



RELATIONSHIP BETWEEN SELF-EFFICACY AND ACHIEVEMENT SCORE AT SECONDARY LEVEL

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Abstract

The present study was determined to explore the secondary school students, self-efficacy and its relationship with their attitude and achievement in science. The variables of the study were self-efficacy, attitude towards science and achievement in science. Similarly, demographic variables like gender, locality and tehsils were also a part of this research study. The research was descriptive in nature and survey method was used to collect the data. The population of the study comprised of all 10th grade science students enrolled in government secondary and higher secondary schools of Faisalabad District. Two tehsils (Jaranwala and Faisalabad) were selected randomly from all 5 tehsils of Faisalabad district. A sample of 640 students was chosen from the population. Both the questionnaires along with Demographic Information Performa, for final study, were administered to 640 students. These students had already participated in 9th grade Board examination in the year 2013. The 9th class board result of these students was obtained from the website of the Board of Intermediate and Secondary Education, Faisalabad for the district of Faisalabad. The data was analyzed by using different statistical techniques. Descriptive statistics i.e. "Mean, Standard Deviation and Frequency Distributions" were applied for the description of data. Analysis of Variance was also used to find out the differences, therefore t-values and p-values also evaluated. The results revealed that in some indicators male had better achievement and science related attitude and the vice versa.

Keywords: Science related attitude, Achievement score

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INTRODUCTION

Self-efficacy is the power to produce the desired results. Many students have to face different problems of self-efficacy while participating in the different examinations. Those who acquire less achievement in the results, are lowering intelligent, may be the cause of self-efficacy. Bandura (1997) reported that the beliefs that one has the capabilities to execute the courses of actions required managing prospective situations. Woolfolk (2004) has presented it as, “beliefs about personal competence in a particular situation” (p.368).

Self-efficacy viewpoint describe how persons think, feel, stimulate themselves and perform. Such philosophy creates these different influences all the way through four main steps. They involve cognitive, motivational, affective and selection steps.

Self-efficacy and Achievement

The word self-efficacy is derived from the concept of some one’s ability or capacity. According to Bandura's (1997) opinion of self-efficacy, the point is that students create logic of or a faith about, how well they are probable to perform in a work. The word of self-efficacy is linked with capacity of things being done (Lane & Lane, 2001), and has been indicated to effect presentation. Self-efficacy is elaborated not with the performances one has but the assessments of what individual can do with whatever performances individual possesses. Different researchers have conducted study that student with a high logic of academic self-efficacy return in numerous ways. They find to self-regulate added productivity, apply further effort, set higher goals, experience less self-efficacy and achieve better academic performances (Zimmerman, 1995; Wigfield & Eccles, 1992).

O, Brein, Pons and Kopala (1997) developed a study on eleventh grade students to evaluate their self-efficacy in mathematics, gender and career benefits in science and mathematics. The main findings of this study were that an important correlation was shown between mathematics-science self-efficacy, achievement, gender and in pursuing a profession in engineering or science. In a recent study by Pietch, Walker, and Champan (2003) the relationship between performance, general mathematics self-efficacy, and specific mathematics was analyzed. The studies also revealed a positive relationship between students’ self-efficacy beliefs in the subject of mathematics.

According to Rodriguez’s (2004) research study of the function of classroom evaluation in students’ work on TIMSS, self-efficacy was a physically powerful forecaster at the classroom

stage. Self-efficacy had influences on achievement in mathematics at both the individual learner level as well as at classroom level. At the learner level, self-efficacy was dependent relative on the teacher's level of utilize of teacher prepared objective tests. Lodewyk and Winne (2005) conducted a study to discover the links between achievements and self-efficacy of secondary school students.

Papanastasiou & Zembylas (2004) have supported that the study was to observe how pupils' attitudes towards science and their thinking about themselves influence their achievements in science, and vice versa. Cyprus presented an interesting position for the study, being a budding nation that has adopted educational facts from a variety of countries, as well as the Greece, USA and UK. The present study reported the various influences that science attitudes and science achievement can have on each other, depending on the features of the educational systems of the country. It indicates various instructions for future research.

According to Cokadar & Kulce (2008), pupils' attitudes towards science were studied at average stage. Pupils' grade, favorite subject, attended school; families' monthly earnings and awareness of self-achievement narrate to the pupils' attitudes toward science. The pupils' attitudes towards science differ depending on pupils' grade, subject preference, attendance in school, family income and awareness of self-achievement. On the other hand, no difference was found of scholars' attitudes towards science related subjects to gender, parents' academic background and students' social perceptions.

According to Osborne, Driver and Simon (1998), some researchers also review that the low relationship between achievement and attitudes might also be referred to the professed difficulty of science, be short of effective teaching and the effect of cultural and family conditions. Reynolds and Walberg (1992) proposed that achievement influenced attitudes. Martin (1996) has also arranged data with reference to the student attitudes and achievement. Schmidt and Cogan (1996) have described that this database represented a significant occasion to attribute students' family environment and its connection to science achievement, particularly at the old 10th grade rank anywhere there has so far been very slight research.

Ramsden (1998), Weinburgh (1995), Simpson and Oliver (1985) have stated that research in science teaching shows that sexual category may also affect attitudes towards science. The conclusions have indicated that male student's attitudes are ultimately more

encouraging than female student's attitudes school science. Weinburgh (1995) expressed that male students indicated positive attitude towards science than females' students in science subjects. Greenfield (1996) predicted that 4th grader females had more science related attitude. Whereas both groups, interest levels declined during lower grade 7 to grade 8, boys' interest rose again during grade 9 to grade 12, but the interest of girls didn't.

According to Ahu (1995), female students are better than male students in science; consider that science is motivating; feel that science content is not difficult and enjoy science. Barrington and Hendricks (1988) noted no gender differences with respect to attitudes toward science with average and gifted students. Teppo (2004) presented that the boys expressed a more encouraging attitude towards mathematics, science and technology, while girls' preferred English. It is reported to be terms of attitudes toward science because they symbolize a common positive or negative sensitivity toward the prescribed study of science or an area of research (Koballa and Crawley, 1985).

Osborne and Collins (2000) have noted that inventive in its use of focus groups to investigate sixteen years old student's views and attitudes towards science in depth. So very amazingly, chemistry was shown to be less attractive than physics. Rana (2002) revealed that higher secondary school students have positive attitude toward science and showed better achievement score in science.

Dhindsa and Chung (2003) revealed that the attitude toward science and achievement score of females was better than females in co-educational institutes. Papanastasiou and Zembylas (2004) showed that attitude toward science and achievement score in science was significant. A research was conducted by Ali (2012) in Pakistan on secondary school students' attitude and achievement. The results show that 10th grade have positive attitude towards science subjects. The achievement level of these students was also greater.

Studies Conducted on Science Related Attitude and Self-Efficacy

Yalcinalp (2005) has conducted a research study on the association between user's attitudes toward computers and Internet self-efficacy and performance. The individuals were the 88 fresh students of the computer literacy course at the Faculty of Commercial Sciences. Findings have shown important connections between the attitudes, self-efficacy and performance of students on the course.

Sonmez, Duyqu, Simcox & Amanda (2003) have investigated the influences of high school scholars' attitude toward science and self-efficacy. Students' attitudes toward science and self-efficacy were evaluated with a 15-item Likert scale instrument obtained for the study. Analysis indicated that female students tend to be less confident as compared to male students before the workshop. This gender gap closed down after the workshop and we did not identify any difference between genders in students' attitudes toward science and self-efficacy based on post test scores.

Objectives of the Study

The objectives were as follows:

1. To examine the difference of students' attitude toward science in male and female students' self-efficacy beliefs.
2. To investigate difference of male and female students' achievement score in science subjects.

Research Questions

The questions were as under:

RQ 1: What is the difference of students' attitude toward science in male and female students' self-efficacy beliefs?

RQ 2: What is the difference of male and female students' achievement score in science subjects?

Research Design

The study demonstrated quantitative analysis of data that was descriptive. Two instruments: "Self Efficacy Questionnaire for Children (Muris, 2001) and Test of Science-Related Attitude (Fraser, 1981)" were used for the study. The researchers explored the difference and relationship among variables of self-efficacy and science related attitude to collect the data.

Population of the Study

This study was included to find out the secondary school students' self-efficacy and its relationship with their attitude and achievement in science with demographic information. Population comprised of 10th grade boys and girls studying science subjects in government secondary schools in 5 tehsils of Faisalabad district. These students were studying Chemistry, Biology, Mathematics, Physics and Computer Science as science subjects at 10th grade stage.

Sample of the Study

There are 5 tehsils of Faisalabad district and 489 (227 males, 262 females) government secondary schools are present in these 5 tehsils (EDO Office Faisalabad). It was impossible to gather information from such a big population. So, sample was obtained from this population. Two tehsils i.e. Jaranwala and Faisalabad were conveniently selected from five tehsils of Faisalabad district. Then two (02) male and two (02) female schools were randomly selected from urban and rural areas each. One class of science subject was randomly selected from sampled schools. All the 10th grade students from each selected class were included in the sample. These students had to appear in secondary school certificate examination.

Research Instruments

The major objectives of the study elaborated secondary school students' self-efficacy and its relationship with their attitude and achievement in science, the variables used were as follows:

1. Students' self-efficacy
2. Students' attitude towards science
3. Students' achievement in science

Results

RQ 1: What is the difference of students' attitude toward science in male and female students' self-efficacy beliefs?

Table 4.

Difference in Male and Female Students' Self-Efficacy Beliefs

Statements	Male	Female	t	p
1-To what extent do your teachers help you whenever you feel difficulty in school work?	4.68±0.60	4.52±0.70	0.000	2.966
2-How do you express your opinion when your class fellows show difference of opinion in some matter?	4.95±0.94	3.95±0.85	0.015	-0.044

3-How do you keep yourself happy in case of some unpleasant event?	3.53±1.07	3.68±1.10	0.563	-1.817
4-How can you study when your interest lies in other activities?	2.91±1.29	3.13±1.22	0.237	-2.269
5-How do you succeed to calm yourself when you feel fear?	3.87±1.00	3.78±1.04	0.400	1.046
6-To what extent do you make friendship with other children?	4.41±0.83	4.48±0.76	0.230	-1.243
7-To what extent do you prepare for test of a science chapter?	4.64±0.58	4.81±0.39	0.000	-4.315
8-How can you talk in a better way with some stranger?	4.25±0.90	4.33±0.89	0.978	-1.064
9-How can you save yourself from worry in examination of science subjects?	4.10±1.02	4.09±0.94	0.041	0.161
10-To what extent do you get success in homework of science subjects?	4.49±0.73	4.58±0.68	0.128	-1.563
11-How do you work together in cooperation with your class fellows?	4.38±0.79	4.53±0.68	0.003	-2.680
12-To what extent you can control your emotions while reading science subjects?	4.02±1.06	4.20±0.91	0.449	-2.369
13-How much attentive are you in the classroom while reading science subjects?	4.58±0.76	4.76±0.62	0.000	-3.293
14-How do you express your dislike regarding unlikeable activities of your class fellows?	3.24±1.23	3.27±1.20	0.668	-0.261
15-When you are feeling inferior, how you do boosting conversation?	3.62±1.11	3.48±1.12	0.595	1.522
16-How much do you comprehend your science subjects?	4.45±0.81	4.58±0.71	0.012	-2.078
17-How much skilled are you at narrating a comic incident?	4.01±1.08	4.26±0.88	0.133	-3.246
18-How skilfully do you express to your class fellows that you do not like science lectures?	3.40±1.40	3.20±1.46	0.144	1.801

19-How much satisfied do your parents feel regarding your homework?	4.47±0.79	4.56±0.65	0.002	-1.698
20-How much skilled are you at making friends?	4.13±1.01	4.15±1.03	0.530	-0.272
21-How can you be successful in controlling your unpleasant ideas?	3.78±1.05	3.85±0.97	0.073	-0.821
22-To what extents can you pass science tests?	4.48±0.64	4.63±0.49	0.000	-3.266
23-How much skilled are you in defending yourself in case of clash with your class fellows?	3.92±1.14	4.05±0.95	0.002	-1.620

RQ 2: What is the difference of male and female students' achievement score in science subjects?

Table 2

Difference of Male and Female Students' Achievement Score in Science Subjects

Statements	Male	Female	t	p
1-The best usage of wealth is to spend wealth for science.	4.30±0.95	4.32±0.95	0.490	-0.249
2-I would like to decide through experiment, in order to know the reasoning of some happening, instead of asking someone about it.	4.06±1.09	4.40±0.82	0.000	-4.426
3-Science lessons are interesting.	4.61±0.79	4.77±0.55	0.000	-2.964
4-I would not like to become a scientist after getting education.	2.59±1.40	2.68±1.30	0.019	-0.878
5-Science is the worst enemy of mankind.	1.79±1.19	1.39±0.81	0.000	4.916
6-I do not like science subjects.	2.04±1.33	1.59±1.06	0.000	4.705
7-I feel bored while watching science programmes.	2.33±1.45	2.05±1.30	0.000	2.523
8-I would like to work with those who work for new inventions, after getting education.	4.36±1.03	4.37±1.05	0.755	-0.114

9-The amount being spent on science is the right usage of national wealth.	4.12±1.19	4.42±0.93	0.001	-3.566
10-There should be more periods for science subjects in timetable of educational institutions.	4.29±0.96	4.50±0.82	0.003	-2.962
11-I would like to get some science book or scientific equipment as a gift.	4.29±1.07	4.57±0.75	0.000	-3.844

Discussion

1. Self Efficacy of 10th grade science students were positively significant with attitude towards science. Highly self-efficacy students had strong attitude towards science.
2. Female science students of 10th grade had higher self-efficacy than male students.
3. Female science students of 10th grade had more positive attitude towards science than male students.
4. 10th grade science students of urban localities had higher self-efficacy than 10th grade science students of rural localities.
5. 10th grade science students of urban localities had more positive attitude towards science than 10th grade science students of rural localities.
6. 10th grade science students of tehsil Faisalabad had the higher self-efficacy than students of other tehsil Jariwala.
7. The students of tehsils of Jariwala and Faisalabad had more encouraging attitude towards science in case of “Social Implications of Science and Career Interest in Science”. Jariwala students had the lowest attitude in case of “Attitude to Scientific Inquiry” than for other tehsil. On the other hand, for “Classroom Enjoyment and Leisure Interest in Science”, the students of district Faisalabad had the higher attitude.
8. **Relationship of Self Efficacy and Achievement in Science**
9. The present study showed that self-efficacy was positively interrelated with the achievement toward science. The conclusions of this study have determined that self-efficacy of science students of secondary school showed better achievement in the subjects of science. The relationship of self-efficacy with all of the five subjects of science and overall achievement scores ranged from -0.17 to -0.31.
10. The investigation that well-formulated technology instruments can require learning is in line with research accounted on different technology based interactive

knowledge situations (Corderoy, Harper, & Hedberg, 2003; Lajoie, 1993; Cognition & Technology Group at Vanderbilt, 1997).

11. At the end resulted from the overall information that self-efficacy is positively interrelated with the achievement of science students.

Attitude towards Science and Achievement in Science

12. The ending and conclusions of the study repeated the conclusions of some early researches that attitude in science was positively interrelated with the science achievement. The attainment evaluates of all the five subjects of science (Chemistry, Biology, Mathematics, Physics and Computer Science) and also overall achievement assess were positively interrelated with the TOSRA scales.
13. Some other research studies have determined that achievement in science and attitude towards science are highly associated and positively correlated with each other (Dhindsa & Chung, 2003; Eccles, 2007; Ferreira, 2003; House, 1993; Mattern & Schau, 2002; Oliver & Simpson, 1984; Rana, 2002; Simpson & Oliver, 1990; Weinburgh, 1995; and Willson, 1983). The positive attitude of the learners towards science concluded in the higher achievements in science. There was no study explored in which achievement in science and attitude towards science was negatively correlated.
14. Talton and Simpson (1987) applied semester system marks to elaborate achievement and concluded reasonable correlations. These conclusions are reliable and dependable with those of the study. Haladyna and Shaughnessy (1982) also supported the results that the classroom atmosphere and the teacher play a significant role in influencing attitude.
15. According to Oliver & Simpson (1988), these conclusions indicate that attitude toward science and science self-concept are reflected to different way by students with reference to their achievement.
16. According to Cokadar and Kulce (2008), the pupils' attitudes towards science have showed significant differences at all grades with respect to the favourite subject, school attended and perception of self-achievement in three-sub dimensions and with respect to monthly income of the family in the perception of subject and perception of science.

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