**ATTITUDINAL CHANGE TOWARDS SCIENCE LEARNING:
A CASE STUDY**

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Introduction

Education plays a vital role in the inculcation of values and development of various skills like scientific skills, aesthetic skills, literary skills, mathematic skills, etc. The NPE, 1968 envisaged 'a radical transformation of the education system to relate it more closely to the lives of the people, provide expanded educational opportunities, initiate a sustained intensive effort to raise the quality of education at all stages, emphasise the development of science and technology and cultivate moral and social values.' Learning of science in schools augments the spirit of enquiry, creativity and objectivity along with aesthetic sensibility. It aims to develop well-defined abilities of knowing, doing and being. It also nurtures the ability to explore and seek solution of the problems related to environment and daily life situations (NCF 2000). At present with the introduction of school based evaluation system in many of the states it becomes inevitable that the teacher should focus on making the teaching learning process activity based. The activity based teaching becomes fruitful only if the teacher has the spirit of inculcating the scientific skills, scientific attitude and interest towards science through the various activities. The modified curriculum in accordance with the school based evaluation system demands more activities which would ensure the active participation of the students. Thus, the activities should be planned to engage the learner in acquiring the methods and processes that lead to the generation and validation of scientific knowledge and nurture the natural curiosity and creativity of the child in science. Again the activities should be age specific and appropriate to the cognition of the student(NCF 2005). At the secondary school level science learning should involve the students in a systematic experimentation as a tool to discover/verify theoretical principles, and working on locally significant projects involving science and technology(NCF 2005). This implies that the students should be

provided opportunities where they would think for themselves about the implementation of the scientific principle to verify it. Provision of such opportunities at secondary school level would develop critical, creative and generative thinking. Along with the opportunities to do some activities or experiments by themselves they should also be given flexibility in experimentation (NCF 2000). Apart from the review of the curriculum frame works some of the reviewed studies suggest that secondary science teachers' beliefs about most as science education contextual factors such as school setting and the tension that arises due to the lack of understanding about the real objectives of the curriculum (Stock, 2010). The teachers seem to be ineffective in teaching science due to the lack of proper instructional material and lack of subject specific in-service training (Gyamfi, 2003). Researches also suggest that allowing the students to learn through project-based method or inquiry-based learning develops the interest for science learning (Yerrick, 2000). So with an intention to provide the students an opportunity to design their own working model the investigator gave a project to the students of class X. Along with the objective of developing interesting science and specifically biology the objective was also to provide flexibility to them to use any low cost/waste material to design the working model.

Need and significance of the study

This was a case study and the investigator conducted it when she was working as a secondary school teacher in one of the CBSE school in Vadodara district. While teaching topics related to biology the investigator observed that many students showed less participation in the class compared to physics and chemistry classes. While the investigator learnt that, in the previous classes the students were asked to write a written assignment and submit for the internal assessment biology. An informal talk with the students revealed that the student thought biology to be a theoretical subject, the content of which has to be crammed and reproduced in the exam. Again the observation during the teaching learning process of first semester of academic year 2010-11 investigator noticed that one student constantly was engaged in talking, doing the work of some other subject or sleeping by giving false reasons during the biology class. The Results of FA1 and SA1 showed that that more than 50% of the students scored less than 35% in the biology test. One of the students who showed total disinterest in the class, described above did not attempt even a single question of biology. All these observation made it very important to keep alive the dying interest of the students for the subject biology. Moreover, while talking to the school supervisor about disinterest of the students for learning biology, it was revealed that the lack of resources, infrastructural facilities and the tradition method of teaching adopted by the earlier teacher of biology led to

such a condition. So to test whether providing different kind of experiences would generate some interest in the students for learning biology, the investigator assigned a project to the students of class X. Considering the moderate infrastructure and resources available in the school investigator gave this project wherein the students could utilise their creativity and use low cost or waste materials at home to make a working model. The aim was to develop interest in the students for learning biology.

Instructions provided for the making of the working model

The instruction was given to make a working model of either working of a heart, kidney or the digestive system of human beings. The students had to make individual models. The students were asked to read the literature, understand the functioning of the human systems and make the working model accordingly. They were provided with the names of the reference books available in the school library. The time given was two weeks. In these two weeks the students were instructed not to take help of their parents but they could approach their science teachers for some guidance.

Objective of the study

To study the development of scientific temper in the students having least interest in learning biology in terms of the change in their attitude towards learning biology.

Operationalization of the terms

Change in attitude: in the present study the change in attitude is described in terms of the interest shown by the students in preparing a working model from the low cost materials or waste materials.

Methodology

Population:

All the students studying in class X in the CBSE schools of vadodara district constituted the population of the study.

Sample:

In order to achieve the objective of the study purposive sampling was used. One student who did not score, in the biology tests was selected as the sample for the study.

Techniques:

Rubric: a rubric was prepared for observing the students while they were presenting the prepared model. The aspects which were included in the rubric were : collection of the materials, cost of the materials, application the scientific principles for making the model, workability of the model, understanding of the workability of the model while explaining the working of the model.

Interview with the student: a semi structured interview was conducted with the student to find out the experiences she had while making the model in terms of reading and understanding the biological terms, difficulties that she faced while buying and making the model and while presenting it.

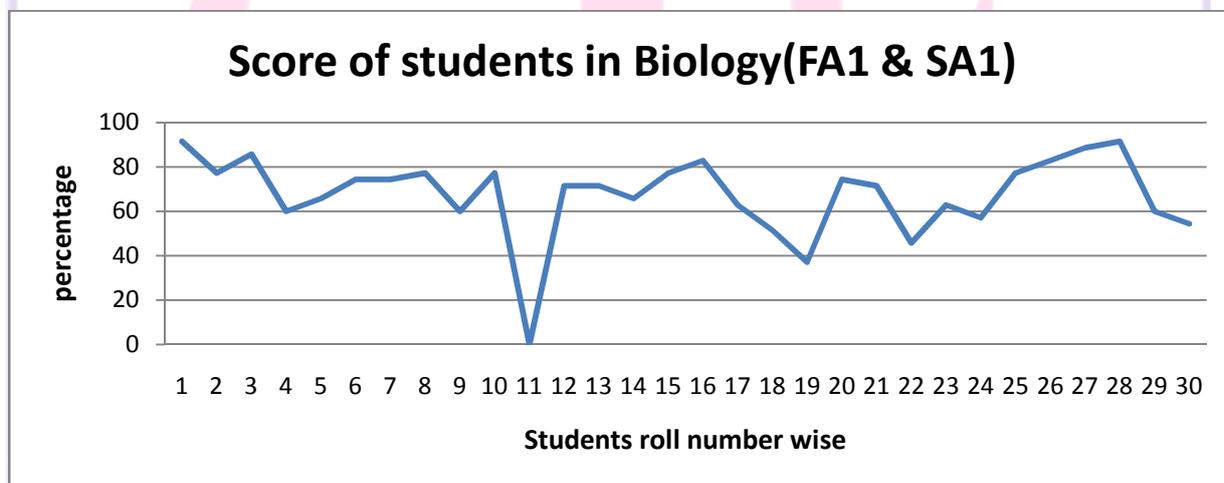
Interview with the parents: A semi structure interview was conducted with the parents of the student after the presentation of the model was over to know about the interest she developed in biology after making the project.

Data collection

The data was collected personally by the investigator while working as a biology teacher in a CBSE School in Vadodara district. The investigator recorded the test scores of the students in the FA1 test and the SA1 and found the students who scored below 35% in both the tests. One student who did not attempt any of the questions of biology in the FA1 and SA1 tests was selected and her change in interest was observed after project was prepared and presented by her. After the presentation the change in behaviour of the student in the biology class was observed and the student was interviewed to find out her experiences while making model and presenting it. The parents of the student were also interviewed during the PTA meeting to find out the change.

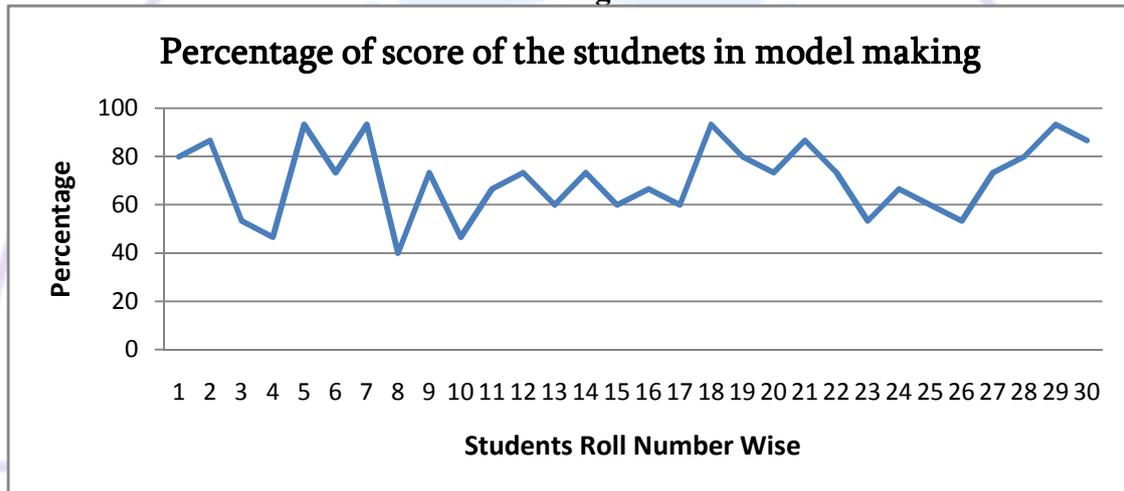
Data analysis and Interpretation

The data collected from the interview of the student and parents was analysed qualitatively and the score of the student in the rubric made for observation compared to the other students was quantitatively analysed using percentage to get the results. The rubric had three criteria and in each criteria based on the presentation of the student about the model scores ranging from 1 to 5 were placed. The total of scores for each student was found and was converted into percentage for easy comparison.



The graph shows the scores of the all the students in the biology tests(FA1 and SA1) in percentage. It is shown that only roll number could not perform in biology and the class room observation while teaching learning also shown the disinterest of the same student. Hence she was selected for the case study.

Findings:



The analysis of the rubric reveals that the student (Roll number 11) made a working model and could present well.

The interview of the parents revealed that the student was very creative and was interested in making different handicraft material from the waste material and hence this model making was of her interest so she did well.

The parents expressed that they only helped her understand the working of the heart once and help her to buy some of the materials like small tubes to make artery and veins.

They said that she collected the old plastic bottles from the house and used the small motor from her own childhood toy to show the pumping of the blood through the heart. They also revealed that the student herself prepared the red coloured solution and filled in the auricles and ventricle which she had made.

After scoring well in the project the parents said that the student used to read the biological topics once in two days which was absolutely not done by her earlier. This implies that scoring well in the model making activity motivated the student to learn biology. The parents were of the opinion that she took so much interest in model making and finding its working because she liked to make such small working models.

The student said that she collected the materials from home like the old bottles, and a small motor from her old toy. While the connecting tubes for auricles and ventricle were brought from the market.

Student said that the model was prepared by herself, she took help of her parents to understand the working of the heart and same thing was has been revealed in the interview with the parents.

The student revealed that she used two reference books out of the list of books given by the teacher.

Student revealed that this was the first time she that she took interest in making a project especially a biology project. She further explained that she liked the project given since she had a choice to make any one model out of the three enlisted. She also said that it was interesting because she herself had to find the material and make the model and there was no dominance of the teacher.

The student revealed that after scoring well in the project and presenting about the working of the heart, she felt that all the topics of biology would be easy if read and understand.

Thus the findings reveal that learningsome of the topics through such learner centered methods help create interest in the students for the subject.

Conclusion

It is usually discussed that for creating interest for a subject in the students' classroom should be have learner centred activities. But giving such activity wherein they learn the concept by putting their own efforts and they present what their understanding in front of the peers also gives lot of satisfaction. Providing such activities gives the students a freedom to select the topic for presentation and flexibility to use the materials of their choice for making the project. Thus a small project given to the students may look absurd and presenting the paper on it may be still appear ridiculous, but the the aim of presenting this study as a paper is to bring to the notice of all science teachers that just blaming the schools and the authorities for the lack of facilities and other problems just hinders the teaching learning process. But in turn thinking what to do if the resources are not available or if there is no support from the staff and planning small activities also creates a difference. The power of small steps is exhibited in this study. Here the teacher just gave a project to find whether it will make any difference in the interest of the student for the learning the subject. The results show that it developed interest in the student for the subject.

Scope of future work:

Such type of small researches can be conducted by the school teachers based on the activities given by them for formative assessment to find out the interest of the students in their respective subjects and to get a feedback for the self.

This was a case study but this could be conducted for all the students in a class can be conducted for the schools of one entire district and the results for different schools can be compared and further the schools developing more interest in their students can be studied as a case for investigating its good practices.

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Paper Received : 30th April, 2017
Paper Reviewed : 21st May, 2017
Paper Published : 1st June, 2017