# Chapter V

## Data Analysis and Interpretation

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# Data Analysis and Interpretation

## 5.0. Introduction

This chapter presentsthe analysis and interpretation of the data objective wise.

## 5.1. Objective wise Analysis and Interpretation

### 5.1.1. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers.

### 5.1.2. Hypotheses of the Study

1. There will be no significant difference among the two subsequent pre-test mean scores of student teacher on Knowledge and Skill Check up.
2. There will be significant difference among the two subsequent post-test mean scores of student teacher on Knowledge and Skill Check up.
3. There will be no significant difference between the pre-test mean score and post-test mean score of student teachers on Knowledge and Skill Check up.

### 5.1.3. Knowledge and Skill Check up

Knowledge and Skill Check Up wasconstructed to evaluate knowledge and skill of the student teachers on wholistic approach to science teaching.

### 5.1.4. Data Collection

Knowledge and Skill Check up(**KSC1**) was administered on the Student Teachers of the Experimental Group as Pre-test.After 10 days of KSC1 Knowledge and Skill Check up(**KSC2**) was administered on the Student Teachers of Experiment Group as second Pre-test. After intervention and practice teaching phase Knowledge and Skill Check up(**KSC3**) was administered on Student Teachers of Experiment Group as Post-test.After 10 days of KSC3 Knowledge and Skill Check up(**KSC4**) was administered on the Student Teachers of Experiment Group as second Post-test.

### 5.1.5. Data Analysis

Data collected through Knowledge and Skill Check Upwas analyzed through content analysis and t-test. Close ended items were analyzed by employing t-test and open ended items were analyzed by content analysis.

#### 5.1.5.1. Analysis of close ended items of Knowledge and Skill Check up of the Student Teachers of Navrachana School of Science and Education

| | N | Mean D | SD | SED | df | $t_{cal}$ | $t_{table}$ | Significance |
|---|---|---|---|---|---|---|---|---|
| **T2-T1** | 18 | 0.4444 | 1.0416 | 0.2455 | 17 | 1.8103 | 2.898 @ 0.01 level | * |
| **T3-T2** | | 43.1667 | 4.9853 | 1.175 | | 36.7363 | | ** |
| **T4-T3** | | 0.5 | 0.7859 | 0.1852 | | 2.0513 | 2.11 @ 0.05 level | * |
| **T4-T1** | | 44.1111 | 4.6512 | 1.0963 | | 40.2361 | | ** |

**Table 5.1:** Analysis of close ended items of Knowledge and Skill Check up of the Student Teachers ofNavrachana School of Science and Education

*** No significant difference at both level 0.01 and 0.05**

**** Significant difference at both level 0.01 and 0.05**

#### 5.1.5.2. Interpretation of close ended items of Knowledge and Skill Check up of the Student Teachers of Navrachana School of Science and Education

Computed t value for subsequence pre-test is 1.8103 which is less than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 17 degree of freedom. So the null hypothesis for subsequent pre-test is not rejected. It is evident from the data and it reveals that there is no significant difference among subsequent pre-test on Knowledge and Skill check up. Computed t value for second pre-test and first post-test is 36.7363 which is higher than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 17 degree of freedom. So the null hypothesis for second pre-test and first post-test is rejected. It reveals that there is significant difference among second pre-test and first post-test on Knowledge and Skill check up.Computed t value for

subsequence post-test is 2.0513 which is less than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 17 degree of freedom. So the null hypothesis for subsequent post-test is not rejected. It reveals that there is no significant difference among subsequent post-test on Knowledge and Skill check up. Computed t value for first pre-test and second post-test is 40.2361 which is higher than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 17 degree of freedom. So the null hypothesis for first pre-test and second post-test is rejected. It reveals that there is significant difference among first pre-test mean and second post-test mean on Knowledge and Skill check up.There is significant difference among pre-test mean score and post-test mean score of student teachers on Knowledge and Skill Check up. It means null hypothesis for pre-test and post-test is rejected.

### 5.1.5.3. Analysis of close ended items of Knowledge and Skill Check up of the Student Teachers of Waymade College of Education

| | N | Mean D | SD | SED | df | $t_{cal}$ | $t_{table}$ | Significance |
|---|---|---|---|---|---|---|---|---|
| **T2-T1** | 21 | 0.1429 | 0.3586 | 0.0782 | 20 | 1.8257 | 2.845 @ 0.01 level | * |
| **T3-T2** | | 41.1905 | 4.9358 | 1.0771 | | 38.2429 | | ** |
| **T4-T3** | | 0.0952 | 0.4364 | 0.0952 | | 1 | 2.086 @ 0.05 level | * |
| **T4-T1** | | 41.4286 | 5.1046 | 1.1139 | | 37.1917 | | ** |

**Table 5.2:**Analysis of close ended items of Knowledge and Skill Check upof the Student Teachers of Waymade College of Education

*** No significant difference at both level 0.01 and 0.05**

**** Significant difference at both level 0.01 and 0.05**

### 5.1.5.4. Interpretation of close ended items of Knowledge and Skill Check up of the Student Teachers of Waymade College of Education

Computed t value for subsequence pre-test is 1.8257 which is less than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 20 degree of freedom. So the null

hypothesis for subsequent pre-test is not rejected. It reveals that there is no significant difference among subsequent pre-test on Knowledge and Skill check up. Computed t value for second pre-test and first post-test is 38.2429 is higher than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 20 degree of freedom. So the null hypothesis for second pre-test and first post-test is rejected. It reveals that there is significant difference among second pre-test mean and first post-test mean on Knowledge and Skill check up. Computed t value for subsequence post-test is 1.0000 which is less than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 20 degree of freedom. So the null hypothesis for subsequent post-test is not rejected. It reveals that there is no significant difference among subsequent post-test mean on Knowledge and Skill check up. Computed t value for first pre-test and second post-test is 37.1917is higher than the table value 2.898 at 0.01 level and 2.11 at 0.05 level against 20 degree of freedom. So the null hypothesis for first pre-test and second post-test is rejected. It reveals that there is significant difference among first pre-test mean and second post-test mean on Knowledge and Skill check up.There is significant difference among pre-test mean score and post-test mean score of student teachers on Knowledge and Skill Check up. It means null hypothesis for pre-test and post-test is rejected.

### 5.1.5.5. Analysis of open ended items of Knowledge and Skill Check up of the Student Teachers

The collected data for these particular items were analyzed qualitatively using content analysis.

#### 5.1.5.5.1. Define Spiritual Education in your words

Content analysis of the responses to the open ended item ‘define spiritual education in your words’ reveals that most of the student teachers were found to have understanding that the spirit or soul is the ultimate power in us which controls and regulates our thinking, behaviour, deeds, becoming and being so as to live with peace and harmony with and in the universe. Spiritual education relates to both the physical and meta-physical reality. Spiritual education educates us on regulating emotions and behaviour to live righteous. Spiritual education deals in feelings, emotions, interests, values, attitudes and deeds that a person should be in order to develop character of a good human being. Spiritual education is which touches our heart and soul. There are various mythologies in different cultures but spirit is the same. So, we should respect

all cultures. Spiritual education deals with principles and completeness of life. Spiritual education deals in the realization of complete whole, that is, the fullness that we desire all through life including our biological, psycho-physical, socio-economical and meta-physical existence. Spiritual education deals in the co-existence of all, universe as a whole.

### 5.1.5.5.2. Which Spiritual Qualities should be inculcated in a child?

Content analysis of the responses of the student teachers to the open ended item 'which spiritual qualities should be included in a child?' reveals that every child should observe peace of mind and peace of soul. They should remain calm and happy in all the situation. They should do good deeds. They should observe truthfulness, compassion and forbearance. They should be sensitive, honest, moral, ethical, esthetical, respectful, loyal, obedient, committed, trustworthy and trusting. They should be polite and disciplined. They should be caring, sharing, loving and affectionate. They should observe prayer, pranayam and meditation. They should yog and yoga. They should observe healthy competition and be cooperative. They should learn how to deal with emotions. They should observe the traditional values, cultural and religious heritage of India at the same time modernize with temporal and spatial, logical & physical mobility. Over and above all they should have realization of the self and learn how to transcend time-space and mind to be one with the whole.

## 5.1.6. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers.

## 5.1.7. Story

A situationbased story was narrated to the experimental group Student Teachers to identify Spiritual Qualities contained therein. Further they were asked to draw out moral of the story.

## 5.1.8. Data Collection

A situationbased storywas narrated to the Student Teachers of the Experimental Group to identify Spiritual Qualities contained therein and moral of the study.

### 5.1.9. Data Analysis

Data collected through the story was analyzed through content analysis.

#### 5.1.9.1. Spiritual Attributes and Moral ofthe story

As responded by the student teachers the spiritual qualities contained in the story were Moral values, Care, importance of time, unity, empathy, value of Water, connectivity**,** determination, path finding, judgement, selection, immersion, ambition, mercy, inspiration, engagement, enquiry, equality, self-interest, humanity,Compassion and Welfare. It is not necessary that a person works only for oneself or family only.One should be socio-centric also.If something is not required for one self, but, it is useful for others then also one should do it. Empathy should be there in every person.We should help each other. The old man is not physically capable to build the bridge but he built it which is helpful to everybody.Sowing a seed does not mean you only have to eat the fruits of the tree. Present the character of an old empathetic person. We may be facing hardships, but, we should be caring. Whatever work we do should be done with full heart without desiring the reward of it. As it's also said in "Bhagavat Gita" that a person should only focus on his karma and the reward/punishment is given by the almighty.We come across many situations in which we can help others. We should be like the old man. We have to do our duty honestly. We should help others as much as we can.We generally don't think about others and their state. We remain busy with the self. Everyone owes service towards society. The old man is physically weak but he wanted to help the lady with child to cross the river and he tried his best to help her. We shouldbe helpful to others.Helpall without any selfish motive. Work with determination, dedication and immersion without any expectation. We ought to be selfless socio-centrics.

### 5.1.10. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers.

### 5.1.11. Crossword Puzzle

Student Teachers were given a crossword Puzzle to solve containing the constituents of the Wholistic Approach with the clues down and across. There are 10 across and 17 down in the crossword puzzle.

## 5.1.12. Data Collection

A Crossword Puzzle (**C1**) was provided to the Student Teachers of the Experimental Group to solve containing the constituents of the Wholistic Approach with the clues down and across as Pre-test. After 10 days of **C1**Crossword Puzzle (C**2**) was administered on the Student Teachers of Experiment Group as second Pre-test. After intervention and practice teaching phase Crossword Puzzle (C**3**) was administered on the Student Teachers of Experiment Group as Post-test. After 10 days of **C3**Crossword Puzzle (**C4**) was administered on the Student Teachers of Experiment Group as second Post-test.

## 5.1.13. Data Analysis

Data collected through Crossword Puzzleswere analyzed by computing mean, median, mode and drawing O-give

### 5.1.13.1. Scores obtained of the Student Teachers of Navrachana School of Science and Education on crossword Puzzles

| Code | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **NA** | 16 | 16 | 27 | 27 |
| **NB** | 9 | 9 | 23 | 24 |
| **NC** | 16 | 16 | 27 | 27 |
| **ND** | 11 | 16 | 25 | 25 |
| **NE** | 15 | 15 | 27 | 27 |
| **NF** | 9 | 9 | 22 | 22 |
| **NG** | 7 | 7 | 22 | 23 |
| **NH** | 8 | 8 | 23 | 24 |
| **NI** | 3 | 5 | 21 | 20 |
| **NJ** | 7 | 8 | 25 | 25 |
| **NK** | 9 | 9 | 24 | 24 |
| **NL** | 7 | 7 | 22 | 22 |
| **NM** | 3 | 3 | 21 | 22 |
| **NN** | 7 | 7 | 25 | 25 |
| **NO** | 7 | 7 | 23 | 24 |
| **NP** | 15 | 15 | 27 | 27 |
| **NQ** | 3 | 3 | 22 | 22 |
| **NR** | 9 | 9 | 23 | 23 |
| **Total** | 161 | 169 | 429 | 433 |

**Table 5.3: S**cores obtained on crossword Puzzles by the Student Teacher of Navrachana School of Science and Education

### 5.1.13.2. Mean, Mode, Median of the Student Teachers on Crossword Puzzle of Navrachana School of Science and Education

| | N | Mean | Mode | Median |
|---|---|---|---|---|
| **NC1** | 18 | 8.9444 | 7 | 8.5 |
| **NC2** | | 9.3889 | 9 | 8.5 |
| **NC3** | | 23.8333 | 27 | 23 |
| **NC4** | | 24.0556 | 27 | 24 |

**Table 5.4:**Mean, Mode, Medianof the Student Teacherson CrosswordPuzzlesof the Navrachana School of Science and Education

### 5.1.13.3. High and Low Scores of the Student Teachers on CrosswordPuzzles of Navrachana School of Science and Education

| | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **High** | 16 | 16 | 27 | 27 |
| **Low** | 3 | 3 | 21 | 20 |

**Table 5.5:** High and Low Scoresof the Student Teacherson CrosswordPuzzlesof the Navrachana School of Science and Education

### 5.1.13.4. Q1, Q2, Q3, and Q4 values of the Student Teachers on Crossword Puzzles of Navrachana School of Science and Education

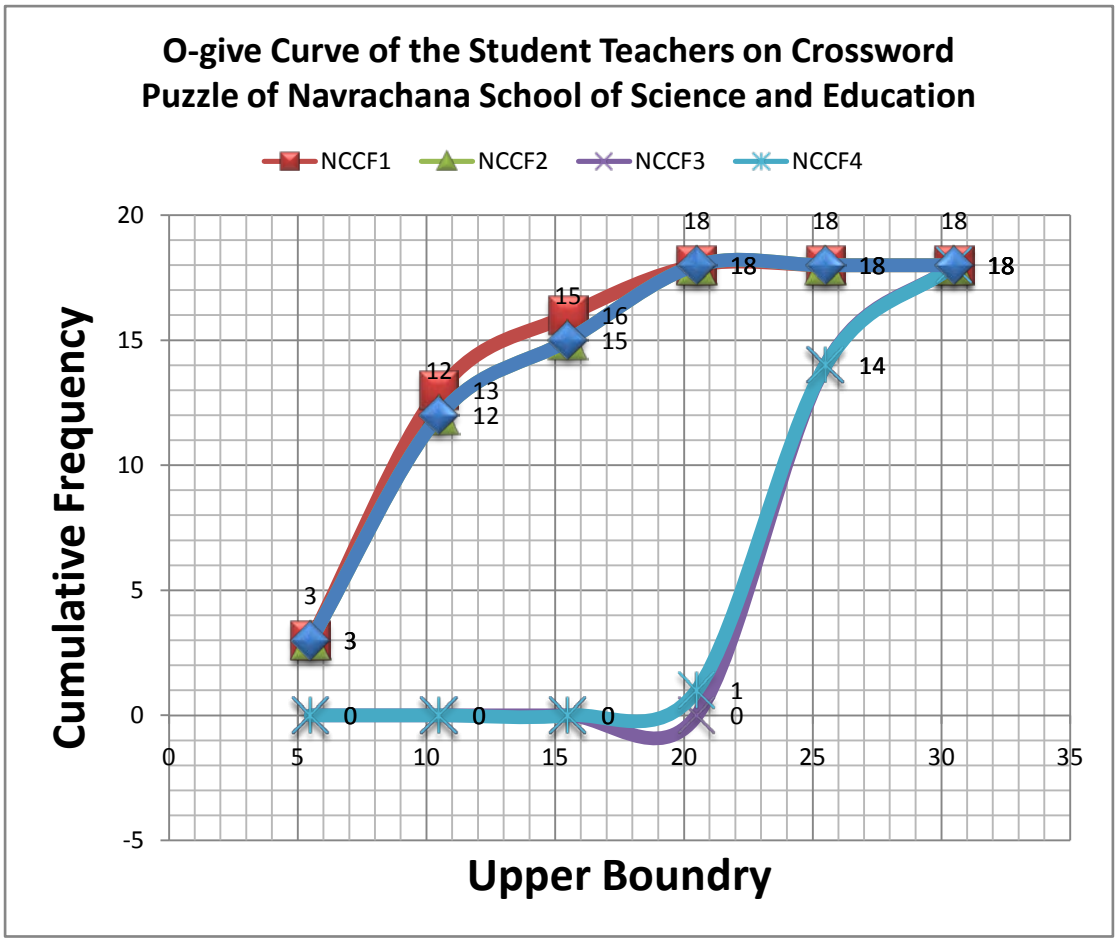
| | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **Q1** | 7 | 7 | 22 | 22.25 |
| **Q2** | 8.5 | 8.5 | 23 | 24 |
| **Q3** | 10.5 | 13.5 | 25 | 25 |
| **Q4** | 16 | 16 | 27 | 27 |

**Table 5.6:** Q1, Q2, Q3, and Q4 values of the Student Teachers on Crossword Puzzles of Navrachana School of Science and Education

### 5.1.13.5. O-give Curve of the Student Teachers on Crossword Puzzle of Navrachana School of Science and Education

| Class Interval | Upper Boundary | Cumulative Frequency | | | |
|---|---|---|---|---|---|
| | | NC1 | NC2 | NC3 | NC4 |
| **1-5** | 5.5 | 3 | 3 | 0 | 0 |
| **6-10** | 10.5 | 13 | 12 | 0 | 0 |
| **11-15** | 15.5 | 16 | 15 | 0 | 0 |
| **16-20** | 20.5 | 18 | 18 | 0 | 1 |
| **21-25** | 25.5 | 18 | 18 | 14 | 14 |
| **26-30** | 30.5 | 18 | 18 | 18 | 18 |

**Table 5.7:** ClassInterval, Upper Boundary and Cumulative Frequency of Crossword Puzzlesof the Student Teachersof Navrachana School of Science and Education




**Graph 5.1** O-give curves of the Student Teachers of Navrachana School of Science and Education on CrosswordPuzzles

### 5.1.13.6. Interpretation on Crossword Puzzle of the Student Teachersof Navrachana School of Science and Education

It is evident from the above Table 5.4 that the Mean scores of CrosswordPuzzles C1, C2, C3 and C4 are 8.9444, 9.3889, 23.8333, and 24.0556 respectively. Mode of crossword puzzle C1, C2, C3 and C4 are 7, 9, 27 and 27 respectively. Median of crossword puzzle C1, C2, C3 and C4 are 8.5, 8.5, 23 and 24 respectively. There is significant difference in mean, mode and median of pre and post crossword puzzle.It is evident from the above Tables that there was a significant rise in Post-test Mean, Mode and Median Scores from the NC1 to NC4. High & Low Scores both have gone significantly higher up from NC1 to NC4 and the high low range is reduced. So, it is evident that the intervention program on Wholistic Approach to Science Teaching was effective. It is evident from the above Table 5.6 that there is significant rise in Percentile scores from Q1 to Q4 from NC1 to NC4. So, the intervention program on Wholistic Approach to Science Teaching was found to be effective.

### 5.1.13.7. Scores obtained of the Student Teachers of Waymade College of Education on Crossword Puzzles

| Code | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **WA** | 9 | 9 | 23 | 24 |
| **WB** | 8 | 8 | 24 | 27 |
| **WC** | 6 | 6 | 25 | 25 |
| **WD** | 6 | 6 | 21 | 24 |
| **WE** | 2 | 2 | 23 | 23 |
| **WF** | 14 | 15 | 27 | 27 |
| **WG** | 13 | 14 | 27 | 27 |
| **WH** | 12 | 13 | 24 | 25 |
| **WI** | 6 | 6 | 22 | 23 |
| **WJ** | 4 | 5 | 22 | 27 |
| **WK** | 6 | 6 | 23 | 23 |
| **WL** | 8 | 8 | 21 | 26 |
| **WM** | 6 | 6 | 23 | 24 |

| | | | | |
|---|---|---|---|---|
| **WN** | 7 | 7 | 26 | 26 |
| **WO** | 5 | 5 | 19 | 19 |
| **WP** | 4 | 4 | 23 | 24 |
| **WQ** | 8 | 8 | 22 | 22 |
| **WR** | 9 | 9 | 24 | 27 |
| **WS** | 1 | 1 | 23 | 22 |
| **WT** | 2 | 2 | 20 | 20 |
| **WU** | 3 | 3 | 23 | 23 |

**Table 5.8: S**cores obtained on Crossword Puzzles by the Student Teacher of Waymade College of Education

### 5.1.13.8. Mean, Mode, Median of the Student Teachers on Crossword Puzzle of Waymade College of Education

| | **N** | **Mean** | **Mode** | **Median** |
|---|---|---|---|---|
| **C1** | 21 | 6.619 | 6 | 6 |
| **C2** | | 6.8095 | 6 | 6 |
| **C3** | | 23.0952 | 23 | 23 |
| **C4** | | 24.1905 | 27 | 24 |

**Table 5.9:** Mean, Mode, Median on CrosswordPuzzlesof the Student Teachers of Waymade College of Education

### 5.1.13.9. High and Low Scores of the Student Teachers on CrosswordPuzzles of Waymade College of Education

| | **C1** | **C2** | **C3** | **C4** |
|---|---|---|---|---|
| **High** | 14 | 15 | 27 | 27 |
| **Low** | 1 | 1 | 19 | 19 |

**Table 5.10:** High and Low Scores on CrosswordPuzzlesof the Student TEACHERS of the Waymade College of Education

### 5.1.13.10. Q1, Q2, Q3, and Q4 values of the Student Teachers on Crossword Puzzles of Waymade College of Education

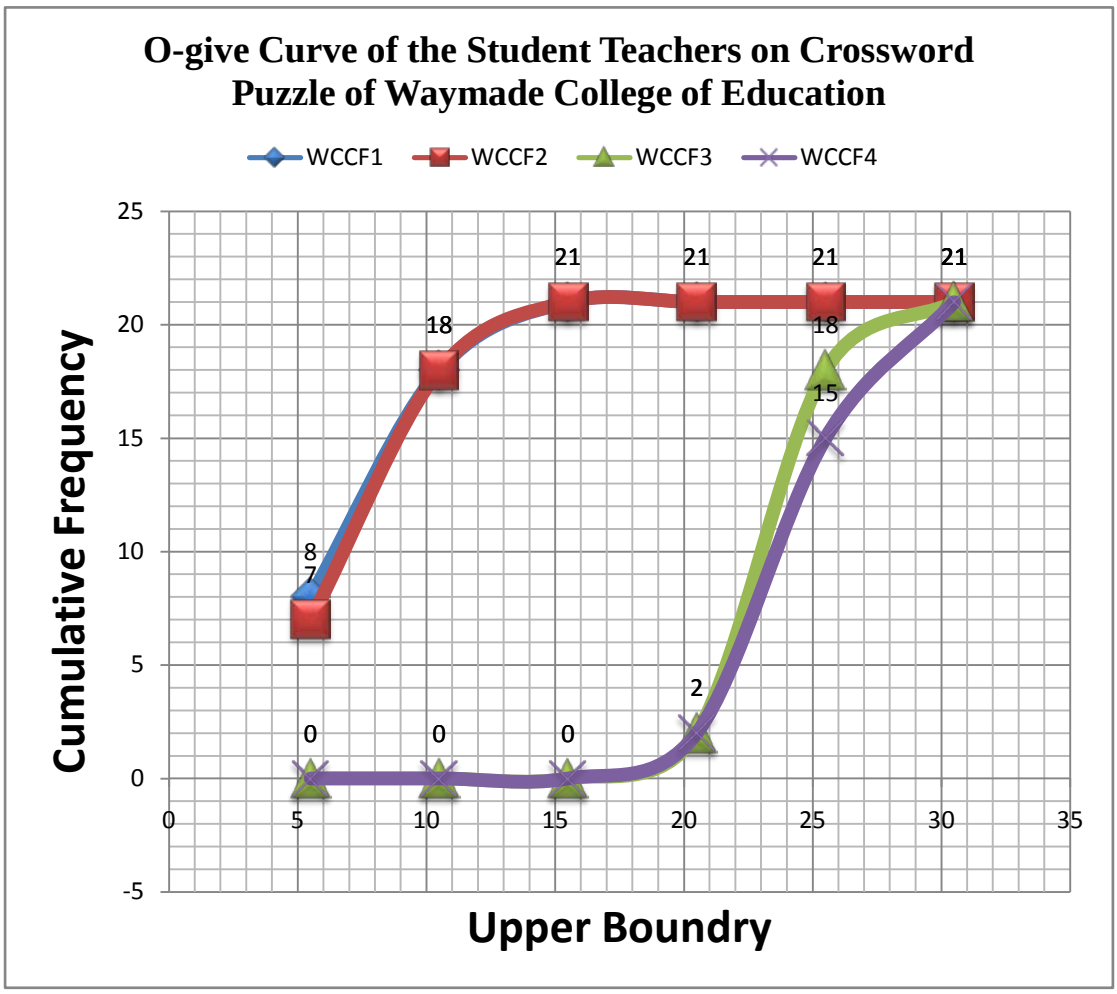
| | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| **Q1** | 4 | 5 | 22 | 23 |
| **Q2** | 6 | 6 | 23 | 24 |
| **Q3** | 8 | 8 | 24 | 26 |
| **Q4** | 14 | 15 | 27 | 27 |

**Table 5.11:** Q1, Q2, Q3, and Q4 values on Crossword Puzzles of the Student Teachers of the Waymade College of Education

### 5.1.13.11. O-give Curve of the Student Teachers on Crossword Puzzle of Waymade College of Education

| Class Interval | Upper Boundary | Cumulative Frequency | | | |
|---|---|---|---|---|---|
| | | WC1 | WC2 | WC3 | WC4 |
| **1-5** | 5.5 | 8 | 7 | 0 | 0 |
| **6-10** | 10.5 | 18 | 18 | 0 | 0 |
| **11-15** | 15.5 | 21 | 21 | 0 | 0 |
| **16-20** | 20.5 | 21 | 21 | 2 | 2 |
| **21-25** | 25.5 | 21 | 21 | 18 | 15 |
| **26-30** | 30.5 | 21 | 21 | 21 | 21 |

**Table 5.12:** ClassInterval, Upper Boundary and Cumulative Frequency of Crossword Puzzlesof the Student Teachersof Waymade College of Education




**Graph 5.2**O-give Curvesof the Student Teachersof Waymade College of Education on Crossword

### 5.1.13.12. Interpretation on Crossword Puzzleof the Student Teachers of Waymade College of Education

It is evident from the above Table 5.9 that the Mean scores of CrosswordPuzzles C1, C2, C3 and C4 are 6.619, 6.8095, 23.0952, and 24.1905 respectively. Mode of crossword puzzle C1, C2, C3 and C4 are 6, 6, 23 and 27 respectively. Median of crossword puzzle C1, C2, C3 and C4 are 6, 6, 23 and 24 respectively. There is significant difference in mean, mode and median of pre and post crossword puzzle.It is evident from the above Tables that there was a significant rise in Post-test Mean, Mode and Median Scores from the NC1 to NC4. High & Low Scores both have gone significantly higher up from NC1 to NC4 and the high low range is reduced. So, it is evident that the intervention program on Wholistic Approach to Science Teaching was effective. It is evident from the above Table 5.11 that there is significant rise in

Percentile scores from Q1 to Q4 from NC1 to NC4. So, the intervention program on Wholistic Approach to Science Teaching was found to be effective.

### 5.1.14. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers

### 5.1.15. Group Discussion

Group discussion was conducted with Student Teacher of the Experimental group on prevailing science education i.e. present reforms in curriculum & its transaction, evaluation and their impact on Science Teaching, need and scope of improvements in science education.

### 5.1.16. Data Collection

The researcher had conducted group discussion with the Experimental Group about present Education system for science teaching.

### 5.1.17. Data Analysis

Data collected through Group Discussion were analyzed through content analysis.

Science teaching has been found to be more products based than process based. There is a need to realize theory practice nexus. There is a need to evolve innovative and inter-connecting ways of science teaching. Cognitive domain is mainly focused. There is a need to realize science education for wholistic development – cognitive, affective, psychomotor, physical, environmental and spiritual. The interface of science technology and society should be duly realized. There is a need to realise value integrated and technology integrated science education. There ought to be due focus on research and development. Science laboratories should be fully functional.

### 5.1.18. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers

### 5.1.19. Observation Schedule

An Observation Schedule was constructed by the researcher to observe the implementation of lessons designed by Student Teachers through Wholistic Approach to teaching science during practice teaching.

### 5.1.20. Data Collection

Student teachers were observed when they implemented the lesson plans through wholistic approach. The Observation schedule contains the elements to be observed, namely, content covered, audio-visual material, performance on skill, students' participation, classroom environment, time management, interactive behaviour and wholistic flow of teaching of the student teacher.

### 5.1.21. Data Analysis

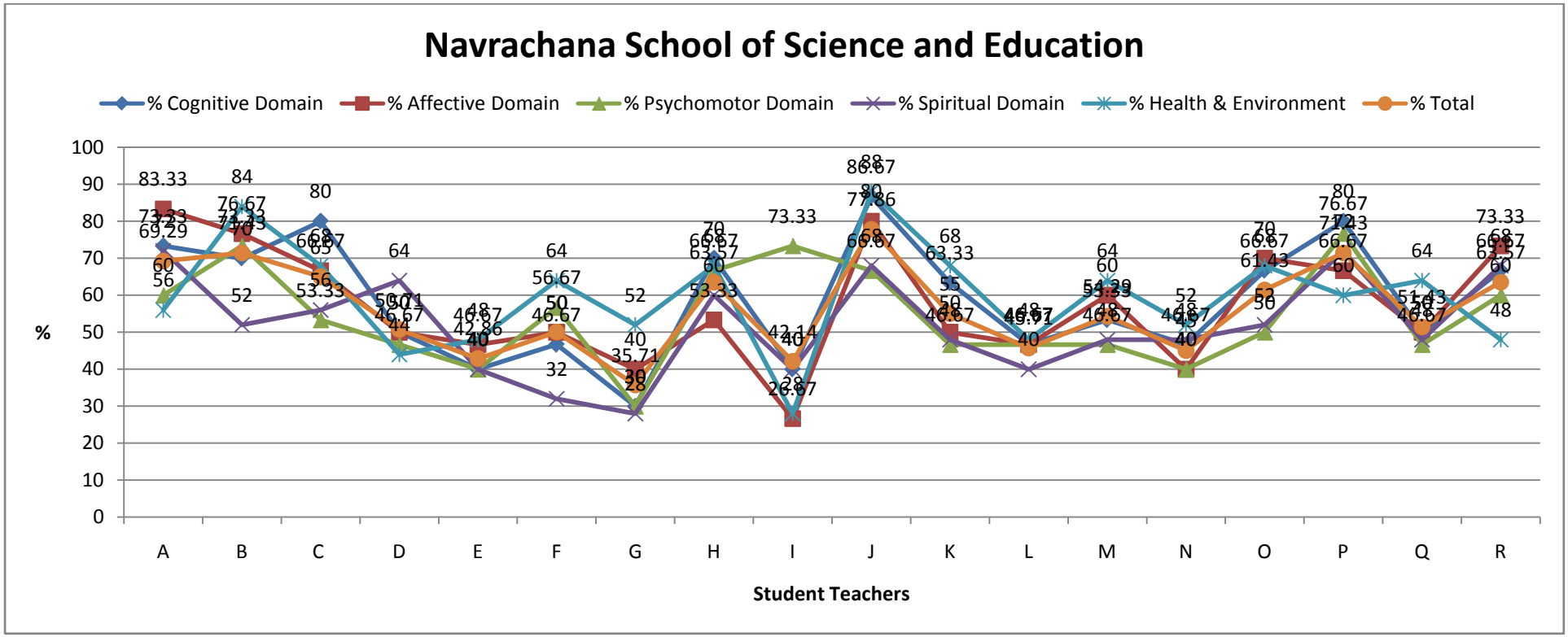
Data of the Observation schedule were analyzed by computing frequency, percentage, % Mean Score and graphs of different domain, graph of wholistic flow and total output of all the domains.

#### 5.1.21.1. Scores obtained, Percentage and % Mean Score of the Student teachers on Cognitive, Affective, Psychomotor, Spiritual, Health & Environment Domains, Total on all Domains and Wholistic Flow of the Student Teachersof Navrachana School of Science and Education on Observation Schedule

| Code | Cognitive Domain | % CD | Affective Domain | % AD | Psychomotor Domain | % PD | Spiritual Domain | % SD | Health & Environment | % H&E | Total | % | Wholistic Flow | % WF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NA** | 22 | 73.33 | 25 | 83.33 | 18 | 60.00 | 18 | 72.00 | 14 | 56.00 | 97 | 69.29 | 21 | 70.00 |
| **NB** | 21 | 70.00 | 23 | 76.67 | 22 | 73.33 | 13 | 52.00 | 21 | 84.00 | 100 | 71.43 | 21 | 70.00 |
| **NC** | 24 | 80.00 | 20 | 66.67 | 16 | 53.33 | 14 | 56.00 | 17 | 68.00 | 91 | 65.00 | 20 | 66.67 |
| **ND** | 15 | 50.00 | 15 | 50.00 | 14 | 46.67 | 16 | 64.00 | 11 | 44.00 | 71 | 50.71 | 15 | 50.00 |
| **NE** | 12 | 40.00 | 14 | 46.67 | 12 | 40.00 | 10 | 40.00 | 12 | 48.00 | 60 | 42.86 | 14 | 46.67 |
| **NF** | 14 | 46.67 | 15 | 50.00 | 17 | 56.67 | 8 | 32.00 | 16 | 64.00 | 70 | 50.00 | 15 | 50.00 |
| **NG** | 9 | 30.00 | 12 | 40.00 | 9 | 30.00 | 7 | 28.00 | 13 | 52.00 | 50 | 35.71 | 11 | 36.67 |
| **NH** | 21 | 70.00 | 16 | 53.33 | 20 | 66.67 | 15 | 60.00 | 17 | 68.00 | 89 | 63.57 | 19 | 63.33 |
| **NI** | 12 | 40.00 | 8 | 26.67 | 22 | 73.33 | 10 | 40.00 | 7 | 28.00 | 59 | 42.14 | 13 | 43.33 |
| **NJ** | 26 | 86.67 | 24 | 80.00 | 20 | 66.67 | 17 | 68.00 | 22 | 88.00 | 109 | 77.86 | 24 | 80.00 |
| **NK** | 19 | 63.33 | 15 | 50.00 | 14 | 46.67 | 12 | 48.00 | 17 | 68.00 | 77 | 55.00 | 16 | 53.33 |
| **NL** | 14 | 46.67 | 14 | 46.67 | 14 | 46.67 | 10 | 40.00 | 12 | 48.00 | 64 | 45.71 | 14 | 46.67 |
| **NM** | 16 | 53.33 | 18 | 60.00 | 14 | 46.67 | 12 | 48.00 | 16 | 64.00 | 76 | 54.29 | 16 | 53.33 |
| **NN** | 14 | 46.67 | 12 | 40.00 | 12 | 40.00 | 12 | 48.00 | 13 | 52.00 | 63 | 45.00 | 14 | 46.67 |
| **NO** | 20 | 66.67 | 21 | 70.00 | 15 | 50.00 | 13 | 52.00 | 17 | 68.00 | 86 | 61.43 | 18 | 60.00 |
| **NP** | 24 | 80.00 | 20 | 66.67 | 23 | 76.67 | 18 | 72.00 | 15 | 60.00 | 100 | 71.43 | 22 | 73.33 |
| **NQ** | 15 | 50.00 | 15 | 50.00 | 14 | 46.67 | 12 | 48.00 | 16 | 64.00 | 72 | 51.43 | 15 | 50.00 |
| **NR** | 20 | 66.67 | 22 | 73.33 | 18 | 60.00 | 17 | 68.00 | 12 | 48.00 | 89 | 63.57 | 19 | 63.33 |
| **%Mean** | | 58.89 | | 57.22 | | 54.44 | | 52.00 | | 59.56 | | 56.47 | | 56.85 |

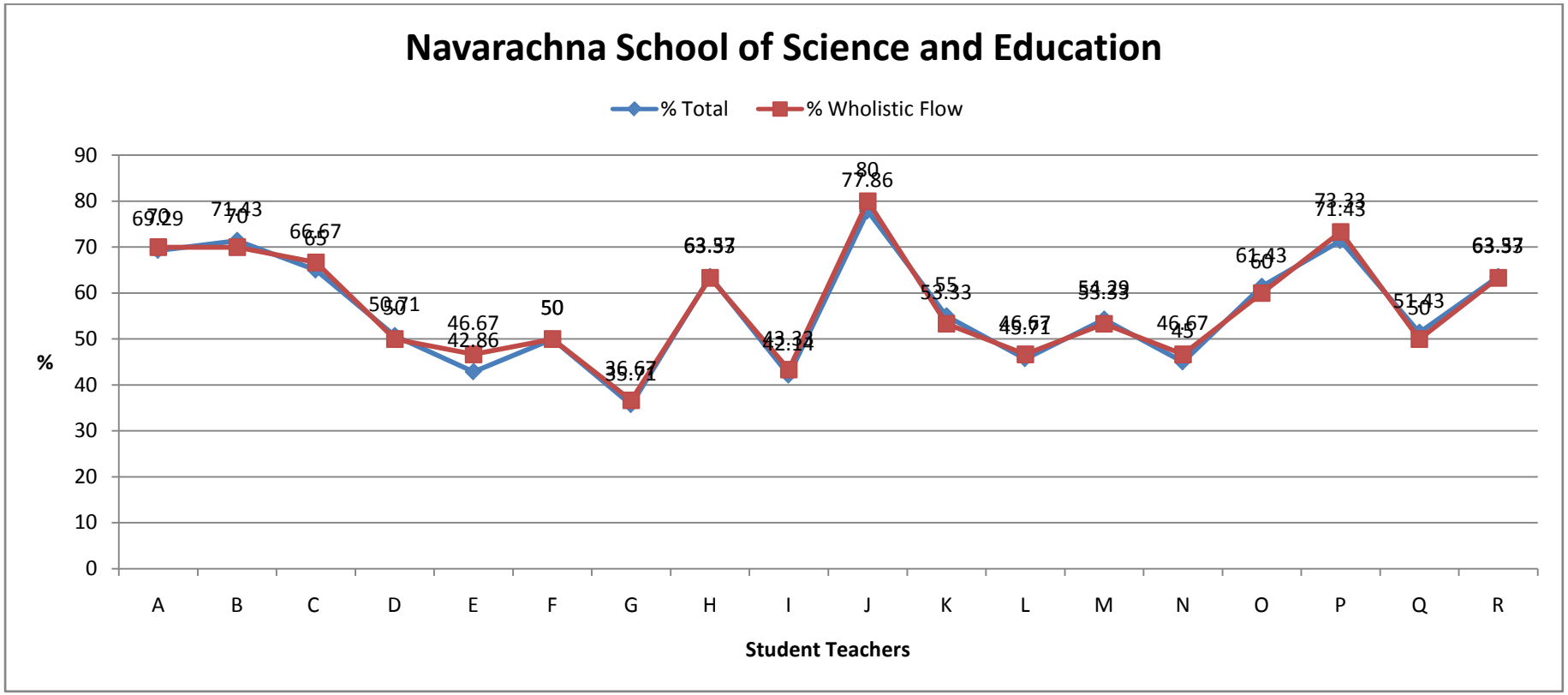
**Table 5.13:**Scores obtained, Percentage and % Mean Score of the Student teachers on Cognitive, Affective, Psychomotor, Spiritual, Health & Environment Domains, Total on all Domains and Wholistic Flow of the Student Teachers of Navrachana School of Science and Education on Observation Schedule

### 5.1.21.2. Graph of % Cognitive, % Affective, % Psychomotor, % Spiritual and % Health & Environment Domains of the Student Teachers of Navrachana School of Science and Education on Observation Schedule




**Graph 5.3:** Graph of % Cognitive, % Affective, % Psychomotor, % Spiritual and % Health & Environment Domains of the Student Teachers of Navrachana School of Science and Education on Observation Schedule

### 5.1.21.3. Graph of % Total on all domains and % Wholistic Flow of the Student Teachers of Navrachana School of Science and Education on Observation Schedule




**Graph 5.4:** Graph of % Total on all domains and % Wholistic Flow of the Student Teachers of Navrachana School of Science and Education on Observation Schedule

### 5.1.21.4. Interpretation of Observation Scheduleof the Student Teachers of Navrachana School of Science and Education

It is evident through the Table 5.13 domain-wise mean % scores that the student teachers scored highest on Health and Environment (59.56 %), whereas, next in the sequence are Cognitive Domain (58.89 %), Affective Domain (57.22 %), Psychomotor Domain (54.45 %) and Spiritual Domain (52 %). The mean total score was found to be 56.47%.

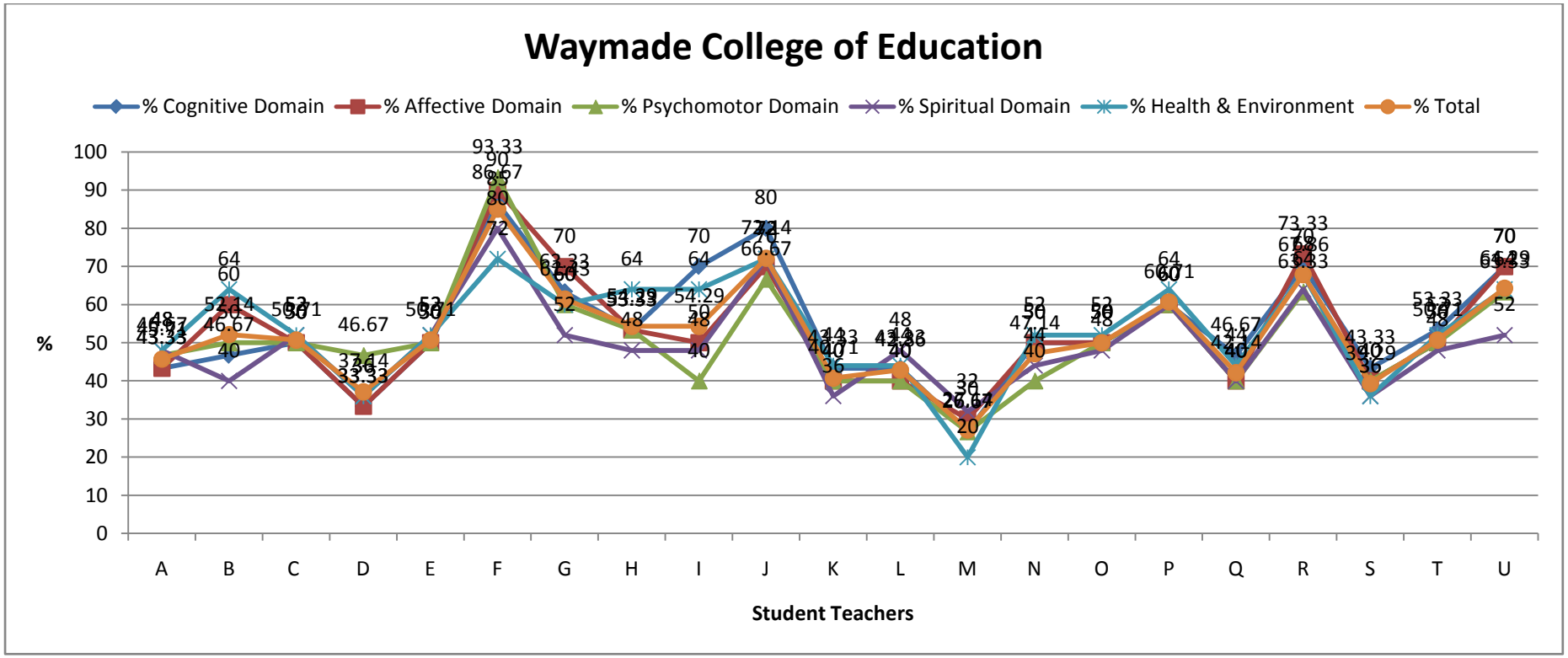
It is evident from Graph 5.4 the Total % scores on all the domains and the % Wholistic Flow as observed by the researcher that there is almost 1:1 correspondence between the two sets of scores. It establishes the validity of the observation done by the researcher.

### 5.1.21.5. Scores obtained, Percentage and % Mean Score of the Student teachers on Cognitive, Affective, Psychomotor, Spiritual, Health & Environment Domains, Total on all Domains and Wholistic Flow of the Student Teachersof Waymade College of Education on Observation Schedule

| Code | Cognitive Domain | % CD | Affective Domain | % AD | Psychomotor Domain | % PD | Spiritual Domain | % SD | Health & Environment | % H&E | Total | % | Wholistic Flow | % WF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WA** | 13 | 43.33 | 13 | 43.33 | 14 | 46.67 | 12 | 48.00 | 12 | 48.00 | 64 | 45.71 | 14 | 46.67 |
| **WB** | 14 | 46.67 | 18 | 60.00 | 15 | 50.00 | 10 | 40.00 | 16 | 64.00 | 73 | 52.14 | 16 | 53.33 |
| **WC** | 15 | 50.00 | 15 | 50.00 | 15 | 50.00 | 13 | 52.00 | 13 | 52.00 | 71 | 50.71 | 15 | 50.00 |
| **WD** | 10 | 33.33 | 10 | 33.33 | 14 | 46.67 | 9 | 36.00 | 9 | 36.00 | 52 | 37.14 | 11 | 36.67 |
| **WE** | 15 | 50.00 | 15 | 50.00 | 15 | 50.00 | 13 | 52.00 | 13 | 52.00 | 71 | 50.71 | 14 | 46.67 |
| **WF** | 26 | 86.67 | 27 | 90.00 | 28 | 93.33 | 20 | 80.00 | 18 | 72.00 | 119 | 85.00 | 25 | 83.33 |
| **WG** | 19 | 63.33 | 21 | 70.00 | 18 | 60.00 | 13 | 52.00 | 15 | 60.00 | 86 | 61.43 | 19 | 63.33 |
| **WH** | 16 | 53.33 | 16 | 53.33 | 16 | 53.33 | 12 | 48.00 | 16 | 64.00 | 76 | 54.29 | 16 | 53.33 |
| **WI** | 21 | 70.00 | 15 | 50.00 | 12 | 40.00 | 12 | 48.00 | 16 | 64.00 | 76 | 54.29 | 17 | 56.67 |
| **WJ** | 24 | 80.00 | 21 | 70.00 | 20 | 66.67 | 18 | 72.00 | 18 | 72.00 | 101 | 72.14 | 23 | 76.67 |
| **WK** | 13 | 43.33 | 12 | 40.00 | 12 | 40.00 | 9 | 36.00 | 11 | 44.00 | 57 | 40.71 | 12 | 40.00 |
| **WL** | 13 | 43.33 | 12 | 40.00 | 12 | 40.00 | 12 | 48.00 | 11 | 44.00 | 60 | 42.86 | 12 | 40.00 |
| **WM** | 8 | 26.67 | 9 | 30.00 | 8 | 26.67 | 8 | 32.00 | 5 | 20.00 | 38 | 27.14 | 8 | 26.67 |
| **WN** | 15 | 50.00 | 15 | 50.00 | 12 | 40.00 | 11 | 44.00 | 13 | 52.00 | 66 | 47.14 | 14 | 46.67 |
| **WO** | 15 | 50.00 | 15 | 50.00 | 15 | 50.00 | 12 | 48.00 | 13 | 52.00 | 70 | 50.00 | 15 | 50.00 |
| **WP** | 18 | 60.00 | 18 | 60.00 | 18 | 60.00 | 15 | 60.00 | 16 | 64.00 | 85 | 60.71 | 18 | 60.00 |
| **WQ** | 14 | 46.67 | 12 | 40.00 | 12 | 40.00 | 10 | 40.00 | 11 | 44.00 | 59 | 42.14 | 12 | 40.00 |
| **WR** | 21 | 70.00 | 22 | 73.33 | 19 | 63.33 | 16 | 64.00 | 17 | 68.00 | 95 | 67.86 | 20 | 66.67 |
| **WS** | 13 | 43.33 | 12 | 40.00 | 12 | 40.00 | 9 | 36.00 | 9 | 36.00 | 55 | 39.29 | 12 | 40.00 |
| **WT** | 16 | 53.33 | 15 | 50.00 | 15 | 50.00 | 12 | 48.00 | 13 | 52.00 | 71 | 50.71 | 15 | 50.00 |
| **WU** | 21 | 70.00 | 21 | 70.00 | 19 | 63.33 | 13 | 52.00 | 16 | 64.00 | 90 | 64.29 | 19 | 63.33 |
| **% Mean** | | 53.97 | | 53.02 | | 50.95 | | 49.33 | | 53.52 | | 52.21 | | 51.90 |

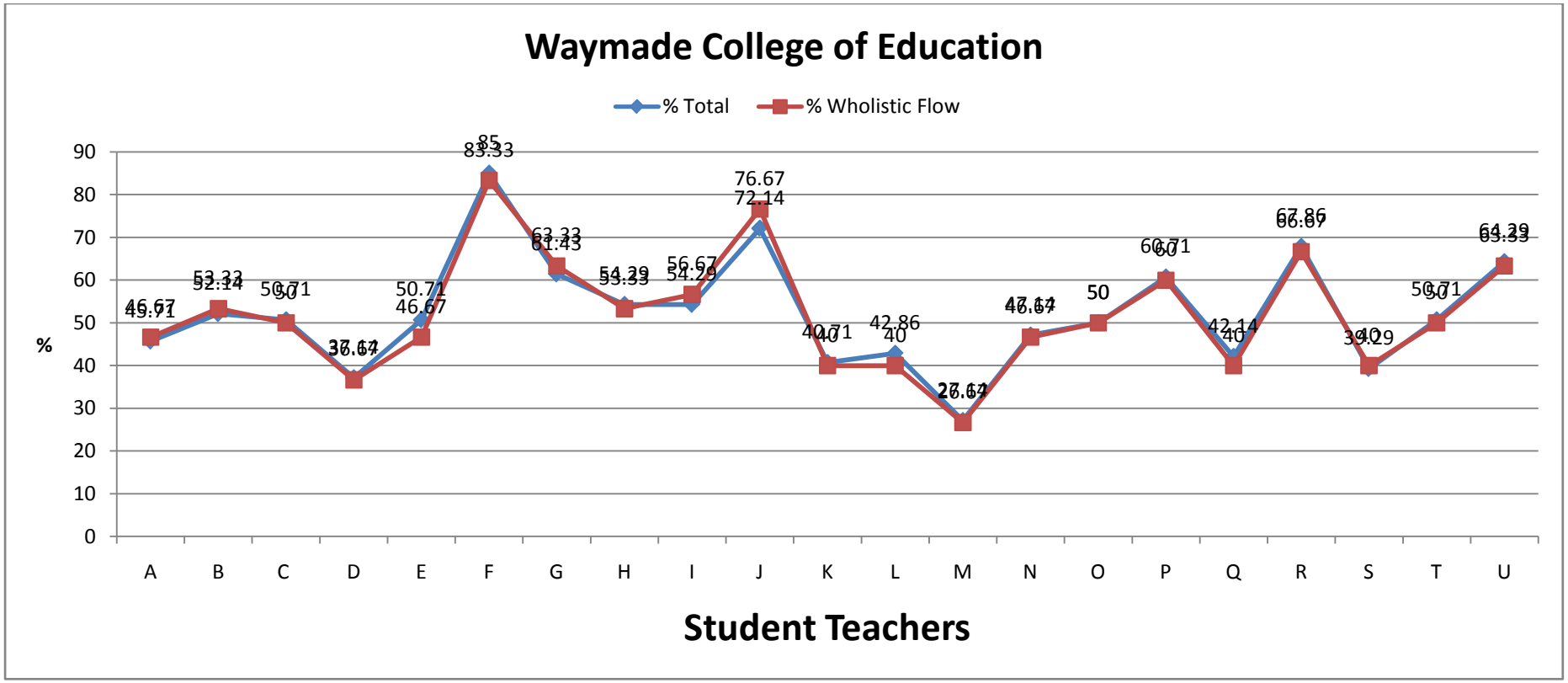
**Table 5.14:** Scores obtained, Percentage and % Mean Score of Cognitive, Affective, Psychomotor, Spiritual, Health & Environment Domains, Total on all Domains and Wholistic Flowof the Student Teachers of Waymade College of Education on Observation Schedule

### 5.1.21.6. Graph of % Cognitive, % Affective, % Psychomotor, % Spiritual and % Health & Environment Domainsof the Student Teachers of Waymade College of Education on Observation Schedule




**Graph 5.5:** Graph of % Cognitive, % Affective, % Psychomotor, % Spiritual and % Health & Environment Domains of the Student Teachers of Waymade College of Education on Observation Schedule

### 5.1.21.7. Graph of % Total on all domains and % Wholistic Flowof the Student Teachers of Waymade College of Education on Observation Schedule




**Graph 5.6:** Graph of % Total on all domains and % Wholistic Flowof the Student Teachers of Waymade College of Education on Observation Schedule

### 5.1.21.8. Interpretation of Observation Scheduleof the Student Teachers of Waymade College of Education

It is evident through the Table 5.14 domain-wise mean % scores that the student teachers scored highest on Cognitive Domain (53.97 %), whereas, next in the sequence are Health and Environment (53.52 %), Affective Domain (53.02 %), Psychomotor Domain (50.95 %) and Spiritual Domain (49.33 %). The mean total score was found to be 52.21%.

It is evident from Graph 5.6 the Total % scores on all the domains and the % Wholistic Flow as observed by the researcher that there is almost 1:1 correspondence between the two sets of scores. It establishes the validity of the observation done by the researcher.

## 5.1.22. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers

## 5.1.23. Focused Group Discussion

Focus of the Discussion was as follows:

(1) Why there is a need of Wholistic Approach of teaching Science?
(2) What should be the efforts for preparing lesson plansemploying Wholistic Approach to teaching science?
(3) What ought to be the age of students for implementing Wholistic Approach of teaching science? Why?

## 5.1.24. Data Collection

The researcher conducted Focused Group Discussion on teaching Science through Wholistic Approach with Experimental Group Student Teachers.

## 5.1.25. Data Analysis

Data collected through Focused Group Discussion were analyzed through content analysis.

### 5.1.25.1. Content Analysis of Focused Group Discussion

Focused Group Discussion was conducted on teaching Science through Wholistic Approach with Experimental Group Student Teachers. Focus of the Discussion was as follows:

**(1) Why there is a need of Wholistic Approach of teaching Science?**

Science cannot exist in isolation. Wholistic approach deals with intellectual development, moral development, emotional development, physical development and development of the environment of individual. Science teaching should address all the domains, such as, cognitive, affective, psychomotor, health and environment and spiritual wholistically.It helps to visualise contents wholistically. Wholistic approach of teaching science deals with cognitive domain, affective domain, psychomotor domain along with spiritual and healthy environment. Science has many concepts which are directly or indirectly related to real life situation and it has answer to many problems faced in life. At present science education emphasises more of cognitive aspect and somewhat psychomotor development is given important but rest of the domains are ignored. So, when we think wholistically it will persuade us to teach. This approach develops confidence of neo-teachers to employ wholistic approach. It makes teaching learning process interesting, effective, and user friendly. This approach helps in understanding science better.

**(2) What should be the efforts for preparing lesson plans employing Wholistic Approach to teaching science?**

Objectives need to be enunciated with respect to all the domains in inter-connected forms. The subject matter has to be accessed from various sources and resources cutting across all the domains. There has to be one to one correspondence amongst objectives, contents, modes of transaction and evaluation. There has to be due focus on theory and practice, classroom and laboratories, laboratories and field.

**(3) What ought to be the age of students for implementing teaching learning process through Wholistic Approach of teaching science? Why?**

- Wholistic approach of teaching science is not age bound. But it is the responsibility of teacher to teach students according to their age level,so that, the students can understand and appreciate the teaching-learning.

- This Approach may be introduced preferably in secondary education, because at this stage students have raised their horizon of thinking and they are able to accept education out of textbook which is related to real life and useful in life exam rather than academic evaluation.

## 5.1.26. Objective No. 2

To study the efficacy of Wholistic Approach to Science Teaching in terms of wholistic development of student teachers

## 5.1.27. Interview Schedule

A structured interview schedule was prepared for interviewing student teachers for gathering data. Student teachers of the Experimental Group were interviewed for gathering feedback on their experience of implementing lessons designed through wholistic approach.

## 5.1.28. Data Collection

Data were collected through Interview Schedule administered on the Experimental Group Student Teachers.

## 5.1.29. Data Analysis

Data collected through Interview schedule were analyzed through content analysis.

**1. What are the efforts done by you to meet Wholistic Education through Wholistic Approach?**

Efforts by the student teachers to realise Wholisitc development are as follows:

❖ Efforts done by me to meet wholistic education through wholistic approach is to relate any topic with all the aspects of wholistic development and explain how a particular topic helps in wholistic development.

❖ During my macro lesson, actual classroom teaching I tried my best to put all my efforts in such a way that all the children could understand the topic well in a play way manner. I used the following approaches:

- Teaching through practical examples.
- Involving each and every child in learning.
- Encouraging the children to come out with their ideas.
- Asking questions and encouraging students by reinforcement.
- Using various teaching aids to develop interest in learning.

❖ For wholistic education I used various techniques during my actual classroom teaching lessons.

❖ Activities related to daily life were conducted.

❖ I implemented learning by doing and more of co-curricular activities for wholistic development.

❖ I tried my best to meet wholistic approach as my topic was-Changes around us.

❖ Various teaching aids and a variety of teaching learning material were used.

❖ Student centred method of learning were employed, such as, experiment, role play, story narration, survey and IT integrated education, activities and field work.

❖ Lesson plans were designed keeping in mind the wholistic approach. Various activities were conducted inside and outside classroom.

❖ Co-curricular activities were conducted.

❖ Innovative approaches were evolved.

❖ Smart Boards, MovieShows, Real life examples were utilised.

❖ Contentsrelated to theattributes of wholistic approach were prepared.

❖ Children could have hand on learning experiences through craft, creative activities, learning through visit to field, exhibitions, museum and fair, competitions, seminar and club activity.

❖ Wherever possible learning experiences through natural environment were provided. Group workand co-operative learning were promoted.

❖ Various aspects wholistic developmentwas included in the school curricula.All the students were involved in various activities and programs.

❖ Scholastic areas like, subject knowledge and co-scholastic, like, sports, music, life skill, attitudes, values, art, and dance are areas of child to meet wholistic education by wholistic approach. Multidimensional and wholistic assessment gives the idea about the outcome of the student. All the students were given the equal opportunity to participate in all kinds of activities.

**2. Do you think infrastructure of the school hinders implementation of the Wholistic Approach?**

❖ No, infrastructure is not an obstacle in the implementation of wholistic approach, because if a child is provided with congenial environment then the child

will be able to involve himself in learning as much as possible. Infrastructure is required to facilitate wholistic approach.

❖ The schools should be equipped with necessary infrastructure classrooms, furniture, room temperature, proper ventilation, fans, laboratories, libraries, music room, play grounds, green and flower plants in the gardens, adequate water supply, and neat and clean toilets.

❖ School should be situated in such an area which is non-polluted- far from road, traffic, and free from noise.It should have space for playing.

❖ No. it is only the attitude of the teacher, if teacher is willing in the wholistic development of the child teacher will find the way. Infrastructure may not be that limiting factor.

❖ Adequate infrastructure is required for curricular and co-curricular activities. Teaching of Science demand well equipped laboratories and library. There ought to be provision for field trips.

**3. Do you face any problem regarding Time-Space-Personnel-Material Management while implementing Wholistic Approach of Science Teaching in the school?**

The content analysis of the responses of the Student-Teachers reveals that the Wholistic Approach of Science Teaching requires sizable time which is rarely available due to the rigid school schedule. The wholistic approach along with class instruction, small group activities, focuses on personalised education. It is very often activity based. It demands a flexible class setting. Wholistic approach demands a variety of learning resources and easy access to the Internet. Differential inputs are to be provided to the differentiated learners for qualitative wholistic development. There are evident problems of Time-Space-Personnel-Material Management. But, as a whole the Wholistic Approach of Science Education is highly satisfying with respect to cognitive, affective, psychomotor, physical, environmental and spiritual development. The ultimate aim of Education is to develop universal beings. Where there is will there is a way. Schools can definitely devise and design wholistic approach friendly Time-Space-Personnel-Material Management Systems.

**4. Describe a River or Sea Wholistically**

Content analysis of the responses of the Student-Teachers is presented as follows:

River is important to us wholistically because the river provides us water for our day to day need.It flows with happiness overpowering all obstacles. The river flows and flows.It doesn't worry about the obstacles.River is very much useful for life and vitality. Water is basic need. Many people believe river as the goddess. It is useful for farming, as well as, electricity.It is because of the water on earth that the life exists. The first organism was evolved and came to life from water itself. Water exists in three states- solid, liquid and gas, which teaches us that according to situation and the needs we should change which would help us to survive and perform better in life. Also the water content always remains the same on the earth. It's due to the water cycle. The same way all our deeds come back to us in the cycle. The river though flows in different directions, but merges into the sea.The sea sustains so many, valuable minerals, pearls and helps the aquatic organisms to live. When our thoughts get deeper we find the valuable pearl of wisdom. In the same way we humans may be of different casts and creeds ultimately have to surrender to the almighty.River a water body embodies all the wholistic attributes- cognitive, affective, psychomotor, physical, environmental, and spiritual. The river water flows continuously. It shows us that we must also be calm in every situation and continuously do our work. River is the large streams of water flowing across the large area of a country. The flowing water in the river is the result of melting snow/ice on the mountains. This water is very pure and consists of healthy minerals which are useful for the mankind. The water of the river is used for drinking, irrigation, electricity generation and for many more industrial purposes. The river passing through a city increases the beauty of that place and fulfils various needs.It maintains the moisture in soil and the atmosphere.It is the home of many creatures. Without water life on the earth cannot exist. River flows in different area and finally merges into the sea. River is small and sea much bigger. The sea is fathomless and has plenty of water. Sea represents something very vast and unlimited and infinite. Glaciers, Sun, Water, Rivers, Animals, Plants, Transpiration, Evaporations, Clouds, Rains, Sea and all are interrelated constituting a universal whole. The ultimate aim of Education is wholistic development and development of a universal being.

### 5.1.30. Objective No. 3

To study the reactions of student teachers towards Wholistic Approach to Science Teaching

### 5.1.31. Hypothesis

There will be no significant difference between observed frequencies and expected frequencies of student teachers against equal probability on various statements of the Reaction Scale.

### 5.1.32. Reaction Scale

Five Points of the reaction scale are Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. The reaction scale consisted of a total of 26 statements.

### 5.1.33. Data Collection

Reactions of the student teachers were gathered with the help of reaction scale on the wholistic approach.

### 5.1.34. Data Analysis

Data gathered through the reaction scale were analyzed by computing frequency, percentage and chi-square.

#### 5.1.34.1. Frequency, Percentage and chi-square on Reaction Scale of the Student Teachers with respect to Navrachana School of Science and Education

| Sr. No. | Statements | SA (%) | A (%) | N (%) | D (%) | SD (%) | $\chi^2$ | Level of Significance |
|---|---|---|---|---|---|---|---|---|
| 1 | The lessons were well designed by the teacher. | 6 (33.33) | 12 (66.66) | 0 (0) | 0 (0) | 0 (0) | 32.35 | * |
| 2 | Choice of content matter was appropriate. | 1 (5.56) | 15 (83.33) | 2 (11.11) | 0 (0) | 0 (0) | 46.24 | * |
| 3 | The teacher explained the various concepts well. | 11 (61.11) | 6 (33.33) | 1 (5.56) | 0 (0) | 0 (0) | 26.24 | * |
| 4 | There was | 4 | 12 | 2 | 0 | 0 | 27.9 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | logical sequence in the presentation. | (22.22) | (66.66) | (11.11) | (0) | (0) | | |
| 5 | The number of points covered was adequate as per the lesson time. | 10 (55.56) | 6 (33.33) | 2 (11.11) | 0 (0) | 0 (0) | 21.24 | * |
| 6 | Teaching pointswere well interconnected. | 5 (27.78) | 11 (61.11) | 2 (11.11) | 0 (0) | 0 (0) | 24.01 | * |
| 7 | Teaching points were well presented. | 6 (33.33) | 11 (61.11) | 1 (5.56) | 0 (0) | 0 (0) | 26.24 | * |
| 8 | The demonstrations given by the teacher were effective. | 6 (33.33) | 10 (55.56) | 2 (11.11) | 0 (0) | 0 (0) | 21.24 | * |
| 9 | The experiments done by us are satisfying. | 2 (11.11) | 12 (66.66) | 4 (22.22) | 0 (0) | 0 (0) | 27.9 | * |
| 10 | The questions asked by the teacher were distributed across various domains. | 12 (66.66) | 5 (27.78) | 1 (5.56) | 0 (0) | 0 (0) | 29.57 | * |
| 11 | The responses given by us were well | 10 (55.56) | 7 (38.89) | 1 (5.56) | 0 (0) | 0 (0) | 24.01 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | treated by the teacher. | | | | | | | |
| 12 | I could formulate the principles governing the various scientific phenomena. | 3 (16.67) | 10 (55.56) | 5 (27.78) | 0 (0) | 0 (0) | 19.57 | * |
| 13 | The wholistic approach of teaching science was meaningful. | 10 (55.56) | 8 (44.44) | 0 (0) | 0 (0) | 0 (0) | 27.9 | * |
| 14 | The wholistic approach of learning science was joyful. | 2 (11.11) | 13 (72.22) | 3 (16.67) | 0 (0) | 0 (0) | 32.9 | * |
| 15 | The wholistic approach could interweave the cognitive-Affective-Psychomotor-Health-Environment and Spiritual Domains. | 11 (61.11) | 6 (33.33) | 1 (5.56) | 0 (0) | 0 (0) | 26.24 | * |
| 16 | The wholistic approach of teaching science helped | 6 (33.33) | 11 (61.11) | 1 (5.56) | 0 (0) | 0 (0) | 26.24 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | me to inter-relate the concepts wholistically. | | | | | | | |
| 17 | I feel confident in employing wholistic approach for teaching Science. | 4 (22.22) | 12 (66.66) | 2 (11.11) | 0 (0) | 0 (0) | 27.9 | * |
| 18 | I would like to suggest this wholistic approach of teaching science to other colleagues. | 12 (66.66) | 6 (33.33) | 0 (0) | 0 (0) | 0 (0) | 32.35 | * |
| 19 | I have learnt to view the reality wholistically. | 10 (55.56) | 7 (38.89) | 1 (5.56) | 0 (0) | 0 (0) | 24.01 | * |
| 20 | I have got a feeling that all the phenomena of the cosmos are inter-related. | 4 (22.22) | 10 (55.56) | 4 (22.22) | 0 (0) | 0 (0) | 19.01 | * |
| 21 | I find it difficult to employ wholistic approach of teaching Science. | 0 (0) | 5 (27.78) | 3 (16.67) | 9 (50) | 1 (5.56) | 14.57 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 22 | I find it time consuming to design lesson plan through wholistic approach for Teaching science. | 3 (16.67) | 4 (22.22) | 8 (44.44) | 2 (11.11) | 1 (5.56) | 8.46 | ** |
| 23 | It takes more efforts to design lesson plan through wholistic approach for teaching Science. | 4 (22.22) | 6 (33.33) | 7 (38.89) | 1 (5.56) | 0 (0) | 10.68 | ** |
| 24 | I feel thatinfrastructure of school hinders in implementation of lessons designed through wholistic approach for teaching Science. | 5 (27.78) | 5 (27.78) | 5 (27.78) | 3 (16.67) | 0 (0) | 5.68 | ** |
| 25 | I find it difficult to manage class while implementing lessons designed through wholistic approach for | 0 (0) | 3 (16.67) | 8 (44.44) | 7 (38.89) | 0 (0) | 16.24 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | teaching Science. | | | | | | | |
| 26 | I find it difficult to evaluate student performance while implementing lessons designed through wholistic approach for teaching Science. | 0 (0) | 2 (11.11) | 6 (33.33) | 9 (50) | 1 (5.56) | 16.24 | * |

**Table 5.15.:**Frequency, Percentage and chi-square along with level of significanceon Reaction Scaleof the Student Teachers with respect toNavrachana School of Science and Education

Table value of $\chi^2$ against 4 degree of freedom at 0.05 level is 9.488, whereas at 0.01 level is 13.277

*Significant at both the 0.05level and 0.01level

**Not significant at both the 0.05level and 0.01level

Numbers in bracket are percentage of frequency.

### 5.1.34.2. Interpretation of the Data Collected of the Student Teachers of Navrachana School of Science and Education through the Reaction Scale

Itisevident from the above table that the values of Chi-square are significant against all the 26 statements, at 0.01 level against 4 degree of freedom except statements Sr. No. 22-24. The null hypothesis against statement -23 is rejected at 0.05 level, but, not rejected at 0.01 level. It means the null hypothesis that there will be no significant difference between the observed frequencies are those expected against equal probability stands rejected again all these statements at the respective levels. Most of these frequencies are either against strongly agreed or agreed. Hence the student

teachers have been found to have favourable reactions towards the Wholistic Approach of Science teaching. Against the statement 22 and 24 the null hypothesis is not rejected. It means the Student teachers are equally divided against these areas, namely, I find it time consuming to design lesson plan through Wholistic Approach for teaching Science, and I feel that infrastructure of school hinders in implementation of lessons designed through Wholistic Approach for teaching Science.

### 5.1.34.3. Frequency, Percentage and chi-square on Reaction Scale of the Student Teachers with respect to Waymade College of Education

| Sr. No. | Statements | SA (%) | A (%) | N (%) | D (%) | SD (%) | $\chi^2$ | Level of Significance |
|---|---|---|---|---|---|---|---|---|
| 1 | The lessons were well designed by the teacher. | 7 (33.33) | 14 (66.67) | 0 (0) | 0 (0) | 0 (0) | 37.63 | * |
| 2 | Choice of content matter was appropriate. | 1 (4.76) | 17 (80.95) | 3 (14.29) | 0 (0) | 0 (0) | 50.48 | * |
| 3 | The teacher explained the various concepts well. | 13 (61.90) | 7 (33.33) | 1 (4.76) | 0 (0) | 0 (0) | 31.44 | * |
| 4 | There was logical sequence in the presentation. | 5 (23.81) | 13 (61.90) | 3 (14.29) | 0 (0) | 0 (0) | 27.63 | * |
| 5 | The number of points covered was adequate as per the lesson time. | 11 (52.38) | 8 (38.10) | 2 (9.52) | 0 (0) | 0 (0) | 24.30 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | Teaching pointswere well interconnected. | 6 (28.57) | 13 (61.90) | 2 (9.52) | 0 (0) | 0 (0) | 29.06 | * |
| 7 | Teaching points were well presented. | 7 (33.33) | 12 (57.14) | 2 (9.52) | 0 (0) | 0 (0) | 26.20 | * |
| 8 | The demonstrations given by the teacher were effective. | 7 (33.33) | 11 (52.38) | 3 (14.29) | 0 (0) | 0 (0) | 21.92 | * |
| 9 | The experiments done by us are satisfying. | 3 (14.29) | 14 (66.67) | 4 (19.05) | 0 (0) | 0 (0) | 31.92 | * |
| 10 | The questions asked by the teacher were distributed across various domains. | 14 (66.67) | 6 (28.57) | 1 (4.76) | 0 (0) | 0 (0) | 34.77 | * |
| 11 | The responses given by us were well treated by the teacher. | 12 (57.14) | 7 (33.33) | 2 (9.52) | 0 (0) | 0 (0) | 26.20 | * |
| 12 | I could formulate the principles governing the various scientific | 4 (19.05) | 12 (57.14) | 5 (23.81) | 0 (0) | 0 (0) | 23.35 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | phenomena. | | | | | | | |
| 13 | The wholistic approach of teaching science was meaningful. | 12 (57.14) | 9 (42.86) | 0 (0) | 0 (0) | 0 (0) | 32.87 | * |
| 14 | The wholistic approach of learning science was joyful. | 2 (9.52) | 16 (76.19) | 3 (14.29) | 0 (0) | 0 (0) | 43.35 | * |
| 15 | The wholistic approach could interweave the cognitive-Affective-Psychomotor-Health-Environment and Spiritual Domains. | 13 (61.90) | 6 (28.57) | 2 (9.52) | 0 (0) | 0 (0) | 29.06 | * |
| 16 | The wholistic approach of teaching science helped me to inter-relate the concepts wholistically. | 6 (28.57) | 14 (66.67) | 1 (4.76) | 0 (0) | 0 (0) | 34.77 | * |
| 17 | I feel confident in employing wholistic approach for | 4 (19.05) | 14 (66.67) | 3 (14.29) | 0 (0) | 0 (0) | 31.92 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | teaching Science. | | | | | | | |
| 18 | I would like to suggest this wholistic approach of teaching science to other colleagues. | 13 (61.90) | 7 (33.33) | 1 (4.76) | 0 (0) | 0 (0) | 31.44 | * |
| 19 | I have learnt to view the reality wholistically. | 11 (52.38) | 7 (33.33) | 3 (14.29) | 0 (0) | 0 (0) | 21.92 | * |
| 20 | I have got a feeling that all the phenomena of the cosmos are inter-related. | 5 (23.81) | 12 (57.14) | 4 (19.05) | 0 (0) | 0 (0) | 23.35 | * |
| 21 | I find it difficult to employ wholistic approach of teaching Science. | 1 (4.76) | 6 (28.57) | 3 (14.29) | 10 (47.62) | 1 (4.76) | 14.30 | * |
| 22 | I find it time consuming to design lesson plan through wholistic approach for Teaching science. | 4 (19.05) | 5 (23.81) | 8 (38.10) | 3 (14.29) | 1 (4.76) | 6.68 | ** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23 | Ittakes more efforts to design lesson plan through wholistic approach for teaching Science. | 4 (19.05) | 7 (33.33) | 8 (38.10) | 2 (9.52) | 0 (0) | 10.96 | *** |
| 24 | I feel thatinfrastructure of school hinders in implementation of lessons designed through wholistic approach for teaching Science. | 7 (33.33) | 5 (23.81) | 6 (28.57) | 3 (14.29) | 0 (0) | 7.63 | ** |
| 25 | I find it difficult to manage class while implementing lessons designed through wholistic approach for teaching Science. | 1 (4.76) | 4 (19.05) | 8 (38.10) | 8 (38.10) | 0 (0) | 13.82 | * |
| 26 | I find it difficult to evaluate student performance while implementing | 0 (0) | 2 (9.52) | 8 (38.10) | 9 (42.86) | 2 (9.52) | 15.73 | * |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | lessons designed through wholistic approach for teaching Science. | | | | | | | |

**Table 5.16.:**Frequency, Percentage and chi-square along with level of significanceon Reaction Scaleof the Student Teachers with respect to Waymade College of Education

Table value of $\chi^2$ against 4 degree of freedom at 0.05 level is 9.488, whereas at 0.01 level is 13.277

*Significant at both the 0.05level and 0.01level

**Not significant at both the 0.05level and 0.01level

***Significant at 0.05 level and not significant at 0.01 level

Numbers in bracket are percentage of frequency

### 5.1.34.4. Interpretation of the Data Collected of the Student Teachers Waymade College of Education through the Reaction Scale

Itisevident from the above table that the values of Chi-square are significant against all the 26 statements, at 0.01 level against 4 degree of freedom except statements Sr. No. 22-24. The null hypothesis against statement -23 is rejected at 0.05 level, but, not rejected at 0.01 level. It means the null hypothesis that there will be no significant difference between the observed frequencies are those expected against equal probability stands rejected again all these statements at the respective levels. Most of these frequencies are either against strongly agreed or agreed. Hence the student teachers have been found to have favourable reactions towards the Wholistic Approach of Science teaching. Against the statement 22 and 24 the null hypothesis is not rejected. It means the Student teachers are equally divided against these areas, namely, I find it time consuming to design lesson plan through Wholistic Approach for teaching Science, and I feel that infrastructure of school hinders in implementation of lessons designed through Wholistic Approach for teaching Science.