DEVELOPMENTAL ATTITUDE TOWARDS SCIENCE AMONG GIRLS OF SECONDARY AND COLLEGE-LEVEL

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ABSTRACT

Girls in secondary and college-level science classes tend to have varying attitudes toward different science subjects. The purpose of this research is to identify instructional strategies for improving girls’ attitudes toward science that emerge from the past studies. In the recent past, the study about students’ attitudes towards science has become a key component of science education. The literature review discloses three main themes related to improving girls’ attitudes toward science i.e. inherent emotion, specific role models, and attitudinal function. Studies carried out have also shown that method of teaching science at school level very much accounted for students’ positive attitude towards learning of science and that, without interest and personal attitude in learning science; they can hardly have interest in higher studies in these disciplines. Science instruction typically lacks women role models, who are an important component of improving attitudes. Finally, attitude researchers know that all attitudes hold certain functions, including value-expressive and social-expressive. Instruction for attitude change requires the instructional designer to consider the functions of existing negative attitudes. One of the predominant factors for inadequate number of women in science is a lack of preparations from school level and attitudes of girls and early experiences with science subjects. The main purpose of this study is to examine the attitudinal differences towards various science subjects among the girl students at secondary school level and those who are pursuing UG science based programs and are still required to study these subjects to fulfill the requirements for their degree. The study have been carried out to investigate whether the girls’ interest level in different science subjects have changed as they continued their studies beyond secondary school level. An attitude toward science-questionnaire was administered on more than 250 girls from secondary school as well as those studying engineering at UG level. Data analysis has been performed on all three themes mentioned earlier and has been thoroughly analyzed, along with specific techniques for classroom implementation.
INTRODUCTION

Interest or feeling towards studying science is the students’ disposition towards ‘like’ or ‘dislike’ science while attitude in science means scientific approach assumed by an individual for solving problems, assessing ideas and making decisions. Review of relevant literature depicts varying opinions and findings on the students’ attitude towards science and their performances. According to Keeves (1992) and Postlethwaite and Wiley (1991), attitudes towards science are, in general, highly favored, indicating strong support for science and the learning of science. Alao (1988) examined six attitudinal dimensions and their effects on students’ achievement. These were social implications of science, attitude towards scientific inquiry, normality of scientists, enjoyment of science and science lessons, leisure interest in science, and career interest in science. Some studies have indicated that the nature of schooling from the earliest years on, could shape the capacities and strengths of the growing female (Maccia et al 1975). This implies that if we have to look at the study of females at higher education e.g. at University level, we have also to look into the schooling before entering university, by considering at these schools as even small societies, the values they represent, the form and content of learning offered and the type of educational environment which existed. To develop more interest at school level in the subject it showed that the enrolment in the subject at higher level could be increased if more students were motivated to study the subject at lower levels. Study findings also demonstrated that students’ attitudes and confidence are being affected at all levels, from elementary to college, and that praise or blame for student attitudes and confidence level cannot be placed at the doorstep of any one level of education. It is quite clear that an individual teacher has also the opportunity to change student perceptions about and confidence in learning science. It is also clear that students can carry attitudes over time and, in the case of negative attitudes, can make learning choices based solely on avoidance of a particular subject unless that attitude or confidence level is counteracted by a successful experience. It is the responsibility of educators at all levels to assess their practice in order to provide an environment that challenges and nurtures the learner, particularly as it relates to the study of science.

Self confidence towards science, influence of role models and knowledge about the usefulness of science. Recently, educational researchers have investigated what factors, affect the success. For this reason, students’ attitudes toward Science have been examined (Oppenheim, 1992). Furthermore, it is very useful to obtain the opinion on students’ tendency to react toward science, which define their beliefs, preference, decision and sensitive thoughts (Hendley, et al., 1995). Studies have also indicated that there is no average difference between male and female intelligence (Saker & Sadker, 1994; Birke, 1992; Hyne, 1996). The only differences that have been found are in mathematical ability and spatial perception (Hyne, 1996). Although, the difference observed is significant, this reason alone is insufficient to explain the under degree of under-representation of women in engineering career. Hence it is dangerous to assume that biological differences are wholly to blame to the lack of female engineering as it is an unchangeable position. The other predominating pre-tertiary explanation for the lack of females in science are a lack of preparation from the school level, and female attitudes and early experiences with science.

This study is being carried out to investigate whether the girls’ interest level and attitude in different science subjects have changed as they continued their studies beyond secondary school level.
METHODOLOGY

A survey model has been used for the study of developmental attitudes of female students towards science subjects. Data for the study were collected between February 22 and 29, 2012. The questionnaires were distributed to the students during regular class sessions. Participating students were instructed to read each item carefully, and then to answer the most desired option from multiple choice questions. All the participants in each class completed the survey. The study consists of approximately 250 female students of Secondary school level and pre degree level of academic year 2011-2012. These female students were from Mody School, MIER, and FET-MITS Lakshmangarh, Rajasthan.

RESEARCH QUESTION

Is there a significant developmental difference in attitudes toward science courses between Secondary and college level female students?

DATA ANALYSIS

1. There is some significant increment in enjoyment level in all areas of science but it is more pronounced in Chemistry.
2. Difficulty level has also reduced to significant level and it also more pronounced in chemistry.
3. Even after learning four years science from their time to opt it as a future course of study the girls are more interested in Mathematics in comparison to Physics and Chemistry of science discipline.
4. Girls attitude shows that they always remain less interested in performing experiments. Some extra efforts have to be done at school level itself to tell them the importance of hands on experience they will gain after performing experiments. In this way it will enhance their confidence level. They should not have an attitude just to clear the exam. Moreover after opting science students are more concentrate on preparation of competitive exam at school level which is quite theoretical and so parents, society and teachers as whole give more stress on theory rather than exp.. Therefore, students have very different attitude regarding experimental courses and importance of experiment in life.
5. Lack of role model is also one of the reasons to have less motivation in science field.
6. Science lessons have to be made more interesting.
7. There is significant decrement towards laboratory experiments especially in Physics therefore efforts has to be made to make the laboratory experiments more interesting.
8. There is no significant change in attitude towards derivation but 10-15% more students feel that derivation are not boring.
9. Our study shows that students are less interested to solve the problem of science in comparison to mathematics.
10. Study also shows that students are not opting science because her friend.
11. A level of difficulty in handling apparatus is mainly due to difficulty in understanding the concept in Physics as reflected in point 28 as well.
12. There is a significant increase in difficulty to handle the experimental apparatus in Physics. This shows that at school level they are not being allowed to work on apparatus because in Physics especially in optics setting the apparatus required more practice and even precautions has to take while observing them.

13. In Physics and Mathematics the trend is just revert from school to UG level.

14. Study shows that less interested Physics text books are being offered to them therefore this makes the subject overall difficult.

15. There is a significant change in attitude towards science that it helps them to be able to reason well.

16. The overall interest is decreasing towards science.

17. Overall understanding level in all branches of science has increased at higher level but at higher level girls student are more interested to help others in Chemistry rather than Physics and Mathematics. This shows that Chemistry becomes more interesting and easier for Girls at higher level.

18. Even the Physics is more difficult for the students but there is significant rise in thinking about the topics and ideas which students learn in Physics.

19. There is a significant amount of sweep in their interest among different subjects of science at lower and higher level. This study also confirm in the enhancement of enjoyment level.

20. According to item no. 1 level of enjoyment has increased during their successive studies at higher level because understanding has increased a lot but in comparison to other subjects science is less preferred.

21. This study also confirm the result of item 9 which shows that most of the students are less interested in solving new science problems and that is why they do not like science assignments.

22. Science students think that Mathematics is more important from their job point of view.

23. Even they want to acquire the jobs which involve mathematics.

24. There is a drastic change in understanding of different subjects at lower and higher level. Physics is less complicated at lower level and Chemistry at higher level.

25. There is a slight difference in opinion regarding gender attitude towards different science subject but this outcome not has sufficient basis because the data collected and compiled from the same gender. Therefore this is just their opinion only.

26. With successive studies the difficulty level in understanding scientific terminology is slightly becoming more simpler in most of the subjects but still it is needed that more efforts has to be made in explaining scientific terminology at early stage.

27. There is a significant fluctuation at lower and higher level when students were asked to use what they have learned to solve new problems in different science subjects.

28. Same as concluded in point 11.

29. There is a need to make the objective more clearly to the students before going to solve the problem. Object oriented problem solving will make them sure what they are doing and why they are doing.

30. There is a significant enhancement to do more writing work in science. To develop the interest we should make the subjects more experimental oriented.
1. I enjoy studying

2. Level of difficulty

3. I would like to do more in future

4. It is waste of time performing experiments in

5. I admire people who have good knowledge of

6. I do not always like to be in class during lessons

7. Laboratory practical are very boring

8. Do you feel derivations are boring?
9. I like solving ______ problems

10. I offer ______ because my friends offer it

11. ______ is difficult, when it involves handling apparatus

12. There are too many facts to learn in ______

13. I study ______ mainly to pass examination

14. ______ textbooks are too difficult to understand

15. ______ helps me to be able to reason well

16. ______ is not as interesting as other science subjects
17 I like to help other students with _______ problems

18 I offer _______ because I have no choice

19 I very often think about the topics and ideas which I learn in _______

20 Studying _______ is waste of time

21 I always sleep during _________ lessons

22 I don’t like doing ______ assignments

23 _______ will help me to get a better job when I leave school

24 I would like a career which involves _______
CONCLUSION

As the sample data used for this study took account of only 265 girls from two institutions and from the data analysis we found that the two groups of the girls had different mean and standard deviation scores with regard to their attitudes towards Physics, Chemistry, Mathematics and Biology, there was a need to verify whether these results represented a real difference between two groups or it was a mere chance difference in our collected samples. In order to confirm this the statistical t-test was performed using t-statistics to determine a probability value that indicated how likely we had gotten these results by chance. The t-test results are presented in the table given below:
As the development of attitudes toward science is a complex function of cultural, biological, psychological, educational and social factors, it is imperative that an integrated approach should be adopted for investigating girls’ developmental differences in attitudes toward science. It is also advocated that a broader sample should be used for future research to give a more realistic picture of girls’ developmental attitudes toward science. Besides, teacher should develop positive relationship with students and more classroom activities, which could involve active teaching-learning process and students’ participation in the class. Secondary schools and other stakeholders in the education should organize periodic seminars and workshops for students, parents, teachers and school administrators designed to promote positive attitudes towards the study of science at school level as well as at higher level.

ACKNOWLEDGEMENT

We gratefully acknowledge the Director, Col. P C Sharma and Mr. Deepak Kumar Bugalia of Nimawat Secondary school, Fatehpur, and Ms. Renu Seghal, Principal Mody School for their support and input at early stages of this exercise. We would also like to thank the Dean, Faculty of Engineering and Technology, MITS for the use of facilities to complete this work.

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