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EFFECT OF STRUCTURED PHYSICAL EDUCATION ON ACADEMIC ACHIEVEMENT OF ELEMENTARY SCHOOL STUDENTS

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ABSTRACT

The study aims to find out the effectiveness of a Structured Physical Education Programme (SPEP) on academic achievement of elementary school children, and further to explore the differential influence of gender and age of the students on the effectiveness of SPEP on academic performance. The experimental study adopted a pretest post-test design with a control group for collecting data fromsix intact classes (n = 171) of students in the age range 10-12 years, studying in fifth, sixth and seventh grades. Two classes from each grade level were selected, one as control group and the other as experimental group. Pre-intervention and post-intervention measurement of academic achievement was done one weeks before and one week after the treatment with the help of teacher made achievement tests. The experimental intervention comprised of 48 classes each of average 40 minutes duration, delivered at the rate of three classes per week. The success of SPEP on academic achievement was find out by ANCOVA. The gain scores were compared by using t-test and one way ANOVA to find out the influence of gender and age on the success of SPEPon academic performance. The results showed that structured physical education is effective in enhancing academic performance of elementary schoolers. Neither gender nor age of the learner exert any significant influence on the success of SPEP on academic achievement.

Keywords: Structured, physical education, Physical Education Programme, Academic achievement, Differential influence.

1. INTRODUCTION

Physical education (PE) is an important part of children's school life because it enables them to stay healthy, apart from helping them to learn many motor skills and social skills. It can also help them maintain a healthy physique and develop desirable habits and positive attitude towards physical activities. The aim of school-based physical education programme, as envisaged by many educational agencies, is to develop a range of learners' physical competencies, empowering them to perform and appreciate various physical activities with confidence (Aboshkair, 2022; Wiium, 2021). Apart from developing learners' motor skills, physical education comes with a variety of profits such as balanced development of mental, emotional, and social aspects of students' personality (Loras, 2020). It also helps them to maintain healthy habits, abstain from unhealthy habits, sustain mental and emotional health, and cultivate the character and lead a productive life as a responsible citizen (Mondejar-Jimenez, Ceballos-Santamaria, Valencia-Garcia & Sanchez-Cubo, 2022). Students develop a wide range of skills and the capacity to use strategies, tactics, and compositional ideas to perform effectively. A well-organized school PE programme builds learners' ability and confidence to participate in different physical activities which become important part of their lives, both in and out of school (Cerda, Garcia, Cerda & Lee, 2021).

The paybacks of physical education in schools are sweeping, including increased attendance, decreased drop-out rate, better academic performance, better health and leisure, improved discipline, reduced student unrest and so on (Kohl & Cook, 2013). Though school curriculum offers structured physical education as a compulsory subject for children at all grade levels in the state of Kerala (India), it is the most neglected subject as there is no term-end or year-end examination for it. U.S. Department of Health and Human Services (2010) reported that regular physical activity enhances cognitive skills such as concentration, memory and attention which in turn favours desirable classroom behaviour and positive attitude towards learning. Regular physical activity in the school will therefore be successful in improving academic achievement of learners. Researches in recent years have come out with ample evidences to highlight that spending time for physical activities is no more a waste of time, instead it contributes to academic achievement of boys and girls by fostering their mental and physical wellbeing (Barth, Skulberg, Anderssen, Tjomsland& Thurston, 2021; Getu, 2020; Marques, Gomez, Martins, Catunda& Sarmento, 2017).None of these studies, however, has examined the effect of SPEon academic achievement of school students under controlled conditions. In this context, the present study examines the successof a Structured Physical Education Programme (SPEP) on academic achievement of elementary schoolers, and the effect of gender and age on the same.

The study has the following specific objectives -1.To find out the effectiveness of SPE on academic achievement of elementary school children. 2. To find out the effect of gender on the success of SPE on academic achievement of elementary school children. 3. To find out the effect of age on the success of SPE on academic achievement of elementary school children. It was hythesized that the Structured physical education has no significant effect on academic achievement of elementary school children. It was also hypothsized that the gender has no significant influence on the effect of SPE on academic achievement of elementary school children. gain. it was also hypothsized that the as no significant influence on the effect of SPE on academic achievement of elementary school children.

2. METHODOLOGY

2.1. Sample

Children in the age range 10-12 years, studying in grades fifth, sixth and seventh, in elementary schools affiliated to Kerala Board of Public Examination, Govt. of Kerala (India) constituted the population for the study. A total number of 171 elementary school children belonging to six upper primary classes, two divisions each from Standard V, VI and VII (grade levels 5^{th}, 6^{th}& 7^{th}), of aided higher secondary school located in Ernakulam district constitutes the participants of the study.

2.2 Reserch Design

Pretest and posttest research design with a control group was adopted for the study.

2.3 Experimental Intervention

The classes were randomly assigned to the control group and the experimental group in such way that one division each from each grade level was allotted to the groups. The control groups and the experimental groups were pre-tested for academic achievement with the help of teacher made tests administered one week before the intervention. The CGPA converted to percentage was taken as pre-test scores. This is followed by intervention with SPEPfor the experimental groups, while the control groups were left free. Both the groups, however, were not prevented from getting the routine physical education classes as per the school timetable by the school physical education instructor. The experimental intervention comprised 36 sessions of SPE lessons, with each session lasting 40 minutes. The classes were conducted three times per week, from 3.30 pm to 4.15 pm, by competent and experienced physical education instructors.The post-test scores of academic achievementswerecalculated from the CGPAobtained by administering another teacher made achievement test administered within one week after the intervention.

2.4 Tools Used

Two sets of non-standardized teacher made achievement tests in six different subjects, viz., Malayalam, English, Hindi, Mathematics, Science and Social Studies, were used for measuring academic achievement. Each test was for 50 marks and of 90 minutes duration. The achievement tests were prepared, administered and evaluated by the respective school teachers handling the subject. The tests were prepared based on the content prescribed for the first term (pre-test) and the second term (post-test).

2.5 Statistical Techniques

Apart from the estimation of descriptive statistical indices such as Mean, Median, Standard deviation, Skewness, Kurtosis and Standard error of mean, the data were subjected to ANCOVA, independent sample t-test and one way ANOVA.

3. RESULTS

The major descriptive statistical indices such as Mean (M), Median (Mdn), Standard Deviation (σ), Skewness (Sk), Kurtosis (Ku), and Standard error of Mean (SE_M), calculated from the pre-test, post-test, and the gain scores of academic achievementfor the control group (CG) and experimental group (EG) of the students are given in Table 1.

TABLE 1
STATISTICAL INDICES PERTAINING TO PRE-TEST-, POST-TEST- AND GAIN SCORES OF ACADEMIC ACHIEVEMENT OF CONTROL GROUP AND EXPERIMENTAL GROUP

Testing	Groups	N	Range	M	Mdn	σ	Sk	Ku	SE_M
Pre-test	CG	80	31	70.50	70.50	8.12	0.16	-1.08	0.91
	EG	91	34	69.47	70.00	7.25	0.04	-0.70	0.76
Post-rest	CG	80	43	**70.70**	**70.5**	**8.11**	**0.48**	**0.37**	**0.91**
	EG	91	26	**72.32**	**73.0**	**6.05**	**0.02**	**-0.74**	**0.64**
Gain Score	CG	80	23	**0.18**	**0.46**	**4.45**	**0.21**	**0.66**	**0.46**
	EG	91	25	**2.85**	**4.00**	**4.25**	**-0.23**	**0.20**	**0.45**

The descriptive statistical indicesshow that all the distributions are normal as the estimated skewness lies between -½ and +½ and are negligible. The highest score of pre-test of control group is 88 while that of experimental group is 85. The lowest pre-test scores of control group and experimental group are in the order of 57 and 51. The maximum score of post-test for the control group is 98, and that of experimental group is 86. The lowest post-test scores of achievement are 55 and 60 for the control group and experimental group respectively. The mean pre-test score of achievement for the control group and experimental group are 70.52 and 69.47 respectively, while the corresponding mean post-test scores of achievement are 70.70 and 72.32. The standard deviations estimated for the pre-test and post-test scores of achievement for the control group are 8.12 and 8.11; while those for the experimental group are 7.25 and 6.05 in the order. The arithmetic mean computed for the gain scores of control group is just 0.18 while that for the experimental group is 2.85, with their standard deviations in the order of 4.15 and 4.25 respectively.

In order to discover the effect of SPEP on academic achievement of elementary schoolers, the post-test scores of control group and experimental group were compared after partialling out the effect corresponding pre-test score by employing one-way analysis of covariance. The data and result of the one-way ANCOVA conducted in this regard is presented in Table 2.

TABLE 2
ANCOVA OF THE POST-TEST SCORES OF ACADEMIC ACHIEVEMENT OF CONTROL GROUP AND EXPERIMENTAL GROUP

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	6114.936	2	3057.468	206.356	.000	0.711
Intercept	587.53	1	587.53	39.654	.000	0.191
Pre-test Score	6003.389	1	6003.389	405.183	.000	0.707
Group	251.444	1	251.444	16.977	.000	0.092
Error	2489.17	168	14.816			
Total	884301.00	171				
Corrected Total	8604.105	170				

a. R Squared = .711 (Adjusted R Squared = .707)

The F-value obtained on comparing the control group and experimental group with respect to the post intervention scores of academic achievement, after taking out the effect of pre-test scores (covariate), is significant at 99.9% confidence interval ($F_{(1,168)} = 16.977$; $p<.001$). Putting another way, there is significant difference between control group and experimental group in the post-test score of academic achievement even after adjustments were made for the

pre-test scores. It exposes that the structured physical education is effective in enhancing the academic achievement of elementary schoolers. The partial Eta Squared value, estimated for the group, shows that ($\eta^2_{patial} = 0.092$), the pre-test scores of achievement exert medium effect on the post-test score of achievement. It also designates that 9.2% of the variance in the post-test score of achievement is explained by the pre-test scores of achievement.

The effect of gender on the efficacy of SPEP in enriching the academic achievement of the participants is examined by comparing the boys and girls with respect to the gain scores of their achievement. The result of the t-test performed in this regard is given in Table 3.

TABLE 3
COMPARISON OF THE GAIN SCORES OF ACADEMIC ACHIEVEMENT OF BOYS AND GIRLS IN THE EXPERIMENTAL GROUP

Group	N	M	SD	SE_M	t	Sig.
Boys	**44**	**3.23**	**4.028**	**0.607**	**0.526**	**NS**
Girls	**47**	**2.49**	**4.462**	**0.651**		

The t-value estimated on comparing the gender groups in the experimental group regarding the gain scores of their academic achievement is not significant ($t = 0.826$; $p>.05$). It shows that there is no significant difference between boys and girls with respect to the improvement they made in their academic achievement when exposed to structured physical education. In other words, the SPEP was equally effective for both boys and girls in making improvements in their studies The effect of age on the effect of SPE on academic achievement of the students was studied by comparing 10-, 11- and 12-years old children with respect to the gains scores of their achievement. The summary of the one-way ANOVA performed in this context is given in Table 4.

TABLE 4
SUMMARY OF ONE-WAY ANOVA: GAIN ACHIEVEMENT SCORES OF CHILDREN IN DIFFERENT AGES.

SOV	SS_S	df	MS	F	Sig.
Between Groups	17.077	2	8.538	0.167	0.628
Within Group	1608.769	88	18.281		
Total	1625.846	90			

The F-value obtained on comparing the gain achievement scores of children in different age groups is not significant ($F = 0.467$; $p>.05$). It shows that age has no significant impact on the effect of SPEP on the academic achievement of elementary school children.

4. CONCLUSIONS

The analysis revealed that structured physical education is successful in improving the academic achievement of elementary school children. This conclusion is arrived at based on the result of the one-way ANCOVA performed to compare the post-test score of academic performance of control group and experimental group, after controlling for the effect of the covariate ($F_{(1,168)} = 16.977$; $p<.001$). The null hypothesis formulated in this context (structured physical education has no significant effect on academic achievement of elementary school children) is, therefore, rejected. Gender has no significant effect on the success of SPE in enhancing academic achievement of elementary schoolers. Both boys and girls were equally benefited from structured physical education in improving their academic performance. This inference was drawn based on the t-value estimated on comparing boys and girls in the experimental group with respect to their gain scores of academic achievement ($t = 0.826$; $p>.05$). The second null hypothesis (gender has no significant influence on the effect of SPE on

academic achievement of elementary school children) is, subsequently, accepted. Age is not a significant factor that discriminate elementary schoolersbased on the improvement they made in their academic achievement when exposed to structured physical education. No significant difference was noticed among children from different age groups with respect to the improvement they made in their academic achievement on account of intervention with SPEP (F = 0.467; p>.05). The hypothesis, "age has no significant influence on the effect of SPE on academic achievement of elementary school children." is, thus accepted.

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