



Learners' and Instructors' Attitude towards Physics Achievement at Secondary Level

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Abstract

Scientific attitude towards science education facilitates twenty first century learning and provides a strong foundation for learners' academic achievement. Science education at secondary level is placed as a backbone towards higher secondary level. The focus of the present study was to investigate the instructors' and learners' scientific attitudes towards physics at secondary level. Quantitative data were collected through questionnaires by using survey research from 1000 random sampled respondents i.e. instructors and learners. Multistage stratified sampling technique was applied in the present research and the collected data were analyzed through descriptive and inferential statistics. A low level of learners' attitude towards physics was found which reflects in learners' academic achievement level in physics. Scientific approach among learners can be promoted through instructors' attitudes towards physics at the secondary level, which will be beneficial for the development of Pakistan.

Key Words: Attitude, Calculation aspect of Physics, Interest in Physics, Understanding Physics

Introduction

Every country of the world systematizes its education system in accordance with its goals, views and philosophy. Education modifies the behavior of the learner. Education prepares individuals according to the necessities of their societal, political and economic surroundings. The study of science demands creative and logical thinking. The science teaching learning process becomes interesting through learners' and instructors' positive attitudes towards the scientific approach. The prosperity and progress of any nation depend on scientific approach of learners. Among developed nations', many were able to get, much achievements in the fields of science and technology due to science education, therefore, National Curriculum (2006) of Pakistan emphasized on teaching and learning physics with the aim "to develop among the students the habit of scientific and rational thinking and an attitude to search for order and symmetry in diverse phenomena of nature and thereby to appreciate the supreme wisdom and creative powers of the creator". Several studies have been reported about low achievement in Physics as compared to other science subjects (Gok & Silay, 2008; Rivard & Straw, 2000; Mattern & Schau, 2002 as cited in Kaya and Boyuk, 2011). In Pakistan, the ratio of science students is not encouraging (Niazi, 2010). The number of students studying for scientific profession and experienced science teachers is relatively less. The Teacher students' ratio is 1:19. Decreasing student attention in sciences and professions is a global fear that has provoked science education development worldwide (Nasr and Soltani, 2011 cited George, 2006). In science teaching and learning, attitudes have significant value. The positive attitude of students helps them in participating in science courses and science-linked professions. Teacher is the dominant factor for the students' achievement towards their academics. Students are strongly influenced by teachers which act as a role model for students. Teachers' attitudes and beliefs are important considerations in understanding students' attitudes. Sometimes instructors' attitude creates obstacles towards achievement and making learners' attitude in physics (Gbore and Daramola, 2013). Researchers have revealed the existence of a correlation between teachers' attitude and students' success in physics (Yara, 2009). The elements of science education identified by Osborne (2010) are scientific method and critical thinking, innovative approach during Creative scientific task, development of

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scientific knowledge and cooperation and collaboration approaches during learning. Everyday science learning has become an inevitable part of general education (Rao, 2003). Mistades (2007) has stated that human progress and the advancement that is achieved by modern world from the past few decades emphasize the position that science and technology have occupied to cope with the challenges of evolution of civilization. Safdar (2007) emphasized that Physics has remained successful for gaining a significant position in science education and on the other hand, its services for human beings are marvelous. The contributions of Physics can be observed all around us, to the progress and enhancing economy of a country so considered as the backbone of a nation, therefore, Pakistan National Curriculum (2006) emphasized on physics at secondary level "the secondary education is crucial and challenging, being a transition level from general science to discipline based curriculum. At this level, there is a need to provide the learners with sufficient conceptual background of Physics which would eventually make them competent to meet the challenges of academic and pre-professional courses after the secondary level".

Physics education is continuously developing along with the circumstances of a rapidly changing world. But at the same time low level of learners' interest in physics around the globe (Nashon, 2003 as cited in Alebious & Michael, 2011). Olusola and Rotimi (2012) quoted findings of Rivard and Straw (2000) that Physics is supposed to be a complicated course for students from school level to higher education as well as for adult graduate students. Students find difficulty in scientific concepts and develop negative attitudes. Williams, Stanis street, Spall, Boyes, & Dickson (2003) described the students perceive Physics as an irrelevant subject. The other reason is the varying nature of Physics, as it turns into gradually more complex, and more arithmetical (Owen, Dickson, Stanisstreet & Boyes, 2008 cited by Ilgaz and Aricak, 2011).

Observational learning theory (Albert Posits) indicates that behaviors are obtained by observing another person that executes the behavior. According to educational psychologists, the study of attitude is necessary for systematic and scientific training. Learners' attitude affects performance and achievement in physics (Schibeei and Riley, 1986 as cited in Cracker, 2006). Attitude's role towards achievement or decline of teaching learning process is considerable. In fact, attitude is an essential feature of an individual's personality. Osborne, Simon and Collins (2003) have stated that "attitude towards science are the feelings, beliefs and values held about an object that may be the enterprise of science, school science, the impact of science on society or scientists themselves".

Osborne, Simon and Collins (2003) mentioned the opinion of Jenkins, 1994; Lepkowska, 1996 that learners' attitude towards learning of physics (science) is thought to be an important predictor of their science results in school, correspondingly following a profession in science- linked fields. For the last few decades, research society of science education has been working on the important aspect of inquiry of students' attitude to science subjects. Its importance is due to an alarming decline of students' attention towards scientific careers. Despite the recognition of the importance of scientific knowledge, the falling number of choosing science has created an alarming situation. Lakshmi (2014) indicated that now it is need of the time to recognize and construct a positive attitude towards subject of science. The development of instructors' attitudes towards scientific approach plays in enhancement of learners' attitude. Mbajjorgu and Reid (2006) gave a view about physics attitude during the learning process.

1. "Attitudes towards Physics
2. Attitude towards Physics subjects
3. Attitude toward learning Physics
4. Scientific attitude"

Teacher is a dominant factor in raising the performance of learners and can motivate self-confidence among students so that they can perform their activities smoothly. The pleasing environment of the schools and good teachers directly affects the learning output. The achievement of students improves under the guidance, encouragement and supervision of teacher. The good teachers follow the constructivist approach in teaching methods. Such successful teachers give much time to students by helping them, enhancing their abilities towards learning and forming a bridge between the school curriculum and the learners' prior scientific knowledge. Aziz (2010) has indicated the best teacher proves to be at high rank of the education system. The best teacher raises the quality of education due to constant attempts. In fact, the success of the students is accelerated by him. Mistades (2007) documented views of Branford, Brown, & Cocking (2002) that attitude and belief are important considerations in perceptive of instructor's inspiration to teach, sincerity to revolutionize, attention practices,

and classroom techniques. Cheung (2009) recommended that for the training of the students to make them effective individuals of country, teachers especially of science, require to ensure effective teaching. Teachers must be aware of how science learning can be enhanced at student level and which methods are best. To develop a positive attitude is the main responsibility of teachers' attitudes towards science subjects. Adodo, 2007; Ibrahim, 2000; Ibukun, 2009 as cited in Gbore & Dramola (2013) mentioned that the academic achievement of learners is the reflection of the quality of education of school and efforts of teachers and students towards achieving the success of students. Teachers' education and exposure are very important behind the achievement of students. Hence, teachers' hardworking for preparing students to get success in exams is not ignorable.

Stefan & Ciomos (2010) discussed that the progress of last few decades shows that the teachers' behavior has a deep impact on students' success. Researchers reported that majority of respondents (9th grade) totally agreed that for the achievement in a subject, the teachers' position is essential. Abudu & Gbadamosi (2014) while mentioning the studies of other researchers concluded that one common assumption regarding attitude of teachers and success of student is that those students which were taught with a positive attitude, achieve high positions because their teachers had utilized the right skills and accurate strategies to handle classroom problems. Gul (2002) cited Mcquire (1968) that the improvement of teacher's attitudes will not only support the teachers' efficiency but will also aid in making the school attractive for both students and teachers. The negative attitude of the teachers may yield low student's achievement and negative student-teacher relationships. According to Craker (2006), "the attitudes toward science change with exposure to science, but that the direction of change may be related to the quality of that exposure, the learning environment, and teaching method".

Osborne, Simon & Collins (2003) gave views of Ebenezer & Zoller (1993) that students' attitude is affected by teachers' attitude and their classroom methodology. School science also depends upon the quality of teaching towards science. Adudu & Gbadamosi (2014) also reported the similar findings of Onocha (1985). Adesoji & Raimi (2004) found that use of labs in science shows a positive effect on students' attitude for particular lesson. Wallace and Kang (2004) gave view about teachers' actions as "representing one aspect of teachers' beliefs and thus, should not be perceived as a separate entity from the belief system as a whole". Researchers further stated, teachers' dealings in classroom are in accordance with the teachers' belief system. Attitude may be due to a person's own experiences and awareness or may be obtained from others. Therefore, instructors' attitude may have some effect on learners' attitude towards science and ultimately on their performance. The negative attitude of the teacher may direct the students towards low achievement and negative student-teacher relationship. Herr (2008) stated that Socrates and Plato are the greatest teachers in history. Prokop, Tuncer & Chuda (2007) quotes Dawson, 2000; & Spall, 2003 that students' attitude towards science has been studied in general but attitude towards particular discipline is not been broadly studied.

Koballa and Glynn (2007) gave view that learning practice of students has effect on their attitude completely, enhance students' inspiration towards learning science, resulting in great success. The attitude of students has a great effect on achievement than achievement on attitude. The researcher further cited Miller (1961) that students' success, inspiration and importance to any subject are affected by encouraging and depressing attitude.

Statement of the Problem

In Pakistan, secondary school students find Physics difficult as it is less descriptive, more mathematical and there are many topics that cannot be understood without experiments. According to Awan, (2006) "Teaching of Physics in laboratory has always remained a great problem. It is due to a lack of student's and teachers' interest as well as shortage of the desired lab facilities. Our children have gained a lot theoretically thus straying away from the true practically achieved knowledge" (p.1). Teachers' attitude may identify how much importance he/she gives to teach any subject. The way Physics is taught at the secondary schools plays a major role in shaping students' approach to study. Teachers' attitude towards Physics may have some relationship with students' attitude and their educational success regarding Physics. Improvement of teachers' attitude will support the teacher's competence as well as help in making the school interesting for students and teachers. The negative attitude of the teachers may lead results in fewer student's achievement and negative student-teacher association (Mcquire, 1968 as cited in Gul, 2003). The purpose of this research is to investigate science instructors' and learners' attitude towards Physics and its relationship with the academic achievement.

Objectives

Following were the objectives of this study:

- i. To explore science instructors' and learner's attitude towards physics at the secondary level.
- ii. To investigate the relationship between instructors' attitude and learners' physics achievement at secondary level.

Method and Procedure

For this research, descriptive research design was used and data was collected through survey method. The study was correlational in nature.

The population consisted of all in-service male science teachers teaching Physics and male secondary school students (10th class). Participants (Public sector instructors & learners) for the research study were selected through random sampling technique. First of all, a list of Government Boys High Schools was obtained from the District Education Office. Afterwards, 100 teachers and 1000 students were randomly selected from the secondary schools.

Tools of Research

Brace (2008) has indicated that "it is one of the skills of the researcher to turn the objectives of the study into a set of information requirements, and from the objectives to create questions to provide that information and then to turn those into a questionnaire". In present study, data were collected through questionnaires based upon Likert scale developed by the researcher. Two questionnaires included instructors' and learners' attitude towards scientific approach were developed for data collection. Validation of questionnaires was made through experts in the field of teaching science subjects. The initial version of questionnaires had 48 items. Each questionnaire comprised of mainly positive and negative statements. The questionnaires consisted of four constructs such as understanding of Physics, interest in Physics, experimental aspect of Physics and calculation aspect of Physics. The questionnaires were presented to experts in order to obtain face and content validity. Items were rephrased, edited and twelve items were removed in the light of experts' opinions. After the development and validation of tool, pilot testing was conducted to test the reliability. Those items which had less reliability coefficient were deleted. The pilot testing yielded reliability of teacher's and students' questionnaires as 0.913 and 0.895 respectively.

Table 1. Comparison between Teachers and Students Regarding Understanding towards Physics

Respondents	N	Average	SD	t value	tab	p value
Instructors	100	3.02	1.54	0.52	1.65	0.78
Learners	1000	2.94	1.21			

Table 1 reveals that the mean value of teacher's responses is 3.02 and students' responses is 2.94 regarding the construct understanding towards Physics. The p value was found 0.78 which is greater than 0.05 indicating that there is no significant difference between the teachers and students' understanding towards Physics.

Table 2. Comparison between Instructors & Learners Regarding Interest towards Physics

Respondents	N	Average	SD	t value	tab	p value
Teachers	100	4.0	1.53	1.19	1.65	0.33
Students	1000	3.81	0.98			

Table 2 shows that the mean value of teacher's responses is 4.0 and students' responses is 3.81 regarding the construct interest towards Physics. The P value is 0.33 and is greater than 0.05 indicating that there is no significant difference between the teachers' and students' interest towards Physics.

Table 3. Comparison between Instructors & Learners Regarding Experimental Aspect of Physics

Respondents	N	Average	SD	t value	Tab	p value
Teachers	100	2.59	1.15	1.02	1.65	0.39
Students	1000	2.42	1.67			

Table 3 indicates that the mean value of teachers' responses is 2.59 while mean value of student's responses is 2.42 for the construct experimental aspect of Physics. The p value is 0.39 showing result that $P > 0.05$ so it can be concluded that there is no significant difference between the responses of teachers' and students towards the experimental aspect of Physics.

Table 4. Comparison of Calculation Aspect towards Physics between Instructors & Learners

Respondents	N	Average	SD	tvalue	Tab	p value
Teachers	100	4.06	1.09	1.55	1.65	0.9
Students	1000	3.81	1.53			

Table 4 shows the mean value of teachers' responses is 4.06 and mean value of learners' responses is 3.81 regarding the construct calculation aspect of Physics. The p value is 0.9 showing result that $P > 0.05$ so it can be concluded that there is no significant difference between the responses of teacher and students towards experimental aspect of Physics.

Table 5. Overall Instructors' Attitude towards Physics at Secondary Level

Variable	SA	A	U	DA	SDA	Mean	St.dev
Teachers Attitude	n 17	18	7	29	29	3.40	1.4
	% 17	18	7	29	29		

Table 5 represents the overall responses of teachers and reflects that the mean value (3.40) falls between Uncertain (U) and Disagree (DA) showing that overall teacher's attitude is less positive towards the subject of Physics.

Table 6. Overall Comparison between Learners' & Instructors' Attitude towards Physics

Respondents	N	Average	SD	t value	tab	p value
Instructors	100	3.40	1.4	1.07	1.65	0.399
Learners	1000	3.24	1.2			

Table 6 explains the students' and teachers' overall comparison of attitude towards Physics. The value of p is 0.399 which is more than 0.05 indicating there is no significant difference between attitude of teachers and students towards Physics.

Table 7. Instructors' Attitude relation with Academic Achievement of Learners' in Physics at Secondary Level

Variable	Coefficient	Significant (p-value)
Teacher Attitude Academic achievement (Marks)	.944	.000*

*Significant at 0.001

Table 7 shows that the Instructors' attitude towards physics and the academic achievements of learners (correlation between variables). Pearson correlation is quite significant with p value of less than 0.001. Value of "r" shows a positive correlation between instructors' attitude towards physics with learners' performance. This

means positive attitude of teachers towards Physics leads to the high achievement of students. This correlation is significant as $p < 0.001$.

Discussion

The study aimed to investigate the instructors' and learners' attitude towards physics and to find the association of both with the academic achievement of learners. The present study found that low level positive attitude of physics instructors and learners towards physics. This study is in line with Soomro, Qaisrani and Uqaili (2011), Hussain, Alam, Bukhari and Ahmad (2011), Kaya and Boyuk (2011) and Trivedi & Sharma (2013). The researchers found that Physics teachers' attitude was between uncertain and disagree depicting less positive attitude. As far as students' attitude was concerned the picture was almost the same in this case reflecting that students' attitude was the mirror image of the teachers' attitude. Students and teachers in this present study were found having a positive attitude towards the experimental aspect of Physics. It can also be interpreted that learner responses regarding experimental aspect were significantly high as compared to other dimensions such as understanding of Physics, interest in Physics and calculations in Physics. This indicates that students' feel ease for understanding the subject if there are experiments in the subject. Experiments create interest in students because these make the scenario more visible and easier for students to understand the subject. The outcome of present research indicates positive relationship (association) between instructors' and learners' attitude towards physics with academic achievements of learners. The result of the present study consisted of Tooke and Lindstrom's (1998) view that learners with positive attitude towards physics would get success. Schibeci (1984) has found a strong association between scientific attitude of learners and level of achievement. After analyzing the data, keeping in view the objectives, and results of the study, it was found that instructors' and learners' scientific attitude towards physics were less positive, while learners' academic achievement was very low and instructors' attitude is the predictor of learners' attitude and affects the learners' academic achievement in the long run. It can be interpreted from this study that students and teachers were behaving in the same way reflected that if teachers were accepting Physics as a difficult subject and they were taking less interest in Physics, it's quite representative from students' result that students also considered it as a difficult subject to show good results. So collected data presented that if teachers were reluctant to teach Physics, students were also feeling difficulty to get good grades in Physics.

Conclusion

A significant correlation between instructors' attitude and academic achievement of learners was found. On the other hand, a significant correlation between learners' attitude and academic achievement also existed. Majority of instructors showed a less positive attitude and learners' attitude towards physics was also less positive resulted in very low achievement of learners in physics. It can also be concluded that instructors' attitude directly affected learners' attitude and ultimately their academic achievement.

Recommendations

1. Teachers may consider attitude as an important factor for academic achievement of students. Teachers must develop a more positive attitude towards Physics as teachers' attitude is predictor of the students' attitude towards Physics.
2. School administration and Education department may provide proper equipment and apparatus for practical Physics to improve the attitude and learning of teachers and students.
3. To develop the positive attitude of students, Co-curricular competitions such as science fair may be implemented.
4. In secondary schools, student counseling must be provided. Counseling can help students to overcome their issues and develop a positive attitude towards Physics.
5. Only Physics teachers must teach Physics to students instead of biology or chemistry teachers as they have no grip on Physics subject resulting in low academic achievement of students.
6. In-service refresher courses may be organized by the Government institutions so that academic achievement in Physics may improve.

7. Students must do the practice of Physics experiments in laboratory to develop the ability to learn through experiments at secondary education level to obtain better academic achievement.
8. Factors behind the less positive attitude of students towards physics must be explored out so that required actions can be suggested to modify the attitude of learners and boost learners' interest in physics.

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