Chapter IV
Data Analysis and Interpretation

4.0 Introduction

Chapter III provides a detailed version of the research methodology exercised during the present study, including the experimentation process, different tools and techniques employed to collect data and an imprecise framework for data analysis. The data collected during the experimentation, in its raw form, was substantial and complex; it needs proper treatment through careful handling, which includes the application of suitable techniques to infer meaning out of it. This data processing and deducing results from processed data would be the other words for analysis and interpretation.

This research aims to develop a life skill-based module of the activities of Science and Technology subject for class IX, to implement and measure the module's effectiveness in terms of student achievement. Tools used for data collection includes achievement test, worksheets, and opinionnaire. Students' achievement was measured during pre-test and post-tests with the supportive worksheets prepared for the intervention with the quasi-experimental design. The third chapter presents a complete account of the research methodology and approach used to collect the required data for the present research study.

The present chapter is devoted to analysing and interpreting the collected data to achieve objectives and test the hypothesis presented in the third chapter. As the sample for the present study was selected using the purposive sampling technique, tests from non-parametric nonparametric statistics were most appropriate for data analysis. Considering that, Mann-Whitney U-test and Wilcoxon signed-rank test were used to understand the program's effectiveness in terms of achievement in science and technology. Regarding the improvement in Life Skills among students taught through Life Skill-based activities (Experimental group), effectiveness was studied through frequency and percentage. Analysis of the data collected through all the tools and techniques was done objective-wise.

To achieve objective three of the present work, which states that "to study the effectiveness of life skill-based activities in terms of achievement of the students in science and technology subject" and to test all three null hypotheses, post-test scores of the experimental and control group were compared. Pre-test and post-test scores of both

the groups (experimental and control group) were also compared for detailed analysis. The exhaustive analysis for objective three is explained through tables 4.1 to 4.6.

Objective four for the present study states, "to study the effectiveness of life skill-based activities in terms of improvement in life skills of the experimental group," and to accomplish this objective, worksheets and field notes were graded using checklists. Further, grades were quantified and evaluated through frequency and percentage to understand the effectiveness of improvement in life skills. A detailed account of that is presented in table 4.7.

The fifth objective for the present work is "to study the opinion of students about implemented Life Skill-based activities in Science and Technology at class IX". For this objective, data was collected through an opinionnaire from the experimental group. Opinionnaire was developed to understand students' perceptions about the program and includes 13 open-ended questions. As it has open-ended questions, one of the qualitative data analysis techniques was used to evaluate the data. Quantitative content analysis was used for the data to study qualitative responses from students. For this, the answers were recorded and then transformed to quantitative frequencies using thematic content analysis. In-depth details were presented in tables 4.8 to 4.31

The descriptive version of the analysis and interpretation of the collected data for all the objectives of the present study are detailed below.

4.1 Analysis for Objective Three

Objective three for the present study states that "to study the effectiveness of life skill-based activities in terms of achievement of the students in science and technology subject", and to achieve this objective, three hypotheses were established. These are:

H01: There will be no significant difference in the post-test mean achievement score in Science and Technology subject of class 9 students of Experimental and Control group.

H02: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the experimental group in pre-test and post-test.

H03: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the control group in pre-test and post-test.

To test these hypotheses, appropriate non-parametric techniques (as sampling was purposive) were applied to analyse the data. As the data was quantitative, Wilcoxon

signed-rank test and Mann-Whitney U test from the non-parametric family were implemented. Research related to each hypothesis is detailed below.

4.1.1 Analysis related to H01: There will be no significant difference in the post-test mean achievement score in Science and Technology subject of class 9 students of Experimental and Control group.

It was highlighted by Best and Kahn (2016) that "to test the significance of the difference between two sets of samples drawn from the same population, the Mann Whitney U test was found to be the most appropriate non-parametric test and is equivalent to parametric t-test". They further stated, "the test may be considered a useful alternative to the t-test when the parametric assumptions cannot be met and when the observations are expressed in at least ordinal scale values. Under this, when the size of either of the groups is more than 20, the sampling distribution of U rapidly approaches the normal distribution, and the null hypothesis may be tested concerning the z critical values of the normal probability table".

Mann Whitney U test was applied to test the difference in the post-test mean achievement score in science and technology subjects of the experimental and control group. Table 4.1 provides a detailed description of the analysis.

Table 4.1: Distribution of Mean Rank, U-Value (U), Z-Value (Z) and Indicator of Significance of the Experimental Group and Control Group.

Group	N	Mean Rank	Mann-Whitney U	Z	Sig. (2-tailed)
Experimental	40	54.53	0	7.69319	0.01
Control	40	26.48			

It can be interpreted from Table 4.1 that the Mean rank value for the group taught through the Life Skill-based activities (Experimental group) and the control group (led through traditional method) was found to be 54.53 and 26.48, respectively. The calculated U value was 0, and the Z value was 7.69, significant at the 0.01 level of significance. The calculated value for U (U=0) interprets that all the values in one sample (Experimental group) were more potent than all the values in the other sample (Control group). The overhead understanding of the analysis revealed that there was a significant difference between both the groups (group taught through activities and group led traditionally). Therefore, the above Interpretation supports the rejection of the null hypothesis, which states that "There will be no significant difference in the post-test mean achievement score in Science and Technology subject of class 9 students of Experimental and Control group". It could be believed that the group taught science and technology subjects

through Life skill-based activities and the group taught through the traditional method differed significantly in terms of mean achievement scores, which, in other words, substantiate the effectiveness of the intervention.

To comprehend the program's effectiveness meticulously, further mean achievement scores of pre-test and post-test of the experimental and control group were analyzed and compared within the group, which was not possible through Mann Whitney U Test. The Wilcoxon signed-rank test was used to test the significant difference in mean achievement scores of pre-test and post-test in the experimental and control groups. It is the most appropriate non-parametric test used to compare two related samples. Parekh & Trivedi (2010) explained that "the Wilcoxon signed-rank test is designated to test the significance of the difference in the mean achievement score of the single group (either experimental or control group) in pre-test and post-test. Detailing further, they stated that the test might be considered a valuable alternative to the t-test or t-test for matched pairs when the parametric assumptions cannot be met.

Therefore, to test the other two hypotheses, i.e., H02: There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the experimental group in pre-test and post-test and H03: There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the control group in pre-test and post-test, Wilcoxon signed-rank test was used, and detailed description was given below.

4.1.2 Analysis related to H02: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the experimental group in pre-test and post-test.

The complete description for, Wilcoxon signed-rank test, used to examine the significance of the difference in the Mean achievement scores in Science and Technology subject of the experimental group in pre-test and post-test, was explained underneath. Mean, Standard Deviation, and Standard Error of mean were also calculated separately for both pre-test and post-test of the experimental group and presented in table 4.2. Comparative highlights are shown in graph 4.1.

Table 4.2: Distribution of Sum of Scores (Σx), Mean, Standard Deviation, Standard Error of Mean for Experimental Group in Pre-test and Post-test

Group	Pre/Post	N	Sum	Mean	Std. Deviation	Std. Error
Experimental group	Pre-test	40	887	22.175	5.72	0.90
	Post-test	40	1989	49.725	3.62	0.57

Graph 4.1: Graphical presentation of Mean, Standard Deviation and Standard Error of pre-test and post-test for Experimental Group.
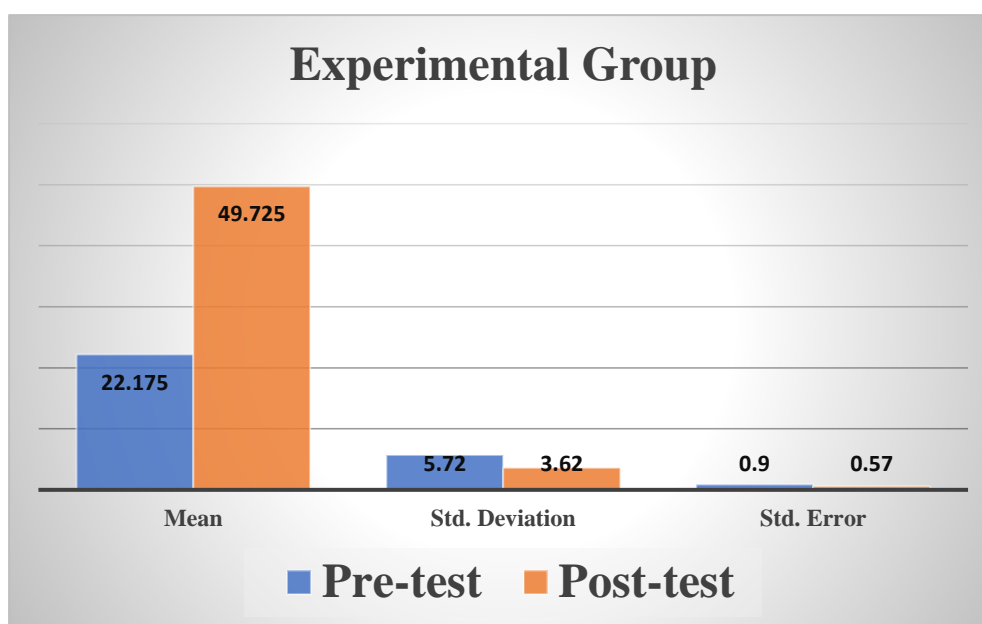
From Table 4.2, it was found that Sum and Mean of the group taught through Life skill-based activities were 887 and 22.175, respectively, before the start of the experiment (pre-test) and at the end of the course (post-test). Further, the calculated sum and mean of the scores for the same group were 1989 and 49.725, respectively. Accordingly, the standard deviation and standard error of mean calculated for pre-test were 5.72 and 0.90 (respectively), and for post-test, these were 3.62 and 0.57, respectively. The comparison between mean scores of pre-test and post-test of the Experimental group highlights a significant difference with less standard error of the mean.

To find whether the difference in the mean scores was significant or by chance and to test the null hypothesis, "There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the experimental group in pre-test and post-test", W-value and Z critical value was calculated. Table 5.3 displays the Wilcoxon Signed-Rank Test result used to compare pre-test and post-test scores for the group taught through Life Skill Based Activities in Science and Technology.

Table 4.3: Distribution of W-value, Mean, Mean Difference, Standard Deviation, Z-value and Significance level for Experimental Group.

Group	N	W-value	W-Mean	Mean Diff.	Std. Deviation	Z	Sig.
Experimental Group	40	0	410	30.72	74.4	-5.51	0.01

It can be revealed from Table 4.3 that the calculated value for W was 0, which supported the normal distribution of scores. The calculated Z- Critical value was -5.51, found to be significant at 0.01 level, which verified that there was a substantial difference in the experimental group's mean achievement score in pre-test and post-test. Thus, the null hypothesis, "There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the experimental group in pre-test and post-test", was rejected. It could be believed that the implemented program had a significant effect on the learning of Science and Technology subject on the students of 9th standard.

4.1.3 Analysis related to H03: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the control group in pre-test and post-test.

To test the third hypothesis, which is, "There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the control group in pre-test and post-test," the Wilcoxon signed-rank test was used. A detailed explanation is given in Tables 4.4 and 4.5.

Table 4.4: Distribution of Sum of Scores (Σx), Mean, Standard Deviation, Standard Error of Mean for Control Group in Pre-test and Post-test.

Group	Pre/Post	N	Sum (Σx)	Mean	Std. Deviation	Std. Error
Control group	Pre-test	40	814	20.35	4.95	0.78
	Post-test	40	895	22.375	5.28	0.83

Graph 4.2: Graphical presentation of Mean, Standard deviation, and Standard Error of pre-test and post-test for Control Group.
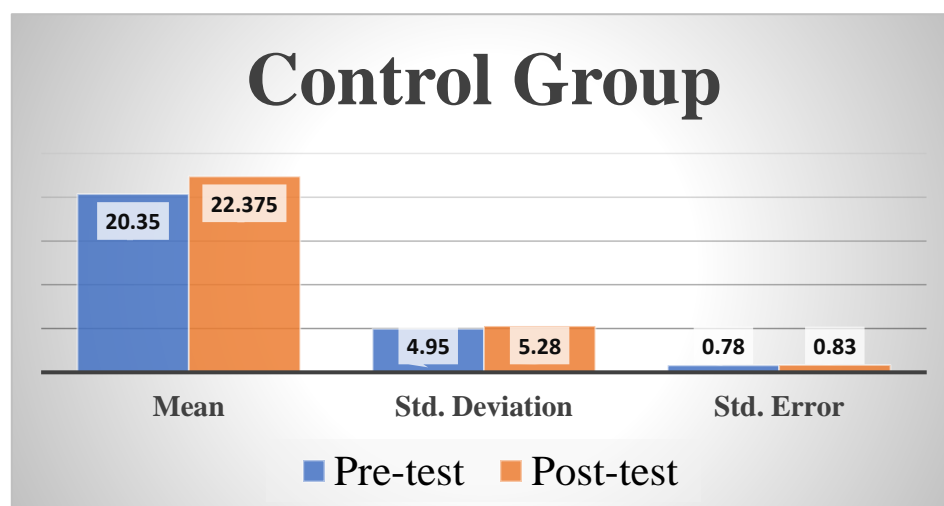
From Table 4.4, it was found that Sum and Mean of the scores for the group taught through the traditional method were 814 and 20.35, respectively, before the start of the experiment (pre-test) and at the end of the course (post-test), the calculated sum and mean of the scores for the same group were 895 and 22.375, respectively. Accordingly, the standard deviation and standard error of mean calculated for pre-test were 4.95 and 0.78 (respectively), and for post-test, these were 5.28 and 0.83, respectively. It could be interpreted from the above data that there was not much difference in mean scores of the students (taught through traditional method) after the completion of the course (post-test) when compared with the mean scores of the pre-test.

To test the null hypothesis, "There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the control group in pre-test and post-test", W-value and Z critical value was calculated. Table 5.5 displayed the result of the Wilcoxon Signed-Rank Test used to compare pre-test and post-test scores for the group taught through the Traditional method in Science and Technology subject.

Table 4.5: Distribution of W-value, Mean, Mean Difference, Standard Deviation, Z-value and Significance level for Control Group

Groups	N	W-value	W-Mean	Mean Diff.	Std. Deviation	Z	Sig.
Control Group	40	133.5	410	-1.62	74.4	-3.7165	.0002

It can be revealed from Table 4.5 that the calculated value for W was 133.5, which supported the normal distribution of scores. The calculated Z- Critical importance was -3.7165, with a negative mean difference of -1.62. Thus, the null hypothesis, "There will be no significant difference in the Mean achievement score in Science and Technology subject of class 9 students of the control group in pre-test and post-test", was accepted. Further, the rank table detailing the differences within the group has been revealed in table 4.6.

Table 4.6: Rank Table of Experimental Group and Control Group

Group	Ranks	N	Mean Rank	Sum of Ranks
Control Group	Negative Ranks	12	11.13	133.5
	Positive Ranks	28	24.52	686.5
	Ties	0	0	0
	Total	40		
Experimental Group	Negative Ranks	0	0	0
	Positive Ranks	40	20.5	820

	Ties	0	0	0
	Total	40		

The above Table 4.6 shows the comparison of mean rank and sum of levels of pre-test and post-test for both the Control group and Experimental group. The table revealed that, in the control group, 28 students having a mean rank of 24.52 showed higher achievement scores, and 12 students with a mean level of 11.13 showed lower achievement scores after the traditional way of teaching. The number of ties in both the cases (Experimental group and Control group) was 0. Considering the Experimental group, all the 40 students indicated higher achievement with all the positive ranks.

All the positive ranks demonstrated by the Experimental group also explained the effectiveness of the program. It could be concluded that students involved in learning science and technology subjects through Life skill-based activities expressed higher achievement when compared to the students taught through the traditional method.

4.2 Analysis for Objective Four

Objective four states that "to study the effectiveness of life skill-based activities in terms of improvement in life skills of experimental group" and to bring off this objective, worksheets and related field notes were graded using checklists. Further, grades were quantified and evaluated through frequency and percentage to understand the effectiveness of Life Skill-based Activities in improving life skills.

A detailed account of the analysis is tabulated in table 4.7 and interpreted subsequently. Further, the data is also graphically represented (graph 4.3) and paraphrased.

Table 4.7: Descriptive Statistics of Worksheets showing Grades, Frequency, and Percentage

Worksheets	Grades	Frequency	Percent
Worksheet 1	A*	11	27.5
	A	13	32.5
	B	11	27.5
	C	4	10.0
	D	1	2.5
Worksheet 2	A*	4	10.0
	A	13	32.5
	B	14	35.0
	C	9	22.5
	D	0	0.0

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	A*	9	22.5
	A	23	57.5
Worksheet 3	B	8	20.0
	C	0	0.0
	D	0	0.0
	A*	8	20.0
	A	27	67.5
Worksheet 4	B	5	12.5
	C	0	0.0
	D	0	0.0
	A*	12	30.0
	A	20	50.0
	B	6	15.0
Worksheet 5	C	1	2.5
	D	1	2.5
	Total	40	100.0

Table 4.7 shows the descriptive statistics of grades achieved by students in five worksheets. CBSE Clustered all the ten core Life Skill under three major themes, namely Thinking, Social and Emotional Skills. All worksheets measure related indicators of three essential life skills – Thinking, Social, and Emotional Skills and were assessed with the help of field notes and a checklist (provided by CBSE in Life Skill manual for IX-X), accordingly grades were given to the students. The assigned grades were based on number of indicators reflected by students through worksheets and records maintained in field notes. Frequency and percentage were calculated to comprehend the improvement in life skills in students through the developed program.

From worksheet 1, it could be observed that more than 50% of students were under A* or A grade, 27.5% of students achieved B grade, and 12.5% of students showed C and D grades. In worksheet 2, 10 % of students achieved A* and 32.5% managed with grade A whereas 35 % and 22.5 % of students achieved B and C respectively. 22.5 per cent of students secured A* in worksheet 3, and 57.5% of students performed under grade A. Remaining 20% of students were able to reach unto B grade in the same worksheet leaving no student for C and D quality. In worksheet 4, The total percentage for rates A* and A clubbed together increased to 87.5%, wherein 12.5 % of students achieved B

grades. Further, after the analysis of worksheet 5, it was observed that 80% of students earned A* or A degree, 15% of students acquired B grades, and 5% of students achieved C grades.

From the above data, it could be remarked that initially percentage of students under grade C and D was sizable and dwindled after a considerable number of activities. The results also highlight the decline in the rate of students under B grade, which eventually boosted the percentage of students under Grade A and A*. Thus, it can be concluded that the implemented program was significantly effective in terms of improvement in Life Skills among Secondary students of CBSE.

Graph 4.3: Graphical Presentation of the Number of Students under Different Grades in all Five Worksheets.
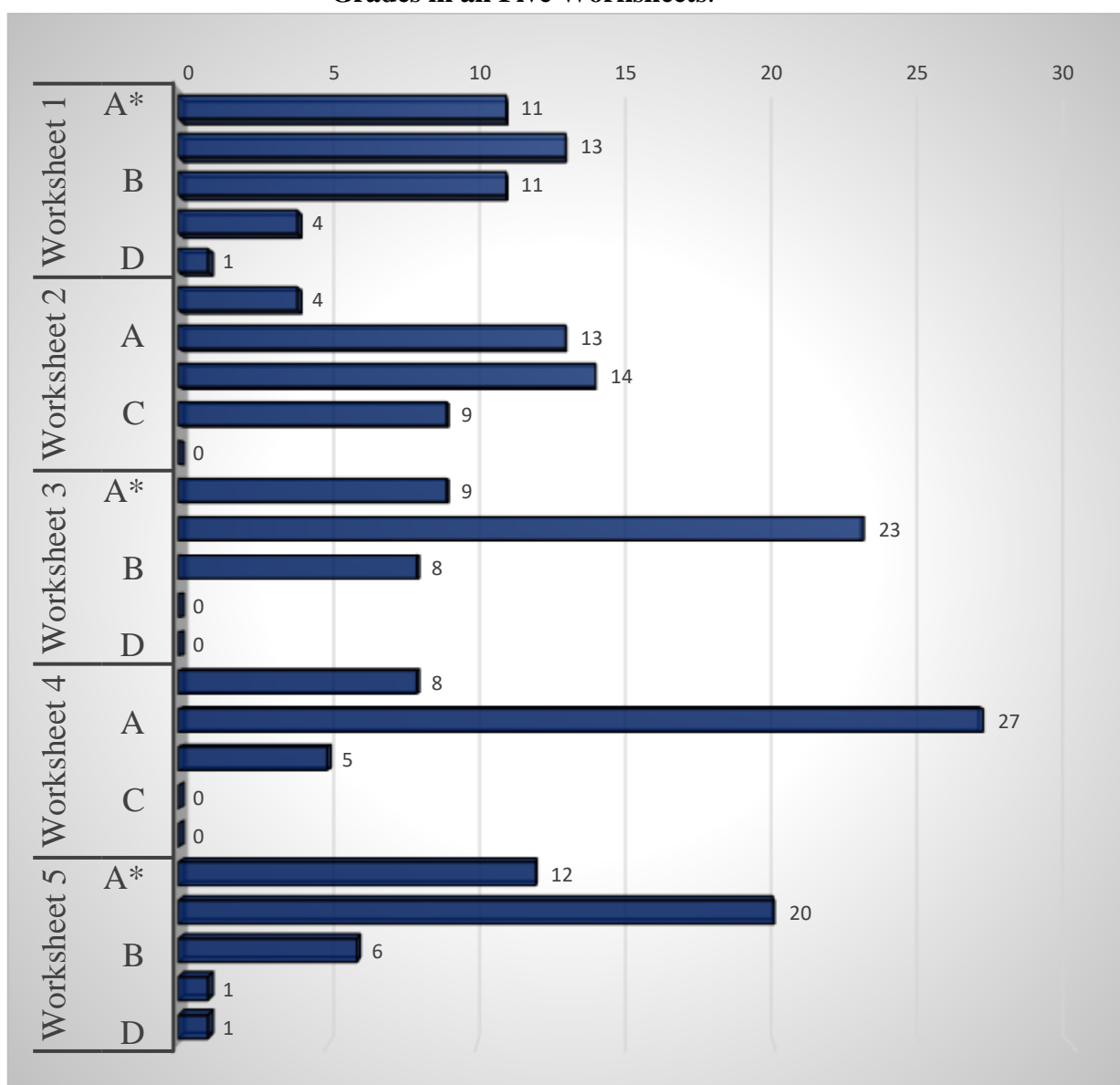
An examination of the graphical representation of the above data (4.3) shows an upward trend in the number of students under grade A with every progressive worksheet. Similarly, there was a noticeable downward trend in the count of students under grades B, C and D. The shift in combined percentage of students from B, C, and grades D to A and A* validates that there was improvement in Life Skills. Accordingly, the thorough evaluation of the data in both the sections, i.e. presentation of frequency and percentage, as well as the graphical representation of the number of students under different grades in all five worksheets, authenticates the effectiveness of the Life skill-based activities, concerning life skills, among students of the ninth standard in CBSE schools.

4.3 Analysis for Objective Five

Objective five states, "to study the opinion of students about implemented Life Skill-based activities in Science and Technology at class IX", to achieve this objective, data was collected from the students of the experimental group with the help of an opinionnaire. The opinionnaire had 13 open-ended questions. Thematic content analysis was done on the responses received from the opinionnaire. Furthermore, later frequency and percentage were used to quantify the themes. The study of the opinionnaire is detailed below through tables 4.8 to 4.31.

Question 1

Did you enjoy learning different topics through activities?

Table 4.8: Student's Responses for Question 1

Responses	Frequency	Percent
Yes	38	95.0
No	2	5.0
Total	40	100.0

Graph 4.4: Graphical Presentation of Students' Responses for Question 1
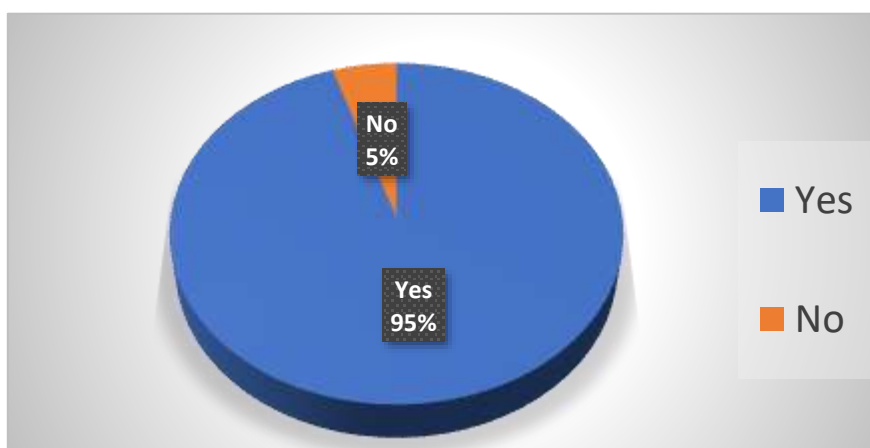
Table 4.8 shows if the students enjoyed learning different science topics through activities designed in the program. It could be explained that 95% of the students enjoyed learning various science topics through activities. 5% of the students didn't enjoy activity-based learning experiences. Thus, it can be said that according to the students teaching-learning through activities was an entertaining and learning practice.

Question 2

a) **Do you think that activities help in developing interest in learning science?**

Table 4.9: Student's Responses for Question 2a

Responses	Frequency	Percent
Yes	37	92.5
No	0	0
Don't know	2	5
May be	1	2.5
Total	40	100.0

Graph 4.5: Graphical Presentation of Students' Responses for Question 2a
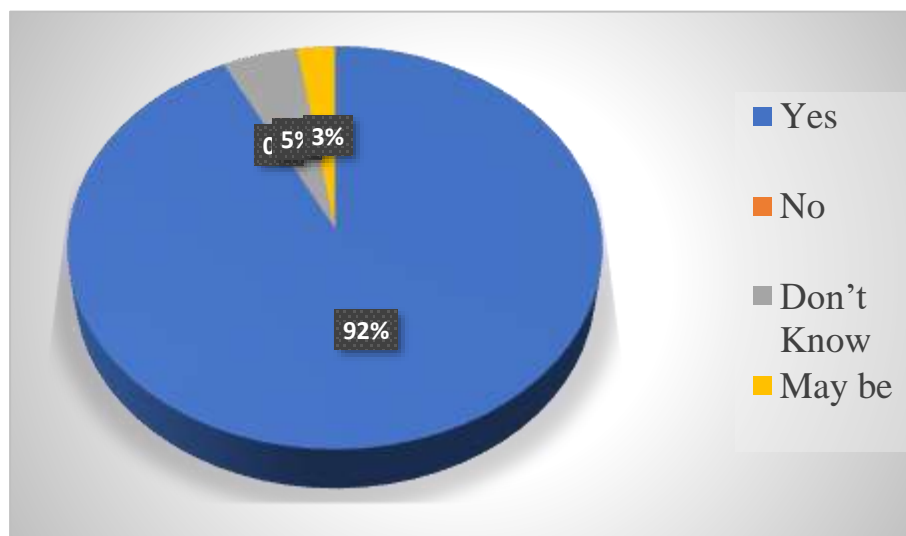
Table 4.9 Shows students' responses to whether activities help in developing interest in learning science or not. 92.5% of the students agreed with the statement, with no student showing disagreement. 5% of the students were marked unaware, and 2.5% were uncertain about the statement. A higher percentage of the students towards positive response concludes that they believe teaching-learning through activities enhanced interest for science and technology subject.

b) If yes, how? If no why?

Table 4.10: Student's Responses for Question 2b.

Responses	Frequency	Percent
Pragmatic Approach	9	22.5
add fun in boring topics	7	17.5
Involvement of Students	8	20
Creates interest	11	27.5
Developing Interrelating Skills	3	7.5
None	2	5
Total	40	100.0

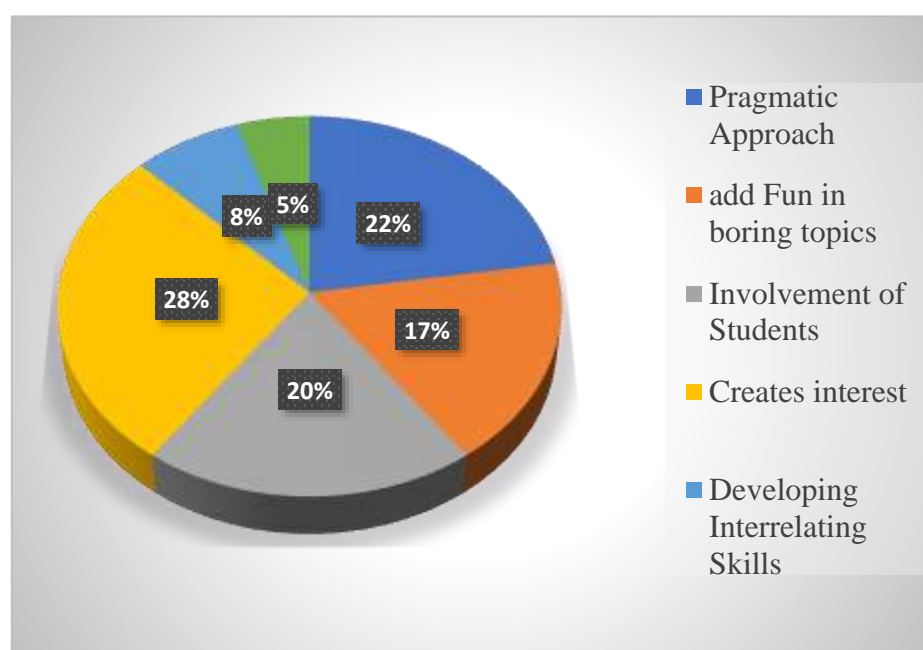**Graph 4.6: Graphical Presentation of Students' Responses for Question 2b**

Table 4.10 explains the different ways the activities help develop an interest in learning science, as suggested by students. When asked, 22.5 % of the students found a pragmatic approach, 27.5 % of students found the activities interesting, 20% of students said the involvement of students in activities, 17.5% of students find the activities develop fun in boring topics also, 7.5% students developed inter-relating skills through exercises. Thus, it can be concluded from the above data that according to students, activities help create

interest among students as, during workouts, most of the students were involved during learning.

Question 3

a) **In your opinion, did learning science help in developing life skills like decision making, thinking skills, etc.?**

Table 4.11: Student's Responses for Question 3a.

Responses	Frequency	Percent
Yes	30	75
No	3	7.5
Don't know	3	7.5
May be	4	10
Total	40	100.0

Graph 4.7 Graphical Presentation of Students' Responses for Question 3a
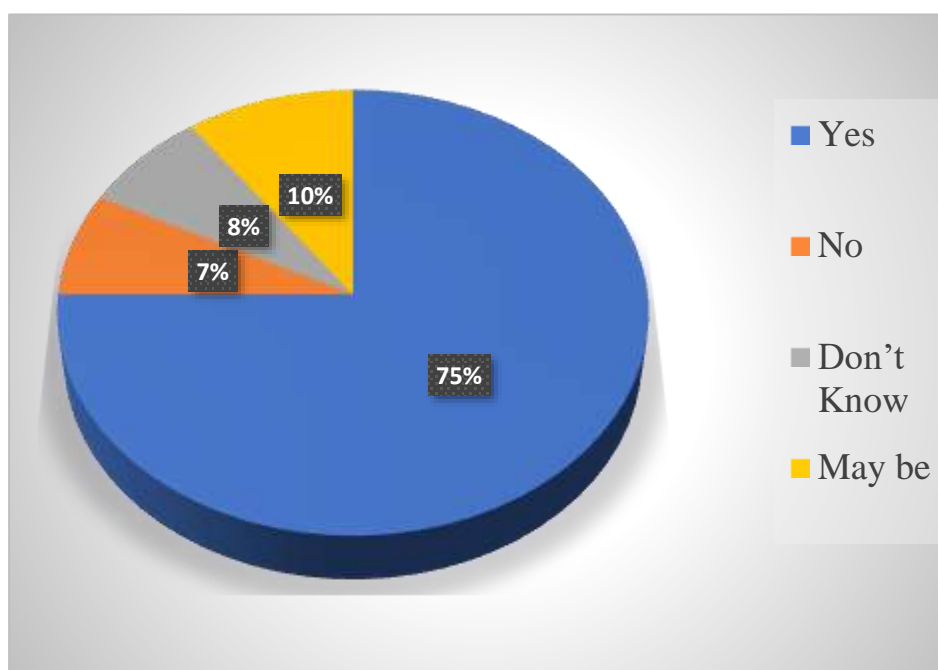
Table 4.11 shows students' responses towards the statement, "learning science through activities helps develop life skills like decision making, thinking skills, etc.". 75% of the students responded 'yes' whereas 10% were uncertain concerning the above statement. It can be interpreted from the above data that a higher percentage of students thought that learning science could support improving life skills.

b) If yes, give examples.

Table 4.12: Student's Responses for Question 3b

Students response	
	Developed problem solving and decision making skills
	Developed team work
	We draw inferences of all the activities our-self
	Discussions at the end of the activities helped in speaking proactively
	Explored self and our future aspirations
	Developed sense of inquiry and self-analysis
	Learning science concepts from daily life
	Developed healthy inter-personal relationship with entire class
	Could easily handle academic pressure and peer-pressure
	Practically and self-learning helps in clearing all doubts
	All the students got chance to speak on the dais
	Understanding each other helps us to develop empathy for each other
	Finish everything within time helps in developing time management and stress management
	Rewards at the end of the activities motivates for next task.
	Cheerful and enjoyable environment during activities relieves stress
	Understanding Concepts easily – such as Energy and Evaporation

The above table 4.12 highlighted a few statements stated by students in response the question 3b. According to students of the experimental group, understanding science concepts helps develop various life skills and scientific skills. Further, students remarked that learning science in a joyful environment helped them create a sense of inquiry and self-analysis, time management and stress management, decision-making skills, communication skills, confidence, interpersonal relationship, self-analysis, and an understanding of the concepts with more clarity.

Question 4

Your understanding of certain science concepts was improved due to activities; mention those activities that helped you learn.

Table 4.13: Student's Responses for Question 4

Activity	Topic	Frequency	Percentage
Activity 1	Tissues	11	27.5
Activity 2	Types of Tissues	16	40
Activity 3	Force, Balanced and unbalanced force	12	30
Activity 4	Cell Organelles	12	30
Activity 5	Cell	20	50
Activity 6	Water	13	32.5
Activity 7	Evaporation	18	45
Activity 8	Life history of Newton	16	40
Activity 9	States of matter	13	32.5
Activity 10	Mixtures	24	60
Activity 11	Crop Production Management	12	30
Activity 12	Separating the components of the mixture	16	40
Activity 13	Animal tissue	16	40
Activity 14	Conservation of energy	13	32.5
Activity 15	Crop variety	16	40
	Don't Know	6	15

Graph 4.8: Graphical Presentation of Students' Responses for Question 4
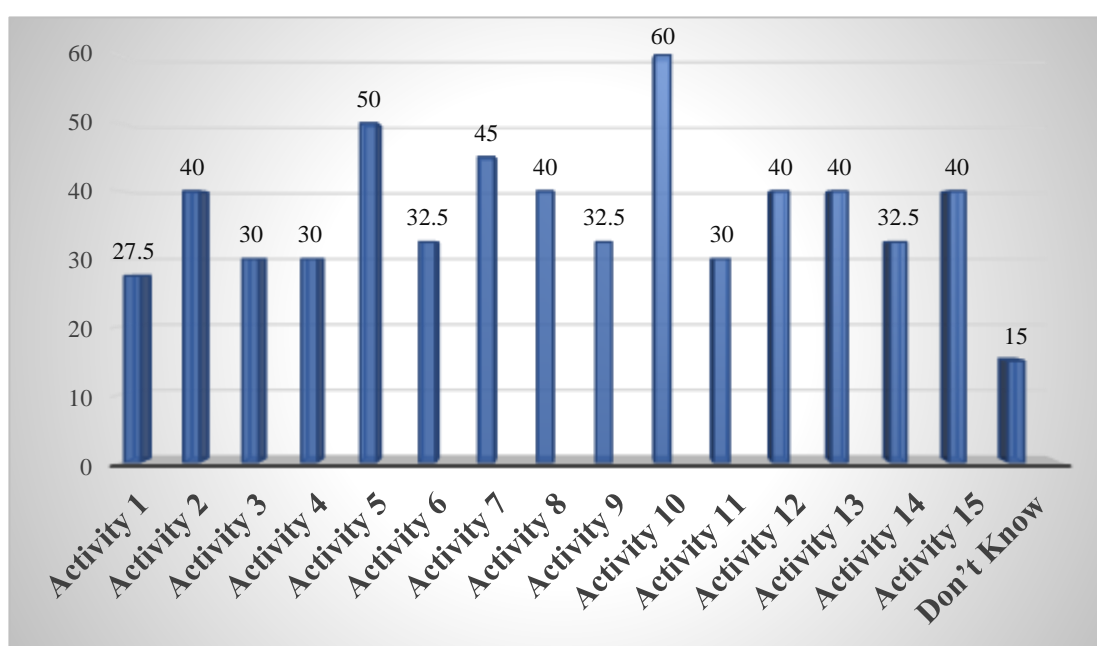
The examination of table 4.13 shows the responses from the students concerning statement 4, "Your understanding about certain science concepts was improved due to activities". 60% of the students liked 'Activity 10' which was on topic 'Mixture', 50% of the students marked 'Activity 5' and 40% of the students pointed to Activity 2, 3, 8, 12, 13, and 15 as a helpful technique for making science concepts accessible and transparent. When students were asked to mention the concepts they learned well, it can be explained from the above graph that Mixture, evaporation, separating the components of the mix, animal tissue, type of tissues, list of history of Newton and crop variety were learned well.

Question 5

a) **Do you think that activities taken under different topics were sufficient enough?**

Table 4.14: Student's Responses for Question 5a

Responses	Frequency	Percent
Yes	16	40.0
No	9	22.5
May be	10	25
Don't Know	5	12.5
Total	40	100.0

Graph 4.9: Graphical Presentation of Students' Responses for Question 5a
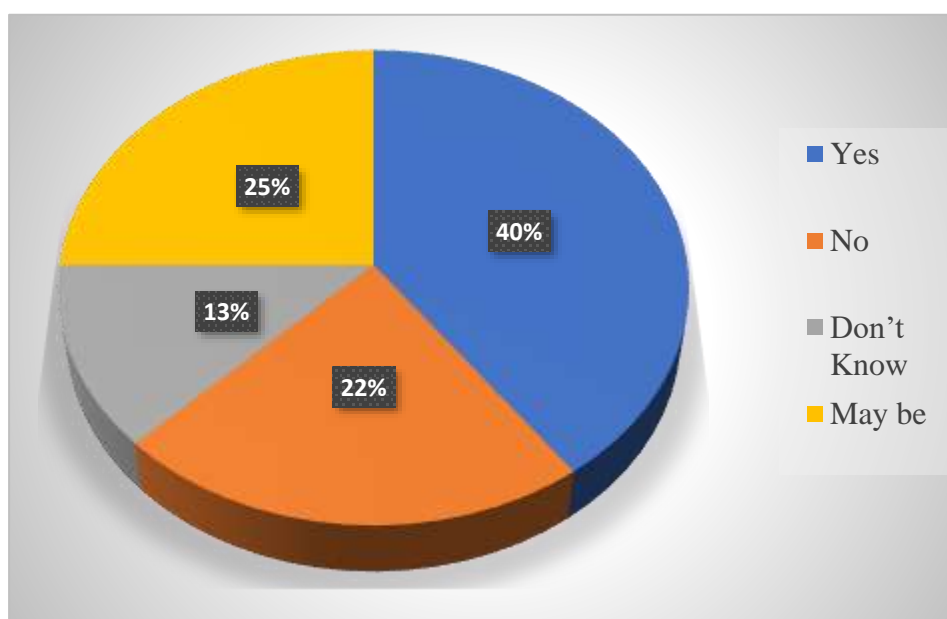
Table 4.14 presents the students' reactions concerning adequacy about the number of activities conducted to teach different topics. It can be derived from the table that 40% of students found the actions were adequate for the learning of science concepts, 25% of students responded as doubtful, 12.5 % of the student did not know if the number of activities taken under the program, were sufficient or not whereas 22.5 % of the students denied the sufficiency concerning the number of activities which were conducted to teach various topics of science subject.

b) **List topics where you feel more activities should have been given.**

Table 4.15: Student's Responses for Question 5b

Topic	Frequency	Percentage
Tissues	5	12.5
Types of Tissues	5	12.5
Force, Balanced and unbalanced force	5	12.5
Cell Organelles	3	7.5
Cell	3	7.5
Water	1	2.5
Evaporation	4	10
Life history of Newton	2	5
States of matter	4	10
Mixtures	6	15
Crop Production Management	3	7.5

Separating the components of the mixture	4	10
Animal tissue	2	5
Conservation of energy	2	5
Crop variety	2	5
All	4	10

Graph 4.10 Graphical Presentation of Students' Responses for Question 5b
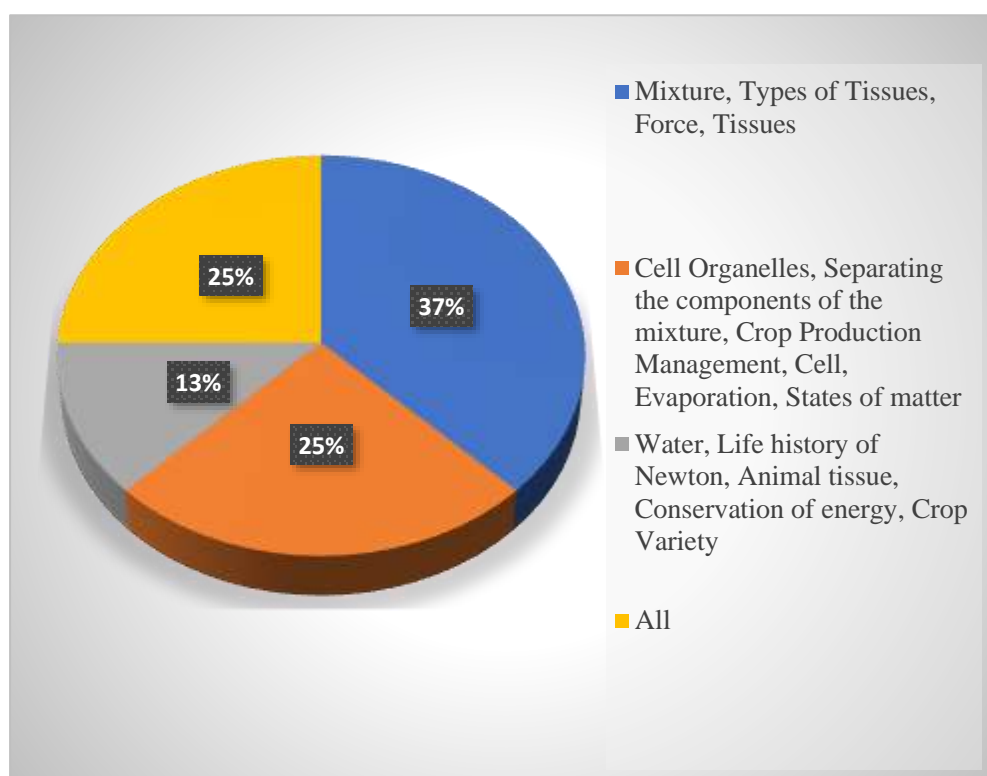

Table 4.15 lists the topic where students believe more activities should be added to make the concept clearer. 15% of students believe that topic 'Mixture' needs more activities whereas 12.5% of the students marked three topics, i.e. Tissues, Types of tissues and Force, Balanced and unbalanced force, which requires more actions to clear all the doubts. It can be interpreted from the above data that most of the activities were sufficient enough to make the concerned topic easier and understandable for the students.

Question 6

List the activities that interested you, and you enjoyed doing them

Table 4.16: Student's Responses for Question 6

Topic	Frequency	Percentage
Tissues	6	15
Types of Tissues	5	12.5
Force, Balanced and unbalanced force	10	25
Cell Organelles	0	0
Cell	0	0
Water	0	0
Evaporation	1	2.5
Life history of Newton	0	0
States of matter	5	12.5
Mixtures	4	10
Crop Production Management	4	10
Separating the components of the mixture	2	5
Animal tissue	6	15
Conservation of energy	0	0
Crop variety	6	15
All	23	57.5

Graph 4.11: Graphical Presentation of Students' Responses for Question 6
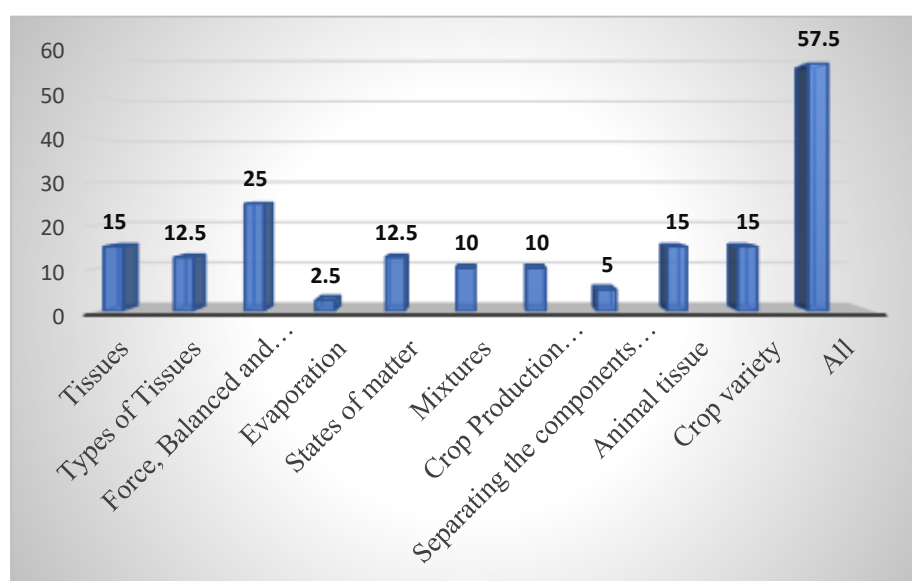
Table 4.16 shows the list of activities that students enjoyed. More than 50% of the students relish their participation in the activities with much enthusiasm and find the program interesting. Moreover, few students enjoyed the activities related to the topics such as animal tissues, crop variety, tissues, balanced and unbalanced force, and mixtures.

Question 7

Whether given home assignments were relevant and exciting or not?

Table 4.17: Student's Responses for Question 7

Responses	Frequency	Percent
Yes	36	90
Don't Know	1	2.5
No	3	7.5
Total	40	100.0

Graph 4.12: Graphical Presentation of Students' Responses for Question 7
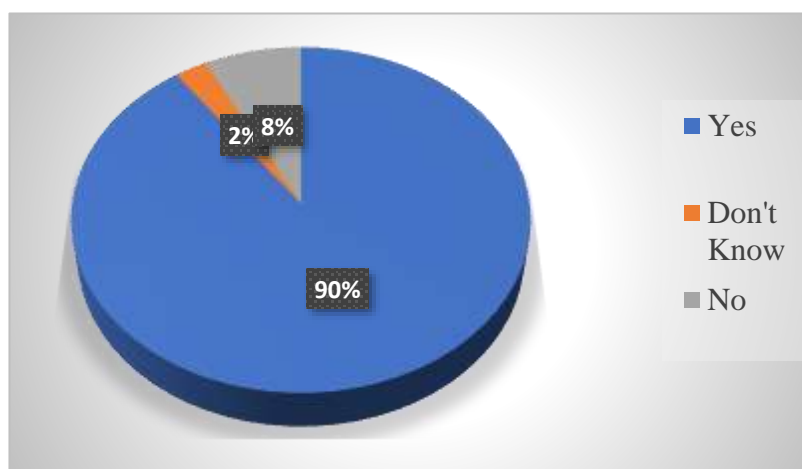
Table 4.17 gives an account of students' responses towards the relevancy of the assignments given after the activities. 90% of students indicated a positive reaction towards the appropriateness of the home assignments, whereas 7.5% of students found homework irrelevant and uninteresting. According to most of the students, the given terms were appropriate as well as attractive. It could be concluded that a higher percentage of students enjoyed the assignments with curiosity.

Question 8

   a) **List the activities more exciting and relevant to the topic**

Table 4.18: Student's Responses for Question 8a

Activity	Topic	Frequency	Percentage
Activity 1	Tissues	5	12.5
Activity 2	Types of Tissues	4	10
Activity 3	Force, Balanced and unbalanced force	7	17.5
Activity 4	Cell Organelles	6	15
Activity 5	Cell	8	20
Activity 6	Water	10	25
Activity 7	Evaporation	9	22.5
Activity 8	Life history of Newton	5	12.5
Activity 9	States of matter	4	10
Activity 10	Mixtures	9	22.5
Activity 11	Crop Production Management	7	17.5
Activity 12	Separating the components of the mixture	7	17.5
Activity 13	Animal tissue	4	10
Activity 14	Conservation of energy	7	17.5
Activity 15	Crop variety	5	12.5
All Activities		28	70

Graph 4.13: Graphical Presentation of Students' Responses for Question 8a
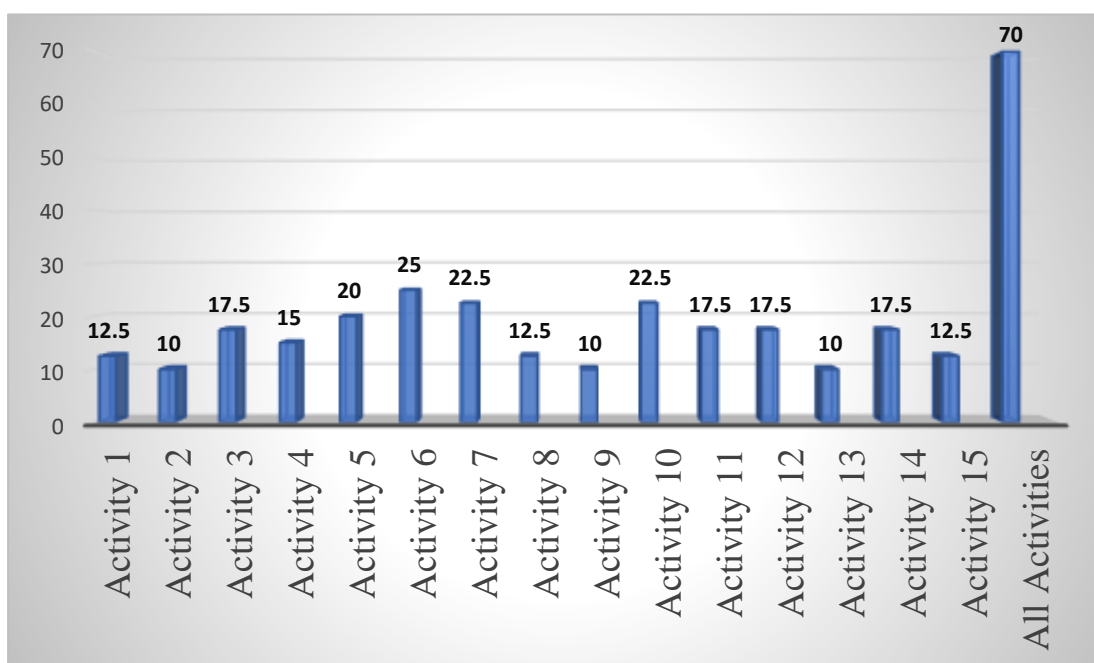
Table 4.18 indicates the list of activities where students found more applicability in terms of the subject matter. 70% of students saw all the activities relevant for their learning of science subject whereas 20-25% of students were able to connect more on the activities 10, 5, 7, and 6 for the topics such as Mixture, cell, evaporation and water; respectively. 10-20% of students pointed other remaining activities. It can be concluded from the above data that a higher number of students marked all the activities as relevant and exciting concerning the subject matter.

b) **Give reason for statement 8a**

Table 4.19: Student's Responses for Question 8b

Response	Frequency	Percentage
Familiar and playful games	13	32.5
Pragmatic approach	16	40
Activities creates interest	24	60
Breaks monotonous class rules	28	70
Easily grasped, interesting and related	22	55
Clear doubts	32	80
Develops curiosity	34	85
Enjoyable and fun-filled	29	72.5
Tough and need more time to complete	11	27.5

Graph 4.14: Graphical Presentation of Students' Responses for Question 8b
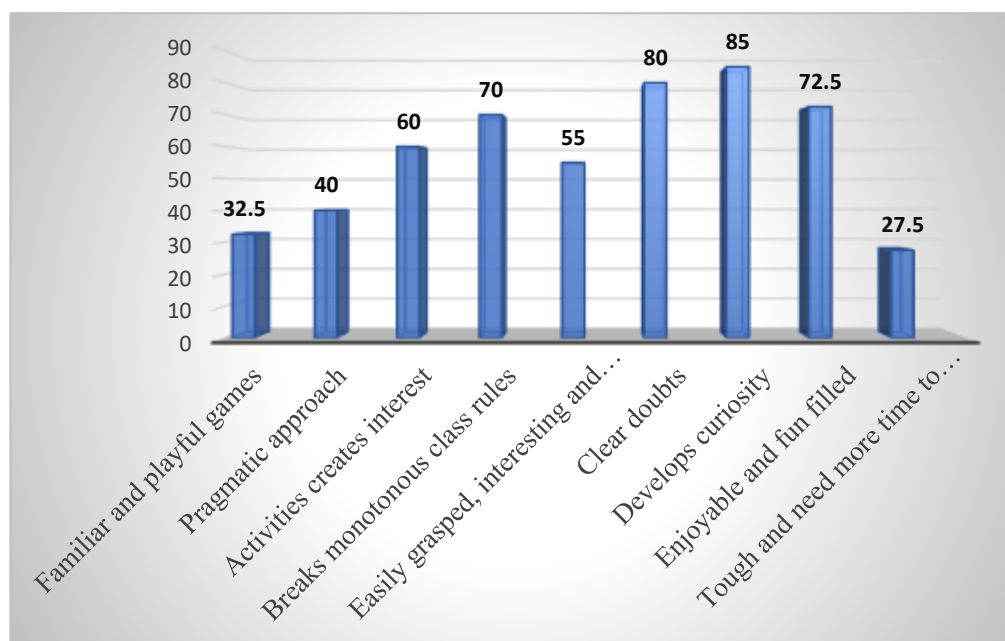
Table 4.19 presents a list of justifications figured out by students in response to statement 8a. Most of the students found activities more exciting and relevant to the topic because activities develop curiosity and interest in the case, unclogs all the doubts, pause monotonous rules of the class, are fun-filled and enjoyable, and involve all the students. Further, a few students also pointed that undoubtedly, activities were enjoyable, but they were also tough and time-consuming.
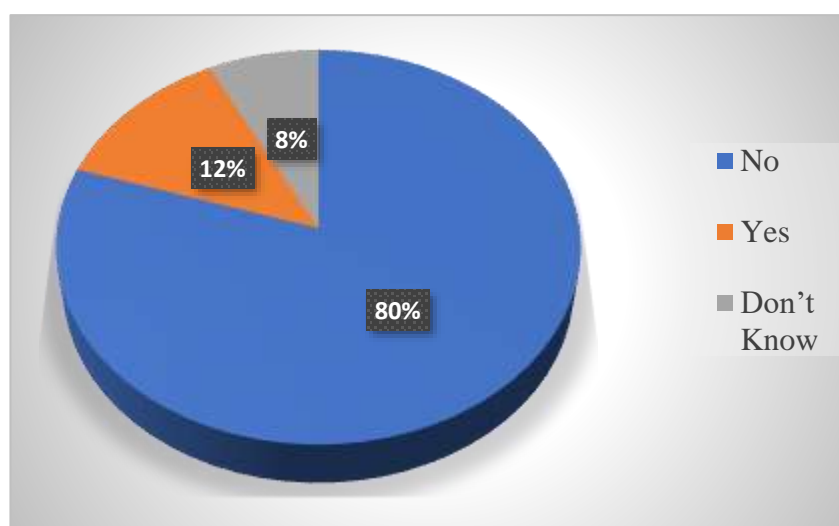
Question 9

a) **No home assignment was given after the activity was not exciting and irrelevant to the topic.**

Table 4.20: Student's Responses for Question 9a

Response	Frequency	Percentage
No	32	80
Yes	5	12.5
Don't Know	3	7.5
Total	40	100

Graph 4.15: Graphical Presentation of Students' Responses for Question 9a

In table 4.20, students' feedback about home assignments was detailed. It can be interpreted from the above table that 80% of students favoured all the tasks exciting and relevant to the topic. On the contrary, 12.5% of students remarked some of the assignments as irrelevant and tedious.

b) **Which home assignment was not exciting and irrelevant to the topic?**

Table 4.21: Student's responses for question 9b

Assignments given after activity 6, Activity 8 and Activity 12 were responded to by students as dull.

12.5% of students identified assignments given after Activity 6, 8 and 12 as dull and exhaustive.

Graph 4.16: Graphical Presentation of Students' Responses for Question 9b
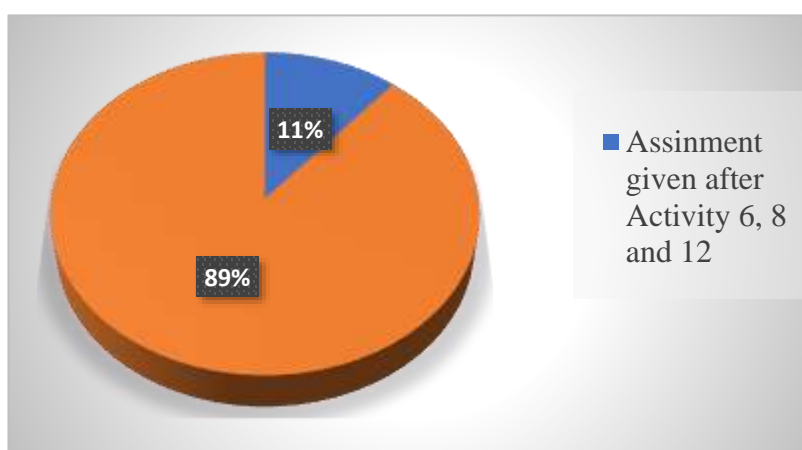
Question 10

What changes do you perceive in yourself after the program in terms of your understanding of science concepts?

Table 4.22: Student's Responses for Question 10

Responses	Frequency	Percent
Better understanding of concepts	14	35
Confident in boring topics also	4	10
Creative skills, thinking skills and inquiry skills	6	15
Relate science concepts with daily life situations	10	25
Energetic, proactive and motivated	4	10
Don't know	2	5
Total	40	100.0

Graph 4.17: Graphical Presentation of Students' Responses for Question 10
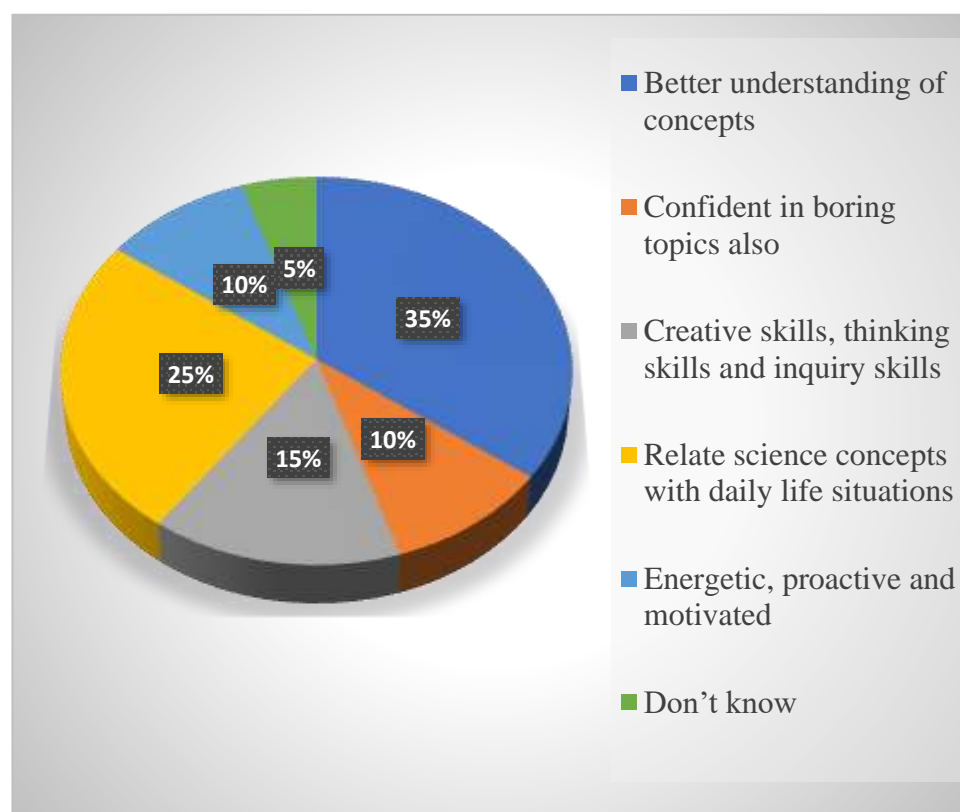

Table 4.22 shows the students' perceptions about the changes they feel about their understanding of science concepts with the program. It can be explained from the table and pie chart that 14 students found their learning got improved as they could understand the concept better. In contrast, ten students stated that they could easily relate science concepts with daily life situations and comprehend them easily. 4 students found their communication skills improved by participating in all the activities conducted by the researcher during the program. Six students found their creativity skills also enhanced by involving themselves in the program. It can be interpreted from the data that students of the experimental group improved their cognizance in science learning.

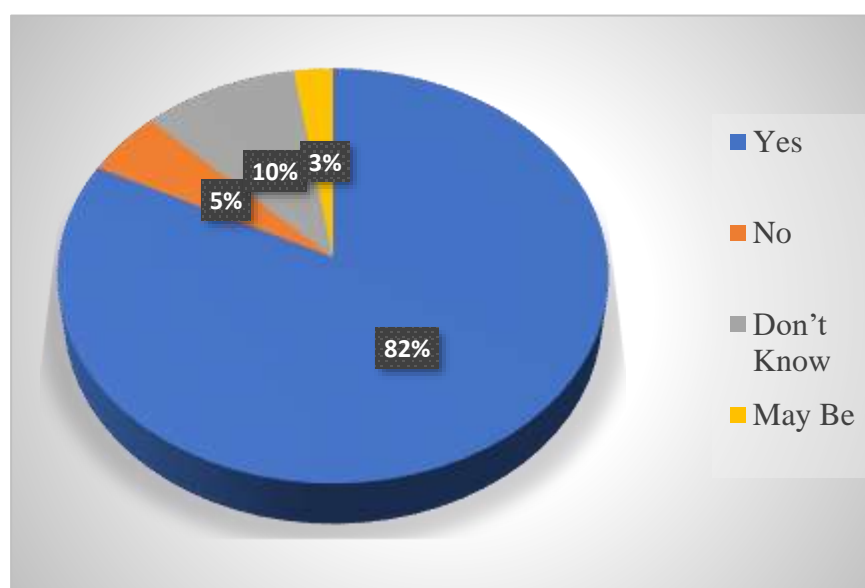**Question 11**

a) **The program helps you in developing:**

Yes/No/Don't Know/Maybe

I. **Communication Skills:**

Table 4.23: Student's Responses for Question 11a (I)

Responses	Frequency	Percent
Yes	33	82.5
No	2	5
Don't Know	4	10
May Be	1	2.5
Total	40	100.0

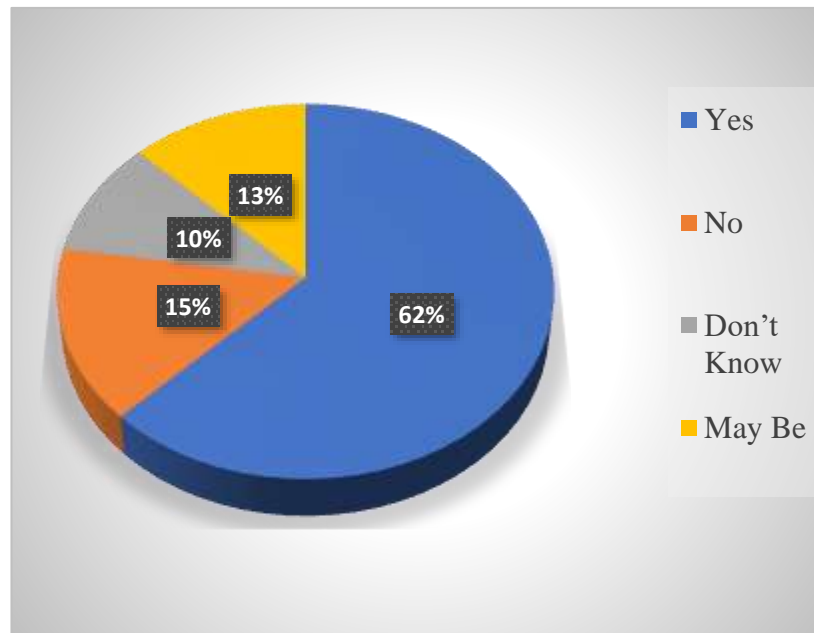**Graph 4.18: Graphical Presentation of Students' Responses for Question 11a(I)**

II. **Creativity and Critical Thinking**

Table 4.24: Student's Responses for Question 11a (II)

Responses	Frequency	Percent
Yes	25	62.5
No	6	15
Don't Know	4	10
May Be	5	12.5
Total	40	100.0

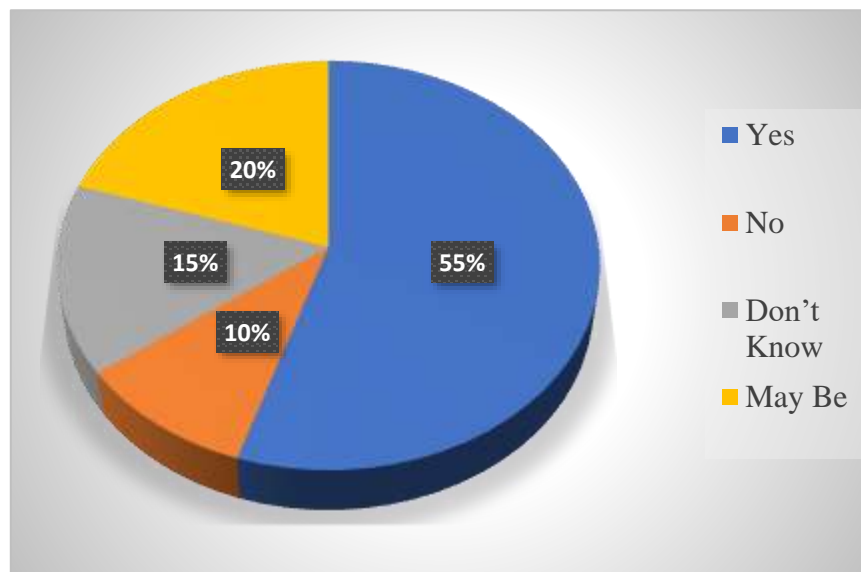**Graph 4.19: Graphical Presentation of Students' Responses for Question 11a(II)**

III. Emotional Stability and Stress Management:

Table 4.25: Student's Responses for Question 11a (III)

Responses	Frequency	Percent
Yes	22	55
No	4	10
Don't Know	6	15
May Be	8	20
Total	40	100.0

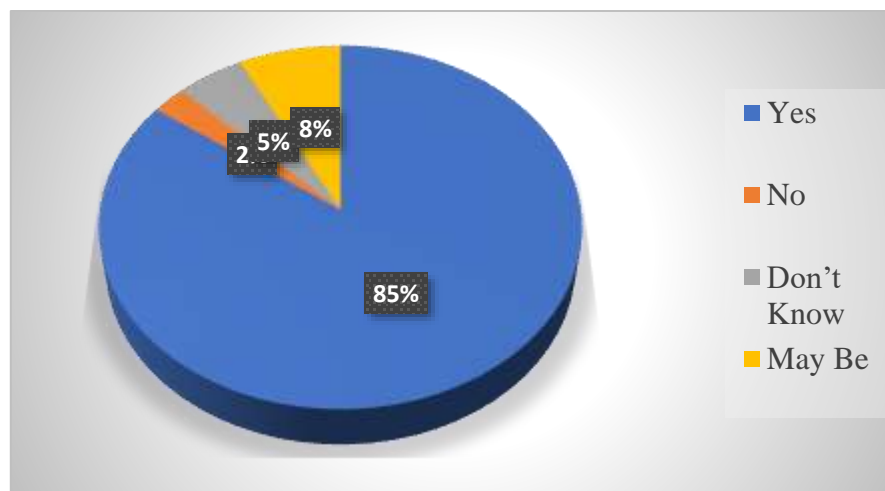**Graph 4.20: Graphical Presentation of Students' Responses for Question 11a(III)**

IV. Self-awareness and Decision making abilities:

Table 4.26: Student's Responses for Question 11a (IV)

Responses	Frequency	Percent
Yes	34	85
No	1	2.5
Don't Know	2	5
May Be	3	7.5
Total	40	100.0

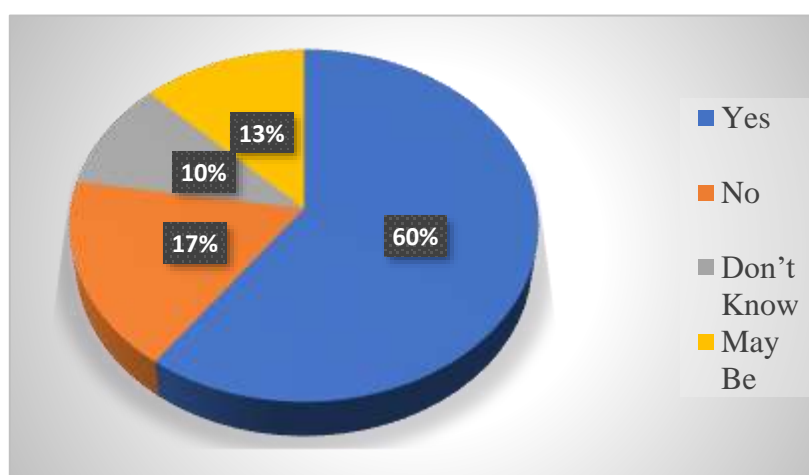**Graph 4.21: Graphical Presentation of Students' Responses for Question 11a(IV)**

V. Empathy and Interpersonal Relationship

Table 4.27: Student's Responses for Question 11a (V)

Responses	Frequency	Percent
Yes	24	60
No	7	17.5
Don't Know	4	10
May Be	5	12.5
Total	40	100.0

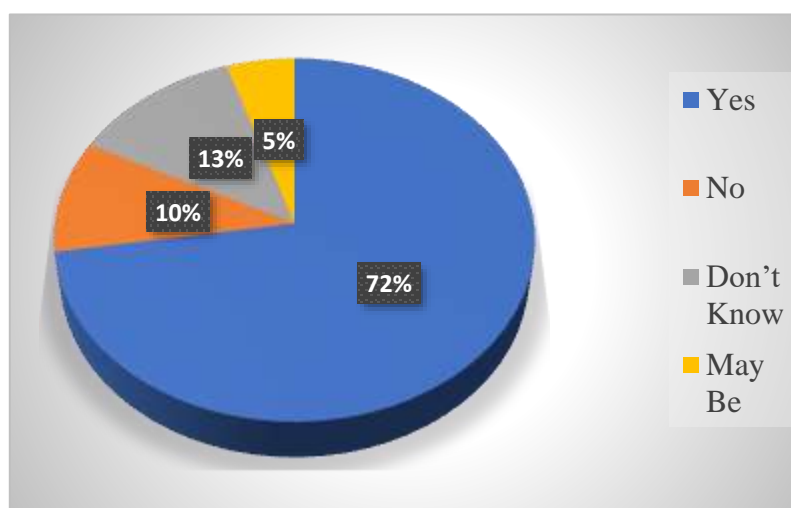**Graph 4.22: Graphical Presentation of Students' Responses for Question 11a(V)**

VI. Problem Solving Skills

Table 4.28: Student's Responses for Question 11a (VI)

Responses	Frequency	Percent
Yes	29	72.5
No	4	10
Don't Know	5	12.5
May Be	2	5
Total	40	100.0

Graph 4.23: Graphical Presentation of Students' Responses for Question 11a(VI)

Tables 4.23 to 4.28 presents students' opinions about the life skills developed during the program. It can be derived from the above data presentation that, on average, more than 55% of students admitted that the program magnified their skills, and almost 10-20% of students were indeterminate whether there is improvement in life skills or not. According

to the students, it means that Life Skill-based activities (program) helped them enhance different life skills.

b) **Express your views briefly about how the program helps you in developing the above Life Skills**

Table 4.29: Student's Responses for Question 11b

Responses	Frequency	Percent
Become more confident and energetic in class	25	62.5
Developed Communication Skills	33	82.5
Developed team management	20	50
Could work in any team easily	31	77.5
Understand each other in class and each other's problems	35	87.5
Could adjust in any environment	22	55
Could manage studies and peer pressure easily	26	65
Developed Inquiry Skills, Creativity and Thinking Skills	27	67.5
Always feel motivated	19	47.5
Created interest in boring science	34	85

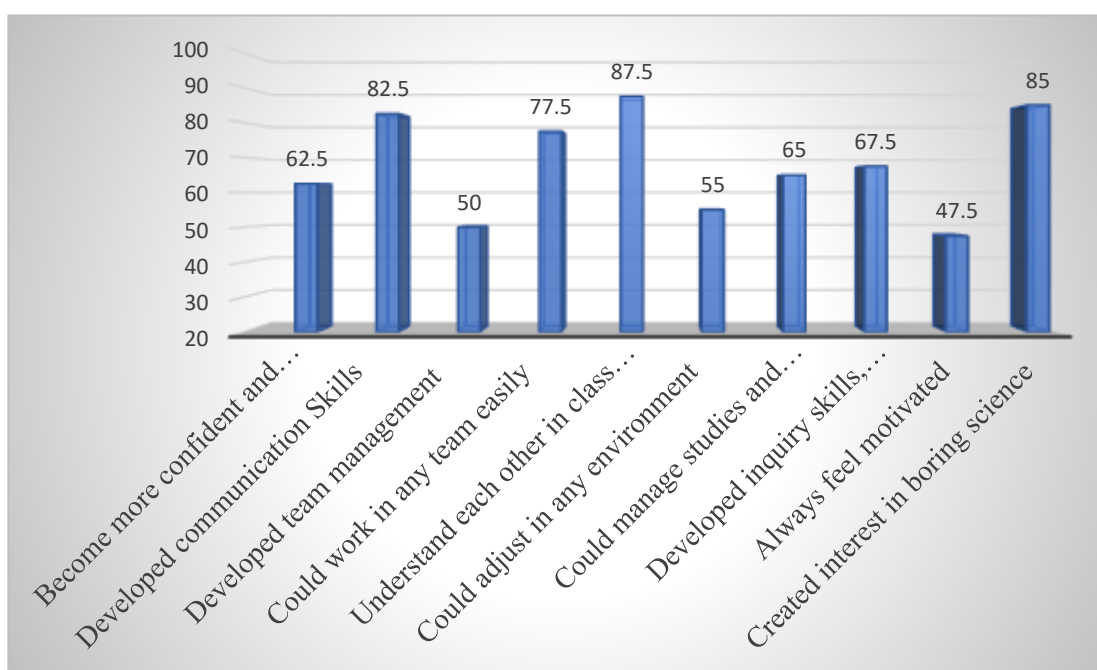**Graph 4.24: Graphical Presentation of Students' Responses for Question 11b**

Table 4.29 highlights different viewpoints stated by students when asked to present their views on the program's effectiveness in terms of life skills. It can be interpreted from the above data that a significant percentage of students opined that the program helped create interest in boring topics, developed interpersonal relationships while knowing each other during the activities, developed teamwork and team management, enhanced communication skills, developed inquiry skills, creativity, and thinking skills.

Question 12

Learning Science would become easier with the help of Life Skills. Yes/No/Don't Know/Maybe.

Table 4.30: Student's Responses for Question 12

Responses	Frequency	Percent
Yes	36	90
No	0	0
Don't Know	1	2.5
May Be	3	7.5
Total	40	100.0

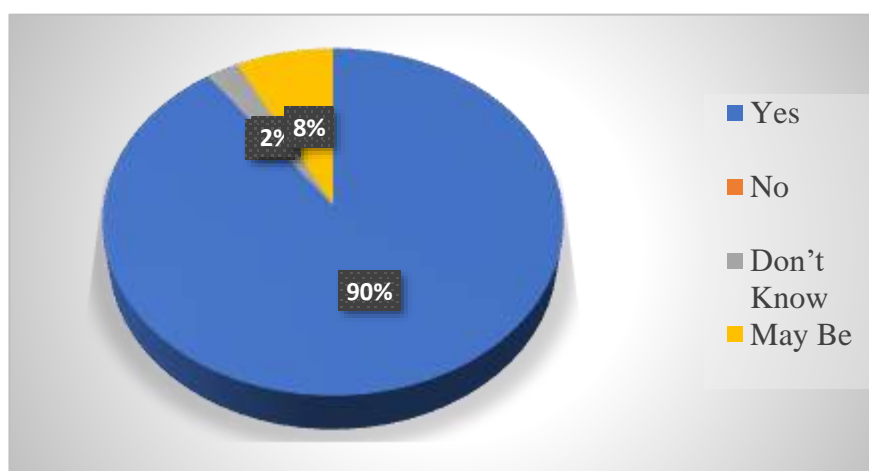**Graph 4.25: Graphical Presentation of Students' Responses for Question 12**

Table 4.30 shows students' responses towards the statement, "Learning Science would become easier with the help of Life Skills". 90% of the students found life skills as a helping hand in learning science concepts.
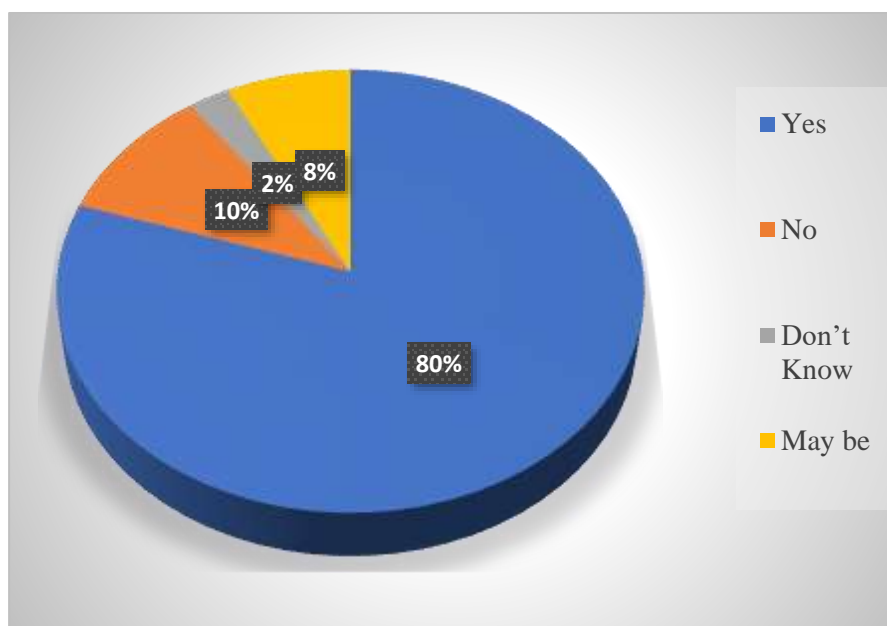
Question 13

Learning Life Skills would become easier with the help of science concepts. Yes/No/Don't Know/Maybe.

Table 4.31: Student's Responses for Question 13

Responses	Frequency	Percent
Yes	32	80
No	4	10
Don't Know	1	2.5
May be	3	7.5
Total	40	100

Graph 4.26: Graphical Presentation of Students' Responses for Question 13

The above Table 4.31 presents students' feedback on whether science concepts helped develop life skills. It can be understood from the table that 80% of students were in favour of the response that Life skills would easily be improved and even strengthened while learning through science concepts. Four students opined that learning life skills did not have any concern with learning science concepts.

The overall inference concluded after the opinionnaire analysis indicates the students' positive and favourable response towards the program. The results evidenced that majority of students enjoyed learning through activities. Further, students marked positive feedback concerning learning life skills on science concept understanding and

vice versa. In addition, students also commented few points, highlighting how the program helped them develop life skills and a better understanding of the concepts taken care of during the program.

4.4. Conclusion

The complete analysis and Interpretation of all the tools were based on the responses given by students of the experimental group. This chapter includes all the study done by the researcher along with initial interpretations. Significant findings of the research, together with the discussion part in detail, were particularized in the subsequent chapter.