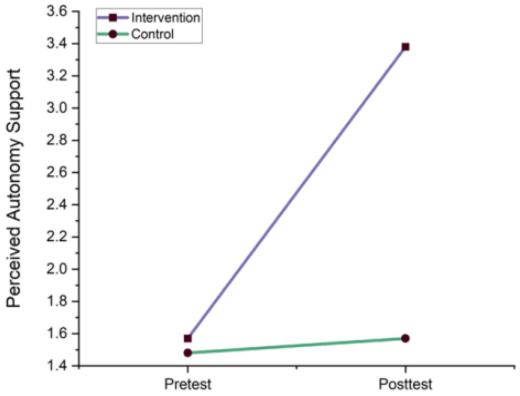

Figure 1 Perceived autonomy support scores (pre-test and post-test).

Table 2 Comparing the mean scores of the groups.

Variables	Pretest				Comparison
	Intervention		Control		
	Mean	SD	Mean	SD	
Perceived Autonomy Support	1.57	0.35	1.48	0.45	t = 0.928
					P = 0.360
Intrinsic Motivation	1.55	0.40	1.61	0.51	t = 0.520
					P = 0.608
Intension to Physical Activity	1.39	0.45	1.44	0.44	t = 0.450
					P = 0.658
Physical Activity	1.18	0.48	1.30	0.49	t = 1.032
					P = 0.319

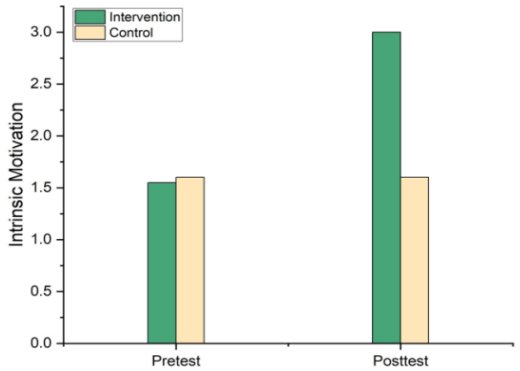

Figure 2 Outcomes of Intrinsic motivation scores.

Intention to Physical Exercise: The analysis of covariance (ANCOVA) findings showed substantial group variations ($F=82.50$, $P < 0.001$). Based on the group means (Figure 3), on the post-test, research found that the treatment group far surpassed the control group, proving that the children's motivation to participate in physical exercise increased as a result of the program.

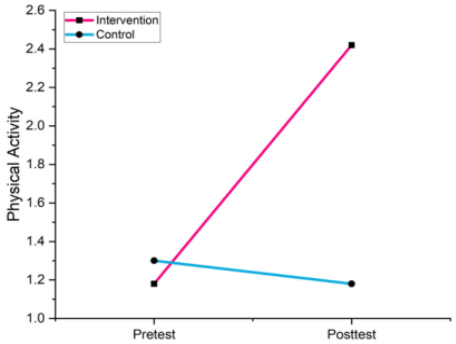

Figure 3 Outcomes of Intention to physical activity scores.

Physical Exercise: The ANCOVA findings indicated substantial variations among the categories (F=113.48, P< 0.001). Based on the group means (Figure 4), the intervention group considerably outperformed, revealing that the therapy increased individual amounts of physical activity compared to the control category on the post-test.

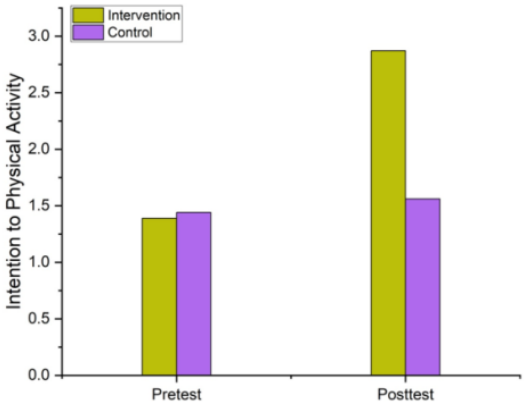

Figure 4 Outcomes of Physical activity scores.

3.1. Discussions

Improving teenagers' levels of physical activity, motivation, and perceived autonomy support is crucial for their general wellbeing. These findings are consistent with earlier research on motivation and autonomy in physical education. Structured treatments improve self-determined motivation and engagement, as indicated by (Barker et al., 2018). According to Hardeman et al. (2019), adaptive treatments successfully encourage physical activity. These results support the idea that involvement in virtual physical education is impacted by tactics that promote autonomy.

The long-term viability of internet treatments for promoting physical activity in teenagers is a problem. According to Burns et al. (2020), the psychological effects of the pandemic had an impact on students' motivation and general well-being. The research of Car et al. (2019), to guarantee efficacy, digital health education needs to be properly organized. The sustainability of these measures after the epidemic should be investigated in future studies. It's also critical to evaluate their applicability in conventional learning environments.

For pupils to benefit from physical activity programs, technology is essential. Bodsworth and Goodyear (2017) noted both the advantages and disadvantages of integrating digital technology into physical education. Although technology increases participation, digital knowledge and accessibility are essential. Physical exercise can be encouraged by wearable fitness technology, according to McCallum et al. (2018). Digital tool integration could increase participation and maintain behavioral adjustments.

Strategies for ensuring teenage physical activity participation must be developed by educators and policymakers. Jacob et al. (2021) discovered that school-based interventions decreased sedentary behavior. Early intervention is crucial for creating long-lasting behaviors, according to (Van Sluijs et al., 2021). For future interventions to be effective, digital and conventional techniques should be combined. Beyond the pandemic, hybrid learning methods might maintain physical activity and motivation. Additionally, to reinforce these healthy habits, cooperation across communities, families, and schools is essential.

4. Conclusion

The findings show that compared to conventional exercise methods, the autonomy-based exercise action used in online physical education courses throughout the COVID pandemic was more successful at increasing adolescent students' intrinsic motivation, intention, and involvement in exercise. These findings suggest that psychological variables like inherent motivation and physical activity intention are more significantly influenced by the sense of autonomy experienced during virtual exercise programs. The findings might be helpful for teachers of physical exercise throughout the COVID-19 outbreak. According to the findings, physical education instructors could utilize autonomy-based techniques to boost the enthusiasm of their pupils and their desire to engage in physical exercise. By providing options for choosing operations, Teachers who teach sports can support the need for freedom in this way by emphasizing a sense of agency and using non-controlling vocabulary and evaluation throughout virtual exercise courses.

The current work did have certain restrictions. Because research only employed males in this research, it is important to apply caution when extrapolating the findings to girls. To provide an accurate depiction of the effect of online treatments on adolescent physical activity habits, more research is necessary; since it were unable to determine the individuals' financial circumstances; it wanted to emphasize their socioeconomic standing. The limited number of participants can be considered another drawback. For the dependability of these results to be increased, more research with a smaller sample size is required. Another drawback of the research is that it relied heavily on self-reports, which are subject to bias due to self-reporting.

Ethical Considerations

The signed informed permission was given by the parents as well as the pupils.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

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