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Research Article

Collision of Brain Breaks Intervention on Physical and Psychological Health in Indian Pre-Adolescents: A Quasi-Experimental Study

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Abstract
This research examines the impact of a 'Brain Breaks' video-based classroom physical activity intervention on physical fitness, psychological well-being, and overall health among 'Pre-adolescent children (aged 9 to12 years) at India'. It used a 'Quasi-experimental design', '110 participants' were allocated to an 'Experimental group (n = 60)' and a 'Control group (n= 50)'. Over '12 weeks', the experimental group engaged in '2 to 5 minutes' 'Brain Breaks videos' delivered '6 days per week' during class time promoting structured physical exertion. Pre- and post-intervention outcomes were evaluated using the 'EUROFIT Physical Fitness Test, World Health Organization Well-Being Scale, and the Physical Activity Enjoyment Scale (PAES)' The findings revealed no significant differences between 'Experimental and Control groups' in terms of 'Agility and Explosive Strength'. However, significant improvements were observed in 'Flexibility, Wellbeing, and Physical Activity Enjoyment' among participants in the 'Experimental group compared to the Control group'. Feasible and valuable suggestions were given based on above mentioned results of the study.
Keywords: Physical activity, EUROFIT, Children, Technology-based video intervention, psychological scale.

1) Introduction:

Cognitive skills are crucial in determining children's academic success, as they are foundational to many learning processes. Furthermore, the comprehensive enhancement of both physical and mental well-being is essential for achieving a balanced and fulfilling life, as it not only fosters resilience and promotes overall health but also equips individuals with the necessary tools to navigate daily challenges effectively, thereby creating a solid foundation for preparing students for school and their future endeavours. As children transition into adolescence, the potential for significant brain development significantly increases, empowering them with enhanced cognitive abilities, emotional understanding, and a greater capacity to navigate the complexities of their changing environment. The current era, as well as the foreseeable future, is characterized as the age of technology, where advancements in mechanization play a pivotal role in shaping our daily lives and societal structures. In this transformative period, it becomes increasingly apparent that if individuals and their future generations do not maintain good health, the intrinsic value of their existence diminishes significantly. Upon closer examination of our society and the global community,

it is evident that emerging technologies profoundly influence various facets of contemporary civilization. While numerous positive aspects are associated with these technological advancements, weighing them against their potential drawbacks is crucial. Regular physical activity significantly enhances overall well-being, contributing positively to physical health by improving cardiovascular fitness, strength, and flexibility. It also improves mental health by reducing stress, anxiety, and symptoms of depression, thereby fostering a more balanced and healthier lifestyle

2) Statement of the research problem

The 'Brain Breaks' video-based physical activity intervention offers a structured approach to integrating brief, planned exercises into classroom routines, aiming to enhance children's physical and cognitive resilience.

However, empirical evidence on its effects on anthropometric measures, motor competencies, and psychological well-being among school-aged pre-adolescents remains limited. Theoretical advantages of such programs are widely acknowledged across diverse 'educational' contexts and 'pre-adolescent' populations, rigorous data confirming their efficacy are scarce, a gap that impedes evidence-based health and education policymaking. This research addresses '2' primary objectives.

(1) To empirically evaluate the impact of a 'Brain Breaks' video-based program on 'pre-adolescent students' motor skills, anthropometric profiles, and psychological well-being'; and

(2) To provide suggestions based on results of this research.

3) Scope of the Research Study

The present study focuses on evaluating the impact of a 'Brain Breaks' video-based classroom physical activity intervention on 'physical fitness', 'psychological well-being', and 'overall health' among 'pre-adolescent children (aged 9 to 12 years)' in 'India'. The research employs a 'Quasi-experimental design' involving 110 participants, divided into an 'experimental group (n = 60)' and a 'control group (n = 50)'. Over a '12-week intervention period', the experimental group participated in '2 to 5 minute Brain Breaks videos', administered '6 days per week' during regular classroom sessions. The scope encompasses the assessment of 'physical fitness' through the 'EUROFIT Physical Fitness Test', 'psychological well-being' using the 'WHO Well-Being Scale', and 'physical activity enjoyment' through the 'Physical Activity Enjoyment Scale (PAES)'. Statistical analysis includes 'Descriptive Statistics' and 'Analysis of Covariance (ANCOVA)'. 'ANCOVA' was used to identify within- and between-group differences in variables of this research, thereby determining the effectiveness of intervention. The study specifically targets 'pre-adolescent school children' as a critical developmental group, addressing the research gap concerning 'Brain Breaks video-based interventions' in 'Indian educational contexts'. This research analysis the effect of a 'Brain Breaks' video-based program on 'pre-adolescent students' motor skills, anthropometric profiles, and psychological well-being'. Feasible and significant recommendation based on findings of this study are given.

4) Significance of this research

(I) **'Social Work, Sociology and Psychology'**

It provides empirical support for 'movement-based interventions' in 'biopsychosocial models', enhancing 'population-level child development and mental health' prevention.

It demonstrates 'scalable, school-embedded' strategies to address 'sedentary lifestyles, inequalities, and resilience' in 'ecological' systems. It integrates 'physical, anthropometric, and psychological' outcomes for 'holistic, evidence-based policy and community programs'.

(II) **'Pre-adolescents'**

It boosts 'motor competence, healthy body composition, and daily activity' via 'fun, brief breaks'. It improves 'attention, mood, self-esteem, and stress reduction without stigma'. It fosters 'lifelong physical activity habits' and 'emotional regulation'.

(III) **'Psychologists'**

It validates 'non-clinical, stepped-care tools for attention, behaviour, and internalising symptoms'. It reveals mechanisms linking 'movement to cognition, self-efficacy, and well-being'. It supports 'replication, adaptation, and advocacy' for 'classroom protocols'.

(IV)**'Clinical Social Workers'**

It offers 'group-based', 'low-cost supplement' to 'counselling' in 'resource-limited settings'. It aligns with 'whole-child assessments' for 'psychosocial risks and adaptations'. It enhances inter-professional school wellness via standardised, teacher-led implementation.

5) Purpose of this study

This research investigates the effects of a video-based 'Brain Breaks intervention' on enhancing mental abilities via physical activity among 'school children'. The central 'hypothesis' posits that regular, daily classroom-based physical activity breaks positively influence 'physical fitness, self-efficacy, goal orientation', interest in 'physical activity, self-awareness' of its importance and benefits for health and overall development. Extensive research has examined technology-based interventions' impacts on 'children's physical, mental, and fitness' outcomes. However, few studies have explored video-based programs like 'Brain Breaks' on classroom physical fitness levels, with none conducted in 'India'. Accordingly, this study evaluates the impact of a '4-month Brain Breaks' video intervention on 'Indian school students' physical fitness'.

6) Review of Literature

Children's academic achievement is deeply influenced by their 'cognitive skills,' which serve as the backbone of various 'learning processes' (Best et al., 2011). Cultivating both 'physical' and 'mental well-being' is essential for achieving a balanced and meaningful life, as it enhances resilience, supports overall health, and equips individuals with critical tools for navigating daily challenges. As students' progress into 'adolescence,' brain development accelerates, leading to improved 'cognitive functions,' 'emotional comprehension,' and the ability to handle complex social environments (Gogtay et al., 2004). We currently live in an 'era of technological advancement,' where digital innovations greatly shape social structures and daily life activities. Nevertheless, it is evident that without prioritizing personal 'health and well-being,' the value of modern achievements may diminish (Bendíková, 2014). Therefore, maintaining 'good health' remains fundamental for individuals and societies worldwide. Regular 'physical activity' significantly enhances both physical and psychological health, fostering 'cardiovascular fitness,' 'muscular strength,' and 'flexibility,' while also alleviating 'stress,' 'anxiety,' and 'depression' (Kuan et al., 2019). It reduces 'non-communicable diseases' and lowers 'mortality rates,' standing as a crucial factor for 'quality of life' and 'longevity' (Williams, 2012). Research shows that active lifestyles directly improve 'academic performance,' reduce psychological strain, and promote personal growth (Rasberry et al., 2011). Modern education systems, however, often feature 'sedentary learning environments' that limit opportunities for recreational activities and raise mental health concerns. Conversely, incorporating 'physical exercise' supports the development of social, emotional, and cognitive skills, enhancing students' overall success (Lakdawalla & Philipson, 2002). Alarmingly, the growing prevalence of 'health issues' among pre-adolescent children is linked to decreasing 'physical activity levels' and escalating 'sedentary behaviour' (Prince et al., 2014). Being 'physically active' is not limited to sports participation, it is central to sustaining a conscious and fulfilling life. Studies highlight that 'physical fitness' serves as a strong indicator of general well-being and predicts 'long-term health outcomes' (Corbin et al., 2014). In line with this understanding, the 'UK Ministry of Education' (2019) recommended that all primary schools ensure at least 30 minutes of daily structured 'physical activity' (Cline et al., 2021). This policy underscores the value of holistic education integrating 'physical,' 'emotional,' and 'social development,' supporting evidence that physical education cultivates 'moral,' 'social,' and 'personal growth' (Wood et al., 2013). Emerging technological tools have made it possible to integrate 'video-based physical activities' that promote engagement and movement. Studies show that interactive games requiring physical effort, such as those using motion sensors, significantly enhance children's activity levels (Wang & Perry, 2006). The 'HOP Sports Brain Break Physical Activity (PA) program' exemplifies this approach by integrating short, video-based activity sessions during class time. These breaks not only teach new 'motor skills' but also provide mental

refreshment and stress relief (Mahar et al., 2011; Weslake & Christian, 2015). The 'Brain Break' model has demonstrated psychological benefits, including improved 'self-esteem,' decreased 'anxiety,' and elevated 'mood' among participants (Ströhle, 2009). While previous intervention studies noted limited improvements in physical fitness due to brief session durations, they did report reduced 'sedentary behavior' and higher classroom engagement (Bonnema et al., 2022). The approach aligns with current educational goals that promote both 'academic engagement' and 'well-being.' By integrating short '2–5-minute breaks' within study sessions, students experience enhanced focus, motivation, and academic performance (Cline et al., 2021). The Brain Break videos often include themes related to 'character education,' 'health,' 'nutrition,' and 'culture,' which foster not only physical activity but also values-based learning (Kuan et al., 2019; Uzunoz et al., 2017). These multimedia activities are particularly suitable for children aged 7–12 years, providing accessible, space-efficient tools for improving health within school settings (Tománek et al., 2019). The effectiveness of these web-based resources lies in their design as 'recreational physical activities' incorporated into classroom routines, which elevate energy levels and enhance attention control (Sit et al., 2010; Bonnema, 2018). Research emphasizes that such 'classroom-based interventions' contribute to 'positive psychology,' nurturing a 'growth mindset' and 'optimism' in students (Mok et al., 2015). 'Brain Break' program serves as an impactful example of how 'technology-integrated physical education' can support both the 'Whole School, Whole Community, Whole Child (WSCC)' model (Lewallen et al., 2015; Shields & Behrman, 2000) and the 'United Nations' Sustainable Development Goals (SDG)' related to health and well-being (Kuan et al., 2019; Zhou et al., 2021). By encouraging regular, structured, and enjoyable physical movement, it strengthens links between 'cognitive,' 'social,' and 'emotional development,' thereby fostering holistic education aligned with sustainable global objectives.

7) Materials and Methods

(i) Research Design

A 'two-group' ('experimental' and 'control') 'quasi-experimental design' was adopted for the present study. The 'experimental group' ('EG') engaged in a 'Brain Breaks video-based intervention program' that extended over a period of '12 weeks'. This program consisted of daily exposure to short 'Brain Breaks videos' lasting approximately '3 to 5 minutes' during regular 'class hours', for '6 days per week'. The videos were projected onto a 'classroom screen' using a 'multimedia projector'. Each 'Brain Breaks video' incorporated elements of 'recreational physical activities', 'songs', 'dances', and other 'safe movement-based tasks', ensuring adequate 'social distancing' among 'students'. Participants were encouraged to actively follow the 'movements and sequences' displayed on the screen. A diverse set of videos was played each day to sustain 'student engagement', 'motivation', and 'enjoyment'. These 'Brain Breaks videos' were officially available through the 'YouTube platform' and the website 'https://brain-breaks.com'. In contrast, the 'control group' ('CG') continued their regular 'academic curriculum' for '12 weeks' without any 'video-based intervention'. Both groups were assessed for their 'attitudes towards physical activity' prior to and following the intervention using the 'EUROFIT test' and the 'WHO Wellbeing and Physical Activity Enjoyment Scale (PAES)' questionnaire. 'Attitudes toward physical activity' were recorded through 'self-reported measures'. The process of 'data collection' was carried out at '2 time points' initially during the '1st week of the academic term (pre-intervention)' and then at the 'end of the 12-week intervention (post-intervention)'. The study involved a total of '100 student participants'. 'Data collection' and 'Pilot testing' of the 'Brain Breaks video-based program' was conducted in the 'Guntur district' of the 'Andhra Pradesh state', 'India'.

(ii) Participants

The present research sought to investigate the effect of the 'Brain Breaks' video-based classroom intervention program on a sample of '110 children' enrolled in 'Classes 5 and 6' (comprising '50 boys' and '60 girls') aged between '10 and 11 years'. Employing a 'Stratified Random Sampling approach', '3 schools' with 'comparable socioeconomic backgrounds' were 'randomly' selected from the official list of 'schools' in the 'Ponnur block', provided by the 'Guntur District

Education Department', 'Andhra Pradesh'. Of these, participants from '1 school' served as the 'control group' (including '26 boys' and '34 girls'), while the 'experimental group' consisted of '24 boys' and '36 girls' from another selected institution.

(iii) **'The Physical Fitness Test of Europe (EUROFIT)'**

The physical fitness of participants was measured using the 'EUROFIT Physical Fitness Test', developed by the 'Council of Europe' in '1980' (Grgic, 2023). Since its introduction, the 'EUROFIT battery' has been extensively employed in European schools, to assess the 'physical fitness levels' of 'children and adolescents', as well as to evaluate the 'effectiveness of physical education programs' (Tomkinson et al., 2018). The 'EUROFIT test battery' examines multiple dimensions of physical performance, including 'strength', 'flexibility', 'balance', 'speed', 'muscular endurance', 'stamina', and 'agility'.

The individual tests generally include the below mentioned.

(1) the 'Flamingo test' for balance,

(2) the 'Plate tapping test' for limb movement speed,

(3) the 'Sit-and-Reach test' for flexibility, and

(4) the 'Standing board jump test' for lower-body strength, among others. Typically, the 'EUROFIT battery' is designed to be completed within '25 to 40 minutes' using 'basic equipment'. In this study, the 'EUROFIT test' was administered to assess various aspects of 'physical fitness', particularly focusing on 'cardiovascular endurance', 'running speed and agility', 'limb movement speed', 'balance', 'flexibility', 'explosive leg strength', and 'abdominal strength' (Berisha & Cilli, 2017).

'Plate tapping Test': The 'limb movement speed' of participants was evaluated by instructing them to alternately tap two plates with one hand as quickly as possible. The 'time taken' to complete '25 cycles' was recorded (Kaya et al., 2018). Regarding the 'reliability' of this test, results from '110 studies' indicated 'intraclass correlation coefficients (ICCs)'

ranging from '0.57 to 0.92' (median 'ICC = 0.87'), with '25%' and '75%' ICCs exceeding '0.90' and '0.75', respectively. The time required to complete '25 cycles' is noted (Sports Authority of India, 2020).

'Sit-and-Reach Test': 'Sit-and-Reach Test' assessed 'hamstring flexibility'. Each participant sat barefoot before a 'sit-and-reach box' with fully extended knees and reached forward as far as possible. The better of two attempts was recorded in 'half-centimeter (cm)' (Kaya et al., 2018). Among the '110 participants', '86%' of ICCs exceeded '0.90', with an 'ICC range of

0.83 to 0.96' (median 'ICC = 0.96'). The score was calculated as the 'distance reached by the hands' measured from the starting to the final position (Sports Authority of India, 2020). 'Standing Board Jump Test': The 'Standing Board Jump Test' measured 'explosive leg strength' (Kaya et al., 2018). Participants stood behind a line and jumped forward with both feet simultaneously, with the longest jump (recorded in 'centimetres') representing their score. The test was conducted twice, and the highest value was retained. The 'reliability assessment' for '110 students' showed 'ICCs' ranging between '0.89 and 0.98' (mean 'ICC = 0.93'), with '86%' of values above '0.90'. All performance outcomes were graded using the 'EUROFIT reference scale'. Based on this scale, trainees were categorized under different 'fitness rating evels' such as 'below average', 'average', 'above average', and 'advanced', corresponding to each skill component assessed.

(V) **Intervention**

The present study aimed to assess the effectiveness of an 'intervention training program' designed to enhance 'educational' and 'health outcomes' and to address key challenges affecting children. An 'experimental research design' was adopted, as demonstration programs—also referred to as 'true experiments'—are widely recognized as the most rigorous approach for establishing 'cause-and-effect relationships' (World Health Organization, Regional Office for Europe, 1998). A 'Brain Breaks video-based intervention program' was implemented with the 'experimental group', while the 'control group' continued to follow their regular classroom activities without exposure to the intervention. The two groups were located in separate educational institutions to minimize the risk of data contamination. Physical fitness levels were evaluated using the 'EUROFIT

test' both before and after the intervention. Psychological variables such as 'mental well-being' and 'activity enjoyment' were assessed through the 'WHO Wellbeing Scale (Neal, 2022)' and the 'Physical Activity Enjoyment Scale (PAES)', respectively. The 'experimental group' participated in the 'Brain Breaks' intervention program daily during regular class hours over a 12-week period. The program consisted of short 'video segments' lasting approximately two to five minutes, incorporating diverse thematic areas such as 'arts' (dance and music), 'sports' (skill-based activities, cycling, rowing), 'education' (nutrition, health, and hygiene awareness), and 'recreational classroom activities' (fun fitness and dynamic physical education). The selection of videos was collaboratively performed by 'researchers' and 'teachers' (Tumynaitė et al., 2014). Each video was either 'real' or 'fictional' and was specifically designed to encourage student participation through imitation of the physical activities demonstrated. The primary objective of the 'video-based intervention' was to improve participants' 'agility, strength, speed, hand–eye coordination', and 'spatial awareness' through engaging and enjoyable physical tasks. The sessions utilized pre-saved and online '2–5 minute videos' of recreational exercises displayed during school hours, prompting students to actively follow the demonstrated movements. This approach aimed to enhance physical fitness levels while reducing sedentary behavior. During the implementation phase, instructors had access to an online database containing over 200 videos covering multiple domains, including 'nutrition, dance, social skills training, environmental education, health, and fitness' (Tumynaitė et al., 2014). The intervention not only contributed to improved student engagement but also fostered a pleasant and dynamic classroom atmosphere, with both students and trainers expressing high levels of enjoyment throughout the program.

(VI) Research Procedure:

The objective of the 'Brain Breaks' classroom video-based intervention study was formally communicated to the respective 'school administrators' during an official meeting to obtain institutional consent for implementing the 'intervention training program'. Subsequently, all selected 'students' from 'classes 3 to 6' were informed through an official letter detailing the 'purpose', 'objectives', and 'methodology' of the study. Informed 'consent letters' were obtained from both the 'students' and their 'parents or guardians' to ensure ethical participation. Participation in the program was entirely 'voluntary', with both 'parents' and 'students' retaining the right to withdraw from the 'Brain Breaks' intervention at any stage. Prior to participation, 'parental consent' was secured for administering 'physical fitness assessments' to evaluate the baseline fitness levels of the students. Following this, participants took part in the 'Brain Breaks classroom video-based intervention program', which was integrated into the regular 'school timetable' and implemented within the 'classroom setting' during 'school hours'. The program extended over duration of '12 weeks'. Both 'physical' and 'psychological post-tests' were conducted one week before and after the completion of the training to measure the intervention outcomes. The program design accounted for the structured implementation of both the 'control group' and the 'experimental group', ensuring methodological rigor and comparability across the two groups.

Vi) Statistical Software and Tests Used

All statistical analyses were conducted using 'IBM SPSS (Version 29)'. The data were subjected to 'Analysis of Covariance (ANCOVA)', complemented by 'Descriptive Statistics' including 'Mean and Standard Deviation' values, to evaluate the presence of statistically significant differences both within and between the study groups across all measured variables.

8) Results and Discussion:

Table 1: Mean and Standard Deviation for Variables of the research study.

Variables	Group	Pre – Test (Mean)	Pre – Test (Standard Deviation)	Post – Test (Mean)	Post– Test (Standard Deviation)
Agility	Experimental	14.780	0.860	14.680	0.870
	Control	15.050	0.740	15.020	0.760
Explosive	Experimental	1.334	0.123	1.350	0.118

Strength	Control	1.310	0.083	1.330	0.082
Flexibility	Experimental	9.900	1.410	12.360	1.610
	Control	9.400	1.510	10.000	1.171
Wellbeing	Experimental	12.300	1.770	16.030	2.390
	Control	3.000	2.110	5.830	1.610
Variables	**Group**	**Pre – Test (Mean)**	**Pre – Test (Standard Deviation)**	**Post – Test (Mean)**	**Post– Test (Standard Deviation)**
Physical Activity Enjoyment	Experimental	40.800	3.600	53.200	4.200
	Control	32.100	2.700	34.600	2.890

It is evident from 'Table 1' that 'Mean' of 'Agility' during the 'Pre-test' for the 'Experimental group' was '14.780', with a 'Standard Deviation' of '0.860'. 'Mean' for the 'Post-test' has slightly decrease to '14.680' after the intervention, accompanied by a 'Standard Deviation' of '0.870'. Thus, the 'Agility' of the 'Experimental group' demonstrated a marginal reduction after the intervention, as reflected in the 'Post-test Mean'.

'Table 1' shows that the 'Mean' for 'Pre-test' of 'Agility' in the 'Control group' was '15.050', with a 'Standard Deviation' of '0.740'. 'Post-test Mean' was recorded as '15.020', with a 'Standard Deviation' of '0.760'. Hence, the 'Agility' levels in the 'Control group' also exhibited a slight decline after the intervention, as observed in the 'Post-test Mean'.

According to 'Table 1', the 'Mean' of 'Explosive Strength' in the 'Experimental group' during the 'Pre-test' was '1.334' with a 'Standard Deviation' of '0.123'. 'Post-test Mean' after the intervention increased to '1.350', with the 'Standard Deviation' marginally reduced to '0.118'. This indicates an improvement in 'Explosive Strength' in the 'Experimental group' post-intervention. 'Table 1' shows that the 'Mean' of 'Pre-test' of 'Explosive Strength' in the 'Control group' was '1.310', with a 'Standard Deviation' of '0.083'. 'Post-test Mean' was recorded as '15.020', with a 'Standard Deviation' of '0.760'. Hence, the 'Explosive Strength' in the 'Control group' also exhibited a slight decline after the intervention, as observed in the 'Post-test Mean'.

It can also be observed from 'Table 1' that the 'Mean' of 'Flexibility' in the 'Experimental group' improved from '9.900' during the 'Pre-test' (with a 'Standard Deviation' of '1.410') to '12.360' in the 'Post-test' (with a 'Standard Deviation' of '1.610'). This increase reflects a significant enhancement in 'Flexibility' subsequent to the intervention. 'Control group' recorded a 'Pre-test Mean' of '9.400' for 'Flexibility' and a 'Standard Deviation' of '1.510', which increased slightly to a 'Post-test Mean' of '10.000' with a 'Standard Deviation' of '1.171'. Thus, a modest improvement in 'Flexibility' was observed in the 'Control group' post-intervention.

According to 'Table 1', the 'Mean' for 'Wellbeing' in the 'Experimental group' improved substantially from '12.300' in the 'Pre-test' (with a 'Standard Deviation' of '1.770') to '16.030' in the 'Post-test' (with a 'Standard Deviation' of '2.390'). This notable increase indicates a positive impact of the intervention on 'Wellbeing' among participants in the 'Experimental group'. 'Control group' exhibited a 'Pre-test Mean' of '3.000' (with a'Standard Deviation' of '2.110'), which increased to a 'Post-test Mean' of '5.830' (with a 'Standard Deviation' of '1.610'). There is slight increase than that observed in the 'Experimental group'. It still suggests some improvement in 'Wellbeing'.

'Table 1' indicates that 'Mean' for 'Physical Activity Enjoyment' in the 'Experimental group' increased considerably from '40.800' in the 'Pre-test' (with a 'Standard Deviation' of '3.600') to '53.200' in the 'Post-test' (with a 'Standard Deviation' of '4.200'). This substantial rise underscores the positive influence of the intervention on participants' levels of 'Physical Activity Enjoyment'. 'Mean' for 'Physical Activity Enjoyment' rose modestly from '32.100' in the 'Pre-test' (with a 'Standard Deviation' of '2.700') to '34.600' in the 'Post-test' (with a 'Standard Deviation' of '2.890') in the 'Control group'. It demonstrates a slight enhancement in 'Physical Activity Enjoyment' following the intervention in 'Control group'.

Table 2: Analysis of Covariance (ANCOVA) for Variables of the research study

Variables	Group	F value	p value
Agility	Experimental	1.711	0.193
	Control		
Explosive Strength	Experimental	1.236	0.269
	Control		
Flexibility	Experimental	99.556	0.000
	Control		
Wellbeing	Experimental	79.637	0.000
	Control		
Physical Activity Enjoyment	Experimental	214.278	0.000
	Control		

'Table 2' shows that 'F' value for 'Agility' is '1.711' and 'Probability (p)' value is '0.193' for both 'Experimental and Control' group. It is evident from the above table that there is no significant variation in 'Experimental and Control' group for 'Agility'.

It is seen from 'Table 2' that 'F' value for 'Explosive Strength' is '1.236' and 'Probability (p)' value is '0.269' for both 'Experimental and Control' group. It is evident from the above table that there is no significant difference in 'Experimental and Control' group for 'Explosive Strength'.

'Table 2' shows that 'F' value for 'Flexibility' is '99.556' and 'Probability (p)' value is '0.000' for both 'Experimental and Control' group. It is evident from the above table that there is significant variation in 'Experimental and Control' group for 'Flexibility'.

It is seen from 'Table 2' that 'F' value for 'Wellbeing' is '79.637' and 'Probability (p)' value is '0.000' for both 'Experimental and Control' group. It is evident from the above table that there is significant difference in 'Experimental and Control' group for 'Wellbeing'.

'Table 2' shows that 'F' value for 'Physical Activity Enjoyment' is '214.278' and 'Probability (p)' value is '0.000' for both 'Experimental and Control' group. It is evident from the above table that there is significant variation in 'Experimental and Control' group for 'Physical Activity Enjoyment'.

9) Suggestions

Valuable recommendations for this research based on above findings are given below.

(i) Non-Significant Traits

'Enhance Agility and Explosive Strength via targeted plyometric drills (e.g., box jumps, sprints) and longer interventions (6+ weeks)'. Increase 'Sample Size' for future research.

(ii) Significant Traits

Leverage 'experimental protocol' to boost 'Flexibility (e.g., dynamic stretching), Wellbeing (e.g., psychological flexibility training), and Physical Enjoyment (e.g., Varied enjoyable activities)' via 'Personalized exercise prescriptions'.

10) Conclusion

The present study examined the impact of a 'Brain Breaks' video-based classroom physical activity intervention on 'Physical Fitness', 'Psychological Well-being', and overall 'Health' among 'Pre-adolescent children (aged 9 to 12 years)' in 'India'. Using a 'Quasi-experimental design', a total of '110 participants' were allocated to an 'Experimental group (n = 60)' and a 'Control group (n = 50)'. Over a '12-week' period, the experimental group engaged in '2 to 5-minute' 'Brain Breaks videos' implemented 'six days per week' during class time to encourage structured physical activity. Assessments were conducted pre- and post-intervention using the 'EUROFIT Physical Fitness Test', the 'World Health Organization Well-Being Scale', and the 'Physical Activity Enjoyment Scale (PAES)'. Statistical procedures, including 'Descriptive Statistics (Mean and Standard Deviation)' and 'Analysis of Covariance (ANCOVA)', were applied to analyze the data. Results indicated no significant differences between the 'Experimental' and 'Control groups' in 'Agility' and 'Explosive Strength'. However, significant improvements were observed in 'Flexibility', 'Well-being', and 'Physical Activity

Enjoyment' among participants in the 'Experimental group'. These findings highlight the 'Brain Breaks' intervention as a practical and effective classroom-based strategy to enhance both physical and psychological outcomes among 'school-aged children'. Feasible context-specific recommendations were accordingly proposed based on the findings of this research.

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