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Co-curricular Activities and Science Achievement of Secondary School Students

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Abstract

The study was conducted to determine whether participating in sports, computer and internet related activities had any impact on students' achievement in science of secondary school students. The participating students (N=1500) were selected from urban and rural areas of two districts of western Uttar Pradesh. The t-test was applied to see the significant difference between the science achievement scores of different groups of students. Results indicate that the students involved in different activities yielded better science performance. Therefore, it was concluded that co-curricular activities affect academic performance in science.

Introduction

Co-curricular activities*** are activities performed by students that fall outside the realm of the curriculum of the school. Students' participation in co-curricular activities such as drama, music, sports, debating and community work can be important in their overall engagement with school, and may be related to positive educational outcomes. Most studies find that children who participate in these activities are more successful academically than those who do not. Garibaldi, (1992) and Kunjufu, (1982) observed that participation in activities of music/drama/sports/debating/community work is a useful

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*** The NCF 2005 has considered Art and Aesthetics, Physical and Health Education as core curricular areas. The co-curricular activities are, therefore, part of curriculum. In this paper, the author has used the term co-curricular activities which can be considered as integral part of curriculum in the present context.

and appropriate vehicle for children to gain valuable academic and social experiences, as well as overall healthy psycho-social development. For those children and adolescents having interests in areas other than academics, the availability of other avenues for skill and value building are very important. Holland and Andre (1987) suggested that although extra-curricular activities were not directly academic in nature, they facilitated total development of students.

For many students, co-curricular clubs and sports play a central role in their secondary school years. We associate these activities with developing several important skills that are valued in the workplace, but not regularly evaluated in the classroom. Involvement is viewed as an indicator of teamwork ability, self-confidence, and the ability to succeed in competitive situations (National Federation of State High School Associations, 2005). Co-curricular activities offer alternative environments in which children can learn about themselves and their worlds, and can discover opportunities for carving their individual versions of success (Eccles, 1999; Gholson, 1985). Sports and other activities create opportunities for students to achieve and have meaningful roles in their school community.

Different activities, in which students participate, both inside and outside the school itself, are among the multiple situations that can have an effect on science achievement. Extra-scholastic activities have been associated with an improved educational level, more interpersonal competencies, higher aspirations and a better attention level (Mahoney, Cairos and Farwer, 2003). Much of the research carried out that examines the access of computer and internet and student achievement seems to emphasise that there is a positive correlation between these variables. There is plenty of evidence to indicate a positive relationship between computer technology and student achievement (James and Lamb, 2000; Sivin-Kachala, 1998; Weaver, 2000; Weller, 1996; Wenglinsky, 1998).

Empirical Studies

Studies conducted within the last decade looked at possible effects of sports participation on academic and social development (Braddock, Royster, Winfield, and Hawkins, 1991; Silliker and Quirk, 1997). Most research on extracurricular activities (sports, games, debates, etc.) shows that participation in these kinds of activities is associated to positive outcomes as academic achievement (Holland and Andre, 1987; Marsh, 1992; Silliker and Quirk, 1997; Cooper et al., 1999; Eccles and Barber, 1999). Moriana et al., (2006) reported that groups involved in activities outside the school yielded better academic performance, especially those that participated in study-related activities and those that participated in mixed activities (both sports and academic). The findings are supported by Darling et al. (2005), whose study showed that students who

participated in school-based extracurricular activities had higher grades, higher academic aspirations and better academic attitudes than those who were not involved.

In today's increasingly technology driven world, it would seem that students who have had access to computers in their home or in classrooms would do better in science and mathematics achievement than those who had no access to it (Berger et al. 1994; Shaw,1998; Papanastasiou, 2003; Papanastasiou and Ferdig, 2003; Papanastasiou, Zembylas and Vrasidas, 2003). However, there are still occasions, where computer use in schools is associated with lower levels of achievement (Papanastasiou, Zacharia, Zembylas, 2004 and Ravitz et.al 2002).

Research Questions

The research questions for the study include the following:

(1) Do students' participation in sports (cricket, football, basketball, badminton and volleyball) related activities explain differences in science achievement?

(2) Do students' participation in computer-related activities explain differences in science achievement?

(3) Do students' participation in internet surfing-related activities explain differences in science achievement?

(4) Do students' participation in sports, computer and internet related activities on the basis of sexes explain differences in science achievement?

Hypotheses of the Study

The hypotheses that will guide the present study are stated in null form as under:

(1) There is no significant difference in science achievement in relation to participation in sports-related activities of secondary school students.

(2) There is no significant difference in science achievement in relation to participation in computer-related activities of secondary school students.

(3) There is no significant difference in science achievement in relation to surfing on internet-related activities of secondary school students.

(4) There is no significant difference among boys and girls in science achievement in relation to participation in sports, computer and internet surfing-related activities.

Method

Sample

The main sampling technique in this study was stratified random sampling with geographical location (urban/rural) of the schools as the basis of stratification. The sample consisted of 1500 secondary school students (Class IX) selected from 30 schools of two districts of western Uttar Pradesh, (India), in which 813 were male and

687 were female students. The average age of the study sample was 15 years. Within the group that performed different activities, students were divided into two groups – those who carry out sports (cricket, football, basketball, badminton and volleyball) related activities and academic (access to computer and internet) related activities. In what concerns participation in co-curricular activities, 321 participated in sports activities and 1179 did not participate in such activities; 1110 participated in computer related activities and 390 did not participate in this activity; 711 participated in internet surfing activities and 789 did not participate in such activities.

(i) Science Achievement Test: Science achievement refers to students' scores on the science test administered to secondary school students. The data concerning students' achievement in science were gathered by administering to sample, a standardised instrument developed by the investigators. The test consisted of 50 items of multiple choice type. There were 16 items in the area of physics, 19 items in the area of chemistry and 15 items in the area of biology. The split-half method was used to determine the reliability of the test. The reliability coefficient of the instrument was found to be 0.87 after the application of Spearman-Brown Formula.

(ii) Information Sheet: Information sheet was provided to collect basic information about personal aspects of the students like gender; participation in sports, computer and internet surfing.

Results and Analysis

The statistical method used in testing the hypotheses was the t-test for the differences between the mean science achievement scores of two groups using two-tailed test. The mean, standard deviation and t-tests of two groups are given in Table 1.

Table 1: Comparison of Mean Achievement Scores on the basis of Co-curricular Activities

Groups		*N*	*Mean*	*SD*	*t*	*Sig/ NSig*
Sports-related activities	Participation	321	29.04	7.27	8.34	Sig
	No participation	1179	25.25	6.97		
Computer-related activities	Participation	1110	29.43	7.53	11.66	Sig
	No participation	390	24.50	6.10		
Internet surfing activities	Participation	711	30.19	7.37	10.49	Sig.
	No Participation	789	26.320	6.93		

When t-test was employed to determine whether there were significant differences in the students' achievement marks, comparing the group that participates in sports-related activities with the one that does not. Result is summarised in Table 1, and indicates that students in the sports activity group obtained significantly better results (t=8.34, P <.001 with 1498 df). Therefore, the first hypothesis is rejected at .001 level.

The number of students having access and not having access to computer and internet were 1110 and 390, 711and 789 respectively. This shows only 74% and 52% secondary school students know how to access computer and internet respectively. It is highly surprising that 26% of the students are so ignorant that they have no idea how to access computer. The data in Table1 also show that the achievement in science of students having access to computer was significantly better (t=11.66, P<.001,

Table 2: Comparison of Mean Achievement Scores of Male and Female Students on the Basis of Co-curricular Activities

Groups			*N*	*Mean*	*SD*	*t*	*Sig/ NSig*
Sports-related activities	Participation	Male	165	28.97	7.34	0.70	NSig
		Female	156	29.27	7.11		
	No Participation	Male	648	24.76	6.66	0.63	NSig
		Female	531	25.27	7.55		
Computer-related activities	Participation	Male	624	29.12	7.38	1.75	NSig
		Female	486	29.91	7.49		
	No Participation	Male	189	24.65	6.36	0.47	NSig
		Female	201	24.36	5.85		
Internet surfing activities	Participation	Male	411	29.85	7.15	1.66	NSig
		Female	300	30.77	7.50		
	No Participation	Male	402	26.28	7.21	0.37	NSig
		Female	387	26.47	6.85		

df=1498) than those who have no access to it. Similarly, the students having access to internet have significantly better science achievement than those who have no access to internet (t=10.49, P<.001, df=1498). Thus, both second and third hypotheses are rejected at .001 level.

Computation of the mean and SD for male and female sub-groups of each group (participation in sports, computer and internet-related activities) showed that there were no statistically significant difference observed in any group and they performed equally good in science, as the t-values (Table 2) were not significant at any level. So, the fourth hypothesis is accepted and it may be argued that the achievement in science of male and female students who participated in these activities are almost the same.

Discussion

The results presented support the idea that participation in co-curricular activities proves beneficial to the students as it in turn affects their educational outcomes. The students who participate in sports-related activities present significantly better academic achievement in science. Along these lines, there were considerably significant differences in performance in favour of the group involved in academic type co-curricular activities, and that such differences did not appear for those involved only in sports (Moriana et al., 2006). According to Peixoto (2004), students who participate in extra-curricular activities present higher values on some dimensions of self-concept, and better academic achievement. The findings are further supported by Darling et al. (2005), whose study showed that students who participated in school-based extra-curricular activities had higher grades, higher academic aspirations and better academic attitudes than those who were not involved in extra-curricular activities. Similarly, a study by Adeyemo (2010) has shown that students' participation in school-based extra-curricular activities is an important factor to students' achievement in physics. Research conducted by Broh (2002) neither completely contradicts, nor completely supports these findings. He reported that participation in some activities improves academic achievement, while participation in others diminishes academic achievement. Contrary to this result, Narang (1987) reported that no academic programme of the school (participation of co-curricular activities) was related to higher achievers.

The results further show that students with computer and internet access have significantly better achievement in science, than those who never had access to computer or internet. Improved access to technology is a pivotal feature of almost all information technology plans. While there is immense interest in the use of technology in schools, and rapid

growth in the presence of technology, many students in secondary schools still have limited access to computers. The result shows that 26% of the students indicated that they never had a computer available for them to use anywhere, neither at home nor in school. According to Mangione (1995), all students must have equal opportunity to learn with and about computers to ensure equity, although few schools have achieved the levels of access necessary to provide students with an equitable experience.

Further, when data was analyzed for male and female sub-groups of each group like participation in sports, computer and internet surfing related activities, to see significant difference in science achievement, it is found that there is no significant difference between these two groups of sub-samples and they perform equally good in science.

Generally, students who participate in co-curricular activities (sports and academic) show better performance in terms of their average marks in science. School administrators, teachers, students and parents all need to be aware of the effects that participation in co-curricular activities has on the science achievement of students. The students would perform better if co-curricular activities are encouraged in schools, as it would improve science students reading habit and thinking abilities. Parents need to be cautious that they do not force their children into participating in these activities for increasing their academic performance. Children have likes, dislikes and interests. There are some activities that they will enjoy and others that they will not enjoy. Parents need to determine where their children's attitudes and interests lie, and allow them to participate in those activities only.

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