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Secondary school students' attitude towards life science

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Abstract
Students' attitudes toward science drastically modify their achievement in science. Therefore, recognition and influence of attitudes became to be a vital part of educational research. The study has been initiated by the idea that; research in students' attitudes in the direction of science frequently involves science in general, but particular disciplines like biology, chemistry, physics and Life Sciences have been ignored. Thus, the study is revolved on the subject of students' attitude toward Life Science. Life Science Attitude Questionnaire was used to gauge students' attitudes toward Life Science. The data were obtained from 25 secondary schools from the students attending 9th and 10th grade. The major findings of the study are that Gender is the major factor that impacts students' attitude toward life science for all dimensions. Attitude toward Life Science teacher is strongly affected by teacher identity. This can be taken as a clue for future research. That effect of teacher should be included as a parameter to be considered for the studies related to student attitude.

Keywords: Learning Attitude, Life Science

1. Introduction
The assessment of students' attitude towards studying life science has been a concrete facet in the science education research community for the last several years. The quality of education that teachers offer to students is tremendously contingent upon what teachers accomplish in the classrooms. Therefore, in preparing the prevailing, competent and victorious students of tomorrow, science and mathematics teachers make sure that their teaching is effectual. Teachers should have the knowledge of how students learn science and mathematics and how to teach in the finest way.
Comprehending students' attitudes is imperative in sustaining their achievement, attention and interest toward a particular discipline. Students' attitudes toward science have been broadly studied (Dhindsa & Chung, 2003; Osborne, Simon, & Collins, 2003), but research was originally paying attention on science in general (Dawson, 2000) and a reduced amount of concentration was addressed to particular disciplines like biology, physics or chemistry (Salta & Tzougraki, 2004). This can partially conceal students' attitudes because science is not viewed as uniform subject (Spall et al., 2003).
Generally, students' attitudes toward science decrease with age (Ramsden, 1998; Osborne, Simon, & Collins, 2003), boys show positive attitudes toward science than girls (Simpson & Oliver, 1985; Schibeci & Riley, 1986; O'Brien & Porter, 1994; Francis & Greer, 1999) and negative attitudes are associated with the physical sciences rather than biological sciences (e.g. Spall, Barrett, Stanisstreet, Dickson & Boyes, 2003; Spall, Stanisstreet, Dickson & Boyes 2004). Keeves and Kotte (1992) and Jones, Howe and Rua (2000) showed that, unlike chemistry or physics, girls showed positive attitudes toward biology than boys. Study of Baram-Tsabari and Yarden (2005) using method of children's impulsive questions found that children's curiosity in human biology increases with age in relation to the interest in zoology which showed reverse inclination.
In the present study, I examined students' attitudes towards life sciences. Life Sciences as a school subject is conventionally detached from other science courses in India. This study varies from the other researches for the reason that it inspects students' attitudes toward life Science, not toward science in general. Furthermore, an additional feature of this study is that, it assures to seal one of the cracks in the area related to comparing students' attitudes with respect to curricular differences and grades.

Emergence of the Study
Attitudinal studies in science education area are mostly relevant to elementary, middle and high school students', and in some cases college students' attitudes towards science.

One of the key factors in learning science is students' attitudes and the development of positive attitudes toward science can inspire student interest in science education and science-related careers. This study was conducted to examine students' attitudes toward life Science with respect to age and gender. The study is delimited to the secondary schools students attending 9th and 10th grade in Punjab region. The following objectives are developed:

1) To study students' attitudes toward Life Science lessons
2) To study implications for Life Science education can be derived from the results of the study

Hypotheses

The present problem is designed to examine the following hypotheses:

1) There is no significant difference between the mean scores of boys and girls on the attitude questionnaire.
2) There is no significant difference between the mean scores of students of different age classes on the attitude questionnaire.

Methodology of the Study

In the study, secondary school students attending 9th to 10th grades were taken. This allowed us to evaluate gender differences in particular topics and examine the effect of students' age on attitudinal changes. The data for the current study were obtained from 1000 secondary school students (n = 514 girls; 486 boys) attending secondary schools in Punjab region. Mean age of the students was 13 year.

Tool of the Study

Following tool have been used for conducting the present study:

1) Life Science Attitude Questionnaire was used to measure students' attitudes toward life science education prepared by the investigator.

Analytical Techniques Employed

Following analytical techniques have been employed to investigate and reach to the results:

1) Mean, Standard Deviation, Percentage and t-ratio have been calculated to analyze the data quantitatively.

Analysis of the Study

The data obtained have been analyzed under the following headings:

1) Significance of difference between the mean scores of boys and girls on the attitude questionnaire.

Table 1

Dimension of Attitude Questionnaire	Sex	N(size of the sample)	Mean	σ(SD)	D (diff. Between means)	σd	t- Ratio
Interest	Girls Boys	486 514	77.76 53.52	14.77 9.90	24.24	0.7997	30.3105**
Towards Career	Girls Boys	486 514	74.35 53.02	15.29 9.72	21.33	0.8154	26.1595**
Towards Teacher	Girls Boys	486 514	75.80 55.47	15.12 12.25	20.33	0.8731	23.2841**
Difficulty Level	Girls Boys	486 514	71.24 53.04	15.25 9.36	18.2	0.8056	22.5922**
Equipments Used	Girls Boys	486 514	74.64 53.64	15.01 9.83	21	0.8072	26.0158**

** Significant at the 0.01 level of confidence.

Interpretation

The above table suggests that significance of t-ratios between boys and girls on all the scores of the dimension of attitude questionnaire is significant at the 0.01 level of confidence. Thus, the data provide sufficient evidence to reject hypothesis namely, "There is no significant difference between the mean scores of boys and girls on the attitude questionnaire. The means suggest that the attitude of girls' towards life science is more as compared to boys in all dimensions. Meaning thereby girls have more interest in life science subject or topics related to life science.

2) Significance of difference between the mean scores of students of different age classes on the attitude questionnaire.

Table 2

Dimension of Attitude Questionnaire	Class	N(size of the sample)	Mean	σ(SD)	D (diff. Between means)	σd	t- Ratio
Interest	9th 10th	486 514	57.57 54.32	11.86 9.87	3.25	0.6921	4.6961**
Towards Career	9th 10th	486 514	50.89 48.13	9.05 7.67	2.76	0.532	5.1884**
Towards Teacher	9th 10th	486 514	54.21 51.12	8.14 7.77	3.09	0.5038	6.1336**
Difficulty Level	9th 10th	486 514	54.76 51.23	9.12 8.76	3.53	0.5661	6.236**
Equipments Used	9th 10th	486 514	49.09 47.87	7.98 7.32	1.22	0.4851	2.5152

** Significant at the 0.01 level of confidence.

Interpretation

It may be observed from the Table 2 that the F-Ratios for all the dimensions of attitude questionnaire have been found to be significant at the 0.01 level of confidence. Thus, the data provide sufficient evidence to reject hypothesis namely, "There is no significant difference between the mean scores of students of different age classes on the attitude questionnaire. Meaning thereby the age class of the students has significant

effect on various dimensions of questionnaire. Whereas for the dimensions 'Equipments used' the hypothesis is not rejected which means the age class of the students has no significant effect on the usage of equipments.

Discussion and Conclusions

One of the most pronounced results of the study is that, Gender is the major factor that impacts students' attitude toward life science for all dimensions. Age Class, on the other hand, is found to be effective for four dimensions. Thus, in general terms, the students have a positive attitude toward life science lessons were most popular among girls. Students' interest in life science lessons differs with gender; girls have more interest in life science. But the degree of interest decreases as the girls get older. The most pronounced reason for students' interest, on the other hand, is that, they are interested in dealing with live animals and plants during life science lessons. The majority of the students believe in the importance of knowledge of life science, but the results displayed that, students do not treat life science knowledge as one of the issues that is necessary and useful in their daily lives. Although majority of the students find biology as "easy", difficulty rating differs by class. Teacher characteristics have found to have a significant role on students' attitudes toward life science; students especially girls take life science teachers as a model for deciding about their career. But, their views about teachers differ according to different teachers. Thus, individual character of a teacher may be one important variable to be work on for the student attitude research.

The differences detected for two dimensions, "interest" and "difficulty", among different grade levels, suggests that attitudes are likely to be influenced by curriculum (subject) than age of students. For example, life science has been defined as the most difficult by ninth graders. However, an increase of interest has been detected among ninth-graders, which may indicate that interest in life science depends on the topic. Dimension titled "Equipment Used" has no significant effect on the age class. Thus, we propose that the various equipments used in the life science subject were not there either in the school or the students may not aware about the usage of equipments. The effect of teacher, on the other hand, is another variable which seem to be important. Data presented in this study, suggest that teacher can significantly affect students' attitudes toward life science and this outcome, on the other hand, indicates the need, for further research on this factor. "Teacher effect" is also interesting from another point of view:

Based on the current data, it seems that life science teacher is not being distinguished from a biologist. The traditional children's view of a scientist, on the other hand, is that a person dresses a white lab coat, works in a laboratory among test tubes, flasks and bottles and (e.g. Chambers, 1983; Schibeci & Sorenson, 1983; Parson, 1997). Unfortunately, there is no data on students' image of a "biologist". Therefore, further research is needed to understand the students' view about the differences between a "life science teacher", a "professional biologist" and a "scientist". The students cannot distinguish life science teacher from a biologist, is valid, and if they have a negative attitude toward their teacher, then this may explain why students' attitude toward future career in life science is low.

Educational Implications of the Study

Frequent use of live organism in life science lessons and/or practical works may increase students' interest toward life science. Interest in life science should be developed for boys and in particular. Because boys showed low interest in career in life science, their interest should be increased perhaps through contact with professional scientists (through science centers) and their ideas about professional life scientist and the role of life science knowledge in daily life should be investigated deeply. Finally, more research should be realized on the subjects like, attitude toward life science teachers and their impact on student's interests and attitudes toward life science. Findings of such studies may significantly contribute to improve life science education in the future.

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