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Impact of Private Tuition on the Mathematics Achievements of Secondary School Students

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Abstract

Private or additional tutoring has a greater impact on learning. It is more frequent among the secondary school students of Science and Mathematics. The purpose of this study was to explore the impact of additional tutoring on the academic achievements of Grad 9 students in Mathematics. In this study, there was one independent variable i. e. additional tuition, and one dependent variable academic achievement. A self-developed questionnaire was administered to conveniently sampled students of three public and one private school from district Sargodha. In total 118 students responded. The research hypothesis was 'there is no significant relationship between additional tuition and academic achievement'. Collected data were analyzed at α=0.05 (the level of significance) to test the hypothesis. Although nonparametric statistic (Spearman rho and Kruskal-Wallis) was suitable to the type of data we had; nevertheless, we calculated parametric statistic (Pearson r and ANOVA) as well, using SPSS to have a comparative look at the two different types of statistic. Based on our analyses we reject the null hypotheses i. e. there is no significant relationship between additional tuition and academic achievement. We, henceforth, conclude that the additional tuition has a greater impact on the achievement of 9th graders in Mathematics. Thus, we recommend increasing the sample size. A similar investigation in other institutes of higher education could also be an extension to our study. The study may be carried out by adding more variables to academic achievement.

Keywords: Additional Tuition, Achievement, 9th Grade, Mathematics, Nonparametric Statistic

Introduction

Pakistan is one of the countries where private tutoring is common while preparing for secondary school examinations (Giray and Aysit 2014). The situation is the same, especially in Asian countries. The reason is that every child is unique and has different skills and potential. Some can grasp school lessons faster as compared to others (Emer Symth 2008). How the child performs in school should not be compared to other children because each child has a different learning pace. Brilliant students would need to compete with other students who get good grades for them to be able to keep their rank in school. At the same time, those average students would also need to strive also hard for them not to fail the class. This is the reason we give importance to additional tuition (Dang, 1998).

Tutoring is a large industry in Asia and is gaining importance. Private or additional tutoring has a greater impact on learning (Effandi and Norazah 2007). In this modern era internet has many benefits and it makes communication so easy but there are lots of disadvantages and the main disadvantage is that email and messaging cannot be effective for teaching when compared to face-to-face tutoring (Jeremy, Robort & Craig, 2016). In the future, the chances of success are going to increase because of tuition. However, students who live in remote or rural areas cannot get benefits from tuition. The word tuition means "a fee for instruction, especially at a formal institution of learning" (Mifflin, 2000 and Presnell, J. 2009).

The children who get benefits from additional tuition are considered blessed. As it provides students' the opportunity that the concepts which are not clear in the classroom become clear in additional tuition. Students gain more attention from the teacher than the classroom. In the classroom,

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students feel frustrated so they do not understand the subjects (Qaiser and Ishtiaq 2013). One reason for additional tuition is that some parents do not have the time to help their children, so they give them additional tuition. The effectiveness of additional tuition depends on several factors involved including teacher, students, and environment. Private tuition is on one to one basis and this increases academic achievement (Wenke, Yasemin, and Bilge 2020). "Academic achievement is all about what students can do when they have finished a course of study, degrees, and programs; list this information and call it competencies"(Sanchez and Roda, 1998).

It also helps the children to remove their shortcomings and to learn the subjects outside the school environment and increase their academic achievement. Additional tuition not only enhances the levels of school performance, but students increase their confidence as well (Wenke, Yasemin, and Bilge 2020). Parents wish that their children achieve high scores and do not want to leave their children behind in their studies (Afzal & Khan, 2006). Every student should indeed be provided equal opportunity in the classroom, yet it seems impossible in the routine practices in the classrooms. Private tutors having good education records are selected to teach children (Giray and Aysit 2014). Additional tuition is for those who are prepared to pay. Primarily, middle- and higher-income families give preference to additional tuition. Those parents who are highly educated also prefer additional tuition. A lot of children take home tuition when they are at the primary and elementary levels. Additional tuition is considered to be necessary for English, Mathematics, and Science subjects. Most students feel difficulty in Mathematics; hence, they take the tuition in Mathematics (Vincent, 2001).

Additional tuition is much more preferred because in the tuition centers each child has a different background and when they communicate with each other they do not feel shy. Hard work is also necessary with tuition, but it is true that students whether they are struggling or not, additional tuition gives them benefits (Wenke, Yasemin, and Bilge 2020). With tuition, a parent will be able to monitor his or her child and get feedback from the tutor. Two types of tutors are available for children: first, who have little expertise, and second who are professional tutors having more expertise. Hence, the selection of tutors depends on the income of the parents (Qaiser and Ishtiaq 2013). It is believed that additional tuition provides an opportunity of reinforcing the new topics learned in schools. It also provides opportunities to clarify difficult concepts and making them understand. With additional tuition, it will be possible for learners to accelerate their learning process and increase overall confidence and Academic achievement (Yuan, 2001).

The increasing trend of tutoring to get better grades motivated us to get insight into whether or not it has any impact on the achievement of the students? in pursuit of higher scores in the examinations, most students opt for private tutoring along with regular classes. Most students want to get tuitions in the subjects of Mathematics, Physics, Chemistry, and another science subject. The current study was designed to find out the impact of additional tuition on the achievement of Grade 9 students in Mathematics. This research provides awareness to parents, teachers, and students about the impact of additional tuition on performance. As a result, parents and students will be able to understand the impact of additional tuition on academic achievement.

The single objective of the study was to find out the impact of additional tuition on the academic achievement of students of Grade 9 in Mathematics.

Following are the null hypotheses:

H_o: There is no significant relationship between additional tuition and academic achievement.

The alternative hypothesis is:

H_A: There is a significant relationship between additional tuition and academic achievement.

Methodology

All students at the secondary level in district Sargodha constitute the population of the study. The sample of the study includes 9^{th}-grade students of three public and one private school from district Sargodha. (F.G High School Tariq Abad Sargodha; Govt. Comp. High School Sargodha; Govt. G. High School 117 Chack S.B, Sargodha; Lasani Grammar High School Sargodha). Both male and female students were included in the study. Male students were 96 and female were 22 in number. Besides, these 29 students were selected from rural areas and 89 students from urban areas of Sargodha. A convenient sampling technique was used for data collection in this research. The list of schools included in the sample is as follows:

Sr. No	Public schools	No. of students
1	F.G High School Tariq a Abad Sargodha	43
2	Govt.Comp.High School Sargodha (boys)	35

3	Govt.G.High School 117 chack S.B, Sargodha	06
	Private school	
4	Lasani Grammar High School Sargodha	34

After the initial construction of a questionnaire comprising of items, a pilot study was conducted to assess the reliability and validity of the questions. For this purpose, in the first phase, the questionnaire was reviewed by experts to determine its validity and it was requested that to check carefully the wording, its organization, and give some suggestions about its modification. In the second phase, the questionnaire was administered to a small number of samples. To determine reliability, the result of this exercise was analyzed on the computer by using SPSS. Based on the revealed data and opinion of the experts, the questionnaire was revised, and a final version was developed having 28 items and the reliability of the data was .723 at .05 alpha levels. In pilot testing, the reliability of the questionnaire was 0.616 we deleted items no 6,8 and 21 to increase the reliability of the questionnaire. Table 1 shows the actual reliability of the questionnaire which is.723.

Table 1: Reliability Statistics

	Cronbach's Alpha	**No of Items**
Pilot testing	0.616	31
Actual reliability	0.723	28

Table 2: Mean and Standard deviation

Descriptive Statistics N=40

No	**Mean**	**Std. Deviation**	**No**	**Mean**	**Std. Deviation**
1.	3.50	1.240	17.	3.73	1.062
2.	4.35	0.770	18.	3.83	1.259
3.	3.73	1.301	19.	3.48	1.339
4.	3.93	0.797	20.	4.03	0.832
5.	3.55	0.904	21.	3.53	1.301
6.	2.40	1.172	22.	2.55	1.239
7.	3.65	0.893	23.	3.78	1.187
8.	3.80	1.400	24.	3.45	1.568
9.	2.10	1.150	25.	3.90	0.709
10.	3.83	1.238	26.	3.63	1.192
11.	3.15	1.292	27.	3.43	1.130
12.	4.23	0.800	28.	3.88	0.931
13.	4.00	1.177	29.	2.59	0.2919
14.	3.48	1.281	30.	4.13	1.776
15.	2.85	1.272	31.	4.05	1.302
16.	4.13	0.966			

Table 2 shows the mean and standard deviation of the questions in pilot testing. The research instrument was improved after pilot testing in the light of experts' opinions.

Results

The purpose of data collection was the analysis of the impact of additional tuition on the achievement of Grade 9 students in Mathematics. Data were analyzed by using SPSS.

Table 3: Frequency, Mean and Median

No.	**1**	**2**	**3**	**4**	**5**	**Median**	**Mean**
1	5(4.2)	24(20.3)	4(3.4)	65(55.1)	20(16.9)	4.00	3.60
2	2(1.7)	5(4.2)	1(0.8)	49(41.5)	61(51.7)	5.00	4.37
3	3(2.5)	14(11.9)	2(1.7)	67(56.8)	31(26.3)	4.00	3.69
4	10(8.5)	19(16.1)	1(0.8)	55(46.6)	33(28.0)	4.00	3.90
5	3(2.5)	24(20.3)	3(2.5)	81(68.6)	6(5.1)	4.00	3.51
6	26(22.0)	32(27.1)	9(7.6)	47(39.8)	4(3.4)	3.00	2.75
7	4(3.4)	19(16.1)	2(1.7)	76(64.4)	17(14.4)	4.00	3.70
8	18(15.3)	13(1.0)	7(5.9)	36(30.5)	44(37.3)	4.00	3.64
9	35(29.7)	58(49.2)	6(5.1)	11(9.3)	7(5.9)	2.00	2.10
10	11(9.3)	7(5.9)	4(3.4)	61(51.7)	35(29.7)	4.00	3.86
11	12(10.2)	22(18.6)	2(1.7)	63(53.4)	18(15.3)	4.00	3.42
12	8(6.8)	6(5.1)	0(0.1)	64(54.2)	40(33.9)	4.00	4.03
13	8(6.8)	15(12.7)	6(5.1)	40(33.9)	49(41.5)	4.00	3.91

14	14(11.9)	17)14.4)	3(2.5)	60(50.8)	24(20.3)	4.00	3.53
15	12(10.2)	56(47.5)	3(2.5)	27(22.9)	20(16.9)	2.00	2.89
16	8(6.8)	14(11.9)	2(1.7)	50(42.4)	43(36.4)	4.00	3.87
17	5(4.2)	9(7.6)	4(3.4)	71(60.2)	29(24.6)	4.00	3.93
18	4(3.4)	18(15.3)	7(5.9)	41(34.7)	48(40.7)	4.00	3.94
19	12(10.2)	41(34.7)	6(5.1)	26(22.0)	33(28.0)	3.00	3.23
20	5(4.2)	17(14.4)	2(1.7)	68(57.6)	26(22.0)	4.00	3.79
21	10(8.5)	16(13.6)	3(2.5)	63(53.4)	26(22.0)	4.00	3.67
22	19(16.1)	59(50.0)	8(6.8)	17(14.4)	15(12.7)	2.00	2.58
23	10(8.5)	7(5.9)	13(11.0)	54(45.8)	33(28.0)	4.00	3.76
24	17(14.4)	19(16.1)	6(5.1)	41(34.7)	35(29.7)	4.00	3.49
25	1(0.8)	16(13.6)	2(1.7)	74(62.7)	25(21.2)	4.00	3.90
26	3(2.5)	25(21.2)	5(4.2)	44(37.3)	41(34.7)	4.00	3.81
27	1(0.8)	40(33.9)	1(0.8)	61(51.7)	14(11.9)	4.00	3.37
28	4(3.4)	14(11.9)	1(0.8)	67(56.8)	32(27.1)	4.00	3.92

In table 3 numbers 1, 2, 3 4, and 5 (on the top of the table) are representing the levels of Likert scale values. Their range is from strongly disagree (1) to strongly agree (5). The table shows the frequency and percentage of the responses (the values in parenthesis).

Table 4: Spearman Rho and Pearson r

No.	Academic Achievement		No.	Academic Achievement	
	Spearman Rho	Pearson r		Spearman Rho	Pearson r
1.	0.132 (0.15)	0.274 (0.00)	15.	0.166 (0.07)	0.196 (0.03)
2.	0.543 (0.00)	0.571 (0.00)	16.	0.570 (0.00)	0.514 (0.00)
3.	0.475 (0.00)	0.427 (0.00)	17.	0.276 (0.00)	0.377 (0.00)
4.	0.011 (0.90)	0.016 (0.86)	18.	0.298 (0.00)	0.241 (0.00)
5.	0.559 (0.00)	0.559 (0.00)	19.	0.319 (0.00)	0.293 (0.00)
6.	0.186 (0.04)	0.145 (0.11)	20.	0.177 (0.05)	0.388 (0.00)
7.	0.452 (0.00)	0.490 (0.00)	21.	0.321 (0.00)	0.307 (0.00)
8.	0.357 (0.00)	0.349 (0.00)	22.	-0.205 (0.02)	-0.220 (0.01)
9.	-0.156 (0.09)	-0.182 (0.04)	23.	0.197 (0.03)	0.257 (0.00)
10.	-0.524 (0.00)	-0.410 (0.00)	24.	0.634 (0.00)	0.585 (0.00)
11.	0.386 (0.00)	0.338 (0.00)	25.	0.488 (0.00)	0.597 (0.00)
12.	0.173 (0.06)	0.259 (0.00)	26.	-0.076(0.04)	-0.22 (0.81)
13.	0.611 (0.00)	0.621 (0.00)	27.	0.068 (0.46)	0.037 (0.69)
14.	0.491 (0.00)	0.529 (0.00)	28.	0.454 (0.00)	0.580 (0.00)

In Table 4, the spearman rho values for statements No 1, 4, 27 are insignificant (P-value is greater than 0.05) so the researchers failed to reject the null hypotheses. P values are given in the parentheses. Spearman rho is negative for all those statements which represent a negative correlation. If the α level is increased to 0.10 then statements No 9, 12, 15, and 20 became significant and the null hypotheses could be rejected. All other statements are significant, and we reject our null hypotheses. Values for Spearman rho in statements Nos. 9, 10, 22, and 26 show inverse correlation; however, the relationship is significant.

Pearson R values for statement Nos. 4, 6, 26, 27 are insignificant (P-value is greater than 0.05) so the researchers failed to reject the null hypotheses. All other statements are significant, and we reject our null hypotheses. Values for Pearson R in statements Nos. 9, 10, 22, and 26 show inverse correlation; however, the relationship is significant.

Table 5: Kruskal-Wallis Test and ANOVA

No.	Academic Achievement		No.	Academic Achievement	
	Kruskal-Wallis H	ANOVA		Kruskal-Wallis H	ANOVA
1.	36.396(4;0.00)	12.07(4;0.00)	15.	15.113(4;0.00)	5.244(4;0.00)
2.	35.391(4;0.00)	14.82(4;0.00)	16.	32.043(4;0.00)	8.465(5;0.00)
3.	30.531(4;0.00)	8.71(4;0.00)	17.	19.150(4;0.00)	8.343(4;0.00)
4.	3.745(4;0.44)	0.47(4;0.79)	18.	12.266(4;0.01)	3.297(4;0.01)
5.	42.911(4;0.00)	11.69(4;0.00)	19.	30.160(4;0.00)	6.578(4;0.00)
6.	17.297(4;0.00)	3.75(4;0.00)	20.	43.520(4;0.00)	17.362(4;0.00)
7.	32.103(4;0.00)	11.01(4;0.00)	21.	14.171(4;0.00)	4.719(4;0.00)
8.	24.138(4;0.00)	7.32(4;0.00)	22.	9.254(4;0.05)	2.902(4;0.03)
9.	7.895(4;0.09)	1.44(4;0.21)	23.	14.372(4;0.06)	4.059(4;0.00)
10.	36.727(4;0.00)	11.22(4;0.00)	24.	47.916(4;0.00)	15.581(4;0.00)

11.	17.435(4;0.00)	3.46(5;0.00)	25.	35.415(4;0.00)	19.953(4;0.00)
12.	14.421(3;0.00)	5.26(4;0.00)	26.	23.578(4;0.00)	10.973(4;0.00)
13.	44.853(4;0.00)	19.34(4;(0.00)	27.	3.770(4;0.43)	1.129(5;0.34)
14.	36.896(4;0.00)	13.43(4;0.00)	28.	33.915(4;0.00)	17.412(4;0.00)

Table 5 shows the results of Kruskal-Wallis Test and ANOVA that were conducted to evaluate the differences among the respondent for each of the five-point on the Likert scale against each statement. Degree of freedom i. e. 4 and the P values are given in the parentheses. Kruskal-Wallis Test values for statements Nos. 4 and 27 are insignificant (p-value is greater than 0.05) so null hypotheses are failed to reject. If the α level is increased to 0.10 then only statements Nos. 9, 22, and 23 become significant and the null hypotheses could be rejected. All other statements are significant, and we reject our null hypotheses.

The results of the ANOVA test shows that the values for the statement Nos. 4, 9, and 27 are insignificant as (P-value is greater than 0.05) so the null hypotheses are failed to reject. All other statements are significant, and we rejected our null hypotheses.

Conclusions

The number and percentage of Grad 9 Mathematics students who participated in this study were 118. The total response rate was 100%. It was decided that a maximum of 45 and a minimum of 6 students would be taken from each School, using a convenient sampling technique. The following points summarize the findings of this study concerning statistical analysis of data.

H_o: There is no significant relationship between additional tuition and academic achievement. The null hypothesis was rejected because there was a significant relationship between additional tuition and academic achievement as discussed in ANOVA and **Kruskal-Wallis H**

H_A: There is a significant relationship between additional tuition and academic achievement. The alternative hypothesis was accepted because there was a relationship between additional tuition and academic achievement as discussed in Spearman Rho and Pearson r.

Discussion

This study was proposed to find out the impact of additional tuition on the achievements of Grade 9 students in mathematics. It was needed to explore and analyze the responses of the respondent regarding additional tuition and academic achievements. The significance of this study was based on the fact that there is a relationship between the additional tuition and academic achievement. We concluded that there is a significant relationship between additional tuition and academic achievements of Grad 9 students in Mathematics. Giray and Aysit (2014) support our finding that additional tutoring may have a positive effect on pupils' performance but in social and physical science. While it has an adverse effect on the students' performance in physical sciences. Findings of Asaf and Zahoor (2017) and Hui-Chen (2017) are also supportive of our alternate hypothesis, they concluded that tutoring has a positive effect on students' performance of mathematics. Findings from Yuhe, G et al (2020) and Gilchrist (2007) support findings of the study that the increasing trend of tutoring is positive on one side due to its impact on student's performance, but it has some adverse effect on parents' pocket and school performance.

Studies carried out by, Effandi (2007) and Winkey and Yasmene (2020) contradict our findings. In Emer Smith's (2008) case data were calculated using multilevel regression and propensity score matching techniques which showed that involving home tutoring does not enhance the academic performance of the students. Similarly, Effandi (2007) and Winkey and Yasmene (2020) concluded home tutoring might not affect the students' performance; rather, self-motivation could have an impact on the performance in mathematics.

Recommendations

1 The study recommends that future researchers should use other variables that might have an impact on the students' achievement. For example, students' self-motivation may have a very positive effect on students' performance along with additional tutoring. (Jeffes et al (2013) and Wenke, Yasemin, and Bilge (2020).

2 Studies using experimental design may help to explore further ventures in this regard. Similarly, some qualitative research may also be conducted to increase the impact of such studies.

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