



## Correlation between Pakistani Students' Academic Achievement and their Attitude toward Technology

**Dr Tariq Hussain**, Assistant Professor, Institute of Education and Research, University of the Punjab, Lahore-Pakistan, [tariq.ier@pu.edu.pk](mailto:tariq.ier@pu.edu.pk)

**ABSTRACT-** The study described here, attempted to find whether academic achievement in technical courses correlates with students' attitudes toward technology. The students enrolled in the technical colleges across Punjab, Pakistan made up the population of the study. 3338 students from this population were picked as the sample. These students were enrolled in either public or private institutes, studying one of three technical courses Mechanical, Civil, or Electrical. The researcher adapted the Pupils' Attitudes toward Technology (PATT) USA instrument to gather data regarding the respondents' attitudes whereas, their scores in the annual examination conducted Punjab Board of Technical Education served as an indication of academic achievement. Pearson's  $r$  was calculated to fulfill the objectives of the study. It was found that a significantly positive correlation does exist between the variables of the study. Moreover, students of both, public and private, institutes showed this correlation. The researcher recommended more studies in the future that focus on aspects such as stress, motivation, and aptitude, in relation to academic achievement. Additionally, a qualitative research, based on the findings of this study, may yield more concrete results.

**Keywords:** Pupils' attitude toward technology, academic achievement

### I. INTRODUCTION

In Pakistan, the Diploma of Associate Engineer (DAE) is one of the options available for students. Their career greatly depends on their performance at this stage. Students, enrolled in DAE, are aged from 15 years to 20 years. This is a period of rapid cognitive and affective development (Aslan & Aslan, 2009).

Many studies (Meece, Parsons, Kaczala, & Goff, 1982; Ma & Kishor, 1997) suggest that 'attitude' is among the various variables linked to students' achievement. Attitude often refers to acting, feeling, and patterns of thinking. It is an acquired characteristic toward an object, whether that disposition is favorable or unfavorable (Koballa & Glynn, 2007). This led to further research suggesting that students' comprehension can be improved with their improved attitude (Osman, Halim, & Ikhsan, 2003; and Kalanda, 2009). Therefore, ensuring a positive attitude toward technology is a prerequisite to ensuring a better performance in technology education. Wolters (1989) regards students' attitudes as a societal phenomenon.

Interestingly, it was reported by Dhindsa and Chung (2003) that achievement and attitude are very much connected to the cultural context, thus can vary between geographical locations. Consequently, to study the correlation between students' attitudes toward technology and academic achievement, specifically, in the context of Pakistani technical education institutes is the need of the hour. This study is an endeavor in this direction.

#### **Objectives of the Study**

To examine the correlation between students' attitude toward technology and their academic achievement in technical education based on technology being studied, and sector.

#### **Research Questions**

1. Does a correlation exist between attitude toward technology and technical education achievement for public sector students?
2. Does a correlation exist between attitude toward technology and technical education achievement for private sector students?
3. Does a correlation exist between students' attitudes and their academic achievement based on the area of study?

## II. LITERATURE REVIEW

Students in technical courses require a considerable practical ability (French, 1980). They usually gain this through experiences in laboratory during their study. Due to the inconsistencies in instrument, small sample sizes, inadequate time period, improper research approach, and unavailability of a widely accepted theoretical framework, not a lot of work has been done to study 'attitude' (Koballa, 1988). However, the literature that does exist, suggests that attitude might play a large part in determining the academic outcomes (Spotts, Bowman & Mertz, 1997).

Over the years, a number of researchers have included 'attitude' as a variable in their studies. Volk, Yip and Lo (2003) studied if students' attitudes might influence achievement in Hong Kong. Walters (2004) collected data from students aged 10 to 18 years old, while, Al-Sa'd (2007) used a questionnaire to collect information from students aged from 14 to 16 years old. Both these studies showed that the students showed a significant difference in attitudes based on their gender (male respondents having a more positive attitude).

In a research by Magno (2003), a significant correlation was found between and academic achievement and attitude toward technical education for students of the Caritas Don Bosco School. Earlier, Germann (1988) had found a moderate correlation between the variables. Wilson's (1983) meta-analytical study also led to the same conclusion. Moreover, a negative correlation was found by Spanjers (2007) between achievement and one of the indicators of attitude: test anxiety. However, a research endeavor in Pakistan revealed that achievement in science was a strongly correlated with attitude toward science (Anwer, et al., 2012).

## III. RESEARCH METHODOLOGY

The researcher intended to study the correlation between technical education achievement and attitude toward technology. Therefore, the quantitative approach was adopted to conduct this study, with a correlational design.

### Population and Sample

The population of this study was made up of all the DAE students enrolled in province of Punjab's Colleges of Technology (CTs). A multi-stage sampling technique led to the selection of 3338 respondents, from 33 private and 11 public CTs.

### Research Instrument

The researcher of this study used the Pupils' Attitudes toward Technology (PATT USA) instrument. This instrument was developed in 1988 by Dr. Marc de Vries, Professor at Eindhoven University, The Netherlands; Dr. Allen Bame, Associate Professor of Technology Education at Virginia Tech; and Dr. William E. Dugger, Jr., Professor of Technology Education at Virginia Tech.

### Pilot Testing of the Instrument

During the initial testing, the instrument was determined to be reliable ( $\alpha = .71$ ). However, it was revealed that respondents were having difficulties in comprehending the statements. This led the researcher to adjust the language keeping in view the cultural context. Ultimately, the rephrased items, tested with the help of 312 respondents, showed improved reliability ( $\alpha = .89$ ).

## IV. DATA ANALYSIS AND INTERPRETATION

### Research Question No. 1

Does a correlation exist between attitude toward technology and technical education achievement for public sector students?

Table 1: Correlation between Attitude and Achievement for Public Sector Students

	Academic achievement	General interest in technology	Attitude toward technology	Consequences of technology	The concept of technology
General interest in technology	.118(**)				
Attitude toward	.064	.537(**)			

technology					
Consequences of technology	.049	.471(**)	.539(**)		
The concept of technology	.033	.377(**)	.504(**)	.353(**)	
Attitude on over all scale	.084(*)	.766(**)	.822(**)	.682(**)	.793(**)

\*\* $p < .01$

The above table shows that respondents' attitude is significantly correlated with achievement ( $r = .084, p = .01$ ). The results also show a significant, positive correlation between achievement in technical education and the scale 'General Interest in Technology' ( $r = .118, p < .01$ ). However, the scales 'Attitude toward Technology', 'Consequences of Technology', and 'Concept of Technology' did not exhibit any significant relationship with attitude ( $p > .01$  in each case).

### Research Question No. 2:

Does a correlation exist between attitude toward technology and technical education achievement for private sector students?

Table 2: Correlation between Attitude and Achievement for Private Sector Students

	Academic achievement	General interest in technology	Attitude toward technology	Consequences of technology	The concept of technology
General interest in technology	.122**				
Attitude toward technology	.085**	.532(**)			
Consequences of technology	.131**	.462**	.481**		
The concept of technology	.025	.350**	.442**	.288**	
Attitude on over all scale	.106(**)	.764**	.790**	.642**	.703**

\*\* $p < .01$

The above table shows a significant correlation between the private sector respondents' academic achievement and their attitude toward technology ( $r = .106, p < .01$ ). The results also show a significant, positive correlation between the attitude and achievement on all subscales excluding 'Concept of Technology' ( $r = .025, p > .01$ ).

### Research Questions 3

Does a correlation exist between students' attitudes and their academic achievement based on the area of study?

Table 3: Relationship between Students' Attitude and Academic Achievement of different Technologies

	Attitude of technology students (n=1121)	Civil Attitude of technology students (n=1143)	Electrical Attitude of technology students (n=1074)	Mechanical Attitude of technology students (n=1074)
Achievement of students	.094(**)	.118(**)		.092(**)

\*\* $p < 0.01$

The results show that attitude and academic achievement are significantly correlated for Civil technology ( $r = .094, p < .01$ ), Electrical technology ( $r = .118, p < .01$ ), and Mechanical technology respondents ( $r = .092, p < .01$ ).

## V. FINDINGS

1. The researcher examined the correlation between achievement in technical education and attitude toward technology. It was found that the variables have a significant, positive ( $r = .084, p < .01$ ) relationship in

the case of public sector schools.

2. Similarly, in the case of private sector, a positive correlation was observed between the variables ( $r=.106, p<.01$ ).

3. The researcher also determined that attitude correlated to achievement for Civil technology, Electrical technology, and Mechanical technology students ( $r=.094, r=.118, r=.092$  respectively,  $p = .01$ ).

## VI. DISCUSSION

The current study looked at students' attitudes toward technology and its correlation with their achievement in academics. While the prior research studies have not explicitly showed a correlation between attitude and academic achievement, it is, however, somewhat debated by Yuan and Lin (2006), and earlier, Marcinkiewicz (1993). The results of the study indicated that Mechanical technology respondents displayed a higher level of attitude ( $M=4.19, SD=.32$ ) than Electrical technology students ( $M=4.14, SD=.36$ ), with students of Civil technology displaying the lowest mean score ( $M=4.13, SD=.36$ ). The result of this study parallels the results of Ertmer (2005) and Khine (2001).

## VII. RECOMMENDATIONS

The concerned body may take into consideration the results of this study while developing a technology-related curriculum as it may deliver comprehension into teaching-learning activities. The administration of technical and vocational training institutes may determine the attitude of the students and develop solutions that will improve the performance of students. Policymakers, planners, teachers, and parents of the students in technical schools may co-ordinate in a useful way so that graduating students of these institutions may have a more positive attitude toward technology with improved performance.

## REFERENCES

1. Al-Sa'd, A. (2007). Evaluation of Students' Attitudes Toward Vocational Education in Jordan.
2. Anwer, M., Iqbal, H. M., & Harrison, C. (2012). Students' Attitude toward Science: A Case of Pakistan. *Pakistan Journal of Social and Clinical Psychology, 9*(2), 3-9.
3. Aslan, C., & Aslan, B. (2009). Differences in teacher candidates' attitudes toward science according to some psycho-social variables. *Procedia-Social and Behavioral Sciences, 1*(1), 1582-1585.
4. Bandura, A. (1980). Gauging the relationship between self-efficacy judgment and action. *Cognitive Therapy and Research, 4*(2), 263-268.
5. Bandura, A. (1992). Perceived self-efficacy in cognitive development and functioning. *Educational psychologist, 28*(2), 117-148.
6. Barden, N. (2004). Implication of the hypothalamic-pituitary-adrenal axis in the physiopathology of depression. *Journal of Psychiatry and Neuroscience, 29*(3), 185.
7. Becker, H. J. (2000). Findings from the teaching, learning, and computing survey. *Education policy analysis archives, 8*, 51.
8. de Klerk Wolters, F. (1989). A PATT study among 10 to 12-year-old students in the Netherlands.
9. Dhindsa, H. S., & Chung, G. (2003). Attitudes and achievement of Bruneian science students. *International Journal of Science Education, 25*(8), 907-922.
10. Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration?. *Educational technology research and development, 53*(4), 25-39.
11. Francis, L. J., & Greer, J. E. (1999). Measuring attitude toward science among secondary school students: The affective domain. *Research in science & technological education, 17*(2), 219-226.
12. Germann, P. J. (1988). Development of the attitude toward science in school assessment and its use to investigate the relationship between science achievement and attitude toward science in school. *Journal of Research in Science Teaching, 25*(8), 689-703.
13. Hermans, R., Tondeur, J., Van Braak, J., & Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & education, 51*(4), 1499-1509.
14. Kalanda, K., & Oliphant, J. (2009). *Factors Influencing Students' Attitude Toward Technology*. Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education.

15. Khine, M. S. (2001). Attitudes toward computers among teacher education students in Brunei Darussalam. *International Journal of Instructional Media*, 28(2), 147.
16. Khunyakari, R., Mehrotra, S., Natarajan, C., & Chunawala, S. (2002). Studying Indian Middle School Students' Attitudes toward Technology.
17. Koballa Jr, T. R. (1988). Attitude and related concepts in science education. *Science Education*, 72(2), 115-126.
18. Koballa, T., & Glynn, S. (2007). Attitudinal and motivational constructs. *Handbook of research on science education*. Englewood cliffs, NJ: Erlbaum Publishers.
19. Ma, X., & Kishor, N. (1997). Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis. *Journal for research in mathematics education*, 26-47.
20. Magno, C. (2003). Relationship between Attitude toward Technical Education and Academic Achievement in Mathematics and Science of the First and Second Year High School Students, Caritas Don Bosco School, SY 2002-2003. *Online Submission*.
21. Marcinkiewicz, H. R. (1993). Computers and teachers: Factors influencing computer use in the classroom. *Journal of research on computing in education*, 26(2), 220-237.
22. Meece, J. L., Parsons, J. E., Kaczala, C. M., & Goff, S. B. (1982). Sex differences in math achievement: Toward a model of academic choice. *Psychological Bulletin*, 91(2), 324.
23. Oliver, J. S., & Simpson, R. D. (1988). Influences of attitude toward science, achievement motivation, and science self concept on achievement in science: A longitudinal study. *Science Education*, 72(2), 143-155.
24. Osman, K., Halim, L., & Ikhsan, Z. H. (2003). The critical thinking attitudinal profile of some Malaysian secondary students: A reflection of scientific attitudes. *Journal of Science and Mathematics Education in Southeast Asia*, 26(2), 143-166.
25. Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. *The Journal of Educational Research*, 95(6), 323-332.
26. Spanjers, D. M. (2007). *Cognitive engagement as a predictor of achievement*. University of Minnesota.
27. Spotts, T. H., Bowman, M. A., & Mertz, C. (1997). Gender and use of instructional technologies: A study of university faculty. *Higher Education*, 34(4), 421-436.
28. Volk, K., Yip, W. M., & Lo, T. K. (2003). Hong Kong pupils' attitudes toward technology: The impact of design and technology programs.
29. Walker, J. M., Hoover-Dempsey, K. V., Whetsel, D. R., & Green, C. L. (2004). Parental involvement in homework. *A Review of Current Research and Its Implications for teachers, After School Program Staff, and Parent Leaders*. Harvard Family Research Project.
30. Willson, V. L. (1983). A meta-analysis of the relationship between science achievement and science attitude: Kindergarten through college. *Journal of Research in Science Teaching*, 20(9), 839-850.
31. Yuan, M., & Lin, Y. (2006). Model selection and estimation in regression with grouped variables. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 68(1), 49-67.