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Original Research Article



## Student's attitude towards science learning in lower secondary school under Tashi Yantse Dzongkhag, Bhutan

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### Abstract

This study was conducted in three schools under Trashi Yangtse Dzongkhag. The main purpose of this study was to determine the grade seven and eight student's attitudes towards learning science and to find the factors affecting student's attitudes towards learning science. A total of 279 students (age 11-19) answered a 15-item questionnaire adapted from the attitude towards the science inventory. The study population consisted of 126 male and 153 female students. In terms of grade, the population consisted of 137 students from grade seven and 142 students from grade eight. To find the factors affecting students' attitudes towards learning science, focused group interviews were conducted with eight students (four boys and four girls) selected randomly from both grades from each school. Recording, computing, and analysis of the quantitative data were done with the Statistical Package for Social Science (SPSS-22). The findings from the quantitative analysis revealed that grade seven and eight students' attitude towards learning science was negative. In addition, descriptive statistics showed that there was a decline in favourable attitude with the increase in age. It was also found that male students possessed a slightly favourable attitude towards science compared to female students. Focused group interviews indicated that several factors like difficulties in learning science, subject teacher, and the vastness of the contents affected students' attitude towards learning science.

**Keywords** Population, Recording, Learning Science, Bhutan

### Introduction

The quality of education also depends on how students learn in the classroom. Moreover, it is also important to know the feeling of students towards a particular subject. Thus, in preparing the students of today to become successful individuals of tomorrow, science teachers need to ensure that their teaching is effective, interactive, and explorative. Teachers should know how students learn science and find out the best possible ways to facilitate the learning of science. Hence, understanding students' attitudes are important to support their achievement and interest in science. The concept of attitude towards science is somewhat unclear, often poorly articulated, and not well understood (Simpson & Oliver, 1990). But definition or concept of 'attitude' towards science itself is vague and has multiple meanings.

Simpson and Oliver define attitude as emotional trends in response to the affair, persons, locations, events or ideas which can be enumerated by the phrases like "I like science" or "I enjoy science". Similarly, the focus of the study will be

based mainly on the affective 'attitudes towards science, which are the feelings, beliefs, and values held about an object that may be the enterprise of science and the behavioral aspects of the science as it has a direct correlation with the achievement.

The performance and the achievement of the student depending on the student's attitudes towards the particular subject. The longitudinal study of Oliver and Simpson (1988) displays a strong association among the three affecting variables - attitude to science, the incentive to attain, and the self-concept that the specific has of their personal ability and their accomplishment in a different discipline. Oliver and Simpson further report that attitude is not only a significant predictor of achievement but also accounts for a large part of the variation in achievement. Student achievement has been the concern in the development of attitudes as an important aspect in science education. However, there has been a

growing interest in the development of attitude as an important outcome of schooling (Haladyna & Shaughnessy, 1982).

“The development of attitude is considered today as basic goal for science teaching, no less important than cognitive goals”. Therefore, identification and influence of attitudes have become an essential part of educational research (Prokop, Tuncer, & Chuda, 2007).

However, in Bhutan despite the importance of finding the student's attitude towards science, it seems not many studies had been carried out either by the Ministry of Education (MoE) or by the schools in our country. It is felt that MoE starts carrying out such studies so that the intervention can be made at the right time. Thus, even in the Bhutanese context, it is important to find out the attitudes of the student towards the science subject and the factors that affect them. Therefore, this study will find out the attitudes of students towards learning science in lower secondary schools under central Trashi Yangtse Dzongkhag and consider recommendations to make the learning of science, fun.

### Statement of problem

Science curriculum is considered to be one of the integral parts of the education system especially in the field of modern development. That is why science is becoming the major subject in keeping pace with modern development. Bak (2001) specified that as science has developed ever more intensely entrenched in our routine life, how normal people distinguish science has concerned growing consideration not only from the scientific society but also from social scientists”.

Despite its importance, students in my school seem to be giving lesser importance to science, which is clearly indicated by their poor performance in the particular subject. Science teachers in my school often complain that most of the students give up science when they reach the tenth standard as students find the subject difficult. The difficulties and misconceptions in learning science are prevalent in the education system around the world. Several recent studies have identified students' perception of science as a difficult subject as being a determinant of subject choice.

As per the performance records of 2013 and 2014, students of seventh and eighth standards at Tsenkharla Central School (where the researcher currently works) performed the poorest in the annual examinations in science compared to other subjects. Similarly, in the results of Bhutan Council of School Examination and Assessment (BCSEA), the performances of the students are poor in science. For example, in the 2014 BCSEA examination result of Tsenkharla Central School, students scored the highest mean marks of 66 in Dzongkha but only 49 in science. This was the lowest mean mark compared to the other subjects. The result indicates that students are poor in science compared to other subjects. It is a concern for science teachers to see no improvement in science despite so much effort being put by teachers and students. That is why it has become essential to determine students' attitudes towards science. After all, studies indicate that students' attitudes

toward science significantly alter their achievement in science (Johnstone & Kellett, 1980).

### Literature Review

According to Anwer and Iqbal (2012), “attitude is an important component of science education, and its thorough understanding is very necessary to enhance student's achievement and success and their participation in science-related careers”. Students' attitude towards science was more important than the understanding of science since the attitude would determine how students would use their knowledge (Ramsey & Howe, 1969). The learning outcomes of students were strongly associated with their attitudes.

As asserted by Reid (2006), attitudes tended to influence one's behavior, and therefore, could be seen as an important aspect of education. Many studies were conducted to see the correlation between the students' attitudes and achievement. Research clearly showed that early childhood experiences serve as a major influence on academic interest, which in turn, had a direct implication on achievement.

Murphy & Beggs (2003) study reveals that the student's attitude towards learning science especially in the lower and middle secondary school was negative. Similarly, Dawson (2000) conducted a survey with 203 seventh grade students to see the upper primary student's interest in learning science. The study found that the overall interest of the students in learning science had decreased since 1980. The study by Hendley, Parkinson, Stables, and Tanner (1995) in Welsh schools used the overall mean obtained from a Likert questionnaire to find grade 10 students' attitudes towards science. Their findings also showed that out of the four core subjects: Science, English, Mathematics and Technology and science, science subject was the most disliked subject.

Reid and Skryabina (2002) claimed that there was a positive attitude towards science in primary school stages followed by a rapid decline from the ages of 12 to 14. However, Reid and Skryabina also found that there was an increase in positive attitude from the ages, 14 to 16 especially in physics subjects, although the same study also showed that positivity towards science declined above 16 years. Even in terms of grades, there was a decline in positive attitude from grade six to seven.

Cokador and Kulce (2008) surveyed 503 students and when they compared the mean scores of grades six, seven, and eight students in terms of positive attitude towards the science, and observed that the scores of six grade students were significantly greater than that of grade seven and eight students indicating the decline in the positive attitude towards science with an increase in grade. Moreover, Piburn and Baker (1993) explored the reasons why students' attitudes in the United States had decreased. When students were in primary school, they liked science and had many science activities with open-ended and action-oriented work in science classes. After they joined junior high school, they usually needed tuition, assessment, and examination in a science subject.

Similarly, open-ended activities were also more difficult because students needed more knowledge related to these activities. Therefore, students felt that science classes had become more abstract and complex, which in turn, influenced them to harbour negative attitudes towards science.

[Bahar, Johnstone and Hansell](#) (1999) explored the areas of difficulty in science by surveying 207 students and discovered that the students perceived science as a difficult subject due to three reasons. The first difficulty lay with the language. Science contained many terminologies, complex vocabularies, similar words with different meanings. Therefore, students not only had to remember the correct meanings of those words but also needed to grasp the underlying meaning of ideas at the same time. The second difficulty was associated with the mathematical content of the subject. Symbols and formulas used in science easily confused the students. And the third difficulty was caused by the vast subject content, which [Johnstone and Kellett](#) (1980) claimed as 'information overloading of fact and formulas'.

[Sirhan](#) (2000) surveyed students' views on the difficulty in science subjects and then compared it carefully to examination performance by looking in detail at hundreds of examination scripts. He found that the students had picked out remarkably accurately the topics where they were having genuine difficulties. In this connection, Bhutanese science students do not favor practical work. It has been noted that there is a lack of practical work in classes VII-VIII due to the time constraint (practical classes sometimes take place after school because there is not enough time in the main timetable to teach practical as well). Moreover, there is a lack of equipment and technical support, lack of expertise, lack of teacher expertise, and withdrawal of the practical examinations ([Johnson et al., 2007](#)).

### **Objectives of the study**

This study is based on three main objectives. First, this study intends to find the students' attitudes towards learning science. Second, it intends to investigate whether there is any difference in attitudes towards learning science in terms of gender. And thirdly, it is hoped that this study will find the factors that determine the student's attitude towards learning science.

### **Significance of the study**

This study is significant in several ways. First, it will have some positive implications on the government. Bhutan's prosperity and development depend on an adequate supply of able scientists, technologists, engineers, doctors, and agriculturists. With the rapid technological development in our country, there is a need for more qualified people in the field of science. As announced by the RCSC (1980-89), better opportunities and prospects will continue to be available for those who opt for the science stream. Moreover, employment opportunity for technical personnel in both public and private sectors remain brighter (RCSC, 1980-89).

This small-scaled study can at least help science teachers in taking measures to develop an interest in students so that more students take up science. Furthermore, the findings from this study can also guide the policymakers and curriculum designers in planning for the Nation Based In-service Programmes and development of curriculum respectively. The schools will also benefit from the finding of the research as it will give schools a clearer picture of the student's attitude towards learning science. Schools will be able to diagnose some of the links that exist between the student's attitude and their achievement. This research will create a platform for schools to work on up-liftmen of the results, especially in a science subject.

The findings of the study will also provide the basis for future researchers because before this, there is no such study carried out on students' attitudes towards learning science in Bhutan. This study will be useful to other stakeholders like parents, guardians, relatives, and curriculum officers who play an important role in the education of young children.

### **Research design**

The researcher had the option to use various types of research designs. One such option was to use a research design called the convergent parallel design. It is the design in which the researcher uses concurrent timing to implement the quantitative and qualitative strands during the same phase of the research process, prioritizes the methods equally, keeps the strands independent during analysis, and then mix results during the overall interpretation ([Cresswell, 2011](#)). However, in this study, the researcher used the concurrent transformative design which involved concurrent data collection of both quantitative and qualitative data in the same phase. It is guided by theoretical perspective in the purpose or research question of the study. Such design helps the researcher to develop a complete understanding of lower secondary student's attitudes towards science. For example, the researcher conducted surveys to find out the students' attitude towards science and the focused interview to find the factors that influence their attitudes. Then the researcher analyzed the survey data quantitatively and the focus group qualitatively.

### **Research approach**

This study used both quantitative and qualitative methods. In the quantitative phase, a descriptive survey method was conducted to study the class seven and eight students' attitudes towards science in the three lower secondary schools under central Trashi Yangtse Dzongkhag. It was also intended to compare the attitude of male and female students towards studying science subjects. In the qualitative phase, the focus interview was conducted to find the factors that affect the attitude towards learning science.

According to [Creswell](#) (2009), mixed-method research is an "approach to enquiry that combines or associates both qualitative and quantitative form". The reason for choosing this method is that it offered no restrictions in the choice of methods, and there was the possibility of obtaining better

results with the provision of collecting diverse information. Its validity was also high compared to the other types of methods.

**Sample/ Participants for survey**

This study was led in three lower secondary schools under central Trashi Yangtse Dzongkhag. Samples were selected from classes seven and eight to give broader attention to the population and to embody the students in lower secondary schools in Bhutan.

To find the factors that affected the student’s attitudes towards science, the focus group interviews were conducted for the students’ participants considering the mixed abilities and gender. The researcher has chosen three schools namely Khamdang Lower Secondary School, Kheni Lower Secondary School, and Tsenkharla Central School under Trashi Yangtse dzongkhag. The basis for choosing these three schools as sample schools were due to their locations. They fell in the central region of Trashi Yangtse dzongkhag.

**Table 1. Student participants for the survey**

| School        | Student participants |         |         |         | Total |
|---------------|----------------------|---------|---------|---------|-------|
|               | Boys                 |         | Girls   |         |       |
|               | Class 7              | Class 8 | Class 7 | Class 8 |       |
| Kheni LSS     | 24                   | 11      | 28      | 29      | 92    |
| Khamdhang LSS | 16                   | 16      | 21      | 17      | 70    |
| Tsenkharla CS | 23                   | 35      | 25      | 34      | 117   |
| Total         | 63                   | 62      | 84      | 80      | 279   |

**Data collection procedure**

The quantitative data was administered using the format of five points Likert attitude scale developed by Rensis Likert. Moreover, the researcher tested students' attitudes towards science on five points Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). When responding to a Likert questionnaire item, respondents were made to specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. Thus, the range captured the intensity of their feelings for a given item.

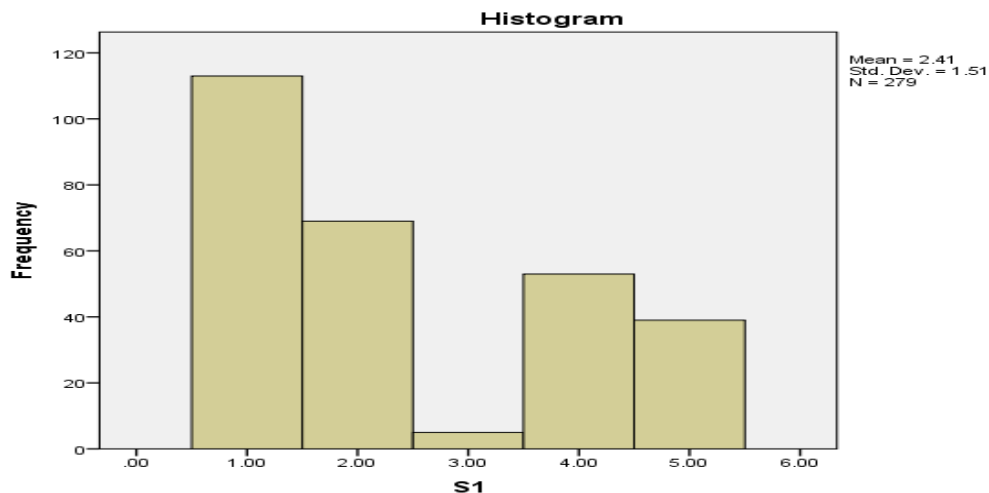
**Tools Used**

In quantitative research, the researcher began by converting the raw data into a form useful for data analysis, which means scoring the data by assigning numeric values to each response. Recording and computing were done with the Statistical Package for Social Science (SPSS-22). Quantitative data collected through the questionnaire were analyzed by using Statistical Package for Social Science (SPSS-22). The SPSS provided manifold programs for analysis such as inferential, multivariate, a test of significance, and correlation statistics and was also user friendly. Statistical data in this study were analyzed using two levels of analysis within the largely simple descriptive statistics such as frequency and percentile.

**Result**

The objective of the study is to find the attitude of students towards learning science, especially in terms of the affective domain related to enjoyment and anxiety. All the 15 questions in the survey questionnaire responded to by the participants were analyzed in terms of frequencies of grade, age, and gender.

Part A: Presentation and interpretation of the items aligned with the students’ enjoyment in learning science  
Item one. Science is something that I enjoy very much.



**Fig. 1 Histogram showing the participants response for the statement (S) 1**

The majority of the students responded that they strongly disagree with the statement, meaning that they do not enjoy learning science. Out of 279 respondents, 40.5% responded

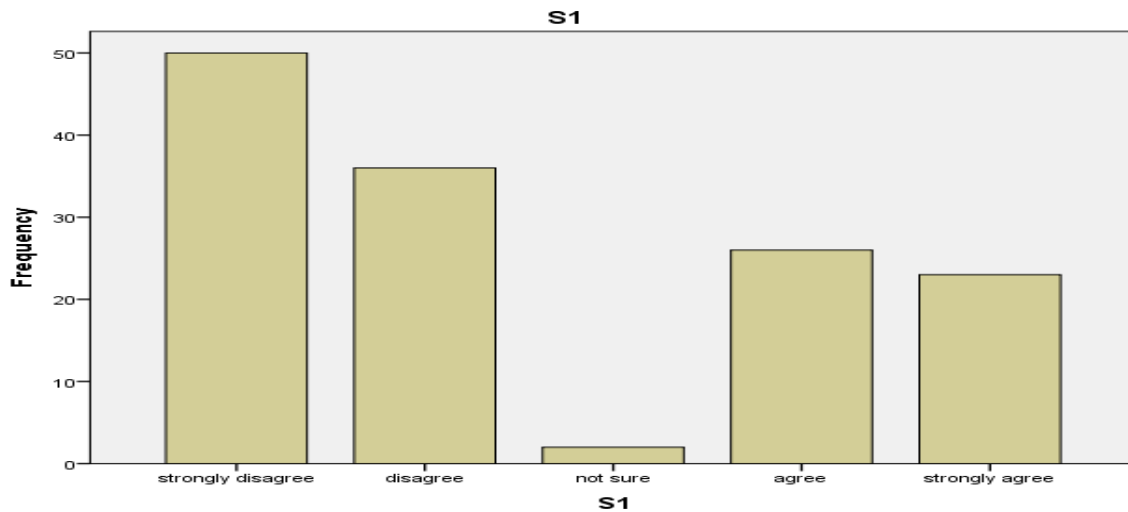
strongly disagree, 24.7% as disagree, 1.8% as not sure, 19% as agree, and 14 % as strongly agree. In total, 65.2% is in favor of the statement as shown in the figure.

**Table 2. Science is something that I enjoy very much**

|       |                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | strongly disagree | 113       | 40.5    | 40.5          | 40.5               |
|       | Disagree          | 69        | 24.7    | 24.7          | 65.2               |
|       | not sure          | 5         | 1.8     | 1.8           | 67.0               |
|       | Agree             | 53        | 19.0    | 19.0          | 86.0               |
|       | strongly agree    | 39        | 14.0    | 14.0          | 100.0              |
|       | Total             | 279       | 100.0   | 100.0         |                    |

**Table 3. Grade seven respondents response on S1**

|       |                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | strongly disagree | 50        | 36.5    | 36.5          | 36.5               |
|       | Disagree          | 36        | 26.3    | 26.3          | 62.8               |
|       | not sure          | 2         | 1.5     | 1.5           | 64.2               |
|       | Agree             | 26        | 19.0    | 19.0          | 83.2               |
|       | strongly agree    | 23        | 16.8    | 16.8          | 100.0              |
|       | Total             | 137       | 100.0   | 100.0         |                    |



**Fig. 2 Bar graph showing the grade seven responses on S1**

**Table 4. Grade eight respondent's response on S1**

|       |                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-------------------|-----------|---------|---------------|--------------------|
| Valid | strongly disagree | 63        | 44.4    | 44.4          | 44.4               |
|       | Disagree          | 33        | 23.2    | 23.2          | 67.6               |
|       | not sure          | 3         | 2.1     | 2.1           | 69.7               |
|       | Agree             | 27        | 19.0    | 19.0          | 88.7               |
|       | strongly agree    | 16        | 11.3    | 11.3          | 100.0              |
|       | Total             | 142       | 100.0   | 100.0         |                    |

From the above data generated, both grades seven and eight do not enjoy learning science. However, in comparison to grade seven, the grade eight students do enjoy science subject more. From grade seven, 36.5% has responded to the strongly disagree whereas 44.4% from grade eight has responded strongly disagree. Similarly, in terms of the strongly agree scale too, grade seven respondents are 16.8% to 11.3% from grade eight.

## Findings

The survey questionnaire was focused mainly on affective domain targeted to find the student's attitude towards learning science. A total of 15 statements were provided to 279 respondents. Out of 15 statements, the first 10 statements were targeted to find the students enjoyment in science. Out of ten statements, four statements were negative and six were positive statements. The average of 64.38% disagreed with the positive statements. Similarly, the average of 63.52% agreed with the negative statements indicated that the students do not enjoy learning science.

In terms of grade, out of 142 grade eight respondents, the average of 66.67% disagreed with the positive statements. Furthermore, the average of 64.8% agreed with the negative statements. The finding indicated that grade eight students do not enjoy learning science. Out of 137 grade seven respondents, the average of 62.03% disagreed with the positive statements and the average of 62.2% agreed with the negative statements. Similarly, the grade seven students too do not enjoy learning science. Therefore, it can be concluded that the enjoyment declined with increase in grade level.

In terms of age, out of 98 participants from the age level 11 to 13, the average of 53.68% disagreed with the positive statements and the average of 52.3% agreed with the negative statements. Likewise, out of 163 participants from the age level 14 to 16, the average of 67.88% disagreed with the positive statements and the average of 65.53% agreed with the negative statements. Similarly, out of 18 participants from the age level 17 to 19, the average of 93.5% disagreed with the positive statements and the average of 83.35% agreed with the negative statements. The findings indicated that the majority of participants from the three-age level do not enjoy learning science. It can be concluded that the students' enjoyment declined with growing age.

In terms of genders, out of 126 male respondents, an average of 60.6% disagreed with the positive statements and an average of 57.23% agreed with the negative statements. Similarly, out of 153 female respondents, an average of 67.53% disagreed with the positive statements and 66.65% agreed with the negative statements. The findings indicated that both the genders do not enjoy learning science. However, in comparison male students enjoy science little more than the female students.

In order to find the student's anxiety towards the science subject, five negative statements were provided to the participants. Out of 279 respondents, an average of 60.84%

agreed with the negative statements indicating that the majority of the respondents have the feeling of anxiety toward the science subject. In terms of grade, out of 142 respondents from grade eight, an average of 59.42% agreed with the statements. Similarly, out of 137 respondents from grade seven, an average of 62.34% agreed with the statements. Findings indicated that the majority of the respondents have the feeling of anxiety towards the science subject. However, in comparison, the feeling of anxiety is slightly lower in grade eight.

In terms of age, out of 98 respondents from the age level 11 to 13, an average of 55.36% agreed with the statements. From the age level 14 to 16, an average of 63.08% agreed with the statement. Similarly, from the age level 17 to 19, an average of 72.22% agreed with the statements. The findings indicate that the majority of the respondents have the feeling of anxiety towards the science subject. Furthermore, there is also strong evidence that the feeling of anxiety increases with the growing of age.

In terms of gender, an average of 57.58% from the male agreed with the statements. Similarly, an average of 65.54% from the female agreed with the statements. From the findings, it can be deduced that a majority of the respondents have the feeling of anxiety towards the science subject. However, it is evident that the feeling of anxiety is more in female than in male counterparts.

It is evident from the finding that in general the grade seven and eight students' affective attitudes towards science is not positive. It is also found that the attitude becomes more negative with the growing of age. But male students have a little more positive attitude compared to female students.

Many studies conducted in the west revealed that there is decline in students' attitudes towards learning science (Jenkins and Pell, 2006; Lindahl, 2003). Similarly, Osborne, Simon and Collins (2003) stated, "tragically, it would appear that school has done nothing for them in terms of stimulating their interest in science". In Bhutanese context, although no scientific studies were carried out in the past to indicate the decline of interest in science subject, this study somehow indicated that the affective attitudes towards learning science in grade eight and eight is negative. The enjoyment and the anxiety towards learning science are not favorable in the context of this study.

## Difficulties in science

One prominent reason surfaced from the participant's response for not enjoying the science was the difficulties of the subject. Out of 24 participants at least nine students responded that the science is very difficult subject. It is found that their enjoyment towards the subject is deterred immensely by the difficulties of the subject. In this connection, one participant SPB1 (KHLSS8) asserted, "*I feel that the science subject is tough and because of that I do not enjoy learning science*". Similarly, another participant SPG1 (TCS8) said, "*My enjoyment in science depends on my*

interest towards the science. My interest depends on my understanding in science. I do not understand science, so I do not enjoy". It can be concluded that the enjoyment and difficulties are intertwined. However, a difficulty in subject is not subjected to single reason. It is composed of the following reasons as pointed out by the participants. Regarding the English language, since it is not a native language, Bhutanese students' perceived difficulties in science subject are also due to language complexities. Moreover, science is one of the subjects with numerous terminologies and complex vocabularies that make the matter worse. In this connection, at least nine participants have pointed out that the difficulties in science are due to the complexity in definition, terminologies, and vocabularies. SPB1 (KHLSS8) shared his opinion stating that

*"In science we come across many new and difficult terms. There are some words whose meanings are not even given in the dictionary. Sometimes I lose my interest seeing those words".*

Moreover, the complexity in language makes the science subject boring as SPG3 (KLSS8) pointed out:

*"Science is boring subject because it consists of many new terminologies and some words are very difficult to understand".*

Furthermore, it also causes frustration in students as SPB2 (TCS7) stated

*"I feel angry when I do not understand new concepts and new terms after working so hard".*

In addition, some of the participants have also suggested ways to make the language simple. SPB1 (KHLSS8), SPG4 (KHLSS) and SPG1 (TCS8) suggested that the subject teacher to explain those difficult terms and definitions in Dzongkha language. The finding indicates that the language complexity is one of the causes of difficulties in science contributing to the frustration and dislike to the subject. While discussing on contents related to the physics and chemistry parts which is one of the causes of the difficulties in science as visible from the findings. Most of students seemed to face difficulties in writing molecular formulae and chemical equations. Most of the participants had shared their difficulties and dislike of the subject due to such contents. In this connection,

SPB1 (KLSS7) stated:

*I do not enjoy in the science class because of many reasons. The chemical*

*parts are so tough, and I don't feel like studying. We are finding difficulties in knowing the formula of acid and base. I don't know the forces and motions. It is mostly to do with calculation (Interview, July 10, 2017).*

Mathematical content refers to calculations based on numerical figures. Science subject consists of numerical calculation which is also one of the causes of the difficulties in science as per the responses from the participants. One of the participants, SPB3 (KLSS8) stated that

*"Symbols of elements and mathematical calculations are some of the difficult topics in the science. How much I try to learn; I do not understand those topics".*

It also develops a sense of hopelessness in student. Similarly, some of the students disclosed the displeasure towards the subject due to the difficulties in understanding the numerical problems. For example, SPG3 (KLSS8) stated *"I hate chemistry topics as it is full of chemical equations and numerical problems".*

It is understood that the science is one subject which contains lots of definitions and explanation of the concepts. It is also clear that the richness in the definitions and the concepts lead to the information overload and make the subject difficult. SPG1 (KLSS7) said, *"There is lots of information in the science textbook and it is tiring to learn everything".* There is also indication that information overload can lead to displeasure towards the subject. In this connection, SPG1 (TCS8) said, *"I do not enjoy learning science because we have so many things to learn in science. I am getting fed up with learning so many things".* Difficulty of the subject is further increased when there is requirement of memorizing the definitions. Many of the participants showed their displeasure in memorizing the definitions and concepts. For example, SPG1 (TCS8) asserted that *"the science is very difficult subject because everything has to do with memorizing. If we do not memorize especially the definitions, everything fails".*

Another reason generated from the participant's responses for the difficulties of the subject was the lack of vertical coherence from grade six to seven. It is quite evident that there is a huge shift in terms of the teaching pedagogy and even in the learning mode. This gap has created difficulties to students especially upon reaching grade seven. One grade seven participant, SPB1 (KLSS7) asserted, *"in class six, there were many activities but in class seven there is less activity".* Similarly, SPB4 (KHLSS) said, *"comparing to class six, science is difficult in class seven. In class six we used to go out and do most of the activities. Now in class seven we remain in the class most of the time and listens to the teacher's teaching".* In this regard another participant SPG1 (KLSS7) said, *"till class six learning science was easier as it was full of activity. We used to go in the lab and outside to learn. Science in class seven is difficult. We have to learn many things. Most of the time teacher explains in the class".* The responses indicate that there is difference in the way that the lesson is being delivered to students.

During the interview, one factor that many of the participants mentioned was the subject teacher. It is quite understandable that the enjoyment or lack of enjoyment towards the subject is greatly determined by the subject teacher. SPB4 (KHLSS7) said,

*“I can say that science teacher is teaching well. If we stay with those friends who do not listen to the teacher, we find the science subject difficult. On the other hand, if we stay with those attentive students then we don't find science that much difficult”.*

On the contrary, some of the participants have also pointed that the 'subject teacher' is one of the causes of their lack of enjoyment. For example, SPG4 (KLSS8) said,

*“Sometimes our teacher tells students to explain so we do not understand. Sometimes our teachers tell us to read ourselves and take note. So, we find it difficult”.*

The enjoyment of the students is enhanced or deterred to a large extent by the teaching methods used by the subject teacher. Some of the participants shared positive comments about their subject teacher. For example, SPB2 (KHLSS7) said,

*“I find science interesting because my teacher uses different types of methods to teach science. He takes us to science lab and to outside to learn science. I am not feeling sleepy in science class”.*

However, many participants pointed out that teacher's inability to arouse interest in students is the main cause of the lack of enjoyment. In this connection, SPB2 (KHLSS) said, *“In my opinion, it also depends on the subject teacher. Some teachers when they teach, they just read like the Holy Scriptures. Then they tell us to write note ourselves. I have also come across such situation”.*

Similarly, another participant SPB3 (TCS8) said, *“what gives me more enjoyment in science is when we are taken outside to learn some topics. Always remaining in the class and listening to the teacher's explanation makes me feel bored”.* The responses indicated that the interest of the students is enhanced when teacher employs wide range of teaching methods and one common response suggested by the participants was outdoor education. For example, SPB1 (KLSS) said, *“in my opinion, sometimes it will be better to go outside to learn about science related topics”.*

Behavior of the subject teacher implies how teacher portrays himself/herself in the class and with the students. Most of the participants pointed out that they do not enjoy the subject due to the fear of the subject teacher. For example, SPG3 (KLSS8) said,

*“I must say that I do not enjoy learning science as I am afraid of teacher. My teacher is very strict and serious”.*

At least two of the participants responded that they could not concentrate in the class due to the fear of the subject teacher. In this connection, SPB3 (KLSS8) disclosed,

*“I feel boring and afraid in science because science teacher never smiles in the class. We cannot concentrate because of fear and the science teacher is always looking angry”.*

Another participant, SPB1 (TCS7) pointed out that he pretends in front of science to be enjoying because of the fear of the teacher. Furthermore, students wish that their subject teacher use jokes and humour to make the lesson interesting. In this regard, SPG4 (KLSS8) said, *“I feel that in order to make the science class interesting teacher should teach us with smiling face. We do not understand when teacher is serious in the class”.* Similarly, another participant, SPG1 (KHLSS) said, *“when teacher teach science, teacher should use humour and jokes”.*

In the Bhutanese science curriculum for the grades seven and eight, all the three branches of science are put together in one textbook. Topics in the textbooks are not integrated but are separately placed in the book. That is why participants believe that science subject for grades seven and eight is vast. When so many chapters with so many sub-topics are inserted in the textbook, students feel the burden of the subject making the students to lose their interest in the particular subject. For example, SPG4 (KLSS8) said, *“science is difficult because all the three types of science are put together in one book”.* Some participants pointed out that the science textbook in grades seven and eight are thick. Similarly, some participants even pointed out that because of thickness of the book students do not enjoy learning science. In this connection, SPG1 (TCS7) said, *“class seven textbook is thick that is why there is no mood to study”.*

## Discussion and Conclusion

This study also found that there is difference in attitude towards science subject in terms of gender difference. Osborne, Miller and Collins (2003) asserted that “what is clear from an extensive literature on the subject, mainly as a result of a serious consideration and investigation of the problem in the 1980s, is that girls' 'attitudes' to science are significantly less positive than boys”. Many studies have found that girls tend to lose interest in science more easily compared to boys (Logan & Skamp, 2007). In this regard, Miller, Blessing and Schwartz said that females' rejection of science is not related to a perception that it is too hard or not fitting the female gender role; they simply do not find it interesting or relevant to their life goals. High-school females who do plan to continue their study of science appear to be following a route that differs from that of boys (2006).

However, in contrast to the above findings, some studies have contradicted that the girls have more positive attitude than boys. Murphy and Begg (2003) stated that “girls were more positive than boys about their enjoyment of science and were more enthusiastic about how their science lessons



impacted upon their environmental awareness and how they kept healthy". Similarly, [Johnstone, McKeown, Cowan, McClune, and McEwen](#) (1999) claimed that girls were significantly more positive about learning science.

In sum, different studies have different views regarding the status of female attitudes towards the science subject. However, this study indicated that there is a significant difference in the attitude in terms of gender. Female possessed more negative attitude towards science subject than male. From the 15 set of questionnaires administered to 126 boys and 153 girls, about 78.6% female did not enjoy learning science compared to 61.1% of the male counterpart.

Finding from this study also showed that there is remarkable decline in affective attitude towards science from age 12 to 18. It was found that more than 83.35% of the students from the age range 17 to 18 do not enjoy learning science as compared to 67.78% from age 12 to 14 and 65.3% from age 14 to 16. In 2003, Osborne, Simon and Collins published a journal after reviewing major literature related to student's attitude towards science for the span of 20 years before 2003. [Osborne et al.](#) (2003) concluded that the number of studies has documented decline in attitudes towards science from age 11 onwards.

The findings from the survey questionnaire administered to students indicated that the majority of the students have negative attitude towards learning science. It was deemed necessary to find out some of the factors that affect the student's attitude towards learning science. This section of the chapter deals with the discussion of the factors discovered in the course of the focus interview.

[Logan and Skamp](#) (2007) finding reveals out that detrimental factors of their interest in science over the transition from primary to secondary level and study found that about 61% of participant students perceived secondary science to be more difficult than primary science and found the interest scores to be declining over the years. Furthermore, [Logan and Skamp](#) (2007) stated, "students tend to perceive that they have a low ability in science when they find science difficult. This negative perception can influence the students' achievement, attitude and behaviour" towards the treatment of science subject. Similarly, this study revealed that the students perceived science as a difficult subject thereby affecting their interest and enjoyment towards learning science. It is found that around 80% of the participants perceived science as the difficult subject and this perceived difficulty had made them to dislike the subject.

According to the findings of this study, difficulty of the subject is mainly caused by language complexity, formula and chemical communication, mathematical content, information overload and lack of vertical coherence. Out of 24 participants, around 66% of the participants believed that the difficulty of the subject is due to the presence of the complex nature of the language. [Johnston](#) (1991) commenting on the perceived difficulty of the subject area pointed out that this difficulty may be caused by complexity

due to ideas and concepts existing at three different levels: macro and tangible, micro, and representational or symbolic. [Johnston](#) (1991) further claimed that "these ideas are all beyond our senses and pupils have little or no experience in constructing such concepts". Similarly, other researcher commented that why science is found to be a difficult subject by many students because its language requires too much processing. It is also no wonder that there is mediocrity in the performance of some second-language learners in science. They are faced with an even more complex task of dealing with the processing of two unfamiliar languages, that of science and that which is used as the medium of instruction. What then passes to long term memory may be quite minimal or transient.

Finding from this study showed that the formula and the chemical communication contents also contribute to the difficulty of the subject. About 19 participants out of 24 pointed out that the difficulty of the subject is due to formula and chemical communication. Moreover, participants had revealed that they do not enjoy learning science because of those contents.

[Salta and Tzougraki](#) (2004) pointed out that the students find the use and application of chemistry concepts and symbols more difficult than their understanding. A chemical reaction is another topic where students develop misconceptions, also because "some of the major problems in teaching and learning chemistry are encountered in the very first stages of an elementary chemistry course". In addition, this study also revealed that the mathematical content in science makes the subject difficult. At least seven out of 24 participants have pointed out that the mathematical contents in the subject makes it difficult to learn. Similarly, [Bahar and Polat](#) (2007) found that there was immense effect of mathematical expression on the difficulty of science. Out of 10 students selected for their interview, nine students emphasized that the mathematical expression in science was one the main sources behind the difficulty of the subject. Another source of difficulty as pointed out by the participants was the information overload. According to [Cassels and Johnstone](#) (1983), information overload in memory is caused by unfamiliar concepts which is not part of the daily life and which have different usage in science.

Furthermore, this study indicated that the lack of vertical coherence caused the difficulty of the subject. About 62 percent of the participants expressed that there is a big jump from primary level to lower secondary level in terms of standard and contents. In this connection, [Speering and Rennie](#) (1996) commented: Many of those students who had enjoyed science in primary school expected that they would continue to enjoy it for those reasons. Instead, most students in this study were generally bored with their science lessons. The reality was that for many students beginning secondary school, science lesson involved lectures, note taking exercises or working from the text.

This study revealed that the student attitude towards learning science depends on the teaching style and the behavior of the

subject teacher. About 43% of the participants were bored with the way their subject teacher taught in the classroom. Teaching quality is one of the key factors that influence the learner's attitude towards the particular subject (Ebenezer and Zoller 1993; Murray and Reiss 2005). Similarly, Logan and Skamp (2007) pointed out that the teaching methods employed in the classroom and the teacher's association with the students are critical in developing the right attitude towards learning.

This study has also revealed that the behavior of the teacher in and out of the classroom affects the attitude of the students. According to White (1988), it is in the hand of a teacher to either make or break students' interest towards the subject. He discussed how a student may experience positive thinking in science lessons with interesting activities to form positive attitude towards the subject and vice versa. Similarly, Haladyna and Shaughnessy (1982) have shown that teachers play an important role because they have the greatest influence on students' lives and can easily bring about changes in their attitudes. The teachers who exhibit such instructional behaviours as encouraging students to be creative and trying to make science more exciting are more likely to have a positive influence on student attitudes".

Vastness of the content in science is another factor that the participants have indicated the reason for disliking the science subject. About 54.3 percent of the participants have pointed out that the science syllabus in class seven and eight is vast. Bahar and Polat (2007) in their study mentioned that one of the factors that were mentioned both by students and teachers was the overloading of the content. Because of the reason students were given no time for active involvement in the experiments and teachers adopted teacher-centered teaching approaches.

## Conflict of Interest

The author hereby declares no conflict of interest.

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