

Effect of an Interactive Physical Fitness Programme on Selected Psychomotor Abilities among Secondary School Students in Jorhat District, Assam

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Abstract

Background: Psychomotor abilities such as agility, eye-hand coordination, and balance are fundamental to the physical and motor development of adolescents. Interactive physical-fitness programmes that combine recreational games, coordination drills, balance exercises, agility tasks, reaction activities, and speed exercises may be effective mean to develop psychomotor abilities. However, empirical evidence regarding their effectiveness among secondary school students in Assam remains limited. **Purpose:** The study aimed to examine the effect of an Interactive Physical-Fitness Programme (IPFP) on selected psychomotor abilities of secondary school students in Jorhat District, Assam. **Materials and Methods:** A pre-test–post-test control group experimental design was employed. One hundred secondary school students were randomly selected and assigned to an Experimental Group (n = 50) and a Control Group (n = 50). The Experimental Group participated in an eight-week Interactive Physical-Fitness, while the Control Group continued their regular school activities. Agility, eye-hand coordination, and balance ability were assessed using standardized tests before and after the intervention. Descriptive statistics and Analysis of Covariance (ANCOVA) were used to analyse the data, with the level of significance set at 0.05. **Results:** ANCOVA revealed significant differences between the Experimental and Control groups in all selected psychomotor variables after adjusting for pre-test scores. Significant improvements were observed in agility ($F = 81.397, p < .001, \eta^2 = .456$), eye-hand coordination ($F = 103.564, p < .001, \eta^2 = .516$), and balance ability ($F = 136.482, p < .001, \eta^2 = .585$).

Conclusion: The findings indicated that an eight-week Interactive Physical-Fitness Programme was effective in improving agility, eye-hand coordination, and balance ability among secondary school students.

Key words: Interactive physical-fitness programme; psychomotor abilities; agility; eye-hand coordination; balance ability; secondary school students

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Introduction:

Psychomotor abilities form an essential foundation of holistic education and play a central role in the physical, cognitive, and behavioral development of school-aged children. These abilities, such as agility, balance, speed, coordination, and reaction time, enable students to execute purposeful movement with accuracy, control, and efficiency. They not only contribute to sports performance but also enhance functional movement patterns required for everyday tasks, academic learning, and overall wellbeing [1]. Developing psychomotor skills during adolescence is particularly critical, as this period represents a key developmental window for motor learning, neuromuscular maturation, and physical adaptability. In recent years, educational frameworks including the National Education Policy (NEP) 2020, Fit India Movement, and the School Health & Wellness Programme have emphasized the integration of structured physical activities within school curricula. These policies highlight physical fitness as a significant determinant of mental alertness, emotional stability, and academic achievement. International research consistently supports the positive effects of physical activity interventions on children's motor skill proficiency, executive functions, and cognitive flexibility [2,3]. However, in India, particularly in the North-East region, empirical evidence examining the direct impact of structured physical fitness programmes on psychomotor development among secondary school students remains limited.

The Interactive Physical-Fitness Programme (IPFP) represents a modern pedagogical approach that combines structured exercise routines with interactive, game-based motor tasks, agility circuits, balance drills, reaction activities, and coordination exercises. Unlike conventional physical training methods, the IPFP emphasizes active engagement, movement variability, and student-centered learning. Interactive and task-oriented physical fitness activities have been shown to stimulate sensory-motor integration, improve neural efficiency, and enhance gross and fine motor performance [4]. Furthermore, interactive physical activity programmes improve motivation, attentional control, cooperation, and self-regulation, which are important contributors to psychomotor development [5].

The Jorhat district, known for its strong engagement in school sports and youth development programmes, presents an appropriate setting to investigate the educational benefits of action-based physical fitness interventions. Students in secondary school often face increasing academic pressure and reduced outdoor play opportunities. Structured physical fitness programmes can therefore serve as an essential tool for promoting active lifestyles, improving

neuromuscular coordination, and preventing sedentary-related health risks.

Purpose of the Study was to examine the effect of an Interactive Physical-Fitness Programme (IPFP) on selected psychomotor abilities of secondary school students in Jorhat District, Assam.

Material and Methods:

The present study employed a **pre-test, post-test control group experimental design** to examine the effect of the Interactive Physical Fitness Programme on selected psychomotor abilities among the secondary school students.

A total of 100 secondary school students from Jorhat District, Assam, India, were selected for the study. The participants were selected using random sampling and were randomly assigned into two equal groups:

- Experimental Group (n = 50)
- Control Group (n = 50)

Prior to participation, permission was obtained from the concerned school authorities, and informed consent was obtained from the participants and their parents/guardians. The study was conducted following institutional ethical guidelines.

Intervention

The Experimental Group participated in an Interactive Physical Fitness Programme designed to improve psychomotor abilities. The programme consisted of structured 8 weeks interactive Physical Fitness programme i.e. Recreational games, coordination drills, balance exercises, agility tasks, reaction activities, and speed exercises under the supervision of the investigators. The programme was conducted for the predetermined intervention period, while the Control Group continued with their routine school programme without any additional intervention.

Criterion Measures:

Both groups were assessed before and after the intervention using standardized psychomotor tests. The following variables were measured:

- Agility
- Coordination
- Balance ability

The same testing procedures were followed during both the pre-test and post-test assessments to ensure uniformity.

Statistical Analysis:

Descriptive statistics, including mean and standard deviation, were calculated for all variables. Analysis of Covariance (ANCOVA) was employed to compare the adjusted post-test scores of the Experimental and Control groups by controlling for pre-test differences. The level of statistical significance was set at 0.05 for testing all hypotheses.

Results:

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Table 1: Descriptive Statistics of Experimental and Control group on selected variables

Variable	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Agility	Experimental	13.25	.078	13.10	13.41
	Control	14.25	.078	14.09	14.40
Eye hand coordination	Experimental	15.05	.069	14.91	15.18
	Control	16.09	.069	15.95	16.23
Balance ability	Experimental	2.555	.114	2.330	2.780
	Control	4.485	.114	4.260	4.710

The adjusted mean of experimental and control group for Agility, Eye hand coordination and Balance ability 13.255 and 14.25 sec, 15.050 and 16.096, and 2.555 and 4.485 respectively. And lower bound and upper bound of experimental and control group for Agility, Eye hand coordination and Balance ability 13.101 & 13.410 and 14.095 & 14.404 sec, and 14.912 & 15.187, 15.958 & 16.233, and 2.330 & 2.780 and 4.260 & 4.710 respectively.

Table No 02: Levene's Test of Agility, Eye hand coordination and Balance ability

Variable	F	df1	df2	Sig.
Agility	3.625	1	98	.118
Eye hand coordination	1	98	.083	1
Balance ability	3.188	1	98	.11

Levene's Test of Equality of Error Variances was employed to check the assumption of homogeneity of variances. Table no 04 shows for agility, Eye hand coordination and Balance ability p-value of 0.118, 1 and .11 respectively which is higher than the conventional threshold of 0.05, which furthermore suggests that the variances are equal across the groups, validating the use of ANCOVA.

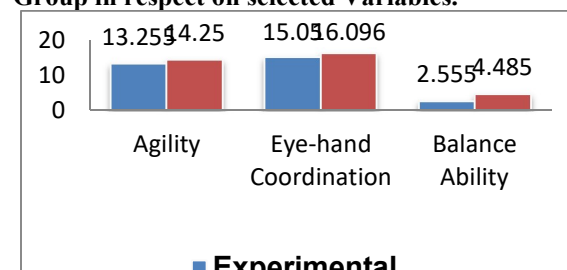
Table No3: Mean comparison between Experimental and Control group by applying ANCOVA on selected variables.

Variable	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Agility	Pre-Test	929.046	1	929.046	3065.900	.000	.969
	Group	24.665	1	24.665	81.397	.000	.456
	Error	29.393	97	.303			
	Total	19914.560	100				
Eye hand coordination	Pre-Test	684.085	1	684.085	3156.000	.000	.970
	Group	22.448	1	22.448	103.564	.000	.516

Balance ability	Error	21.025	97	.217			
	Total	25260.107	100				
	Pre-Balance	125.137	1	125.137	206.212	.000	.680
	Group	82.822	1	82.822	136.482	.000	.585
	Error	58.863	97	.607			
	Total	1608.000	100				

The ANCOVA table shows that the significant difference exists on Agility, as the obtained 'p' value 0.00 is less than .05, which indicates that, there is significant improvement exist after eight weeks of interactive physical fitness programme on agility. And the significant difference exists on Eye hand coordination, as the obtained 'p' value 0.00 is less than .05 and the significant difference exists on balance ability, as the obtained 'p' value 0.00 is less than .05

Figure No 1: Graphical Representation of Mean between the Experimental Group and Control Group in respect on selected Variables.



Discussion on Findings:

The findings of the present study indicated that the eight-week Interactive Physical-Fitness Programme significantly improved agility, eye-hand coordination, and balance ability among secondary school students. These findings are supported with previous research indicating that interactive and task-oriented physical activity programmes positively influence psychomotor development through enhanced neuromuscular coordination, motor learning, and movement efficiency. The significant improvement in agility observed in the experimental group is supported by Sheppard and Young, who reported that agility is optimally developed through activities integrating speed, coordination, balance, and decision-making rather than isolated movement drills [6]. Similarly, Malina et al. emphasized that varied and multidirectional movement experiences enhance motor competence by improving locomotor control and body movement efficiency [7]. Ortega et al. further reported that recreational and gamebased physical activities involving frequent directional changes and perceptualmotor engagement contribute substantially to motor skill development in children

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and adolescents [8]. Moreover, school-based physical activity interventions have demonstrated significant improvements in agility among students participating in structured exercise programmes compared with control groups [9].

The improvement in balance ability found in the present investigation is in agreement with the findings of Granacher et al., who demonstrated that regular participation in balance-challenging physical activities significantly enhances postural control and balance performance in schoolaged children, even without high-intensity physical loading [10]. These findings suggest that interactive physical fitness activities requiring continuous postural adjustments effectively stimulate neuromuscular adaptations responsible for balance improvement. Similarly, the significant enhancement in eye-hand coordination observed in the experimental group is supported by previous evidence indicating that regular practice of coordinated movement activities improves perceptual-motor integration and coordination skills [7]. Interactive physical-fitness activities involving catching, throwing, striking, and reaction-based tasks provide repeated opportunities for sensory-motor integration, thereby enhancing eye-hand coordination and motor control.

Overall, the findings of the present study support existing evidence that strategically designed interactive physical-fitness programmes incorporating recreational games, agility drills, coordination exercises, and balance activities effectively improve psychomotor abilities among secondary school students. Such programmes may therefore be considered an effective pedagogical approach for enhancing motor competence within school physical education curricula.

Conclusion:

The present study found that an eight-week Interactive Physical-Fitness Programme significantly improved agility, eye-hand coordination, and balance ability among secondary school students in Jorhat District, Assam. After controlling for baseline differences using ANCOVA, the experimental group showed significantly better performance than the control group across all selected psychomotor variables. These findings indicated that structured interactive physical fitness activities enhance psychomotor abilities. The results support the integration of interactive physical fitness programmes into school physical education curricula as an evidence based approach.

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