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Academic Performance of Students in Mathematics and English: A Case Study of District Malakand, Khyber Pakhtunkhwa, Pakistan

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Abstract *The present study investigates the major factors associated with academic performance of students in Mathematics and English. The data are collected from matric level students who have passed the 9th class examination in the area of District Malakand, Khyber Pakhtunkhwa, Pakistan through questionnaire. The performance in these two subjects is measured through scores of students in 9th class board examination in these subjects. Significant factors in the performance in these subjects are measured through Chi-square test of association. The analysis conclude that the factors area, accommodation, daily study hour, parent's education and parent's concept of Mathematics and English were found to be significantly associated with the performance in these two subjects.*

Key Words:
Academic Performance, Chi-square, Student's achievements, Socio-economic status, Association

Introduction

Education plays an important role in the social, economic and technological development of a country. It ensures the acquisition of knowledge and skills that enable individuals to increase their productivity and improve their quality of life. In Pakistan, Mathematics and English are two major subjects taught at matric level. The overall performance of a student depends a lot on these two subjects as the mathematical and verbal abilities are the two key factors linked with academic achievement of a student.

Pakistan's education system faces long-standing problems in access, quality, and equal Opportunity at every level: primary and secondary schools, higher education and vocational education. In spite of recent encouraging trends, such as the rapid spread of private schooling and an expansion of higher education opportunities, reform system remains elusive. The students' performance plays an important role in producing the best quality graduates who will become great leader and manpower for the country. Mathematics and English are the two main

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and important subjects that are linked with overall academic performance of a student. Mathematical and verbal abilities are considered the two key factors in the academic achievements. The socio-economic status and parents' education have a significant effect on the overall academic performance as well as in Mathematics and English (Farooq et. al. 2011). Their study found that economic status and parents' education have positive significant association with their children academic performance. Kola (1998) discussed two types of factors that affect students' academic performance; internal and external classroom factors.

Harb and Shaarawi (2006) conducted a study in the College of Business and Economics – UAEU to investigate the determinants of students' academic performance. Their study concluded that apart from other factors, performance in English is one of the main factors that contribute to the overall performance of a student. Besides competence in English, the students' attendance in the class and living area have significant impact on students' academic performance. Communication skills, learning facilities and proper guidance shows a positive impact while family stress has negative impact on students' academic achievements (Mushtaq and Shabana, 2012).

For measuring the students' academic performance, CGPA, GPA or the result of a particular subject is used (Galiher, 2006; Darling, 2005; Broh, 2000; Stephen & Schaban, 2002, Hijazi & Naqvi, 2006; Hake, 1988; & tho.1994). Jamillah (2016) conducted a study to find out the factors affecting the academic performance of students in secondary school of Ilala District, Tanzania. Their findings revealed that poor English vocabulary is the main cause that students do not understand concepts in various discipline like Geography, Physics and Chemistry. Rossi (2017) investigated the relationship of current employment status and former socioeconomic status with academic performance of evening undergraduate students and found that there is no such relationship.

In this paper, we investigate the major factors that impact the performance of a student in the two major subjects i.e. mathematics and English. The area that we have chosen for our research is District Malakand, Khyber Pakhtunkhwa, Pakistan.

Research Methodology

The population of the study consists of all 10^{th} students who have passed the 9^{th} class examination of District Malakand, Khyber Pakhtunkhwa, Pakistan. A two stage sampling method were used for data collection. In the first stage, we selected the schools randomly and in the second stage students were randomly selected from the school selected in the first stage. A well designed questionnaire has been used for collection of data from the students. An appropriate sample size determination is an important step in social science research. A sample of 987 was determined by using online sample size calculator with 95% confidence level and ±5% precision. Informed consent was taken from all the participants of the study

according to Helsinki Declaration (1964). Descriptive statistics like frequencies and percentages have been calculated to highlight the main features of the data. To find out the factors that are significantly associated with academic performance in these two subjects, Chi-square test of association has been performed. For the purposes of data analysis the statistical software SPSS v-22.0 was used.

Results and Discussion

This section includes the statistical analysis of the data through chi-square techniques. The result shows that female's performance is better than males in terms of their performance in mathematics. In order to distinguish the different gender, the chi-square (3.80) and p-value (0.091), results show insignificant differences. It means that there is no association between marks in math's and gender which validates results found in recent international research reports.

Table-1 shows that 19.49% rural students got marks above 55 and 27.91% urban students got marks above 55. The chi-square analysis shows that there is strong association between performance in mathematics and area of the students (χ^2 =09.94 and P-value= 0.003).

Similarly, the results show that 36.05% students who were borders obtained highest marks while 20.28% students who obtained highest marks were non-borders. The chi-square analysis (χ^2 =47.40 and P-value= 0.000) shows that there is strong association between marks in math's and accommodation of the students.

The percentage of private schools' students who perform better is 32.76% while govt. school students who obtained highest marks in math's were 18.39% The results of the chi-square analysis (χ^2 =47.40 and P-value= 0.000) shows that there is strong association between marks in mathematics and school.

The result shows that 15.23% students obtained highest marks whose previous school academic background was poor while 24.41% students obtained highest marks whose previous school academic background was good. The chi square analysis shows that there is strong association between the performance in mathematics and previous school background (χ^2 =70.35 and P-value= 0.000).

The results also show 22.82% students got more than 55 marks were good in mathematics at primary level and 21.47% students got more than 55 marks were poor in mathematics at primary level. The value of chi-square is 11.90 and p-value is 0.003 which is significant that means there is association between math's performance at primary level and marks obtained in 9th class.

From table it is evident that 24.57% students who obtained greater than 55 marks had positive attitude toward math's and 18% students obtained greater than 55 marks had negative attitude with mathematics. The chi-square analysis shows that there is strong association between attitude towards math's and marks mathematics (χ^2 =26.31 and P-value= 0.000). The result shows that 23.97% students got more than 55 marks who read books other than text books while

18.47% students got more than 55 marks who do not read books other than text books. The chi-square analysis shows that this difference is insignificant which means that there is no association between them (χ^2 =3.79 and P-value = 0.15).

Similarly, the chi square analysis shows there is significant association between mathematics marks and daily study hours (χ^2 =15.68 and P-value = 0.047). The result also shows that the students who have self confidence in math's learning has a significant association with mathematics marks as can be seen from chi square analysis with p-value = 0.006.

Similarly, student's mathematics marks have no association with teaching method of interactive teaching method as can been from chi square analysis in the table-1.

Parent's education has been shown to be significantly associated with the performance in mathematics. This is conformity with the recent results in the literature. But, mother status of working has been shown insignificant unlike their father occupation as can be seen from table-I.

Similarly, financial status of students has no association with student's marks in mathematics which validates many recent results in the literature. From the analysis it is evident that students whose parents have basic mathematic concepts they perform better in mathematics. The reason is that parents makes their children attitude in mathematics in their early stage of academic career by helping in solving their problems on daily basis.

Table 1. Chi-square Analysis of Student's Performance in Mathematics

Variables		Marks in Mathematics %			Chi-Square	D.F	P-val.
		<35	35 - 55	> 55			
Sex	Male	179 (28.44)	320 (49.46)	143 (22.1)	3.80	2	0.091
	Female	78 (22.1)	192 (54.39)	83 (23.51)			
Area	Rural	182 (28.84)	326 (51.66)	123 (19.49)	09.94	2	0.003
	Urban	80 (21.68)	186 (50.41)	103 (27.91)			
Lodging	Border	20 (13.61)	74 (50.34)	53 (36.05)	24.26	2	0.000
	Non Border	242 (28.37)	438 (51.34)	173 (20.28)			
School	Private	38 (12.97)	159 (54.27)	96 (32.76)	47.40	2	0.000
	Govt.	224 (31.68)	353 (49.93)	130 (18.39)			
Prev. acad. Background	Poor	98 (49.75)	69 (35.03)	30 (15.23)	70.35	2	0.000
	Good	164 (20.42)	443 (55.17)	196 (24.41)			

Good in math at primary level	Yes	202 (24.13)	444 (53.05)	191 (22.82)	11.90	2	0.003
	No	60 (36.81)	68 (41.72)	35 (21.47)			
Attitude toward math's	Positive	151 (21.57)	377 (53.86)	172 (24.57)	26.31	2	0.000
	Negative	111 (37.00)	135 (45.00)	54 (18.00)			
Read books other than text books	Yes	189 (25.17)	382 (50.87)	180 (23.97)	3.79	2	0.150
	No	73 (29.32)	130 (52.21)	46 (18.47)			
Daily study hour	0-1	65 (30.95)	104 (49.52)	41 (19.52)	15.68	8	0.047
	1-2	112 (28.64)	191 (48.85)	88 (22.51)			
	2_3	61 (24.50)	135 (54.22)	53 (21.29)			
	3-4	22 (17.60)	68 (54.40)	35 (28.00)			
	Above	2 (8.00)	14 (56.00)	9 (36.00)			
Self confidence in math's learning	Yes	185 (23.81)	410 (52.77)	182 (23.42)	10.32	2	0.006
	No	77 (34.53)	102 (45.74)	44 (19.73)			
Teaching method of math's teacher is interactive	Yes	241 (25.94)	478 (51.45)	210 (26.60)	0.497	2	0.780
	No	21 (29.58)	34 (47.89)	16 (52.53)			
Father education	Illiterate	123 (30.37)	211 (52.10)	71 (17.53)	28.88	10	0.000
	Below matric	49 (28.00)	87 (49.71)	39 (22.29)			
	Matric	40 (24.69)	87 (48.15)	35 (21.60)			
	FA/FSc	38 (31.15)	49 (40.16)	35 (28.69)			
	BA/BSc	8 (11.68)	39 (54.93)	24 (33.80)			
	Above	4 (6.15)	39 (60)	22 (33.85)			
Mother education	Illiterate	183 (27.48)	344 (51.65)	139 (20.87)	20.32	10	0.026
	Below Matric	55 (29.89)	93 (50.54)	36 (19.57)			
	Matric	8 (12.12)	37 (56.06)	21 (31.82)			
	FA/FSc	10 (20.41)	21 (42.86)	18 (36.73)			
	BA/BSc	3 (13.04)	12 (52.17)	8 (34.78)			
	Above	3 (25)	5 (41.67)	4 (33.33)			
Mother status	Working	34 (26.77)	58 (45.67)	35 (27.56)	2.47	2	0.291
	House wife	228 (26.12)	454 (52)	191 (21.88)			
Father occupation	Government job	81 (21.49)	202 (53.58)	94 (24.93)	7.26	2	0.026
	Private job	181 (29.05)	310 (49.76)	132 (21.19)			
	Yes	90 (21.74)	223 (53.86)	101 (24.40)	7.35	2	0.025

Father has math concept	No	172 (29.35)	289 (49.32)	125 (21.33)			
Mother has math concept	Yes	37 (16.97)	121 (55.50)	60 (27.52)	13.06	2	0.001
	No	225 (28.77)	391 (50)	166 (21.23)			

Table-II shows the analysis of English students and its association with different variables. It is evident from the chi square analysis that gender has no significant association with the performance in English as the value of chi-square is 3.90 and p-value 0.12. Similarly, Students area of residence has a strong association with their performance in English as can be seen from table-II that urban students perform better than those belong to rural. The lower performance of rural students in English may be because of lack of standard education facilities and lack of parent's education etc.

From the analysis, it is also evident that students on campus residence in hostel give better performance in English than non-border students. The reason for the strong association may be their frequent interaction, discussion and communication in English with other fellow students whereas this opportunity may not be available to non-border students.

Similarly, school type has also been shown to be significantly associated with English performance because private schools' teacher mostly interacts with their students in English as compared to government school teachers. Secondly, private schools have their curriculum in English unlike government schools.

Previous school academic performance also plays an important role in the students' performance which is also evident from the analysis in table-II which shows that the performance in English has a significant association with previous academic background with chi-square value= 79.41 and the p-value =0.000.

Similarly, English performance at primary level also plays important role and has been significantly associated with English marks of the students which is evident from the analysis with chi-square= 6.46 and p-value = 0.004. Student attitude towards English has been significantly associated with student's performance in English with chi-square p-value=0.009. The results also reveal that students who read other than text books outperform than students who read only text books as can be seen from analysis table with chi-square=12.4 and p-value=0.002.

Similarly, watching English programs on TV, listening English programs of radio and reading English newspaper and magazines significantly improves students' performance in English as evident from table-II with lower p-values as 0.05. Those students who daily read their lectures has high performance than those who do not read their lectures. The chi-square value is 41.09 and p-value is 0.000 which is significant that means that there is association between the two variables. Students performance whose teachers have interactive method of teaching in the

class perform better than those whose teachers don't have interactive class but the difference in the two teaching methods is insignificant. Similarly, teacher attitude in the class has no association with student performance in English as can be seen from the results in the table.

Parent's education plays a very important role in the development of their children ability in English which is evident form the current analysis which shows the significant association of parent education with that of student's performance for obvious reasons.

From the table, it is evident that mother status of work has no association with the performance of students in English while their father's occupation is significantly associated,

Similarly, parent's concept of English improves child English performance which is clear from the analysis in the table that mother/father English concept is significantly associated with English performance of students.

Table 2. Chi-Square Analysis of Student's Performance in English

Variables		Marks in English %			Chi-sq.	D.F	p-value
		<30	30-50	> 50			
Gender	Male	109 (16.85)	459 (70.94)	79 (12.21)	3.90	2	0.120
	Female	51 (14.45)	243 (68.84)	59 (16.71)			
Area	Rural	108 (17.12)	462 (73.22)	61 (9.67)	24.71	2	0.000
	Urban	52 (14.09)	240 (65.04)	77 (20.87)			
Lodging	Border	9 (6.12)	102 (69.39)	36 (24.49)	24.80	2	0.000
	Non Border	151 (17.70)	600 (70.34)	102 (11.96)			
School	Private	23 (7.85)	218 (74.40)	52 (17.75)	22.93	2	0.000
	Govt.	137 (19.38)	484 (68.46)	86 (12.16)			
Prev. acad. background	Poor	72 (36.55)	111 (56.35)	14 (7.11)	79.41	2	0.000
	Good	88 (10.96)	591 (73.60)	124 (15.44)			
Good in English at primary level	Yes	131 (15.23)	602 (70)	127 (14.77)	6.46	2	0.04
	No	29 (20.71)	100 (71.43)	11 (7.86)			
Attitude toward English	Positive	129 (14.88)	610 (70.36)	128 (14.76)	9.53	2	0.009
	Negative	31 (23.31)	92 (69.17)	10 (7.52)			
Read books other than text books	Yes	128 (17.04)	506 (67.38)	117 (25.94)	12.4	2	0.002
	No	32 (12.85)	196 (78.71)	21 (8.43)			
Watch English programs on T.V	Yes	47 (13.28)	239 (67.51)	68 (19.21)	14.72	2	0.001
	No	113 (17.49)	463 (71.67)	70 (10.84)			
	Yes	36 (15.52)	153 (65.95)	43 (18.53)			

Listen English radio programs	No	124 (16.15)	549 (71.48)	95 (12.37)	5.73	2	0.057
Read English newspapers, magazine etc.	Yes	33 (13.31)	166 (66.94)	49 (19.76)	19.48	2	0.005
	No	127 (16.89)	536 (71.28)	89 (11.84)			
Daily study hour	0-1	51 (24.29)	141 (67.14)	18 (8.57)	41.09	8	0.000
	1-2	52 (13.30)	297 (75.96)	42 (10.74)			
	2_3	45 (18.07)	162 (65.06)	42 (16.87)			
	3-4	11 (8.8)	85 (68)	29 (23.20)			
	Above	1 (4)	17 (68)	7 (28)			
Teaching method is interactive	Yes	154 (16.31)	660 (69.91)	130 (13.77)	1.24	2	0.54
	No	6 (10.71)	42 (75)	8 (14.29)			
Attitude of English teacher to students	Positive	156 (16.17)	676 (70.05)	133 (13.78)	0.57	2	0.75
	Negative	4 (11.43)	26 (74.29)	5 (14.29)			
Father education	Illiterate	92 (22.72)	269 (66.42)	44 (10.86)	44.78	10	0.000
	Below matric	19 (10.86)	134 (76.57)	22 (12.57)			
	Matric	24 (14.81)	122 (75.31)	16 (9.88)			
	FA/FSc	18 (14.75)	80 (65.57)	24 (19.67)			
	BA/BSc	5 (7.04)	50 (70.42)	16 (22.54)			
	Above	2 (3.08)	47 (72.31)	16 (24.61)			
Mother education	Illiterate	118 (17.72)	466 (69.97)	82 (12.31)	39.02	10	0.000
	Below matric	31 (16.85)	136 (73.91)	17 (9.24)			
	Matric	4 (6.06)	50 (75.76)	12 (18.19)			
	FA/FSc	4 (8.16)	32 (65.31)	13 (26.53)			
	BA/BSc	2 (8.70)	12 (52.17)	9 (39.13)			
	Above	1 (8.33)	6 (50)	5 (41.67)			
Mother status	Working	23 (18.11)	83 (65.35)	21 (16.54)	1.68	2	0.43
	House wife	137 (15.69)	619 (70.90)	117 (13.40)			
Father occupation	Govt job	51 (13.53)	263 (69.76)	63 (16.71)	6.04	2	0.049
	Private job	109 (17.50)	439 (70.47)	75 (12.04)			
Father has English concept	Yes	48 (11.24)	309 (72.37)	70 (16.39)	14.68	2	0.001
	No	112 (19.55)	393 (68.59)	68 (11.87)			
Mother has English concept	Yes	22 (11.11)	132 (66.67)	44 (22.22)	16.82	2	0.000
	No	138 (17.21)	570 (71.07)	94 (11.72)			

Conclusion

Based on the findings of the current research study, it is concluded that there is a significant association between urban/rural area to which students belong and academic performance in the subject of English and Mathematics. It was also concluded that students lodging in hostels, school type, previous academic background, daily students study, parent's education and their concepts towards the subject has a significant effect on the academic performance of students in the two subjects. Similarly, daily reading other than text books and self-confidence plays an important role in the student achievement towards in the subject of English and mathematics.

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