Students’ Attitude towards Science and Technology

Najafi, Mohammad
PhD, Dept. of Education, Faculty of Educational Sciences and Psychology,
University of Isfahan, Isfahan, Iran.

Ebrahimitabass, Ebrahim,
PhD. (Corresponding author)
Faculty of Nursing and Midwifery, Zahedan University of Medical Sciences, Zahedan, Iran.

Dehghani, Aazam,
Std. Dept. of Educational Technology, Faculty of Educational Sciences and Psychology,
University of Isfahan, Isfahan, Iran.

Rezaei, Maryam,
Std. Dept. of Educational Technology, Faculty of Educational Sciences and Psychology,
University of Isfahan, Isfahan, Iran.

Abstract: This study assessed attitudes towards science and technology middle school students. The population included all 3rd grade students a total of 230 students (105 female and 125 male) chose through stratified random sampling method. Research instrument was the Persian translation of the Science Education questionnaire. Data analyzed by SPSS version 17.00. Reliability of the scale calculated by Cronbach’s alpha coefficient (0.91). Results indicated that there is a positive attitude towards science and technology among students. However, there was not a positive attitude towards some items of science and technology. The results also showed that there is a meaningful difference between males and females points of views in attitude towards sciences and technology. According to this result, males have higher averages than the females. The results of this research provide important information about students’ attitude towards science and could be used by science teachers and educators to development of science curricula and science books.

Keywords: Science and Technology, Attitude, Science Education, Student.

1. Introduction

Science education is an important issue in education because it improves science and technology education and increase the scientific development in higher education and other related fields. One of the fields to achieving the desired curriculum is attitudes of students towards science and technology. Knowing and awareness of these areas would enable science curriculum planners to develop better and appropriate curricula. Indeed, concerning element of learner in curriculum development is based on the theoretical background that considers learner, knowledge and society as science education (Eisner, 1984). Learner is one of the elements that it believes have most important position in structure of curriculum. Science is in the curriculum because it is relevant and, it should be added, relevant to people. Relevance is the very reason for its existence, and it should be the very backbone of science teaching (Newton 1988: 7).

Research on students' interest in science and technology increased from the 1960s (Osborne and others, 2003). Studies aimed at increasing the education of hearing the "student voice" in education. Such as study Flutter and Rudduck (2004), ESRC (2004), and Fielding (2004). Identifying and responding to the student voice may be seen as a means of reducing the alienation that some students feel from their schooling and thus of helping to overcome the associated problems. From this perspective, accommodating the student voice becomes a means of transforming schooling (Fletcher 2003) and of making the curriculum more relevant.
to students’ needs and interests. The investigation of students’ attitudes towards studying science has been a substantive feature of the work of the science education research community for the past 40 years. (Osborne et al, 2003). Students’ increasing reluctance to choose science courses, and physical science courses in particular, in their final years of secondary education has important implications not only for the continuity of scientific endeavor but also for the scientific literacy of future generations. As a result, development of positive attitudes towards science, scientists, and learning science, which has always been a constituent of science education, is increasingly a subject of concern (Trumper, 2006). Students’ learning interests and attitudes toward science have both been studied for decades. However, the connection between them with students’ life experiences about science and technology has not been addressed much (Chang et al, 2009).

Many researches like as TIMSS (Trends in Mathematics and Science study) and PISA\(^5\) conducted to assess the students’ abilities in science.

2. Background of research

Lavonen et al. (2008) studied the interests and experiences of students in physics and chemistry. Their research conducted on 3626 secondary students with average of 15 years old. Based on their results, students were acquired many experiences in outside the school related to science and technology. However, they had little experience in using technology tools such as mechanic. These results showed diversity of science and technology experiences among students.

Manninen et al. (2005) examined conceptions of students about technology and environmental issues and school science. Their results showed that girls showed more concern towards environmental issues. Their results also showed that both boys and girls believed in science and technology capacities and capabilities.

Stefánsson (2006) examined the Icelandic students’ views about science, technology and school science. He suggested that students consider school sciences interesting, easy to learn and believe that everyone should learn science in school. They also believed that the science which they learn in school is useful in everyday life.

Ogava and Shimode (2008), in their study on 560 Japanese students (268 female and 292 male) with average of 15 years old, examined their views about the various components of ROSE project. Results showed that there was not meaningful difference between girls and boys in attitude toward science. They considered school science important and easy to learn but were opposite to increasing the science content in science curriculum.

Trumper (2006) investigated students’ interests in physics. He studied the factors in students' ideas about science in school, out-of-school experiences in science and their attitudes towards science and technology. Results showed that in general, students’ interests in physics are neutral (neither positive nor negative), however, boys were more interested in physics than girls.

Chang et al. (2009) in their study on 942 Taiwanese students examined their attitudes about science and technology, learning interests and life experiences. The results indicated that boys showed higher learning interests in sustainability issues and scientific topics than girls. However, girls recalled more life experiences about science and technology in life than boys.

Anderson (2006) investigated views of 1027 students from central region of Ghana. His results showed that the majority of students believed that science and technology are useful

\(^5\) Program for International Student Assessment
for society and can help to reduce poverty and famine in the world. The results also showed that boys are more interested in become scientists than girls. There was a lower level of agreement that the benefits of science are greater than its possible harmful effects, although a majority of both boys and girls hold this view. Only a minority of boys and girls agreed that science and technology will help to eradicate poverty and famine in the world. Students’ positive views about science, technology and society are not reflected in their opinions about their school science education. While this is regarded as ‘relevant’ and ‘important’ by most students, most boys (and rather more girls) don’t like it as much as other subjects.

Most students did not agree that school science is a difficult subject. Most boys and girls disagreed that school science has made them more critical and skeptical, opened their eyes to new and exciting jobs or increased their appreciation of nature.

3. Research Questions

The research investigated attitudes of students in science education and technology. Examining students’ attitudes toward science education and technology, can play important role in preparing information for curriculum planners to identify demands and needs of students in science education. The research questions include:

1- What is the attitude of students towards science and technology?
2- Is there any meaningful difference between male and female opinions?

4. Research Methodology

This study seeks to examine attitudes towards science and technology among high school students. For this purpose, a descriptive - survey was used. The population of study was all 8th grade students. A total of 230 students (105 girls and 125 boys) were selected as sample of study. The instrument of study was Persian version of a part of ROSE questionnaire which it was attitudes to science and technology. Among of questionnaire items, 16 items are relating to attitudes towards science and technology. Cronbach’s alpha coefficient was calculated for 16 items (0.91). In this study, the descriptive statistics like as mean and standard deviation and one sample t-test for testing hypothesis were used.

5. Findings

Findings are based on an analysis of research questions. In each section table of analysis and the statistical analysis of the data is presented.

5.1 The first research question: What is the attitude of students towards science and technology?

According to the results in Table 1, all items related to attitude towards science and technology are above average (M=2.5) and all items are meaningful at the level of P≤ 0.05. In general the results show that students have a positive attitude towards science and technology. From all items, item No. 3 (Science and technology will find cures to diseases such as HIV/AIDS, cancer, etc.), has the highest average (M=3.31) and item No. 15 (We should always trust what scientists have to say), has the lowest average (M=2.67).

5.2 Second research question: Is there any meaningful difference between male and female opinions on each component?
To examine differences in male and female students' opinions about each of the components of attitude towards school science, science and technology and environment, Independent t-test was conducted and the results are showed in Table 4. Based on these results, only in the third component of the attitude towards environmental issues, there are significant differences between boys and girls \((t=2.06, P=0.04)\). Accordingly, the boys with a mean total \((M=49.07)\), have the higher average in this component.

6. Conclusions

The results of this study showed that in general, students show positive attitudes towards all three components of science and technology. Student are interested in a job related to the technology, they consider science and technology important to society and believe that Science and technology will find cures to diseases such as HIV/AIDS, cancer, etc. (congruent with the results of Trumper (2006)). They believe that Thanks to science and technology, there will be greater opportunities for future generations and Science and technology make our lives healthier, easier and more comfortable (congruent with the results of Stefánsson (2006)). Results also showed that in opinion of the students, The benefits of science are greater than the harmful effects it could have and with lower average than to other items, the believe that Science and technology will help to eradicate poverty and famine in the world and science and technology are helping the poor. Despite these benefits, students believe that science and technology are the cause of the environmental problems and science and technology benefit mainly the developed countries. Also the students show a positive attitude towards the activities of scientists in science and technology. They believe that scientists are neutral and act without bias and always had to trust their words and follow the scientific method that always leads them to correct answers. These results mostly are in line with the results of Schreiner and Sjoberg (2005) that showed students had a high degree of agreement on six items. These items were:

- Science and technology will find cures to diseases such as HIV/AIDS, cancer, etc;
- Science and technology are important for society;
- Thanks to science and technology, there will be greater opportunities for future generations;
- New technologies will make work more interesting;
- The benefits of science are greater than the harmful effects it could have;

These results also were consisted with Jenkins (2006). The results of Jenkins (2006) also showed that about attitude towards science and technology, generally the girls have the lower average than boys, although although the differences are not large.

Therefore, identifying and defining the word of science and technology in terms of assessing students' attitudes to science and technology would be important (Osborne and Collins, 2000).

Acknowledgement

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References


Annexure

**Table 1**: Results of one sample t- test about students’ attitudes towards science and technology

<table>
<thead>
<tr>
<th>Sig.</th>
<th>df</th>
<th>t</th>
<th>SD</th>
<th>Mean</th>
<th>N</th>
<th>Items</th>
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<tr>
<td>0.00</td>
<td>249</td>
<td>9.03</td>
<td>1.12</td>
<td>3.14</td>
<td>250</td>
<td>1. I would like to take a job in technology</td>
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<td>10.32</td>
<td>1.00</td>
<td>3.31</td>
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<td>3. Science and technology will find cures to diseases such as HIV/AIDS, cancer, etc.</td>
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<tr>
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<td>12.71</td>
<td>1.07</td>
<td>3.23</td>
<td>250</td>
<td>4. Thanks to science and technology, there will be greater opportunities for future generations</td>
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<td>249</td>
<td>10.66</td>
<td>1.06</td>
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<td>5. Science and technology make our lives healthier, easier and more comfortable</td>
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<td>9.20</td>
<td>1.09</td>
<td>3.03</td>
<td>250</td>
<td>6. New technologies will make work more interesting</td>
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<tr>
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<td>249</td>
<td>3.38</td>
<td>1.10</td>
<td>3.09</td>
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<td>11. Science and technology are the cause of the environmental problems</td>
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<td>8.45</td>
<td>1.08</td>
<td>3.08</td>
<td>250</td>
<td>12. A country needs science and technology to become developed</td>
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<td>8.41</td>
<td>1.14</td>
<td>3.01</td>
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<td>13. Science and technology benefit mainly the developed countries</td>
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<td>2.75</td>
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<td>14. Scientists follow the scientific method that always leads them to correct answers</td>
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<td>2.67</td>
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<td>15. We should always trust what scientists have to say</td>
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<tr>
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<td>2.23</td>
<td>1.18</td>
<td>3.12</td>
<td>250</td>
<td>16. Scientists are neutral and objective</td>
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**Table 2**: Results of independent t- test about three factors based on gender

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<th>df</th>
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<th>SD</th>
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<td>Attitude toward science and technology</td>
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<td></td>
<td></td>
<td>9.54</td>
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<td>male</td>
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