



## **Development of Positive Attitudes of Class V towards Learning Science**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author DT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors LT and SW managed the analyses of the study. Author JC managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Attitude of children towards science gained attractiveness among the researchers, mainly to influence students' science learning, their achievements and participation in science class. Therefore, this study using mixed method examined the effects of parents or guardians involvement on attitude of students towards science, gender, teaching strategies, past achievement and student-teacher relationship and little on classroom environment and school location. A total of 18 students completed a questionnaire developed to examine the factors involving on attitudes of students to science. To further increase the authenticity of the quantitative findings, 11 students through judgmental selection took part in interview. The teaching strategies executed, past achievements, career choices and student-teacher relationship were positively correlated with attitude of students towards science. The study suggests that students attitude towards science can be improved by focusing on aforementioned reasons. Moreover, attitudes towards science higher classes can be improved by offering science only to interested, depending on the performance in previous grades.

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## 1. INTRODUCTION

Bhutan a very small and land locked country to be found between the two largest and most populated countries, China and India, introduced science education in the schools ever since the introduction of modern education in the country. The curriculum itself was borrowed from India which later had undergone several reviews at different times. The very reason for various revisions was to make it more innovative within the Bhutanese context or 'Bhutanize' it. With the introduction of New Approach to Primary Education (NAPE) in 1986, the science for classes PP to III is being integrated in to environmental studies and science for primary classes is being taught through general science curriculum, while the science for classes VII to XII remained as three separate namely, Physics, Chemistry and Biology [1].

However, students believe that learning science is complex and difficult to understand which affects their attitudes towards learning and achievement. Attitudes towards science are defined as determiner of special emotions as "liking or disliking" science [2] as cited in [3].

It is said that learning science makes an individual to understand the core concepts and principals of science, correlation between science and humanities, the differences between science and technology [4]. However, the science education aims not only to teach the scientific facts, information and functioning process but also teach and encourage good attitudes towards learning it [5]. On the other hand, school science has a responsibility to educate the next generation of scientists [6]. Moreover, the main aims and objectives of developing good attitudes towards learning science is to influence the career choices in the field of science, technology, engineering, and mathematics [7].

The development of attitudes towards science is to create a public that is knowledgeable about scientific topics and raise citizens who appreciate the value of science [8]. However, it is the supposed failure of school science to engage sufficient students in studying science for a future career that has pushed students' attitudes to the fore as a matter of concern for society and policy makers [6].

No matter how simple or hard the scientific concepts may be, the beginners (primary students) in learning science still required adequate support and inspiration from the teachers, society, leaders and the nation. In fact, the attitude of students towards science determines the performance and achievement. So, the following work consist of findings towards developing positive attitudes towards learning science of class V through various interventions and methodologies supported by relevant literatures.

## 2. RESEARCH TOPIC: EXAMINING EFFECTS OF PARENTS/GUARDIANS INVOLVEMENT IN SHARPING STUDENTS' ATTITUDE TOWARDS LEARNING SCIENCE SUBJECT IN SCHOOLS

### 2.1 Reconnaissance

Basically it has three components to look at namely situational analysis, competences and literature review.

### 2.2 Situational Analysis

#### 2.2.1 Country

Bhutan is a small landlocked country located in South Asia, south of India and north of China. It lies between latitudes 26° and 29°N, and longitudes 88° and 93°E. Elevation rises from 200 m (660 ft) in the southern foothills to more than 7,000 m (23,000 ft). Bhutan held its first democratic elections in March 2008. The total area of the country is currently 38,394 square kilometers. As of now the general literacy rate of Bhutan is 66% and poverty rate is estimated 8.2% of the population. Thus, poverty has declined by about a third from the estimate of 12% in 2012 [9]. According to NSB report release of 2017, the unemployment rate (2.50%) of our country still remains the same as 2016. So there is need to upgrade the student's level so as to improve literacy rate and to further reduce unemployment rate. More importantly Bhutan is identified globally for its policy of Gross National Happiness (GNH).

#### 2.2.2 Education system of Bhutan

Prior to 1960s there were virtually no modern education facilities in Bhutan. It was introduced

with the initiation of economic development in 1961. However, the monastic education was existed and continued to exist even today. At present there is an extensive network of schools throughout the country. In the present formal educational system, we have hierarchical structure and chronological graded learning, which requires certification for the learners to progress through the grades to go to higher levels. The system consists of one year in pre-primary (PP), six years in primary, two years in lower secondary schools (LSS), two years in middle secondary schools (MSS), two years in higher secondary schools (HSS), and three years in tertiary education and four years in training colleges.

### **2.2.3 My class**

The class chosen to conduct research was class V students of Beteni Primary School since these students were learning all the basic concepts. The class had 18 members ranging from 11 to 13 years of which 11 of them were females. Most of them were very young and innocent to decide their likes and dislikes, prioritize their needs and wants, desire and determination. Even then, how researcher work for the development of positive attitudes towards learning science would play a vital and imperative role for their decisions and achievements in future.

### **2.2.4 Present classroom situation**

The class V students were my source of the information and they participated and helped me in gathering data throughout the study.

As a matter a fact, these students had no better results in the academic session of 2017 especially in science in comparison to other classes which was a clear indication of interest towards learning. Additionally, it was found out that this set of students displayed least interest in learning science through their participation, behavior and incompleteness of task on time. Student exhibited very limited basic scientific knowledge and facts and found least bothered to explore and expose their learning which eventually weighed down their subject performance. Similarly, most of the students had career choices which are related to humanities subjects and least science related choices. Therefore, researcher honestly believed that choosing of other classes would be no better than this section of students in getting clear and authentic results.

### **2.2.5 Competence**

The researcher is a teacher in Beteni Primary School, Tsirang and has Bachelor's of degree in Physics and Chemistry from Samtse College of Education and completed a research module as Introduction to Educational Research as separate module. Moreover, an experience of doing a mini-research as major assignment at College would help me in conducting the study. Similarly, DBIP and SBIP conducted in Dzongkhag and school respectively on research methodologies must guide in collecting adequate, good and reliable data.

### **2.2.6 Reason**

The very reason of having science education in schools was to develop positive attitude in learning science irrespective of individual differences [10]. However, the performance and achievement of class V (of 18 students, 70% scored >60, 20% scored between 65 & 70 and only 10% scored <75) students in the previous year have clearly indicated not good attitudes and interest in learning science. To scrutinize the factors affecting in developing good attitudes towards science can be abstracted which may help in adapting and implementing various teaching strategies with interventions through this research. Moreover, it would give another platform in becoming so influential and inspirational to children that can further help in altering their behavior and increasing their performance academically. Additionally, the other purpose was to explore the relationship between the classroom learning environments and development of attitudes as [11] have clearly stated that classroom learning environment is a strong factor in determining and predicting students' attitudes toward science.

## **2.3 Literature Review**

A literature review personally for me is all about compiling and evaluating the research available on a certain topic or issues. The following presents the related literature from the different contexts on the same issues.

It was believed that the most influential component of attitude towards science is gender. Girls have very good and higher attitude than boys in learning science [12,13]. In contradictory to it was [14] stated that boys have better attitudes toward science than girls, and that boys were more apt to continue

studying science as cited in [3]. Moreover, [15] suggested that males had a more positive attitude toward science than females. Also males chose science as an elective course and they were more motivated to achieve in science than females.

Researchers also supported the idea that students' attitude towards science were dependent on the type of science they were interested in; such as physical science or life science. For instance, the findings of another study supports the idea that boys show a more positive attitude toward physical sciences while girls have a more positive attitude toward biological sciences [16]. It is also revealed that while boys were interested in learning about planes, cars, light, electricity and new sources of energy, girls were more interested in learning about rainbows, healthy eating and animal communication. [16] indicated that attitudes influence.

Moreover, research also indicated that the schools, school level, families and socio-economic status of parents also influence the attitudes of children towards science. As the economic status of parents increases, so does their child's attitude towards science [17] as cited in [18]. Parents should care about their child's lessons, encourage and help them when they can for children to develop positive attitudes. In the same paper, it was pointed out that the students, whose parents are well-educated and have a high economic status, have more positive attitudes [19]. In addition to it, where the student lives, in a village or city, influences their attitudes towards science [12].

Additionally, factors such as science achievement, gender difference, student-student and student-teacher interaction and the classroom learning environment all have an effect on the attitude toward science [20,15]. And it was also stated that students take active part when they are provided with hands-on experiences and learning than a lecture method [21]. Individual differences play an important role in student learning [22]. In addition to academic success, individual differences related to other factors such as learning approaches, motivation, cognition, and anxiety have been studied [23,24].

However, [16] indicated that attitudes influence achievements rather than achievement affecting attitudes. Students with positive attitudes toward

science tend to have higher scores on achievement measures [25].

The researched paper also claims that modern science and scientist images which presented to children under 12 years old were critically important for forming behaviors and defining choices. The study also pointed out that children made decisions about their future careers before going to secondary school [26].

But some even said that the attitudes of elementary students towards science were limited in comparison to secondary students [27]. Nevertheless, [28] as cited in [18] has pointed out that the period on which students have the highest interest in science is when they first meet science— in elementary school. The attitudes and value judgments of students towards science are formed on this period. For this, it can be said that the attitudes of students which were formed in elementary school level, were one of the fundamental variants that play a role in their science learning.

### **3. RESEARCH QUESTION: HOW INVOLVEMENT OF PARENTS / GUARDIANS EFFECTS STUDENTS' ATTITUDE TOWARDS LEARNING SCIENCE?**

#### **3.1 General Aim**

Within this, the aim of this research was to analyze the attitudes of 5<sup>th</sup> grade students in elementary school towards science. In the search for this purpose, the answers for the following questions will be explored:

- What is the level of students' attitudes towards science?
- Do the attitudes of students towards science change according to their genders, general achievement levels, science achievement levels, parents' income levels, mothers' academic degrees, fathers' academic degrees, and ideal future professions.

#### **3.2 Methods**

##### **3.2.1 Model of the study**

The study was a survey looking at whether there were differences in students' attitudes towards science subject in school based on gender,

student-teacher relationship, parents/guardians involvement, past achievement (previous scores), teaching strategies and styles practiced by teacher, classroom environment, career choices and location of the school.

The study used both qualitative and quantitative (mixed) method to supplement and compensate the findings and approaches in each method. Moreover, this method helped researcher collects and analyzes data and explores diverse perspectives. In fact, this method helped researcher seek more panoramic view of the research from different view-points. Quantitative method was used to count the number of times that a particular phenomenon occurs such as how often an individual responds to the questions asked and activities provided by tally marking to translate into numbers. Similarly, qualitative data was analyzed through color coding and grouping which eventually helped out to draw significant themes.

### **3.2.2 Participants**

The universe of the study consists of the students attended the primary science in 2017 and still being here in 2018. In the study, the locations, economic situations of the school and families were considered. The sampling of the study consists of 18 5<sup>th</sup> grade students attending primary science and school with differing socio-economic status.

### **3.2.3 Data collection tools**

I used the following tools and all the tools were used in gathering baseline data and post-intervention data except observation. Moreover, the appropriateness of the tools further enhances the authenticity of the findings.

Mixed method will be used to enhance the validity of findings and compensate the approaches.

#### *3.2.3.1 Unstructured interview*

Unstructured interview was used during pre-data collection to diagnose and confirm the cause of problems for having poor attitudes in learning science before work on with the intervention strategies. Similarly, information on their past year performance and determination and perseverance to perform can be also assembled through this tool. This tool is more of informal or like everyday conversation without specific

predetermined set of questions. The questions asked can be differed based on the respondents however; interviewer with certain topics in mind can help in determining the actual understanding of the topic. Unstructured interviews are most useful when you want to gain an in-depth understanding of a particular phenomenon within a particular context [29].

#### *3.2.3.2 Observations*

It is a systematic description of events, behaviors, and artifacts in a social setting chosen for study. It enables the researchers to describe the existing situations using the five senses, providing a written photograph of the situation under study. Additionally, the data gathered are more reliable and accurate, and problem of depending on respondents is decreased through observations.

The students were observed for one week in baseline data collection and tally marks were drawn against the question for each student. It happened within the classroom and science lab during the science periods.

#### *3.2.3.3 Questionnaires*

It is tool consisting of series of questions for the purpose of gathering information from the participants. This method is cheap and does not require much effort from the questioner as it surveys verbally. Moreover, it contains standardized answers that make it simple to gather and compile data.

The questionnaires were fully framed based on their support that they received from teacher, friends, parents and school in learning the subject. Moreover, the items were designed to determine the influential factors which have an effect on their attitude in learning and academic performance in the subject.

### **3.2.4 Baseline data**

The class V students in Beteni Primary School were found to be less interested in learning science despite of their average scores. So, the following data were gathered based on “development of positive attitudes of class V towards learning the science subject”. Therefore, the following three methods (observation, interview and questionnaires) were being used to gather the data. The methods were used both in baseline and post intervention data except observation.

### 3.3 Baseline Data Analysis

#### 3.3.1 Interview analysis

The total of eleven participants were selected non-randomly (purposive/judgmental sampling) for the interview irrespective of their academic achievement, socio-economic status and individual intellectual and cognitive abilities. The likes and dislikes in science subject differs individually because of individual insight and beliefs.

In fact, the following were the reasons classified based on the findings.

##### 3.3.1.1 Easiest/difficult subject

Despite of 13% interested in learning science, only 6% of them found the subject easy and understandable and 5% of them indicated science as their favourite subject nevertheless, the reasons were not stated.

It was also found out that more (9%) students considered the subject to be difficult in comparison to the other arithmetic and literature subjects.

##### 3.3.1.2 Career choice

Similarly, 6% of the students were interested and enjoyed learning science because of what and who they wanted to become in future regardless

of their academic performance and career choice was the most influential and contributing factor towards learning and achievement of subject. Doctor, an engineer, scientist and pilot were some of the aspired career choices of those many students.

##### 3.3.1.3 Past achievement

Past achievement (previous scores) also has little impact in the learning, interest and on children's attitudes of students towards the subject. Among 9% of the students sharing the impact in the future learning, 6% of the students were encouraged to learn the subject irrespective of the altitude of scores they obtained and only 3% of them were discouraged by the past performance – scored low marks in the previous year which resulted in showing least interest in learning of the subject.

##### 3.3.1.4 Teaching strategies

It was also indicated that one of the effective teaching strategies was through demonstration and experiments. Most, 17%, of the students understood and utmost learning took when there is experimentation and demonstration compared to other teaching strategies like lecture, use of teaching aids, audio-visual and field trips. Moreover, students stated that science is a subject where an individual gets an opportunity to rectify and proof the theories mentioned in the text.

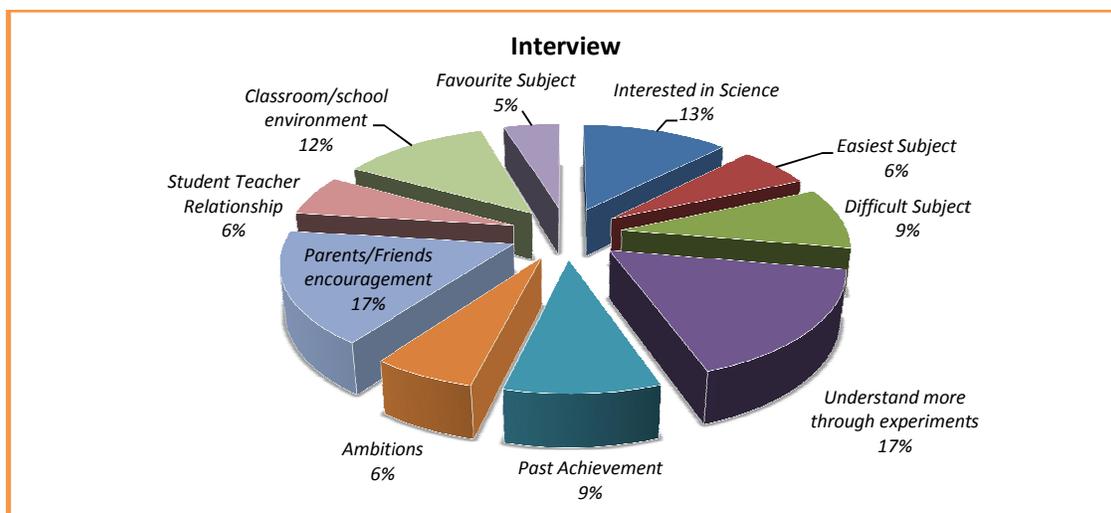


Fig. 1. Baseline data interview analysis

3.3.1.5 Parents/guardian/friends encouragement

Similarly, same number of students have their encouraging parents and exhibited concern over the learning however, in fact only 3% students have parents and friends who encouraged them to learn science and enduring parents wanted their children to give equal importance to all the learning subjects.

According to the finding, male (80%) students indicated their interest in learning and acquiring scientific knowledge in comparison to the female (67%).

3.4 Observation Analysis

The observation was made on nine categories inside the classroom and during the lab activities. The result showed that 25% of the students were punctual and attended science classes regularly. Moreover, 22% and 11% of the students were found working on practice problems and solving on time respectively. As anticipated most, 16%, of the students paid attention to the teacher during the lesson delivery irrespective of topics and contents delivered. It was observed that neither (0%) of the students asked questions or doubts about the lesson to the teacher nor displayed courtesy to ask and learn from their friends and only 10% of the students could give partial responds immediately. This was a clear indication of how interested students were in learning themselves and poor attitudes towards the subject. However, it was found out that only few (4%) students were engaged talking to their partner but 9% of them were observed doing other works during the delivery. Despite of it, same students have been repeatedly found giving the same problems or troubles.

3.5 Questionnaires Analysis

The following information was collected to examine their attitudes in learning science before the interventions. The items developed centered on various expected learning factors such as classroom and school location, relationship between achievement and learning, societal influence, student-teacher relationship, parents encouragement or involvement, career choices, gender and strategies and skills used in teaching the subject.

It was found out that maximum of the students in the class “agreed” and “strongly agreed” in all the items developed and 88.89% (highest of all) of the students strongly agreed that, ‘teacher explains the meaning of the new science related words’. In contradictory to the 100% interest of students in learning science, only 66.7% of them enjoyed learning science every day and appreciated the pacing of teaching and reinforcement provided by the teacher. Maximum (72.2%) number had strappingly agreed that they understood and learned more when a teacher demonstrated in spite of it, approximately half (55.5%) of the students were interested in learning science in future. The result showed that 44% and 50% of the students found teacher approachable and like the subject because of the teacher respectively.

More than 61.1% believed and strongly agreed that their interest in learning science was absolutely determined by the past achievement in the exclusive subject. It was astonishing that not even a single student has disagreed with the item 1, 2, 3, and 19 which was a clear indication of students observation made to the efforts shown by teacher in teaching the subject.

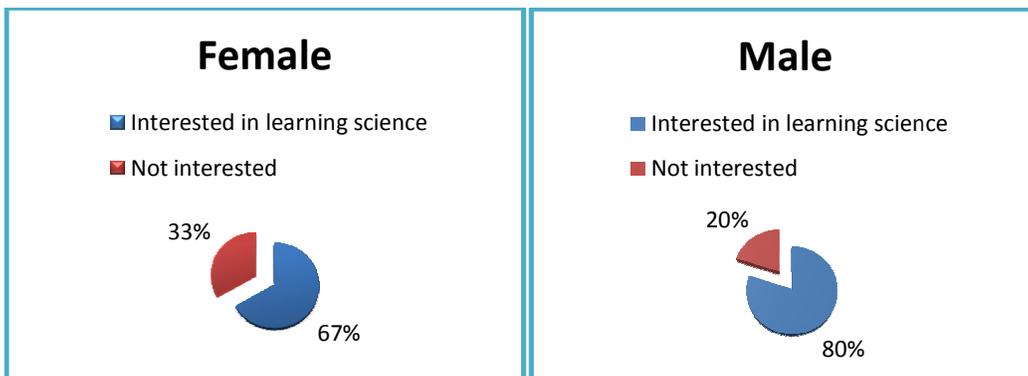


Fig. 2. Graphical representation of male and female respondent

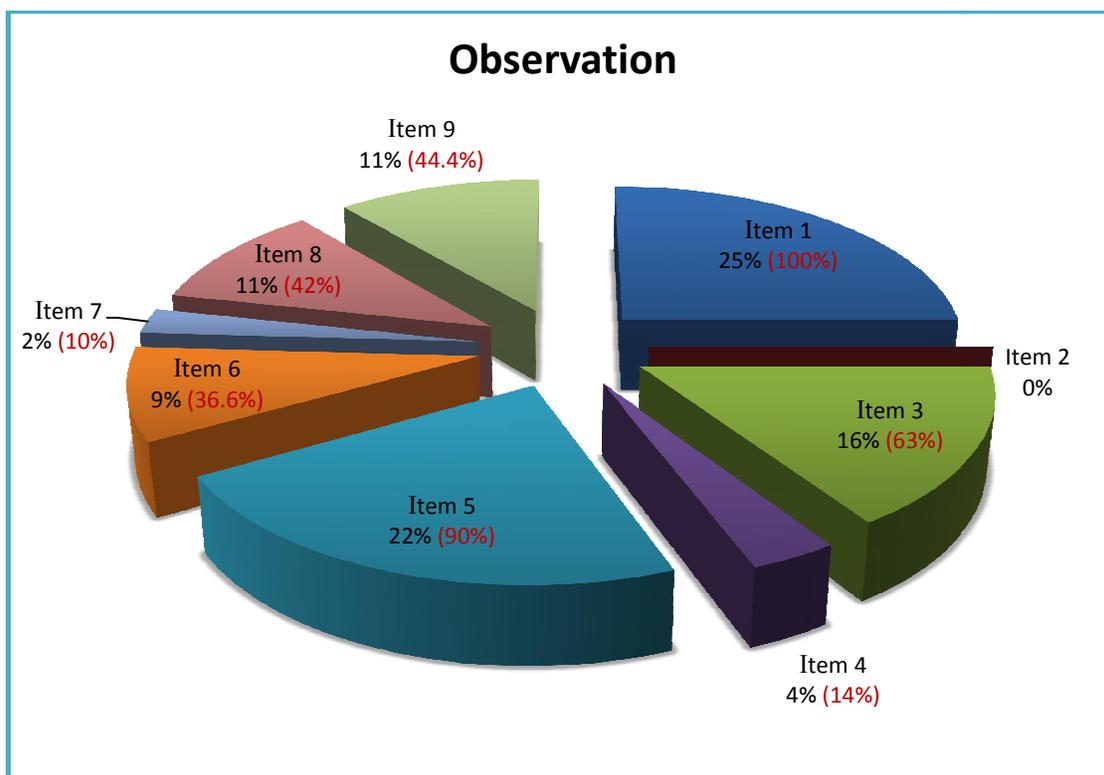


Fig. 3. Observation analysis in learning science before the interventions

### 3.6 Intervention Strategies

Some of the intervention strategies that one used in collecting post data to further enhance and assure the validity of my findings were:

#### 3.6.1 Check, give immediate feedback and encourages discussion

It is very much necessary for the teacher to check work, observe learning and give immediate to student as in individual or in groups as in the conduction of activities so that they are in tract with teaching and learning. Giving feedback not only fosters their learning but also invigorates their mind in inculcating perseverance for future learning. Furthermore, in discussion not only the exchanges of ideas take place but it will help in clarifying the doubts.

#### 3.6.2 Create conducive learning classroom

To make a session engaging and lively, it's very important to connect with your students. Today's children are very prompt in everything. They are curious about knowing new things. As a teacher, you should develop effective teaching methods so that your students understand

that their learning is not just confined to the classroom, but something that they'll be using in real life too.

#### 3.6.3 Familiarize the basic science equipments/materials

Lab equipment is complex scientific tools and can have dangerous side effects if not handled properly. Something as simple as a spirit lamp can light surrounding objects on fire, cause property damage and potentially harm your fellow lab denizens if it is handled incorrectly or carelessly. Knowing how to safely handle and use all lab equipment will limit these kinds of accidents and create a safe working environment. Moreover, the curiosity and excitement sky rocket their learning desire.

#### 3.6.4 Demonstration and experiments

A demonstration was a teaching method used with both large and small groups. Demonstrations become more effective when verbalization accompanies them. During the demonstration, giving a simple explanation for each step as you proceed is vital. Demonstration is a strategy where the teacher communicates

information by adopting a visual approach that facilitates observation of procedures, experiments and application of skills. Thus, focusing on aim, procedure and demonstration would make practical effective for the students. Demonstration and experimenting give students more hands-on experiences which amplifies learning potentials and capacity.

### 3.7 Post Intervention Data Analysis

The results and information gathered were entirely based on the same samples used in

the base line data collection. Most (15%) of the students were interested in learning the subject because of the following reasons;

#### 3.7.1 Career choice

The dreams of the children also play an imperative role in the learning, interest and developing attitude towards the subject. In fact, 9% (6 students) of them were interested and took pleasure in learning science everyday from the early age as they dreamt of becoming an engineer, doctors, architectures, scientists, etc.

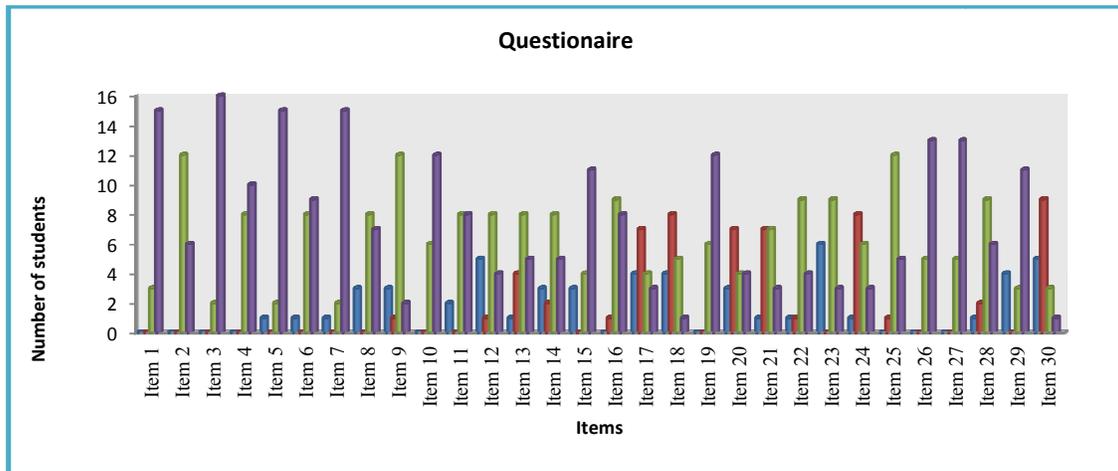


Fig. 4. Graphical representation showing baseline data questionnaire

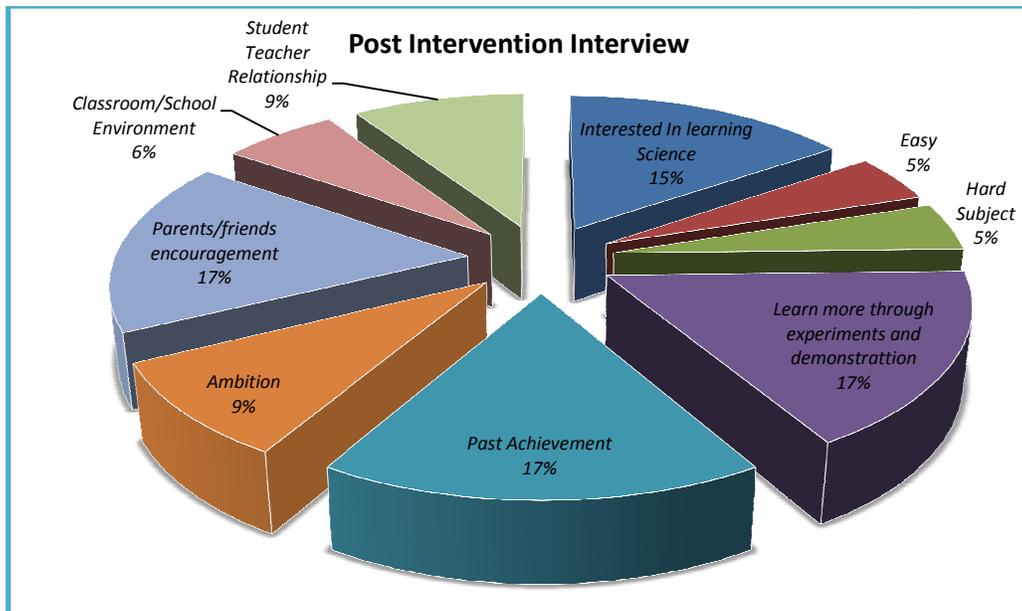


Fig. 5. Pie chart showing Post intervention interview analysis

**3.7.2 Easy/Hard subject**

Despite their interest towards subject, 5% of the students indicated that the subject is easy to understand nonetheless 5% of the students still found the subject difficult in comparison to other subjects.

**3.7.3 Past achievement**

The learning of the subject can also be determined by the past performance in the subject and

17% of the students indicated the relation the past achievements have in future learning. Nevertheless, the fact is 5% of them felt sad or got discouraged when they scored low marks and matching number of them got encouraged when their scores were high. Above all, 7% of them were neither discouraged nor encouraged regardless of the scores.

Above all, discouragement because of the low scores lasted for short period of time. All they worked assertively to bring better performance without varying the perseverance their future learning.

**3.7.4 Teaching strategies**

The teaching strategies can also change and shape the attitude towards the subject. All the students (11 out of 11) agreed genuinely that their best learning took place when a teacher demonstrated or gave opportunity to explore and discover (experiments) themselves in the lab compared to other strategies.

**3.7.5 Parents/guardians/Friends encouragement**

It was also clearly indicated that only 2% of the students' parents guide and encouraged

learning science and 5% of them have encouraging friends where as 7% of students have parents made their children to learn all the subjects with equal importance regardless of their interest.

Around 7 (9%) of them found the teacher friendly, approachable and encouraging. Moreover, the pace of lesson delivery was adapted appropriately in accordance to the grade and level of their understanding.

The result showed that all the male participants were interested and enjoyed learning science and where as only 67% of the female were interested but 33% of them showed least interest in learning the subject.

**3.8 Comparison of Baseline and Post Intervention Interview Analysis**

The results are prominent from the comparison graph itself. The number of students interested in learning the subject increased by 2% and intervention strategies helped children to decrease the discernment of considering the subject difficult from 9% to 5% which was a clear indication of improvement in their understanding and achievement in the subject.

The skills and strategies a teacher executes during the delivery of content played a very inevitable role and made students understood which eventually boosted their interest towards the subject.

Similarly, all (100%) the students agreed in both data collection that their utmost learning took place when a teacher demonstrated and let them explore and discover themselves through experimentations.



**Fig. 6. Graphical representation of respondents regarding interests**

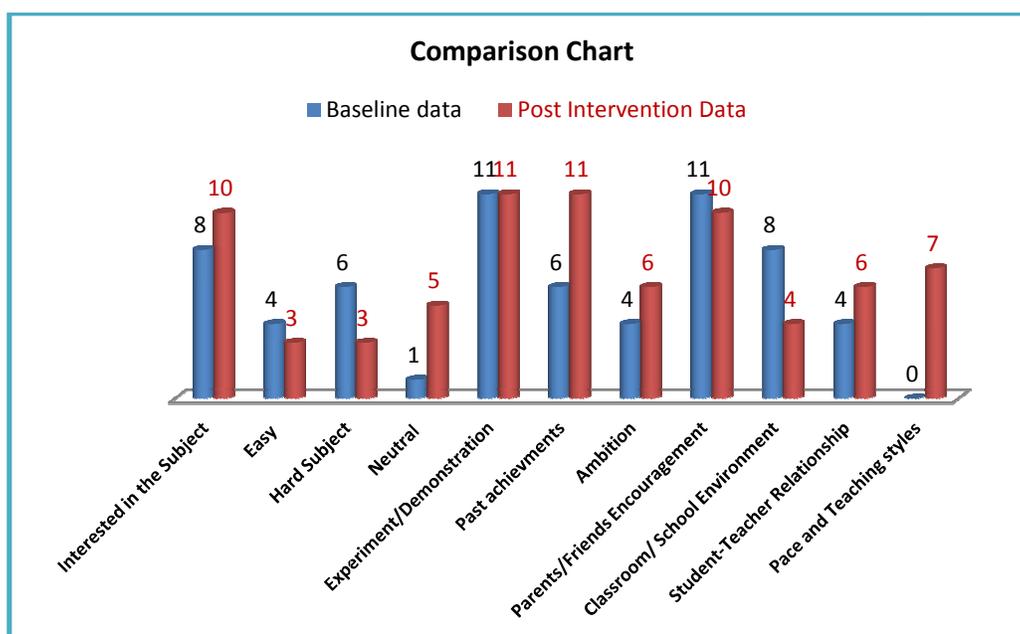


Fig. 7. Comparison of baseline and post intervention data of interview

In comparison to the base-line data collection, the number has increased evidently by 8% who shared the impact of past achievement in the future learning. However, fewer children felt encouraged when obtaining high marks. On the other hand, 2% more than the baseline data collection felt discouraged of squat marks scored in the exams and tests. Moreover, 7% of them claimed that they were neither discouraged nor encouraged because of the altitude of scores. In fact, all the students worked convincingly hard to increase the assurance of performing better in their next learning.

Among all, least number of students have encouraging parents to learn science however, more number of parents encouraged learning all the subjects equally without any discrimination and differentiation.

As anticipated, only 9% of the children stated and found out the pace and teaching styles of a teacher appropriate and were aligned with their grade and learning abilities. Nevertheless, none of them shared about it during the baseline data collection.

### 3.9 The Post Intervention Data Analysis of Questionnaire

The information was collected after the execution of interventions. It was found out that maximum (77.8%) number of students strongly agreed that they understood and learnt more when a

teacher demonstrated during the delivery of the lesson. Moreover, students favored *experimentation* and *demonstration* method to teach the subject. It was fascinating that none of the students disagreed with the two items i.e, 27 and 29. Similarly, 66.6% of the students believed that a teacher was an influential factor for their interest in liking the subject and 61% of them considered science as their favorite subject respectively. In fact, 55.5% of the students found out that a teacher gave clear instruction, explained the new words, checked the understanding of the topic and used teaching learning materials which enhanced the assurance of learning the subject.

The result also showed that 38.9% of the students disbelieved that their parents helped in doing the science related works. Likewise, (27.8%) of students have their parents who encouraged as well as deject them from learning the subject. Additionally, identical number of students agreed and disagreed with the statement, "*my friends encourage me to learn science*" simultaneously.

Half (50%) of the children do not believe with the appropriateness of the pace of a teacher and a statement, '*teacher do not seem to like students asking questions*' correspondingly. Similarly, same number of students agreed that their past achievement played an imperative role in future learning.

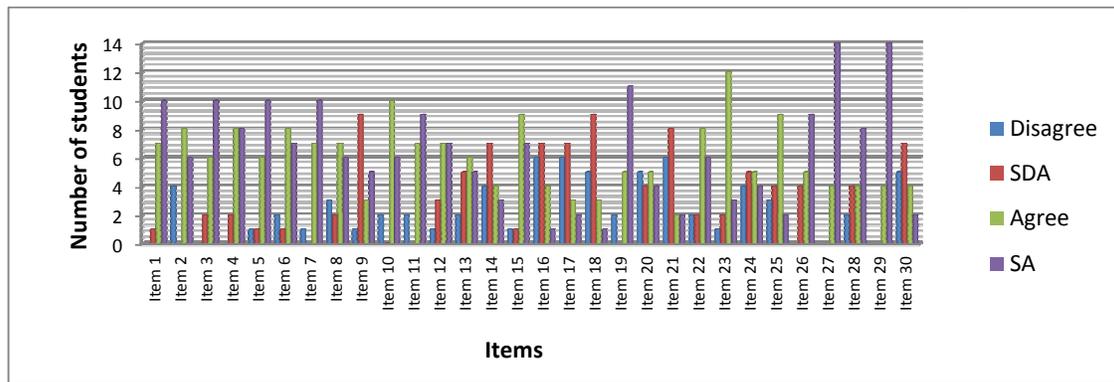


Fig. 8. Graphical representation of post intervention questionnaire

### 3.10 Comparison between the Baseline and Post Intervention Data (questionnaires)

The information about the baseline data and post intervention data could easily be marginalized from the graph itself. It is comprehensive that maximum number of the students learned and understood more when a teacher demonstrated and preferred demonstration and experimentation. In fact, more number of students agreed with demonstration and experimentation strategies and skills in comparison to base line data. Similarly, the more number of students believed that past achievement in the particular subject determined the future learning. However, the number has reduced by 2 students in post intervention which was from 61% to 50%.

Around 40% of the students found out that the classroom was friendly and conducive for learning the subject. The subject teacher also played a vital role in determining and influencing the learners and additional number liked and enjoyed learning the subject because of the subject teacher. However, there was slight increased in the numbers who strongly disagreed with, *'my parents encourage me to learn science'*. But there was unanticipated and far-reaching numbers who strongly disagreed with the pace of a teacher during the lesson delivery after the interventions.

## 4. DISCUSSION

It was said that learning science makes an individual to understand the core concepts and principals of science, correlation between science and humanities, the differences between

science and technology [4]. To supplementary the assurance, here are the presentations of how current findings and past findings match and the possible reasons for the findings.

In contradictory to [12,13], irrespective of the genders and abilities all (18 students: 11 girls & 7 boys) agreed that they are interested in learning science in both the questionnaires. However, from 11 students (5 boys and 6 girls) more boys (90%) turned out to be more interested in learning subject in interview then girls (67%) which really corresponded with the statement, boys have more positive attitude towards science then girls by [14], Simpson and Oliver (1988). This could be because of the physical sciences related to cars, electricity, light, energy, etc which the basics they learn from the primary school [16].

In contradictory to [19], it was found out that very partial number of students has encouraging parents to learn science. Moreover, the parents neither help to do work nor care about their science related work. Thus, the lack of encouragement from parents must be the educational background as most of them are illiterate. Moreover, lack of time due to low economic status and farming activities as it is only an economic source for the family. The economic background of their parents also determines the learning of children [17]. However, all the parents instructionally solicited to study all the subjects with equal importance.

The teaching styles and strategies used by a teacher influenced and played imperative character in determining good attitude of students towards the subject. Similarly, the findings agreed with [21] that students take

active part when they are provided with hands-on experiences and learning than lecture method. In fact, 100% of the students in both the baseline and post intervention data collection (interview) stated that their maximum learning had taken place when a teacher demonstrated and let them explore themselves through experimentation which ultimately enhances their observation and application skills. Additionally, the intervention strategies such as experimentation and demonstration and familiarization of basic science equipments or materials helped to further enhance the learning attitude towards the subject and the number has increased by 5% (72% to 77%) in the post intervention (questionnaires) which apparently depicts the importance and effectiveness of teaching strategy in science classes. One of the child even stated that they get to rectify the theories they learn the class through experimentations.

The past achievement or the result in the specific subject has certain impact to their future learning as stated by [20,15]. The findings from both questionnaires and interview demonstrated that more children get encouraged and discouraged when they score high or low respectively. However, very countable of them neither felt discouraged nor encouraged irrespective of the altitude of scores. It is very likely that these students don't nuisance about their learning. Additionally, most of them have perseverance of studying hard which help in putting out the past scores from their mind.

As mentioned by [20,15], the student-teacher relationship also contributes to assure the learning and interest of subject. Similarly to it, highest number agreed that their teacher is approachable and friendly in questionnaires then interview which is even debatable that most of them are not yet confident to converse with teacher. Moreover, it was observed that none (0%) of the students ask questions regarding the content and lesson. Additionally, number of students who appreciated the pace of teacher has reduced by modest which could be result of their lack of concentration as 4% and 9% of them were observed talking and doing other work during the lesson delivery. However, 50% of students are interested because of the teacher.

The study points out those children made decisions about their future careers before

going to secondary school [26]. In fact, all the students have made different career choices made from the early age but only 50% of them enjoy learning science and have good attitude on science from the primary level to achieve it. Most of the choices are related to science, technology, engineering and mathematics such as an engineer, Doctors, Pilot, Lawyer, Officers, teachers, Pilot, etc. It is obvious that some of them have the perceptions of achieving their goal or choices with single subject and overlook the rest. Moreover, they are unaware of the scopes and prospects science subject have in their near future. However, their career choices can be altered if right tools (teacher and parents encouragement) are not reached to them at the right times.

#### **4.1 Possible Second Round of Research**

After reflecting on the first action research cycle, it is evident from the findings that all the students were interested in learning the subject. Moreover, this study has brought improvement of attitudes towards the subject through executions of intervention strategies. However, very limited of them showed factual attitude of interest towards it through classroom participation, group discussion, timely homework and class work, demonstrated willingness to learn and try new things and show curiosity to learn more on the topic. If this trend continues, the consequences will be dire in their learning and more importantly an attitude towards the subject would be hampered eventually. If second action research cycle has to be developed to the first as an extension, it would be on how awarding rewards or honoring and group discussion help in developing their good attitudes towards the subject.

#### **5. CONCLUSION**

The attitude and interest of children to the definite subject could be determined by various factors. Similarly, parents' encouragements, career choices, past achievement, teaching strategies and student-teacher relationship are found to be most important factors than classroom environment, location of school and socio-economic status of parents affecting the learning as well as attitude of children in the study. In fact, all the children claimed that their maximum learning take place when a teacher demonstrates and make them explore and discover through experimentation. Hence, a teacher should

adapt with abilities and styles of learning of children and implement accordingly to further enhance the good attitude for the betterment of performance in the subject. In fact, experimentation and demonstration should be implemented as when and wherever possible in the science classes since students like studying by exploring and getting hands-on experiences and to impart best knowledge. Additionally, timely checking with relevant feedback to their work also contributes in nurturing their interest and learning towards the subject. Moreover, to provide same opportunity for them to succeed in life, their learning cannot be compromised or compounded with single strategy. Therefore, science education is the powerful instrument to build and change the society.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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