

## CHAPTER 5

### DATA ANALYSIS AND INTERPRETATION

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#### 5.1 Introduction

This section presents the data, its analysis and interpretation after the implementation of the developed training program. As explained in the earlier chapter the present study aimed at developing an intervention program on Critical Thinking skills and studying its effectiveness on the student teachers of Navrachana University. Effectiveness in terms of quantitative data and qualitative data were analyzed. The developed program was validated by the experts (after incorporating the modifications suggested) from the field and was implemented in the form of pilot study on student teachers of 2016-18 batch. The pilot study helped the researcher in modifying the intervention program based on the descriptive feedback received during the study.

The final intervention program with the modifications during the study was compiled for 50 hours. It was implemented on 2017-19 batch of student teachers of Navrachana University of Vadodara.

As mentioned earlier, the study is quantitative as well as qualitative study. The data involved collection of quantitative as well as qualitative data. The quantitative data gave a lead to the qualitative data in terms of significant achievement in terms of scores. The focus of the study was on quantitative as well as qualitative data.

Triangulation method has been used, keeping in mind the limitations of both the qualitative and quantitative study methods. Triangulation is defined as “the combination of methodologies in the study of the same phenomena” (Denzin, 1978).

The data was collected over a period of 50 hours session through:

Quantitative data

- Standardized test of analysis of article by Richard Paul
- Validated Situation test

Qualitative data

1. Case studies
  - Journal entries of the students in the intellectual journal for over a period of 5 months
  - Self-assessment of the students at the end of the intervention
  - Mapping of student teacher's thinking process
2. Focus Group Discussion
3. Descriptive feedback for the program

## **5.2 Objective-wise Analysis**

### **5.2.1 For Objective 1: Developing an intervention program based on Paulian approach to Critical Thinking.**

The researcher began identifying her area of research by beginning to think on the broad areas that can be researched upon. The researcher while going through the training program on Critical Thinking from Critical Thinking Community felt the need of this skill for the student teachers. After reviewing the related research in the area of Critical Thinking, the researcher felt a strong need of implementing the Paulian approach to Critical Thinking on the student teachers of Navrachana University. Since the researcher took the training into the Paulian approach, she had reading materials which she could refer to for making the intervention program. She developed an intervention program based on the Paulian approach to Critical Thinking. While developing the program the researcher kept in mind the age and maturity level of the student teachers as the researcher would be dealing with adults.

The developed program used pedagogy such as situations sharing, storytelling, activities, real life examples, discussions (NCERT, 2005), Socratic discussion (Yang, 2005), paired discussions and lectures for transacting it. It also involved posting journal entries and completing assignments given in the class. The students were asked to maintain journals for their weekly posting of the entries. The journal entries were for the purpose of behavioral application of the concept taken in the class and assignments were given for the purpose of in-class work. It further helped them to reflect on their thinking on real life situations. As per NCERT, reflective diary helps the students to reflect and perceive things in a new light. This will further help them to change the attitude as the circumstance may be. It also involved discussions in the

class. Keeping in mind the above aspects, the intervention program was given for validation to six experts (names mentioned in appendix). The suggestions given by the experts were incorporated into the developed intervention program. Thereafter, the developed intervention program was implemented as a pilot study on 2016-18 batch. Through descriptive feedback it was identified that relating significant concepts with real life examples is very necessary and after each significant session, there can be a discussion on asking the view of the students for the most desirable action that they would take in a particular situation. Accordingly the intervention program was modified. Thus, the final developed intervention program on Critical Thinking skills based on Paulian approach to Critical Thinking was prepared to be implemented on 2017-19 batch.

### **5.2.2 Objective 2: Implementing Critical Thinking skills program based on Paulian approach to Critical Thinking on student teachers of Navrachana University.**

The intervention program on Critical Thinking was implemented for 50 hours in semester one of 2017-19 batch, beginning-ending in the months of July-March. The classes were conducted during the morning sessions of the day. The first class was allotted to Critical Thinking in the B.Ed program wherein the mind was fresh to grasp the new information and apply it. This intervention was considered as part of Tools for Professional Development Course and Self and Self Expression Course (Extension) in the second semester. The Tools for professional Development Course contains elements of metacognition, reflection and thinking and learning tools. These tools for professional development course aims to make the teachers professionally competent. While implementing the intervention program it was found that students were more responsive to lecture method of teaching. It was also found that students were more responsive to real life situations. Many students could relate a lot with writing journal entries in the Intellectual Journal. They liked to reflect on the situations in their real life. They found content to be interesting when the researcher related the content with her real life examples. Keeping in mind the same the program was modified to a certain extent.

Many came after the session to solve their queries regarding their personal lives and put forward many questions like, "I had a bad experience with reference to

relationship in my life, can I still trust anybody'? They also had questions with regards to students loafing in the presentations. They asked, "Madam, what to do in such situations"? Thus, many questions were raised during the implementation program. Few students came on with the conversations they had with their friends with regards to copying in their exams. They reported saying that madam, "she admitted to be copying in the examinations". So can you once check her while she is writing an exam? Student teachers were seen to be quite keen while taking up the course and many gave a feedback saying that the course should be continued for the complete year.

### **5.2.3 Objective 3: Assessing the Effectiveness of the Intervention program based on Paulian Approach to Critical Thinking for Student Teachers of Vadodara.**

For achieving this objective the data is organized and analyzed to understand in the best form in the following way.

1. Scores of standardized test
2. Scores of situation test
3. Results of the T-test
4. Case studies of 8 cases
  - i. Brief Profile
  - ii. Interpretation of Journal Entries followed by Researchers Observation
  - iii. Self- Evaluation by the case
  - iv. Consolidation of the case
  - v. Overall observations of the cases
5. Mapping of the profiles - Developmental Stages based on standards of thought
6. Focus Group Discussion
7. Descriptive Feedback of the students

- 1) Scores on Standardized test

In order to analyze objective three of the research the data was obtained from pre-test and post-test scores of analysis of article and situation test. The difference between pre and post test score were analyzed through t-test and then calculating t-value for each aspect of Critical Thinking based on the scores of Pre-test and Post-test. The scores from pre-post-test from analysis of the article test are presented below are based on the twelve dimensions are Purpose, Questions, Information, Inferences, Concepts and Ideas, Assumptions, Implications, Point of view, Clarity, Accuracy, Precision, and Relevancy

*Table 4 Pre-Test and Post-Test Scores of the student teachers on Analysis of the Article Test*

Student	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Total	D
1-Pre	1	2	4	1	2	3	6	6	1	1	1	2	30	
1-Post	5	3	2	4	9	4	6	3	2	2	1	1	42	8
2-Pre	2	0	2	1	0	0	0	0	0	0	0	0	5	
2-Post	4	3	3	1	3	0	0	2	0	0	0	0	16	11
3-Pre	5	4	3	3	2	5	2	2	1	1	1	1	30	
3-Post	3	5	4	3	2	4	9	6	2	2	2	2	44	14
4-Pre	3	2	3	3	0	0	5	3.5	0	0	2.5	2	24	
4-Post	5	4	7	9	2	5	2	4	1	2	2	0	43	19
5-Pre	1	1	1	5	1	0	1	0	1	1	1.5	1	14.5	
5-Post	6	4	2	6	4	2	3	0	2	1	1	1.5	32.5	18
6-Pre	4	0	3	5	1	1	0	0	1	2.5	0	0	17.5	
6-Post	7	6	9	5	8	4	6	4	2	2	2	2	57	39.5
7-Pre	6	6	1	5	3	0	5	0	0	0	1	0	27	
7-Post	6	2	4	5	1	3	4	3	1	0	0.5	1	30.5	3.5
8-Pre	1	4	3.5	1	2	0	0	2	3	2	0	1	19	
8-Post	3	4	4	1	0	3	5	2	0	2	0.5	1	25.5	6.5
9-Pre	0	0	1	0	0	0	0	0	0	0	0	0	1	
9-Post	1.5	0	3	1.5	0	0	0.5	0	0	0	0	0	6.5	5.5
10-Pre	0.5	0.5	0	00	0	2	2	0	0	0	0	0	5	
10-Post	3	5	3	0	3	3	0	3	1.5	1	0	0	22	17.5
11-Pre	2	0	3	1	0	0	0	0	0	1	1.5	0	8.5	
11-Post	1.5	5	9	1	0	2	0	0	1	1	0	0.5	21	12
12-Pre	1	1	6	0.5	4	0	0	0	0	0	0	0	12.5	
12-Post	3	2	4	6	2	0	6	2	1	1	0	0	27	14.5
13-Pre	6	0	2	6	2	0	0	4	0	0	05	0	20.5	
13-Post	6	1	4	3	6	2	6	4	1	2	1.5	0	36.5	16

14-Pre	0	0	0	0.5	0.5	0	0	0	0.5	0.5	0.5	0	2.5	
14-Post	2	3	6	2	2	3	0	3	0	1	1.5	1.5	25	22.5
15-Pre	4	0	2.5	4	0	2	2	3	1	1	0	1	20.5	
15-Post	4	2	6	2	1	2	3	0	1	2	1.5	1	25.5	5
16-Pre	4	2	0	0	0	0.5	0	0	2	2	2	0	12.5	
16-Post	4	4	4	7	4	4	5	4	1	1	1	0.5	39.5	27
17-Pre	1.5	0	0	1	1	4	0	0	1	0	0	1	9.5	
17-Post	1	1	3	5	5	2.5	1.5	0.5	0.5	0.5	0.5	0	21	11.5
18-Pre	3	6	2	4	1	4	5	1	4	4	2	1.5	36.5	
18-Post	7	6	4	4.5	6	6	8	4	2	3	0	0	52.5	16
19-Pre	4	4	0	8	1	0	0	1	2	2	0.5	0	22.5	
19-Post	5	6	4	7	5	6	8	4	1.5	2	1	1	50.5	28
20-Pre	1	3	2	0	2	1	2	0	2.5	1	1	1	16.5	
20-Post	3	2	8	5	3	4	4	0	2	1.5	1.5	1	35	18.5
21-Pre	2	3	0	0	3	1	0	1	1.5	0	0	0	11.5	
21-Post	4	4	4	8	3	0	4	2	2	1.5	1.5	1	35	23.5
22-Pre	3.5	4	6	3	1	1	3	1	3	1	0	1	27.5	
22-Post	6	6	9	8	4	8	4	4	2	2	1	1.5	55.5	28
23-Pre	3	3	3	0	2	1	5	3	3.5	3.5	2	2.5	31.5	
23-Post	3	4	4	8	4	7	3	5	1.5	1	0	1.5	42	10.5
24-Pre	4	4	6	1	2	4	0	2	3	0	0.5	0	26.5	
24-Post	9	6	8	7	10	10	9	5	2	2	2	2	72	45.5
25-Pre	4	1.5	0	2	0	0	0	0	0	1.5	1	0	9.5	
25-Post	5	6	3	6	0	4	3	0	1	1	1.5	0	30.5	21
26-Pre	0.5	2	2	2	0	1	0	0	2	0.5	1	0	11	
26-Post	2	4	6	4	2	0	0	0	0	1.5	0.5	1	21	10
27-Pre	8	10	5	6	3	5	6	5	2	2	2	1.5	55.5	
27-Post	10	10	8	10	9	7	10	5	2	2	2	2	77	21.5
28-Pre	2	5	0	2	0	0	4	0	1.5	0	0	0	14.5	
28-Post	7	4	8	6	1	5	3	1	1.5	2	2	1.5	42	27.5
29-Pre	2	1	2	1	4	1	0	0	1	1.5	1.5	0	15	
29-Post	8	2	4	2	6	3	3	0	0	0	0	0	28	13
30-Pre	2	2	5	2	0	2	4	2	0	0	0.5	0.5	20	
30-Post	5	4	4	4	4	0	0	1	2	1.5	1	1.5	28	8
31-Pre	2	1.5	2.5	0	2	4	0	1	0.5	0.5	1	0	15	
31-Post	5.5	3	4	4	5	4	5	2	0	0	0	0	32.5	17.5
32-Pre	3	0	1	3	0	2	2	1	1	0	0	0	13	
32-Post	0.5	3	4	4.5	3	1	1	0	1	0	2	0	20	7
33-Pre	5	0	2	3	4	5	4	6	2	3	1.5	2	37.5	

33-Post	4	6	4	8	7	8	9	5	2	2	2	2	59	21.5
34-Pre	2	1	2	7	2	2	0	4	1.5	1	1.5	1.5	26.5	
34-Post	5	8	5	3	2	8	6	4	2	2.5	2.5	1.5	54	27.5
35-Pre	2.5	4	0	4	0	1	0	2	0	0	0	0	13.5	
35-Post	4	5	4	5	2	5	4	0	1	1	0.5	1	32.5	19
36-Pre	6	0	4	8	3	4	0	2	3	4	3	2	39	
36-Post	8	6	6	6	3	8	5	4	1.5	1	2	1	51.5	12.5
37-Pre	4	3	3	3	3	2	0	4	2	1	2	1	28	
37-Post	4	5	6	4	4	7	4	5	1	1	2	1	44	16
38-Pre	4	4	4	5	0	3	0	3	1	1.5	0	0	25.5	
38-Post	5.5	6	4	5.5	4	4	3	2.5	2	2	2	2	42.5	17
39-Pre	2	0	2	0	1	4	0	0	1	0	0	0.5	10.5	
39-Post	3	4.5	2	1	0	1	3	0.5	1	1	0.5	0	17.5	7
40-Pre	5	5	0	5	4	0	0	5	1	1.5	3	3	32.5	
40-Post	6	4	7	4	5	6	5	1	1.5	2	2	2	45.5	13
41-Pre	3	0	5	7	4	0	0	1	1.5	0	1	1	23.5	
41-Post	7	4	10	9	7	3	8	4	1.5	2	2	2	59.5	36
42-Pre	5	7	2	3	8	0	1	4	2	2	2	1.5	37.5	
42-Post	4.5	8	6	4.5	5	8	6	2	2	2	2	2	52	14.5
43-Pre	2	0	0	4	3	1	1.5	0	1	0	0	0	12.5	
43-Post	4	1	5	0	0	0	1	0	0	0	0	0	11	-1.5
44-Pre	3	4	5	4	0	2	4	0	2	2	1.5	0	27.5	
44-Post	8	8	4	7	8	8	1	1	2	2	2	2	53	25.5
45-Pre	5	0	2	0	0	0	0	2	1	1	0	0	11	
45-Post	4	2.5	4	6	0	0	0	0	1	0	1	0.5	19	8
46-Pre	4	6	4	7	1	4	0	0	1	3	2	1	33	
46-Post	6	8	10	4	4	7	8	8	2	2	2	2	63	30
47-Pre	4.5	4	2	7	0	0	0	0	2	2	0.5	1	23	
47-Post	6.5	10	6	7	6	6	2	0	2	2	2	2	51.5	28.5
48-Pre	4	3	3	3	0	1	0	0	0	0	0	1.5	15.5	
48-Post	4	4	6	6.5	8	6.5	0	0	1	1	1	1	39	

Summary of t-value of means of student teachers on Pre-test and Post-test for Analysis of Article test

Table 5 *t-Test: Two-Sample Assuming Equal Variances Analysis of Article*

	Variable 1	Variable 2
Mean	20.32978723	37.80851064
Variance	124.0247456	254.1581869

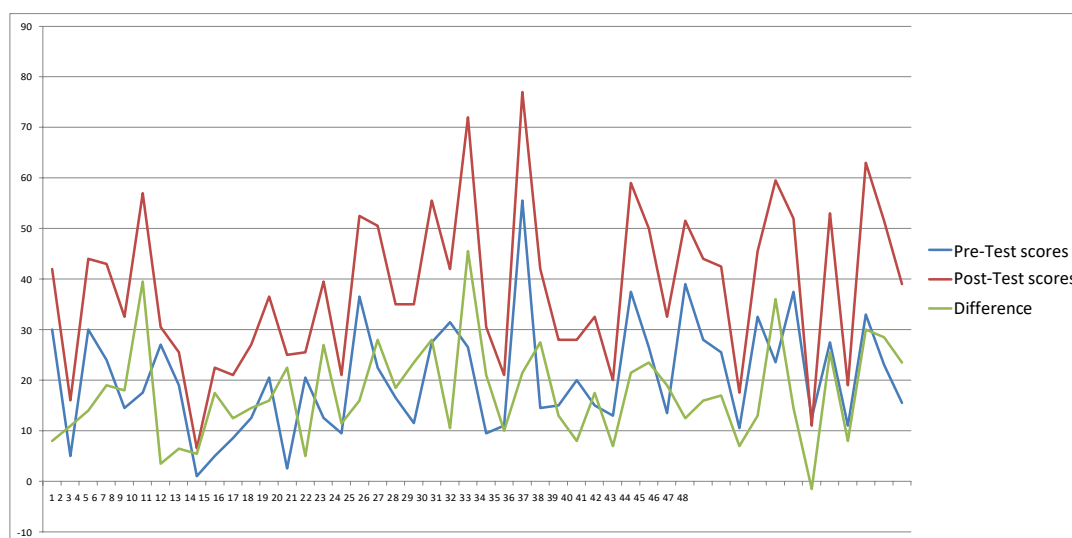
Observations	47	47
Pooled Variance	189.0914662	
Hypothesized Mean Difference	17.48	
Df	92	
t Stat		
P(T<=t) one-tail t Critical one-tail	12.32405226	
P(T<=t) two-tail		
1.74529E-21		
1.661585397		
3.49057E-21		
t Critical two-tail	1.986086317	

From the above table 5.2, it can be observed that the mean achievement score of the teachers on pre-test is 20.329 and that of post-test is 37.808. Whether this observed difference is significant or otherwise, the researcher used dependant means t-test. The table also reveals that the t-value is 12.32 which is greater than table value of 't' at 0.05 level. The null hypothesis that there will be no significant difference between pre-post test scores of the student teachers in terms of standards of Critical Thinking and elements of reasoning at 0.05 level of significance (standardized test) is thus rejected.

The following figure indicates the Pre-Test and Post-Test scores and the difference in the scores of analysis of article test



Figure 23 Comparative analysis and difference of Pre-Test and Post-Test scores of Analysis of the Article Test



Following tables presented below show t-value scores on the various aspects of Critical Thinking of Paulian Approach. They are Purpose, questions, information, inference, concepts and ideas, assumptions, implications and point of view in pre-post test

t-value for pre-test and post test scores on the aspect of ‘Purpose’ of Critical Thinking

Table 6 t-value of Q.1 on ‘Purpose’

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	147	3.0625	1.77	6.160	46
Post Test	228.5	4.76	2.09		

The value of t is 6.160540. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.3 that the calculated t value of 6.160 is greater than the expected value of t at 0.05 level of significance for 46 degree for freedom. Thus the null hypothesis that there will be no difference in the mean gain score on purpose through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘purpose’ of Critical Thinking.

*Table 7 t-value of pre-test and post scores of Q.2 on 'Questions'*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	113.5	2.364	2.335	6.70	46
Post Test	214	4.45	2.24		

The value of t is 6.707377. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.4 that the calculated t value of 6.707 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Questions' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Questions' of Critical Thinking.

*Table 8 t-value of pre-test and post scores of Q.3 on 'Information'*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	111.5	2.3229	1.802	8.38.	46
Post Test	248	5.166	2.13		

The value of t is 8.837814. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.5 that the calculated t value of 8.83 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Information' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Information' of Critical Thinking

*Table 9 t-value of pre-test and post scores of Q.4 on 'Inferences'*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	141	2.937	2.45		
Post Test	230	4.791	2.494		

The value of t is 4.287191. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.6 that the calculated t value of 4.28 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Inference' through the instructional strategy is rejected. This

shows that the instructional strategy was effective enough on the aspect of ‘Inference’ of Critical Thinking.

*Table 10 t-value of pre-test and post scores of Q.5 on ‘Concepts and Ideas’.*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	72.5	1.51	1.68		46
Post Test	182	3.791	2.705		

The value of t is 5.614442. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.7 that the calculated t value of 5.614 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus the null hypothesis that there will be no difference in the mean gain score on ‘Concepts and Ideas’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Concepts and Ideas’ of Critical Thinking.

*Table 11 t-value of Pre-Test and Post-scores of Q.6 on ‘Assumptions’*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	73.5	1.531	1.667	6.398	46
Post Test	194	4.041	2.78		

The value of t is 6.398785. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.8 that the calculated t value of 6.398 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Assumptions’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Assumptions’ of Critical Thinking.

*Table 12 t-value of pre-test and post scores of Q.7 on ‘Implications’*

	Scores	Mean gain	SD	t-value	Degree of freedom
Pre Test	64.5	1.343	1.97	5.425	46
Post Test	187	3.89	2.89		

The value of t is 5.425778. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.9 that the calculated t

value of 5.425 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Implications’ through the intervention program is rejected.

This shows that the intervention program was effective enough on the aspect of ‘Implications’ of Critical Thinking.

*Table 13 t-value of pre-test and post scores of Q.8 on ‘Point of View’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	71.5	1.48	1.80	2.58	46
Post test	110.5	2.302	2.06		

The value of t is 2.582477. The value of p is 0.012984. The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.10 that the calculated t value of 2.58 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Point of View’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Point of View’ of Critical Thinking.

*Table 14 t-value of pre-test and post scores of Q.9 on ‘Clarity’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	61	0		0	46
Post test	61	0			

The value of t is 0. It is evident from the table number 5.11 that the calculated t value 0 is not greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Confidence in Reason’ through the intervention program is accepted. This shows that the intervention program was not effective enough on the aspect of ‘Clarity’ ( Q.9) of Critical Thinking.

*Table 15 t-value of Pre-test and Post scores of Q.10 on ‘Accuracy’*

	Scores	Mean	SD	t-value	Degree of freedom
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Pre Test	52.5/105	10			46
Post test	65.5/131				

It is evident from the table number 5.12 that the calculated t value 0 is not greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Confidence in Reason' through the intervention program is accepted. This shows that the intervention program was not effective enough on the aspect of 'Accuracy' of Critical Thinking.

*Table 16 t-value of pre-test and post scores of Q.11 on 'Precision'*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	43.5	0			46
Post test	56				

It is evident from the table number 5.13 that the calculated t value 0 is not greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Confidence in Reason' through the intervention program is accepted. This shows that the intervention program was not effective enough on the aspect of 'Precision' of Critical Thinking.

*Table 17 t-value of pre-test and post scores of Q.12 on 'Relevancy'*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	32	0		-0.09	46
Post test	48				

It is evident from the table number 5.14 that the calculated t value -0.095053 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Relevancy' through the intervention program is accepted. This shows that the intervention program was not effective enough on the aspect of 'Relevancy' of Critical Thinking.

The questions that mentioned about standards of thinking generated t value which was either zero or less than zero. This has happened because the scores were too low to generate results for t-test.

### 5.3 Findings

- 1) It was found with the calculation of t-value that the intervention program was effective on the aspect of “Purpose” of Critical Thinking i.e. 6.160
- 2) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Questions” of Critical Thinking i.e. 6.70
- 3) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Information” of Critical Thinking i.e. 8.83
- 4) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Inference” of Critical Thinking i.e. 4.28
- 5) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Concepts and Ideas” of Critical Thinking i.e. 5.614
- 6) It was also found that the intervention was effective in the aspect of “ Assumptions” of Critical Thinking i.e. t-value of 6.398
- 7) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Implications” of Critical Thinking i.e. 5.425
- 8) It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Point of View” of Critical Thinking i.e. 2.58
- 9) It was found with the calculation of t-value that the intervention program was not effective on the aspect of “ Clarity” of Critical Thinking i.e. 0
- 10) It was found with the calculation of t-value that the intervention program was not effective on the aspect of “ Accuracy” of Critical Thinking i.e. 0
- 11) It was found with the calculation of t-value that the intervention program was not effective on the aspect of “ Precision” of Critical Thinking i.e. 0
- 12) It was found with the calculation of t-value that the intervention program was not effective on the aspect of “ Relevancy” of Critical Thinking i.e. - 0.090503

Table 18 *Individual Scores and Aspect of Critical thinking in which student teacher performed best out of all aspects in test*

Sample number	Pre-Test scores	Post-Test scores	Difference	Area performed well
1	30	42	8	Concepts and Ideas
2	5	16	11	Concepts and ideas
3	30	44	14	Implications
4	24	43	19	Inferences
5	14.5	32.5	18	Purpose
6	17.5	57	39.5	Concepts and ideas
7	27	30.5	3.5	Information
8	19	25.5	6.5	Implications
9	1	6.5	5.5	Purpose, inference
10	5	22.5	17.5	Questions
11	8.5	21	12.5	Information
12	12.5	27	14.5	Implications
13	20.5	36.5	16	Implications
14	2.5	25	22.5	Information
15	20.5	25.5	5	Information
16	12.5	39.5	27	Inferences
17	9.5	21	11.5	Inferences, concepts and ideas
18	36.5	52.5	16	Concepts and ideas
19	22.5	50.5	28	Implications
20	16.5	35	18.5	Information
21	11.5	35	23.5	Information, implications
22	27.5	55.5	28	Assumptions
23	31.5	42	10.5	Assumptions
24	26.5	72	45.5	Implications
25	9.50	30.5	21	Questions
26	11	21	10	Information
27	55.5	77	21.5	Concepts and ideas
28	14.5	42	27.5	Information
29	15	28	13	Purpose
30	20	28	8	Concepts and ideas
31	15	32.5	17.5	Implications
32	13	20	7	Information
33	37.5	59	21.5	Question
34	26.5	50	23.5	Implications
35	13.5	32.5	19	Information, assumptions, implications
36	39	51.5	12.5	Questions
37	28	44	16	Assumptions
38	25.5	42.5	17	Concepts and ideas
39	10.5	17.5	7	Questions
40	32.5	45.5	13	Information
41	23.5	59.5	36	Implications
42	37.5	52	14.5	Assumptions

43	12.5	11	-1.5	Information
44	27.5	53	25.5	Concepts and ideas
45	11	19	8	Inferences
46	33	63	30	Implications. Point of view
47	23	51.5	28.5	Questions, concepts and assumptions
48	15.5	39	23.5	Concepts and ideas

As shown in Table 5.15, the individual Pre-Test and Post –Test Scores are shown as well as it indicates the area in which the student has performed well

**Aspect on which the most improvement is seen in the test:**

- 1) 21.42% of the student teachers performed best on the aspect of ‘Information’.
- 2) 21.42% of the student teachers performed best on the aspect of ‘Implications’.
- 3) 19.64% of the student teachers performed on the aspect of ‘Concepts and Ideas’.
- 4) 10.71% of the student teachers performed best on the aspect of ‘Assumptions’.
- 5) 10.71% of the student teachers performed best on the aspect of ‘Questions’.
- 6) 8.77% of the student teachers performed best on the aspect of ‘Inferences’
- 7) 5.35% of the student teachers performed best on the aspect of ‘Purpose’.
- 8) 1.78% of the student teachers performed best on the aspect of ‘Point of View’.

The following figure shows the improved responses on the dimension of ‘Purpose’, ‘Questions’, ‘Information’, ‘Point of View’, ‘Inferences’, ‘Implications’, ‘Assumptions’ and ‘ Concepts and Ideas’.





1-Pre	5	5	1	3	5	6	5	6	6	5	6	0	0	53	
1-Post	6	8	3	8	10	5	9	10	10	0	10	3	1	83	30
2-Pre	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0.5	
2-Post	0.5	0	0	2	0.5	0.5	2	1	0	2	4	2.5	0	15	14.5
3-Pre	6	3	6	5	3	3	5	6	7	5	3	6	3	61	
3-Post	4.5	8	8	6	0	4	8	3.5	8	5	8	4	4	71	10
4-Pre	3	6	5	2	5	0	3	4	5	4	4	5	0	46	
4-Post	3	8.5	5	2	3	4	9	3.5	8.5	4.5	7	2	0.5	60.5	14
5-Pre	5	4	4.5	6	3	0	4	3.5	3	4	0	5	3	45	
5-Post	8	8.5	8	3	8	9	3	3.5	9	3.5	4	8	1	76.5	31.5
6-Pre	6	5	5	4	4	5	4	4	4	4	1	3	3	52	
6-Post	9	9	4	9	9	9	9	3	9	2	4	0	4	80	28
7-Pre	3	5	1	5	5	3	4	0	0	0	0	0	0	26	
7-Post	4	1	7	3	3	7	8	1	7	1	1	1	0	44	18
8-Pre	4	5	3	4	4	3	6	5	5	4	0	5	0	48	
8-Post	1	4	1	2	6	7	6.5	5	6	0	4	2	2	46.5	-1.5
10-Pre	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0.5	
10-Post	6	5	1	0	1	0	3.5	1.5	4	0.5	1	0	0	23.5	23
11-Pre	1	4	3	4	3	2	3	4	0	0	0	3	0	27	
11-Post	6	6	7.5	4	5	2	10	8	0	0	6	6	3	63.5	36.5
12-Pre	3	2	5	3	2	5	2	1	0	0	0	0	0	23	
12-Post	2	2	8	0.5	0	0	6.5	0	1	3	5	5	0	33	10
13-Pre	4	3	2	5	4	0	5	4	0	2	3	3	0	35	
13-Post	4	8	10	3.5	0	8	0	8	0	0	9	8	0	58.5	23.5
14-Pre	4	2	1	1.5	1	1.5	2	4	3	2	2	2	3	29	
14-Post	8	8	8	2	1	8	8	3	7	5	7	9	2	76	47
15-Pre	4	2	0	3.5	2	2	0	1	3	3	2	2	0	24.5	
15-Post	8.5	7	1	3	0	9	5	3	6	2	1.5	4	0	50	25.5
16-Pre	5	5	5	5	4	4.5	5	4	0	0	2	0	0	39.5	
16-Post	6	8	9	2	3.5	6	7.5	4.5	9	3	10	1.5	0	64	24.5
17-Pre	2	5	3.5	4	5	6	4.5	4.5	0	4	3	5	0	46.5	
17-Post	7.5	8.5	3	4	4	4	2	3	2	3	9	8	0	58	11.5
18-Pre	6	6	3	5	5	2	4	6	3	4	2	4	6	56	
18-Post	2	10	8	2	2	9	8	10	10	10	10	3.5	4.5	89	33
19-Pre	5	5	3	5	5	4	4	5	0	6	5	3	2	52	
19-Post	10	10	10	3	1.5	3.5	9	4.5	10	5	10	9	9	94.5	42.5
20-Pre	5	5	5	5	5	0	4	5	0	5	3.5	4.5	0	47	
20-Post	10	2.5	7	0	2.5	0	7.5	5	9	9	10	8	7	77.5	30.5
21-Pre	5	5	5.5	4	1	3	4	6	2	0	0	0	0	35.5	
21-Post	4	7	7	1	1	9	3	5	8	6	9	1	1.5	62.5	27
22-Pre	6	6	2	2	3	2	4	5	0	.	0	4	2	39	
22-Post	10	9	9	3	4	10	10	7	10	7	10	10	1	100	61
23-Pre	6	4.5	3	6	3	0	0	5	4	4	2	5	0	42.5	
23-Post	9	10	4	4	2	5	10	10	10	10	9	9	9	101	58.5

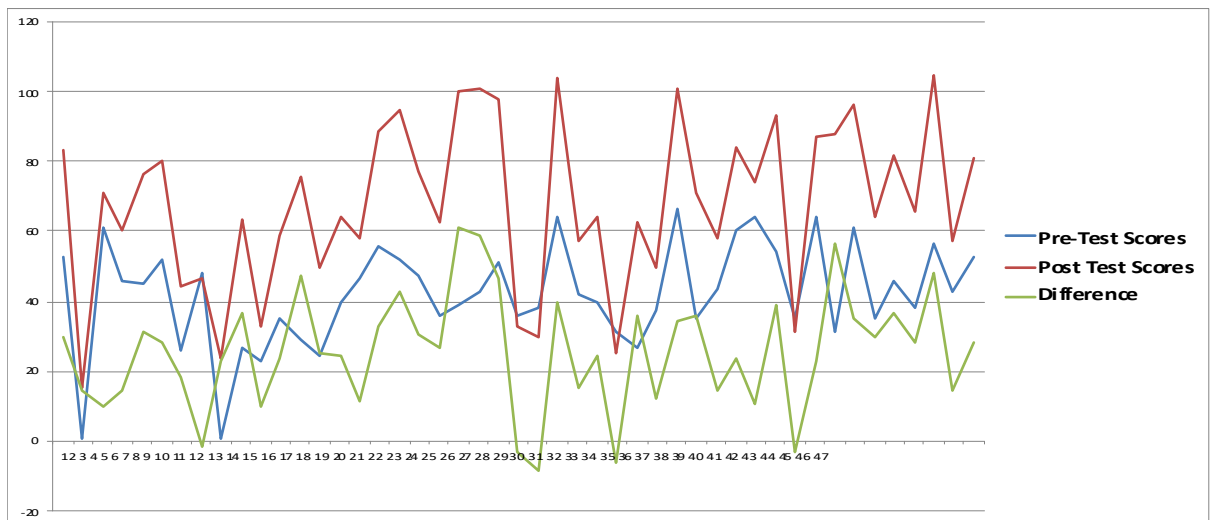
24-Pre	3	5	3	6	6	5	0	6	5	5	6	1	0	51	
24-Post	10	10	1	2	6	10	10	6.5	10	6	10	6	10	97.5	46.5
25-Pre	4	6	2	2	5	0	6	7	4	0	0	0	0	36	
25-Post	4	3.5	0	4	3	0	3	4	2	0	5	1.5	3	33	-3
26-Pre	4	4	3.5	3.5	3.5	0	3.5	4.5	0	4	4	3	1	38.5	
26-Post	5	5	0	2.5	1.5	0	0	2.5	3	0	5	2	3.5	30	-8.5
27-Pre	5	5	5.5	4	5	5	4.5	7	4	4.5	3	5	7	64.5	
27-Post	10	8.5	10	8	2.5	10	10	6	9	6	10	6	8	104	39.5
28-Pre	4	4	0	6	4	0	6	6	5	5	2	0	0	42	
28-Post	7.5	7.5	0	3	8	0	7.5	6	0	4	4	7	3	57.5	15.5
29-Pre	6	5	6	6	6	5	6	0	0	0	0	0	0	40	
29-Post	2.5	3	3	4	2	3	10	10	9	2	8	8	0	64.5	24.5
30-Pre	4	4	2	3.5	4	0	5	6	0	0	2.5	0	0	31	
30-Post	5	0	0	5	5	0	0	5	0	0	0	5	0	25	-6
31-Pre	4	1	0	2	0	4	6	2	0	0	4	4	0	27	
31-Post	1.5	9	9	4	0	2.5	8	8	0	7	5	7	2	63	36
32-Pre	0	4	0	4	3	4	3.5	3.5	3.5	3	4	3	2	37.5	
32-Post	4.5	3	2	2	2	0	5	5.5	7	3	8	8	8	50	12.5
33-Pre	6	6.5	0	6	5.5	6	5.5	5	6	5	5	5	5	66.5	
33-Post	3.5	10	0	4	10	10	10	10	10	10	10	10	3.5	101	34.5
34-Pre	6	5	0	6	6	1	3	1	5	2	0	0	0	35	
34-Post	5	8.5	0	4	0	4.5	10	4.5	10	7	9.5	7	1	71	36
35-Pre	4.5	4	3	4.5	3.5	0	5.5	5.5	3	4.5	0	5.5	0	43.5	
35-Post	1	5	10	2	4	2.5	6.5	4	2	9	6	4	2	58	14.5
36-Pre	6	6	4.5	4	4	6	4	5	5.5	4	6.5	4.5	0	60	
36-Post	2.5	8	9	2	2	4	9	10	10	4	8.5	9	6	84	24
37-Pre	5	6	4	6	6	6	5	5	5	6	5	5	0	64	
37-Post	4	9	0	10	3.5	1	10	2	8	0	10	10	7	74.5	10.5
38-Pre	6	4	5	4	1.5	5.5	5.5	6.5	5	2	2	4	3	54	
38-Post	7	8.5	0	4	6.5	7	10	10	10	6	8	9	7	93	39
39-Pre	4	2	2	5	4.5	3.5	5	5	0	4	0	0	0	35	
39-Post	1.5	3	6	3	1	3	3	4	0	0	5	2	0	31.5	-3.5
40-Pre	6	6	5.5	4.5	4.5	4	6	5	5.5	4.5	6	6	1	64.5	
40-Post	3.5	10	10	2.5	4	4	10	3	9	8	10	8.5	5	87.5	23
41-Pre	6	5	0	5	0	5.5	5	5	0	0	0	0	0	31.5	
41-Post	3	10	8	3.5	9	2.5	9.5	9.5	8.5	9	8.5	6.5	0.5	88	56.5
42-Pre	5	5.5	4	5	3	5	4	5.5	6	6	5	4	3	61	
42-Post	4.5	10	5	10	2	9	10	10	10	7	10	4	4.5	96	35
43-Pre	3	3.5	0	4	3.5	0	2.5	4	3.5	3	3.5	2	2.5	35	
43-Post	10	9	3	2	0	0	8	9	6	1.5	6	8	2	64.5	29.5
44-Pre	4.5	4	3.5	5	1	2	4	5	4	3	3	4.5	2	45.5	
44-Post	4	10	10	3	0	1	9	9	9	7	10	9	1	82	36.5
45-Pre	4	4.5	4	3	3.5	4	1.5	4	0	3	3.5	2	1	38	

45-Post	4	9	1	3	1.5	5	1.5	8	8	8	8.5	8.5	0	66	28
46-Pre	5	6	5	3	4	5	4.5	6	6	1	4.5	3.5	3	56.5	
46-Post	10	8	8	6.5	1.5	9	10	10	10	8	10	9	5	105	
47-Pre	6	6	4.5	6	6	3	5.5	0	0	0	2	4	0	43	
47-Post	4	10	7.5	8	4	0	4	6	0	0	10	4	0	57.5	14.5
48-Pre	6	5	2	5.5	5	4	3	6	5	4	4	3	0	52.5	
48-Post	8	8.5	4	4	2	9	10	9	7	1	6	8	4.5	81	28.5

As shown in table 5.16 it shows the data of 47 students on situation test

The following figure indicates Pre-Test and Post-Test scores on situation test

Figure 25 Pre-Test and Post-Test scores on Situation test



Summary of t-value of means of student teachers on pretest and posttest for Situation Test

Table 20 t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	42.15957447	67.92553191
Variance	214.9141998	556.1736818
Observations	47	47

Pooled Variance 385.5439408

Hypothesized Mean Difference 0

Df	92
t Stat	6.361261885
P(T<=t) one-tail	3.82726E-09
t Critical one-tail	1.661585397
P(T<=t) two-tail	7.65451E-09
t Critical two-tail	1.986086317

From the above table 5.11, it can be observed that the mean achievement score of the teachers on pre-test is 42.159 and that of post-test is 67.92. Whether this observed difference is significant or otherwise, the researcher used dependent means t-test. The table also reveals that the t-value is 6.36 which is greater than table value of t at 0.05 level. The null hypothesis that there will be no significant difference between pre-post test scores of the student teachers in terms of Intellectual Traits of Critical Thinking and at 0.05 level of significance (situation test) is rejected.

In order to find out the effectiveness of the each intellectual trait from the respective question, t-value was calculated. Following tables presented below show t-value scores on:

Q.1 Intellectual Integrity, Q.2 Intellectual Humility, Q.3 Confidence in Reason, Q.4 Confidence in Reason, Q.5 Intellectual Integrity, Q.6 Intellectual Empathy, Q.8 Intellectual Empathy, Q.9 Intellectual Perseverance, Q.10 Intellectual Perseverance, Q.11 Egocentrism, Q.12 Socio-centric, Q.13 Integrated Situation

Table 5.12 presents the summary of the t-value for intellectual integrity. The mean gain score for experimental group for pre and post-test was calculated and in order to find out whether the difference in the mean gain score is significant or not, t-value was calculated

*Table 21 t-value of pre-test and post scores of Q.1 on 'Intellectual Integrity'*

Pre Test	206	Mean	SD	t-value	Degree of freedom
Post Test	254.5	4.29	1.706		2.23
Difference	48.5	5.30	2.97		

The t value is 2.23. It is evident from the table number 5.12 that the calculated 't' value of 2.23 is greater than the expected value at 0.05 level of significance for 46

degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Intellectual Integrity’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Intellectual Integrity’ of Critical Thinking.

*Table 22 t-value of pre-test and post scores of Q.2 on ‘Intellectual Humility’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	204.5	4.26	1.67		
Post Test	334	6.95	3.08	6.826510	46

The t value is 6.826510. It is evident from the table number 5.14 that the calculated t-value of 6.826 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus the null hypothesis that there will be no difference in the mean gain score on ‘Intellectual Humility’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Intellectual Humility’ of Critical Thinking.

*Table 23 t-value of pre-test and post scores of Q.3 on ‘Confidence in Reasoning’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	135.5	4.26	1.67	4.095	46
Post Test	235	5	3.71		

The t value is 4.095. It is evident from the table number 5.15 that the calculated t value of 4.095 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Confidence in Reason’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Confidence in Reason’ of Critical Thinking.

*Table 24 t-value of pre-test and post scores of Q.4 on ‘Confidence in Reasoning’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	195.5	4.07	1.627	-1.312	46
Post Test	173	3.60	2.42		

The t value is -1.312. It is evident from the table number 5.16 that the calculated t value of -1.312 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Confidence in Reason’ through the intervention program is accepted. This shows that the intervention program was not effective enough on the aspect of ‘confidence in reason’ (Q.4) of Critical Thinking.

*Table 25 t-value of pre-test and post scores of Q.5 on ‘Intellectual Integrity’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	170	3.61	1.73	-1.06617	46
Post Test	148	3.14	2.84		

The value of t is -1.066170. The value of p is 0.291793. The result is not significant at  $p \leq 0.05$ . It is evident from the table number 5.16 that the calculated t value of -1.066 is smaller than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Intellectual Integrity’ through the intervention program intervention program is accepted. This shows that the instructional strategy was not effective enough on the aspect of ‘Intellectual Integrity’ (Q.5) of Critical Thinking.

*Table 26 t-value of pre-test and post scores of Q.6 on ‘Intellectual Integrity’*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	135.5	2.88	2.19	2.794	46
Post Test	216	4.69	3.57		

The value of t is 2.794993. The value of p is 0.007491. The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.17 that the calculated t-value of 2.794 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Intellectual Integrity’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Intellectual Integrity’ of Critical Thinking.

*Table 27 t-value of pre-test and post scores of Q.7 on ‘Intellectual Empathy’*

	Scores	Mean	SD	t-value	Degree of freedom
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Pre Test	182.5	2.88	1.826	5.95	46
Post Test	328.5	6.98	3.244		

The value of t is 5.958313. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.18 that the calculated t-value of 5.95 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Intellectual Empathy' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Intellectual Empathy' of Critical Thinking.

*Table 28 t-value of pre-test and post scores of Q.8 on 'Intellectual Empathy'*

		Mean	SD	t-value	Degree of freedom
Pre Test	198.5	4.13	2.08	3.76	46
Post Test	274.5	5.71	3.244		

The value of t is 3.766491. The value of p is 0.00046. The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.19 that the calculated t value of

3.76 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Intellectual Empathy' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Intellectual Empathy' of Critical Thinking.

*Table 29 t-value of pre-test and post scores of Q.9 on 'Intellectual Perseverance'*

	Scores	Mean	SD	t-value	Degree of freedom
Pre Test	126	2.625	2.424	7.56	46
Post Test	301	6.68	3.621		

The value of t is 7.561400. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.20 that the calculated t value of 7.56 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Intellectual Perseverance' through the intervention program is



rejected. This shows that the intervention program was effective enough on the aspect of ‘Intellectual perseverance’ of Critical Thinking.

*Table 30 t-value of pre-test and post scores of Q.10 on ‘Intellectual Perseverance’*

	Scores	Mean	S.D	t-value	Degree of freedom
Pre Test	132.5	2.76	2.06	2.636	46
Post Test	195	4.43	3.255		

The value of t is 2.636216. The value of p is 0.011325. The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.21 that the calculated t value of 2.636 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on ‘Intellectual Perseverance’ through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of ‘Intellectual Perseverance’ of Critical Thinking.

*Table 31 t-value of pre-test and post scores of Q.11 on ‘Socio-centrism’*

		Mean	S.D	t-value	Degree of freedom
Pre Test	114	2.42	2.05	11.95	46
Post Test	339.5	7.07	3.04		

The value of t is 11.955139. The value of p is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.22 that the calculated t value of 11.95 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on socio-centrism through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of socio-centrism of Critical Thinking.

*Table 32 t-value of pre-test and post scores of Q.12 on ‘Egocentrism’*

	Scores	Mean	S.D	t-value	Degree of freedom
Pre Test	128.5	2.677	2.099	6.997	46
Post Test	271.5	5.77	3.06		

The value of  $t$  is 6.997030. The value of  $p$  is  $< 0.00001$ . The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.23 that the calculated  $t$  value of 6.997 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Egocentrism' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Egocentrism' of critical thinking.

*Table 33 t-value of pre-test and post scores of Q.13 on 'Integrated Situation'*

	Scores	Mean	S.D	t-value	Degree of freedom
Pre Test	52.5	1.19	1.77	3.865	46
Post Test	128	3.04	2.88		75.5

The value of  $t$  is 3.865743. The value of  $p$  is 0.000339. The result is significant at  $p \leq 0.05$ . It is evident from the table number 5.24 that the calculated  $t$  value of 3.865 is greater than the expected value at 0.05 level of significance for 46 degree for freedom. Thus, the null hypothesis that there will be no difference in the mean gain score on 'Integrated situation' through the intervention program is rejected. This shows that the intervention program was effective enough on the aspect of 'Integrated situation' of Critical Thinking.

Following are the inferences that are drawn from the above tables FINDINGS

- It was found with the calculation of  $t$ -value that the intervention program was effective on the aspect of " Intellectual Integrity" of Critical Thinking i.e. 2.23 (Q.1)
- It was found with the calculation of  $t$ -value that the intervention program was effective on the aspect of " Intellectual Humility" of Critical Thinking i.e. 6.826 (Q.2)
- It was found with the calculation of  $t$ -value that the intervention program was effective on the aspect of " Confidence in Reason" of critical thinking i.e. 4.095 (Q.3)
- It was found with the calculation of  $t$ -value that the intervention program was not effective on the aspect of "Confidence in Reason " of Critical Thinking i.e. -1.312 (Q.4)

- It was found with the calculation of t-value that the intervention program was not effective on the aspect of “ Intellectual Integrity” of Critical Thinking i.e. - 1.0661 (Q.5)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Intellectual Empathy” of Critical Thinking i.e. 5.95 (Q.6)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Intellectual Empathy” of Critical Thinking i.e. 3.76 (Q.8)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Intellectual Perseverance” of Critical Thinking i.e. 7.56 (Q.9)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Intellectual Perseverance” of Critical Thinking i.e. 2.636
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Socio-centrism” of Critical Thinking i.e. 11.95 (Q.11)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Egocentrism” of Critical Thinking i.e. 6.99 (Q.12)
- It was found with the calculation of t-value that the intervention program was effective on the aspect of “ Integrated Situation” of Critical Thinking i.e. 3.86 (Q.13)

#### **5.4 Interpretation**

- It was found in this study that student teachers are not able to comprehend a situation that involve multiple traits; i.e. Integrated situation
- It was further found that the student teachers were able to comprehend a situation that involved answering of one trait
- Students were able to improve in the situation that involved their real life experiences ( trait of socio-centrism)

- They were able to understand/interpret the situation that involved the trait of socio-centrism in the best possible manner
- They were able to understand and relate to situation of Q.4 that is intellectual integrity in the lowest possible way
- Negative difference was seen in confidence in reason and intellectual integrity, lowest being on the situation that involved intellectual integrity. The reason might be the situation specifically talks about academic integrity. The question was bit contextual and also involved bit of English communication to comprehend. Halpern, D. (2014) fifth edition has cited this as a barrier to critical thinking. She has labelled this kind of language as Bureaucratese. It is use of formal, stilted language that is unfamiliar to people who lack special training. This aspect involved use of words that involved foreign words like stacking of papers, bubble sheets etc.

Below table shows Pre-Post Test Scores, Percentage increase in terms of scores as well as area in which they performed well.

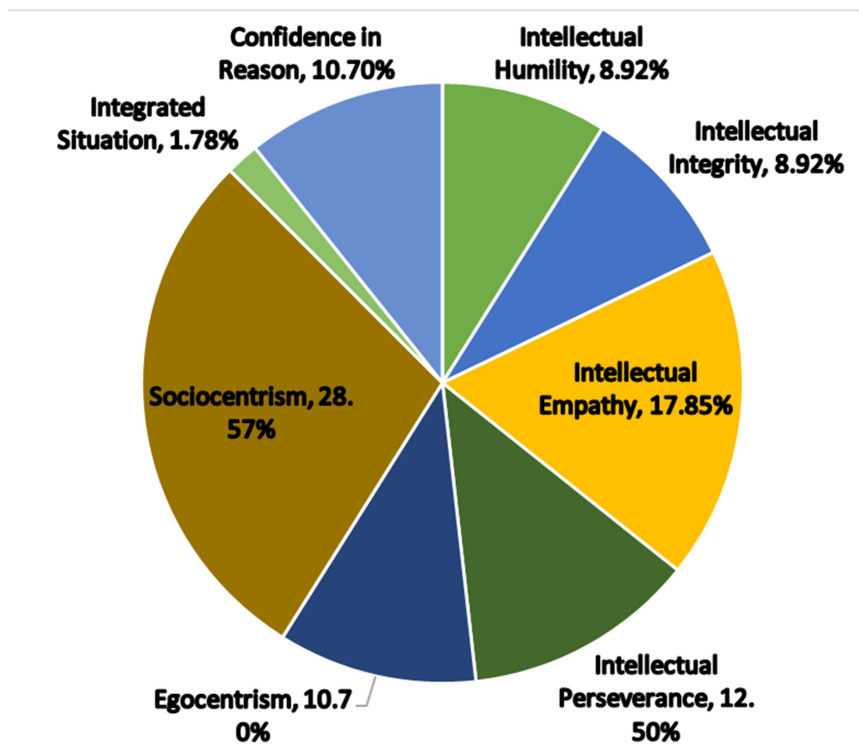
*Table 34 Comparative analysis of pre-post test scores on situations*

Sample number	Pre-Test Scores	Post Test Scores	Difference	Area performed well
1	53	83	30	Integrity
2	0.5	15	14.5	Socio-centrism
3	61	71	10	Socio-centrism, humility
4	46	60.5	14.5	Empathy
5	45	76.5	31.5	Integrity
6	52	80	28	Integrity, humility
7	26	44	18	Perseverance
8	48	46.5	-1.5	Integrity
9	0.5	23.5	23	Humility
10	27	63.5	36.5	Empathy
11	23	33	10	Socio-centrism, egocentrism
12	35	58.5	23.5	Confidence in reason
13	29	76	47	Confidence in reason
14	24.5	50	25.5	Humility
15	39.5	64	24.5	Perseverance
16	46.5	58	11.5	Socio-centrism
17	56	89	33	Socio-centrism
18	52	94.5	42.5	Perseverance

19	47	77.5	30.5	Perseverance
20	35.5	62.5	27	Socio-centrism
21	39	100	61	Socio-centrism
22	42.5	101	58.5	Empathy
23	51	97.5	46.5	Empathy, integrated situation
24	36	33	-3	Socio-centrism
25	38.5	30	-8.5	Humility
26	64.5	104	39.5	Socio-centrism
27	42	57.5	15.5	Egocentrism
28	40	64.5	24.5	Empathy
29	31	25	-6	Egocentrism
30	27	63	36	Confidence in reason
31	37.5	50	12.5	Egocentrism
32	66.5	101	34.5	Empathy , perseverance, socio-centrism, egocentrism
33	35	71	36	Socio-centrism
34	43.5	58	14.5	Confidence in reason
35	60	84	24	Empathy
36	64	74.5	10.5	Empathy , socio-centrism , egocentrism
37	54	93	39	Socio-centrism
38	35	31.5	-3.5	Socio-centrism
39	64.5	87.5	23	Confidence in reason
40	31.5	88	56.5	Perseverance
41	61	96	35	Confidence in reason
42	35	64.5	29.5	Integrity
43	45.5	82	36.5	Socio-centrism
44	38	66	28	Perseverance
45	56.5	105	48.5	Empathy
46	43	57.5	14.5	Socio-centrism
47	52.5	81	28.5	Empathy

The following figure shows the improved responses on the dimension of ‘Intellectual Humility’, ‘Intellectual Integrity’, ‘Intellectual Empathy’, ‘Intellectual Perseverance’, ‘Egocentrism’, ‘Confidence in Reason’, ‘Socio-centrism and ‘Integrated Situation’.

Figure 26 Improved Responses on Constituents of Traits of Mind



#### Aspects on which most improvement is seen in the test of traits of mind

1. 28.57% of the student teachers performed best on the aspect of 'Sociocentrism'.
2. 17.85% of the student teachers performed best on the aspect of 'Intellectual Empathy'.
3. 12.5% of the student teachers performed on the aspect of 'Intellectual Perseverance'.
4. 10.7% of the student teachers performed well on the aspect of Egocentrism.
5. 10.7% of the student teachers performed well on the aspect of Confidence in Reason
6. 8.92% of the student teachers performed on the aspect of 'Intellectual Integrity'
7. 8.92% of the student teachers performed on the aspect of 'Intellectual Humility'
8. 1.78% of the student teachers performed on the aspect of 'Integrated Situation'

Below mentioned figure shows the improved responses on the dimension of ‘Intellectual Humility’, ‘Intellectual Empathy’, ‘Intellectual Integrity’, ‘Intellectual Autonomy’, ‘Confidence in Reason’, ‘Intellectual Perseverance’, ‘Socio-centrism’ and ‘Egocentrism’.

Order of improvement

- 1) Socio-centrism
- 2) Intellectual Empathy
- 3) Intellectual Perseverance
- 4) Confidence in Reason
- 5) Ego-centrism
- 6) Intellectual Integrity
- 7) Intellectual Humility
- 8) Integrated Situation

## **5.5 Section II: Qualitative Data Analysis**

This section contains qualitative analysis of the data. It aims to understand the phenomena in a comprehensive way by analysing the qualitative data. The guiding questions to this section were: What happened during and after the process of intervention implementation? What were the areas in which the impact of the intervention was significantly observed? Based on the guiding questions the following approach of Case study research was selected. Also the focus group discussion and descriptive feedback tools were used to further analyze the implementation impact on enhancing the Critical Thinking skills. The data was analysed and put up into this section based on following:

### **1. Case Studies/Profile Studies**

The data of the cases was collected from intellectual journal kept over the period of intervention. The researcher had to read and re-read the data to comprehend the data so that the analysis can be done accurately. The patterns in the data were noted down. The patterns of initial data helped to develop initial codes and thus the data was reduced to meaningful form. Initial codes from each case were developed to

broad themes emerging from all the cases so that inferences can be drawn (Creswell, 2014). The member checking was done with the case so as to preserve the validity and credibility of the data.

## **2. Transcript based Focus group discussion:**

Focus Group Discussion was conducted keeping in mind the objectives of the research. The triangulation with quantitative and quantitative data was one purpose of Focus Group Discussion and another was to understand in depth the effectiveness of the intervention program (Mishra, 2016). The Points that were kept in mind while conducting the discussion were: The objectives of the discussion along with certain key questions that can be discussed in the session were identified. . The specific topic of interest was discussed with student teachers of same elective. The discussion was guided by the facilitator that is the researcher. The facilitator i.e. the researcher helped in generating an inquiry into the group. The discussion was live and specific to the objective. This discussion was conducted with primary objective of whether critical thinking skills have developed based on the aspects of Paul's model to critical thinking. The inquiry began with the key question of: What are the different areas in which Critical Thinking has helped the student teachers in academic and personal life. The numbers of students in this discussion were seven in number. The duration of the discussion was one hour. The researcher probed for answers wherever it was possible to seek clarity into the thought and gain understanding. To analyze the data, the researcher heard the interview several times between the researcher and the focus group. After the initial analyses of the initial codes, broad themes were inferred

## **3. Descriptive feedback:**

Feedback was taken from the student teachers with reference to specific questions for the purpose of understanding overall working of the intervention program. The questions asked were: significant pointers that helped from the program, pointers that did not help and support the student teachers from the intervention program and the improvements needed in the conduction of it



**There are 11 Case studies chosen and presented in the following section:**

- i. Two cases of analysis of article test who showed significant difference in the test scores and two cases who showed least improvement in the test scores.
- ii. Two cases that showed significant improvement in situation test and two cases (the student teacher didn't submit the record so only one is considered) that showed least improvement in the test scores.
- iii. Two cases who have explicitly shown improvement in the way they think from researcher's point of view.
- iv. Two cases who showed improvement in the both the tests.

These cases have been chosen based on expert's advice. The student teachers who improved the most have shown significant difference in dealing with their thoughts. Student teachers who performed the least in the scores have been taken up to study their profiles as they would contribute to developing the understanding of how they advanced through the Intellectual (diary) writing and what was lacking in terms of development. There is a thoughtful consideration of cases that performed poorly so as to clearly see the gap that remained in terms of developing the thought process. Two cases who have performed best across both the tests have been chosen as they overall did well and the researcher wanted to understand the qualitative development of these participants.

*Table 35 Table showing criteria of selection of cases*

Area of performance	Performance	Profiles
Analysis of the article test	Sample that had highest improvement score in this test	(Profile-A) (Profile-B)
	Samples that had lowest improvement score in the test	(Profile-C) (Profile-D)
Situation test	Sample that had highest improvement score in this test	(Profile-E) (Profile-F)
	Samples that had lowest improvement score in the test	(Profile-G)
Both the tests	Sample that had highest improvement score in this test	Vinita (Profile-H) Shruti (Profile-I)
Overall improvement	Two samples that researcher found to be improving the most	Usha (Profile-J) Rashmi (Profile-K)

The reasoning for the selection of the cases is given below:

Profile J was considered and analyzed from the researcher's point of view.

This point of view was taken based on the following strong reasons. Profile J's initiatives towards critical thinking was commendable. There have been situations when this profile came to the university early for the purpose of solving CT doubts. The doubts were reasoned doubts. The application of CT was seen in the profile's all walks of life right from actively participating in the classes discussions and questions round to making the other student teachers understand about CT. This profile's entries were found to be reflective, were treated in depth and elaboration was commendable. This profile applied her CT understanding in the later part of the year that is in her internship phase by doing action research in her class on Critical thinking on a voluntary basis. As part of Action Research Critical thinking was integrated in English Poem in the form of elements of reasoning. This profile also asked her students to keep intellectual journal so that CT is not only an integral of her system but is also an integral part of her students system.

Profile-K was considered and analyzed from the researcher's point of view.

This point of view was taken based on the following strong reasons. The profile entries were elaborated to such a momentous extent that the depth of the thought process was observed. The entries with the real life situation considered complexities to such an extent that each and every concept was accurately reflecting the understanding of the student teacher on aspects of CT. This student teacher was so deeply impacted by CT that she initiated the class into doing a course assignment submission i.e. Power Point Presentation through Elements of Reasoning. She initiated the incorporation of logic into the subject (Assignment submission) which was eventually planned by other student teachers as well.

The following are the cases analyzed in detail. The cases are called Profiles. The profiles are given names from Profile A to Profile K for confidentiality purpose. The pictures of some entries have been added for proof purpose. The pictures have been added based on significant pointers emerging from the Journal Entries.

## 5.6 Profile Analysis

### 1. Profile – A

#### Brief description of the case

Profile A is around 26 years of age. Her height is approximately 5.5 feet (175 cms) and she weighs around 60 kilograms. She is fair in complexion with a heart shaped face and big curved eyes. When asked about her weakness she describes herself to be ‘intellectually lazy’ sometimes. She is from South Indian background and settled in Vadodara from past 25 years. This profile has shown significant improvement in the academic scores of pre and post-test. Her Methods/Electives are Commerce and Economics. She is perfectionist and is always concerned with finishing the task on or before time otherwise, she becomes impatient. She also conveys that, she is impatient with her family members as a result of which sometimes she becomes a burden to them. When asked she gave an elaboration saying that, suppose if there is fight between my mother and me, then I want it to get resolved within no time. For which I may go to any extent. But in reality the situation may be such that giving some space would resolve the conflict without any efforts. She also becomes angry soon when things don’t go her way and responds to situations right away.

The below table shows scores of the pre-intervention and post intervention of the case 1 on standardized test.

*Table 36 Score on Analysis of Article test:*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
4	9	4	6	6	8	1	7	2	10	4	10

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
0	9	2	5	3	2	0	2	0.5	2	0	2

- Pre-Test Total -26.5
- Post-Test Total-72

- Difference in pre-post- test scores – 45.5
- Highest Improvement – Q.7 ( Implications)

Below are the journal entries she has written in her Intellectual Journal and the researcher's observation with regards to the same

### **Journal Entry-1**

#### **Work Out with the Character of Fair-minded Fran**

The student teacher has mentioned of helping her friend of whom she was envious but then, in trying to work out with the character of fair-minded Fran, she talked to her mind saying that “I tried to explain my mind that I shall receive what suits me the most and not helping my good friend would be incorrect on my part”. (TH-9)

The student teacher has also mentioned an incident about helping her maid's kids who were asking for used books to be given away to them. She thought of not giving used books and instead gave new books as the maid had four kids. This student teacher has mentioned about “sympathising with the kids”.

#### **Researcher's Observation:**

The first journal entry as it is the first entry doesn't consider the complexities of the application. Fran is considered as helping her friend as well as helping her maid's kids with the books. Though the entry has been asked to be posted on informal domain (personal life) she has tried to reflect on her mind. Using words like sympathy, being envious she has reflected on her personal incidents. She has seen improvement in relationship with her friend as well as her maid. The story that was narrated of Fran mentioned words like 'selfish' and 'naïve'. She has understood of helping others in the character of Fair-minded Fran. Her entry is not been posted in depth and lacks elaboration as this is an initial week for posting the entries. The probable reason may be that the student teacher has not mastered the art of reflection.

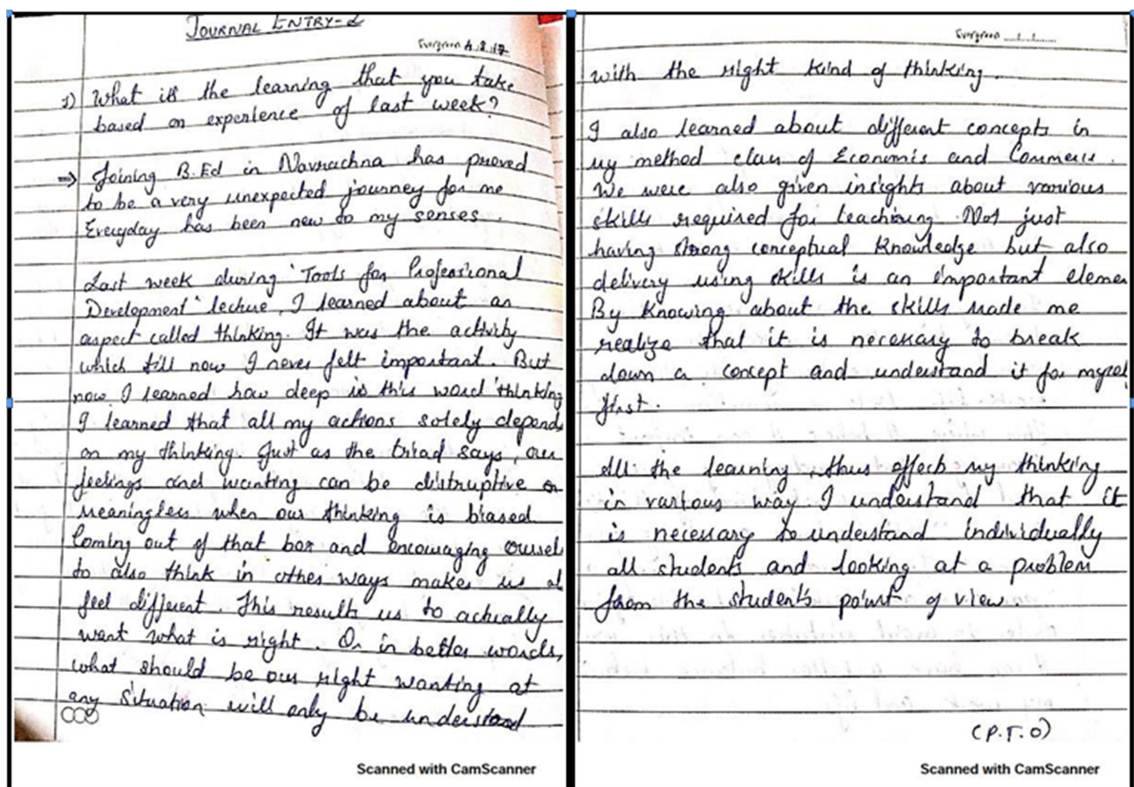
## Journal Entry 2

### Triad of Thinking, Feeling and Wanting

The student has written an opening note that till now she could not realize that this word “thinking” was that momentous (TH-32). She has further mentioned that now she has sensed that how “thinking can be biased”. (TH-14) Further the student teacher has mentioned that “our action is the result of how we think”. She is further mentioning that “rather than thinking what work has been allotted is a burden and saying that I can’t do”, I have started to stop for a while and think about ways of how efficiently I can finish all the jobs”. (TH-15)

Below pictures from the intellectual journal of Profile A shows posting of the entry

Figure 27 Posting of the Entry in the Intellectual Journal of Profile –A



### **Researcher's observation:**

Student teacher has used the word 'thinking' which gives a clear idea that this word has started to come into the mind of the student teacher which is very vital to be there. To recognize that behavior is product of thinking is again a critical indulgent that she has cited. Major reflection for the student teacher is that she is stopping for a while to think about the thinking process so that actions are not thoughtless.

One of the significant entry of the three entries that talks about changing the way she thinks is that, the first aspect in triad is thinking, she mentions how she is an introvert and did not involve herself in the class just because what she thought was incorrect. After the realization of how thinking is important she is able to participate in the classes and she mentions that, "I understood the fact that, the more I asked, the more I learned and the more I was clear with my concept the more I was able to participate and help others in the class." I started shaping up my mind and kept on being open to putting ideas in front of 50 students", "This training of mind helped me to change my thinking". (Th-22) The student teacher has also mentioned about a conscious pause before getting angry on someone. She has also reflected upon continuous reflection that has helped her to understand some of her shortcomings.

### **Researchers' Observation:**

The student teacher is actually taking time to reflect on her thinking process and helping herself to understand her own thinking process. These entries showed few changes like elaboration and clarity in entries. Precision is also observed in the entries.

### **Journal Entry 3**

#### **Standards of thinking and reasoning**

Here, as a researcher I can see major difference in the understanding of the concepts, the clarity in written communication and reflecting accurately on concepts is another observation on the entry posted.

The student teacher clearly mentions that “I could more deeply understand my various feelings for others”. I would like to thus put myself through the logic cycles whenever I feel anger or fear”. “I can handle negative feelings if I am able to answer the questions of the logic cycle” (TH-2.)

#### **Researcher’s observation:**

She has reasoned through logic of how it was worth studying in the University. She has used the word “inference” for the above statement which means she is explicitly using parts of reasoning. Logic clearly represents clarity of thought in written communication and concepts clarity. The written communication uses official critical thinking language like purpose, inference, biased thinking

#### **Journal Entry 4**

##### **Elements of reasoning**

This week students created logic of the course/subject they have opted for, whereby student teacher has written how that has helped her in understanding problems in the subject. She has written in the entry that, “I learned that creating the logic for my subject is pushing me and checking my knowledge of the subject”.

Breaking down the parts of reasoning forces me to think the path through which my mind travels”. “I would want to become more “precise” in whatever I do and I say as well think so as to avoid error”. She has mentioned that, “logic of anger was triggered and I could act differently”.

Below picture shows Profile A’s attempt to it

Figure 28 Posting of the Journal Entry 4 in the Intellectual Journal of Profile -A

C.T Dimension	Reflection / Learning
I learned patience. The logic of anger was triggered and I could not differently.	Though her behaviour was bothering me a lot I purposefully stopped myself from being agitated. I made myself understand that on her part she is quite genuine that she is clearing her doubts. And the efforts she was making made me realize that I should be help her and supporting instead of showing my agitation.

In the same week she has mentioned about her interdisciplinary class project of toy making where she had to design a simple toy. She has written that she had to first understand the whole purpose of the project clearly so that she could work with her father to design the same. To make her father understand the purpose of the project she first understood it by herself.

#### Researcher's Observation:

Element of purpose is seen to be used explicitly here. Purpose is an element of reasoning. Understand the purpose of the assignment and breaking it into smaller parts to make others understand clearly is a major aspect that she has mastered (TH-17). The depth in thought process is also observed where the student is just not stopping at understanding something but she is reasoning with the projects assigned in the classes. In one of the conversations of the peer she has written how logic of anger was triggered and how she acted out differently with the help of logic of anger.



## **Journal Entry 5**

### **Intellectual Humility**

She then has written that, “How her arrogant behavior made her suffer in the work”. She could identify her over confidence and she also accepted in the second entry that she had not taken out enough time to understand the assignment. She has further added that “by admitting that I was lazy about the subject and that’s why could not make the assignment properly I was showing ignorance to the subject”. She has also mentioned that, “here I was boastful that I knew everything and that I can guide my friend. Later I realized that it was a very immature thought and tried to correct it.”

#### **Researcher’s Observation:**

She has mentioned about her immature thought in terms of intellectual humility. She has corrected her thought to improve on it. She has reflected on it. Intellectual laziness is also indicated in the entry.

### **Intellectual Empathy**

The student teacher has mentioned her situation with her friend when her friend was finding difficulty in completing the assignment. “I got angry when she kept on asking about the assignment again and again”. “But then I tried to think from her side, when I did that I realized the difficulty she faced in understanding English”. She also mentioned that, “I made myself approachable to her”.

#### **Researcher’s Observation:**

Her anger reduced because she reflected on Intellectual Empathy dimension that deals with thinking from other’s point of view (TH-1). She has used empathy to avoid anger. She made herself available for her conceptual clarity.

### **Intellectual Courage**

She has mentioned her point of view on marriage wherein her mother had a differing point of view but quite true. The student teacher accepted that point of view finally, as that seemed to be the right one. She thought from her point of view and

purposefully thought about courage as an aspect to be thought about in this situation and that's how actually a mind functions. She could combine both the traits precisely and accurately pointing it at varied levels.

#### **Researcher's Observation:**

Focusing her attention now on traits of mind is what is evident in this week. She has actually mentioned her situation and depicted it very accurately. That shows that she is able to think about her and put herself into the shoes of others.

#### **Journal Entry 6**

#### **Traits of mind: Intellectual Integrity, Perseverance and Confidence in reasoning**

The most significant learning in this week is intellectual integrity.

#### **Intellectual Perseverance**

She mentions how she could overcome the defeat of not doing something just because it was difficult. After so much of efforts the student teacher has written that, "instead of simply dropping the plan after few efforts, I kept on trying out various options until I came to a solution."

#### **Researcher's Observation:**

The profile is using intellectual perseverance to work with a task. She has also successfully completed the task because of application of the trait.

#### **Intellectual Integrity and Confidence in reasoning**

She further mentions how she avoided getting her presentation being taken away by someone who had not presented theirs in the class yet. The other group who had not presented asked her to pass on the presentation to which she questioned and thought deeply that it's not right to send the presentation to anybody.

*“We can explain the same many a times but not pass the entire presentation. She mentions that, “that we tried to reason out the problem deeply and acted wisely”.*

**Researcher’s Observation:**

The intellectual Integrity is being explicitly applied in the following situation. It is observed that this profile is elaborating on her entries extensively. She was seen coming to the mentor and questioning about how things should be done in the journal in the form of entry. She had moved from the format of table for posting the entries to running format that shows/indicates that she wants to write a lot and is interested in elaboration than restriction. (Came and took the permission to write in paragraph form so that elaboration is possible. Another critical aspect of her thinking is that she is seen to be questioning about things and thinking deeply before acting. She is actively seen to be reasoning with the intellectual traits

**Intellectual Autonomy:**

The student teacher has written about intellectual autonomy in terms of creating purpose for one of the assignment. She has written that, “I asked for the purpose of the assignment to get suggestions from my group members”. “However some group members did not seem to align with those taught in tools for professional development class.” “Instead of blindly accepting it with the thinking of getting the work done in less time and easily, I took my own time to recurrently refer to my notes and create such a point”.

**Researcher’s Observation:**

The student teacher is seen to seek depth into what she does. She considers the point of view (element of reasoning/standard of thinking) of others but does what is right (intellectual integrity). She is not simply thinking of getting work done but doing it in depth so that she can justify what she has done. (This group created the assignment with the elements of reasoning i.e. created logic for it)

## Journal Entry 7

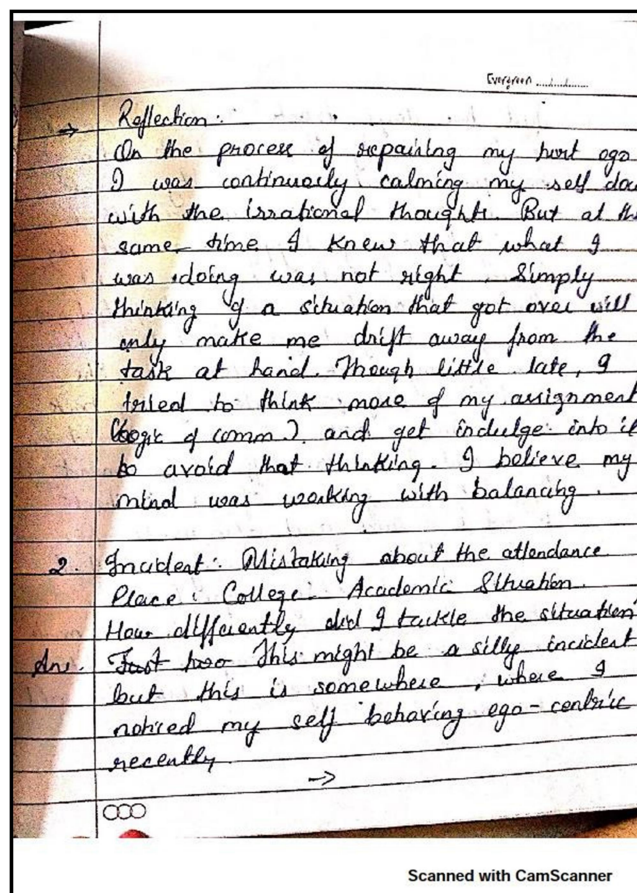
### Barriers to Critical Thinking

#### Egocentrism

The student teacher mentions accurately about observing how her mind is validating things that are not rational. She refers to one incident here that how that self-validating ego was not allowing her to work and focus on tasks that were important. She has used words like “repairing ego” and “irrational thoughts”. She mentions at the end how the indulgence into a fight that was already over would not help her now. (TH-29)

Below picture shows the intellectual journal of egocentrism entry of profile A

Figure 29 Posting of the Journal Entry 7 in the Intellectual Journal of Profile -A



### **Researcher's Observation:**

She has used concepts like 'repaired ego', 'irrational thoughts'. She has mentioned that she was going through the stage of self-validation that got avoided because of conscious thinking. The entry is written in depth with utmost concept clarity and accuracy. The profile is reflecting on the situation and coming out of it. Socio-centrism:

The profile has observed one of the student teacher to be a part of the group mechanism, she has also taken points of view of different students and confirmed. Researcher's Observation:

Observation of the student teacher in the group mechanics and also taking point of view of students in it makes it clear that student teacher has understood the concept of socio-centrism

### **Final Journal entry**

Stage of development: Between Challenged thinker and Beginning thinker's stage

Justification: Realized the faults in thinking process, consciously uses elements of reasoning and standards of thinking. She has mentioned that, "I have been successfully able to stop myself from thinking wrongly or prejudiced as I was prior to this". "Learning about critical thinking has helped me to trigger the fact that firstly I am over thinking and secondly it's totally unnecessary".

Barriers to critical thinking: significant barriers to student teachers thinking are egocentrism and socio-centrism. Another barrier that she mentions is, "the laziness to review the literature on critical thinking. Furthermore she finds difficulty when people don't follow critical thinking or at least try to understand it. Also not being able to communicate properly at many situations is a barrier I guess to critical thinking".

### **Self-Evaluation**

My passion is to do creative stuff. I am very much interested in art, craft and designing garments. At the same time I very impatient person. Though with perfection yet I am always concerned with finishing the task on or before time otherwise I grow impatient. Even with my personal life I am impatient with my family members as a result of which sometimes I become a burden to them. Suppose if there is fight between my mother and me, then I want it to get resolved within no time. For which I may go to any extent. But in reality the situation may be such that giving some space would resolve the conflict without any efforts.

Talking again about my passion, my broth and sister-in-law are both college professors and it is through them that I started aspiring for teaching profession. For this in July 2017 I joined Navrachana University to pursue my B.Ed. course. There I came across some of the best mentors in life who did not just influence my skills but also my own self by giving personal attention to me. There I came across the researcher, a persistent and very sincere faculty who gives her whole heart and soul in teaching and knowing her students deeply. Under her guidance we were trained in a field called Critical Thinking. It was totally new to me and understanding the theory was easy because of the way ma'am taught us. She made it more digestible with lot of real life examples. But when it came to practicing it in real life things were never easy. For which ma'am asked us to keep a personal diary (students usually called it a diary). Again initially it was difficult for me because I had to purposefully enact or find out situations where I practiced critical thinking in my life. However, late it became easy as it was a daily practice.

Once the course got over, just like any other course Critical Thinking took a break in my life. I almost forgot about it as I did not practice it. Due this some silly issues started to take over me. Issues like for instance, in my class I started getting easily distracted and disturbed because of unfavorable behavior of my three classmates. I came across a situation where they were acting against me and were talking behind my back. Due to this I became quiet in class from a very active and enthusiastic student. It was then my mentor noted this change in me and had a personal talk where she reminded how important is it to keep referring to CT notes

practices it. I felt she was a right and that can be attributed as a turning point in regards to 'CT'

**Theme 1: No point in wasting time for issues that are not important**

As a result I went home and referred to my CT notes. I started deliberately reminding about CT and practicing it. With which I could overcome the problem faced in class. I reminded myself that it not a big problem to ponder so much and to waste a huge chunk of my thinking in. That was one incident where CT helped me

**Theme 2: to control impatience and over thinking, helping to calm because of reminding the mind for thinking critically**

Later in my life CT helped me to control my impatient and over thinking nature (TH-11.1). An example for this was an incident that happened recently in my life, just 2 weeks back. I was disturbed when my friend was not replying to messages since 3 continuous days and I needed his help in some matter. I would message, call and even email him but couldn't get reply. Later when I got to know that it was his mere negligence that he failed to reply and not that he got really caught up in some work made my head blow over him. I could not help but shout at him on the fourth day. It was like; while shouting a part of me is reminding to which I believe is 'CT' to calm down because of which I could calm myself within a few seconds, apologized to him for shouting but also at the same time made my point very clear and asked him politely never to repeat this careless action to me. To my surprise he apologized to me immediately which I was not expecting. (TH-10)

**Theme 3: helped to control anger, learnt to question and research deeply about content**

If I had not known or deliberately practiced CT I would have never been able to control my anger and it would have adversely affected my relationship with my friend (TH-8). I undoubtedly would attach this victory over my anger to CT.

Apart from this I have learned questioning and researching deeply in the content that I study (TH-5).Sincerely, I do not know how long this effect will stay

with me because I strongly believe that to develop as critical thinker I need to constantly practice and constantly refer to CT to reinforce it in my brain.

### **Consolidation of case**

The case has shown a significant improvement in scores as well as in the way she thinks. (Reflected in diary-journal entries). She started with superficial entry in the first week and at the end of the entries she has improved in terms of depth of the entry and required elaboration for the same. The understanding of the concepts has been clearly written in the Intellectual Journal. She has used critical thinking terminologies quite often like thinking, mind, reflecting, purpose, inferences, repairing hurt ego, over thinking, irrational thoughts. She has reflected upon on how her mind travels and has reflected a lot on her thinking process.

Before the intervention she was being quite angry on things. She had unorganized thoughts and impatient in the way she dealt things. After the intervention she is seen to being a bit patient and thinks before she acts. (Field notes). After the intervention she is also seen to process concepts with lot of depth

She has seen to improve on major aspects of critical thinking like purpose, questions, depth, breadth, logic and few traits. Initially it is seen as a deliberate effort then a habit (not always). She is seen to seek purpose for everything. Questioning is seen to be the strategy for finding out the purpose. She has gained more patience and calm mind. She is seen to take timeout for thinking and answering questions like why must he have done this? What is his point of view? Basically she has now a calmer way of thinking. She is thinking then acting. She is also seen as a person who continuously seeks the purpose of the action. She basically has emphasized upon the importance of considering information at depth and breadth. She is actively seen questioning in the classes again. She showed lot of interest in participation and asking questions. She used to seek clarifications and ask questions. She was seen to consciously participating in the intervention program.

### **Broad improvements/themes emerging from the profile**

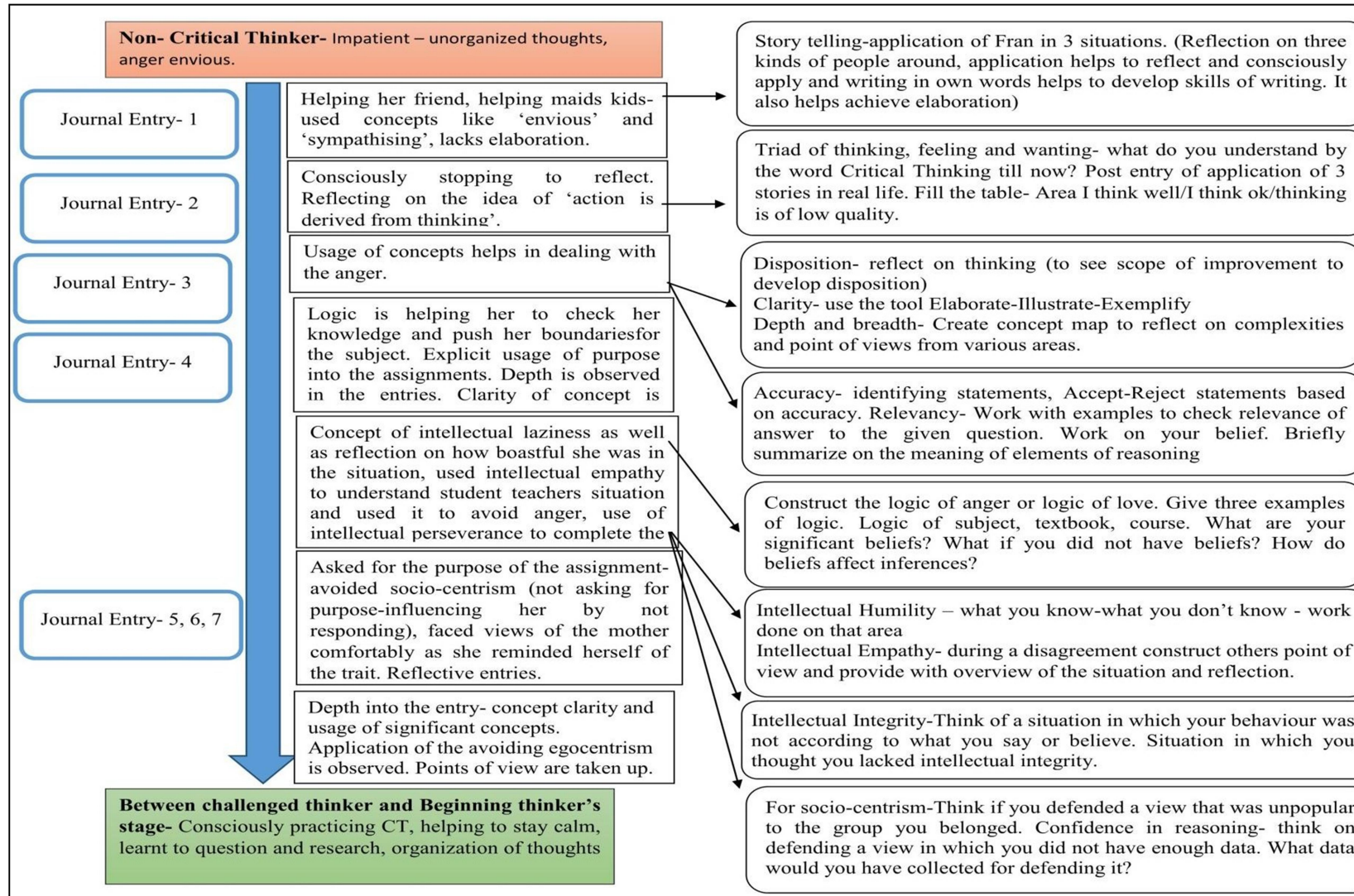
- Helped in dealing with relationship with a friend, maid, peers and mother



- Dealt with animosity, sympathized with maid
- Significant understanding of thinking is momentous and can be biased at times
- Helped in efficiently conducting tasks
- Helped in tackling introvert nature
- Helped in dealing with anger and fear ( problem mentioned in profile)
- Dealt with negative emotions
- Thinking before acting ( impatience mentioned as problem in profile)
- Got to know the superficial knowledge of the subject
- Helped to make in class project
- Helped in identifying arrogance in work and towards subject
- Acted wisely by not allowing peers to take away presentation of the group
- Independent thinking
- Does not engage in fight that will not help ( problem mentioned in profile)

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking.

Figure 30 Consolidation of the Profile A



## 2. Profile - B

### Brief description of the case

Profile B is around 26 years of age. Her height is 5'6" and weight is around 80 kg. She has brown short hair with an oval face with black eyes. Her skin tone is fair. She is from Madras and belongs to a south Indian family. Initially she was scared as she didn't know any other language apart from her mother tongue Tamil and English. She had problems after coming to Vadodara and in conversing in Hindi. She has completed her Masters in Accounts and Financial Management from University of Madras. Her method subjects in B.Ed. are Commerce and Economics.

The below table shows scores of the pre-test and post- test of the profile on the standardized test.

*Table 37 Score on Standardized test of Profile – B*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
4	7	0	6	3	9	5	5	1	8	1	4

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
0	6	0	4	1	2	2.5	2	0	2	0	2

- Pre-Test Total =17.5
- Post-Test Total=57
- Difference in pre-post- test scores =39.5
- Highest Improvement – Q.7 ( Implications)

### Journal Entry 1

#### Work Out with the Character of Fair-minded Fran

The student teacher has posted a backdated entry. This backdated entry is dealing with shopping that she went for with her dad. She has written that, 'keeping in

mind the financial status of my dad I thought, I should choose something that fits my father's budget'.

Second entry deals with helping one of her classmate communicate in English. She has written that, 'I know how difficult it is to survive without knowing a common language. When she asked I said agreed and promised her that communication will be well before she completes B.Ed'

### **Researcher's Observation**

The profile has posted a backdated entry as well as an entry that deals with application of the concept. The concept of Fair-minded Fran is understood with the aspect of helping and understanding other's point of view (TH-1.1) as well as being rational with regards to the budget of her father. Elaboration is missing. Concept is accurately understood though more conceptual clarity will bring complexities to understand. Purpose of writing the entries is missed.

### **Journal Entry 2**

#### **Triad of Thinking, Feeling and Wanting**

She has talked about thinking process made my thinking move to the new level and handle things in a better way.

### **Researcher's Observation**

The profile has not dealt with the triad of thinking, feeling and wanting. She is not using it to change things around her. Elaboration is observed in the entry.

Conceptual understanding and application is not observed. The profile has changed the posting of the entry format from tabular to running. The purpose of posting entries is not understood by the student teacher as the application is missing.

### **Journal Entry 3**

#### **Standards of Thinking and Elements of Reasoning**

This incident is about the integration classes that student teachers take while they study their first year B.Ed. In this case she had explained concept of social responsibility to one of her friend in the class. Somehow the concept was not communicated well and was faulty. She has written that, “She had to find out more and more information for that concept and check whether it matches the concept before I deliver them. There is a chance that she might not be able to deliver it very well”.

#### **Researcher’s Observation**

She is using the format of standards of thinking into her integration classes (TH-3). Due to this the accuracy of the concept is seen. She is willing to find more information for the concept. She has helped her friend in delivering the information in the integration class. Elaboration is evidently seen. Accuracy of the concept is also evident from this entry.

### **Journal Entry 4**

#### **For Elements of Reasoning: Logic of the subject**

She has used Elements of Reasoning in the entry and not applied it. She has not framed the logic of planning the trip.

#### **Researcher’s Observation:**

Elaboration is missing. Accuracy of the concept is observed. Application of the concept is not seen.

## Journal Entry 5

### Intellectual Traits of Mind: - Intellectual Humility, Intellectual Courage, Intellectual Empathy

#### Intellectual Humility

She has mentioned getting lesser marks than expected in one of her papers.

She has written that, *“I thought I have done well, I thought I knew every question that has been asked. But due to some misunderstanding, I have not elaborated well”*. She is further mentioning that *the learning that I have now is not enough’*.

#### Researcher’s Observation:

Here she is estimating more than she knows, but she is able to understand that she is overestimating it. Awareness of what i know is not enough is observed. That attribution can be done to the trait of Intellectual Humility. She has also stated that she has to learn so many things after her mid-semester exams.

#### Intellectual Courage

Here the profile is mentioning a belief about a religious ceremony conducted at her place. She is writing that, *“since my friends are from this generation and I am from south to make them understand my belief and idea requires some courage from my side”*.

#### Researcher’s Observation:

The meaning of intellectual courage is misunderstood here. The concept requires a person to face ideas and beliefs that are contrary to one’s own. The concept can be understood in this way but requires complexities that are not considered and written. Accuracy of concept is not observed. Elaboration is seen.

### **Intellectual Perseverance**

She had to visit corporation school as part of practice teaching. She was required to teach in both the languages. She did not know Hindi, so she has written that, *“after constant practice I was able to speak few sentences in Hindi and also I am now able to understand what others speak”*. (TH-30)

#### **Researcher’s Observation:**

The word constant practice shows that with the help of lot of effort she is able to speak few Hindi sentences. Concept of constant practice is used. This can be attributed to the concept of Intellectual Perseverance as they were asked to apply the concept in real life. Application of the concept is observed.

### **Intellectual Integrity**

They had a group presentation to be made. They made a plan to meet at somebody’s place but only few turned up. She has mentioned that, *“Since I was ready to go to my friends place and arrange so that everyone will be able to understand the concept well. Since I was ready to go to my friends place for discussions leaving all my other work, I expected the same. This made me to understand that people expect others to behave how they do but they are not following the same”*.

#### **Researcher’s Observation:**

She has understood from the point of view of her following the norms and others should do the same. Clarity and accuracy of the concept is observed.

Elaboration is consistently increasing. Application of the concept is observed.  
Intellectual Autonomy

She had faced some resentment from her relatives about doing B.Ed. They were advising her to have children at the same time. She has written for that situation that, *“I politely told them that, I can concentrate on one thing at a time and as of now we have no such plans. So please don’t force me. Thought my aunty was saying for*

my good, I should look at my situation as well. But will consider her opinion and make my own decisions accordingly”. (TH-12)

### **Researcher’s Observation**

That indicates that she is considering other’s opinion but is very independent to take make her own decision with respect to the variables like doing B.Ed.

Application of the concept of Intellectual Autonomy is explicitly observed.  
Confidence in Reasoning

She is stating here that, “I have previous knowledge and evidence from the business what i am doing through face book; I was able to reason confidently. I had evidences and pieces of information about doing business through facebook”.

### **Researcher’s Observation:**

The profile is using words in her entry like evidences and pieces of information. Critical thinking language is used in posting entries. Also, she is using that piece of information for suggestions. Accuracy of the concept is observed. Reflective entries are not observed.

### **Egocentrism**

She is mentioning that, “she had taken an ID course on special children. Everyone was telling that this is a very easy case; you have to take a child with a difficult problem. After listening to them I told, “Be it difficult or easy, i will be analyzing on the basis of what i have been taught in the course”.

### **Researcher’s Observation:**

She has posted two entries, one about egocentrism and other about personal.

The researcher observed that both are not accurate and relevant. She has not understood the concept of egocentrism. The concept understood is more towards the concept of intellectual autonomy.



### **Socio-centrism**

She has posted a correct entry on socio-centrism and has explained how group thought influenced her. She has written that, *“we had been given commerce assignment to frame logic of commerce, everyone was saying that we need to write the logic from student’s point of view. Even without thinking again, I wrote the logic of commerce from student’s point of view after discussing with my friends. Then after submission I came to know that it has been written from subject point of view. I listened to what my group of friends told, thought it was correct and write the assignment other way. I was dependant on my friends”*.

### **Researcher’s Observation**

She has referred to the concept of socio-centrism in an accurate way. She has referred to her group thinking of a particular way to complete the assignment (TH-7). She did it the way the group thought and did not think about the accurate way of doing it. She has not applied the concept but has caught herself in the act. This means she is able to have awareness of the concept. Elaboration is evidently observed.

Stage of Development: Beginning Thinkers stage

Ask questions to myself, analyze things in a logical manner

Barrier to Critical Thinking: distracted easily, socio-centrism, intellectual laziness

### **Self-Evaluation**

I am a person, who loves to be friendly with everyone and I love to help others. I want to be surrounded by people every time. I am interested in doing crafts, jewelleryes, and I am interested in music and I am being trained in Carnatic music (Vocal). I have taken teaching as my profession because I love to teach and know more new things.

I got married in 2017, March and shifted to Vadodara, Gujarat since my husband is based over here. Initially I was scared as I don’t know any other language

apart from my mother tongue Tamil and English. I had problems after coming to Vadodara in conversing in Hindi. My mother in law gave me a good suggestion that why I don't join some course or class so that I can get new friends as well as I can learn the language quickly and easily. And this was the beginning of my B.Ed journey at Navrachana University. Initially when I took this decision many people thought that I have become mad to study after marriage and also thought that I have demoted myself from being an Assistant Professor to a School teacher. I later told them that teaching is my passion, at the end I teach students irrespective of the place.

When I went for my first class in B.Ed, I was feeling little odd, because I did not know the language and was thinking how people will accept me. But as days passed my thinking was proved wrong and my classmates were the best part of this B.Ed. journey.

In this course, I have studied so many subjects and among them is the Critical Thinking, which was introduced to me by the researcher. On the very first class, the researcher asked "According to you what is critical thinking?", I remember saying that "critical thinking is creative thinking" for which madam said it isn't thinking creatively but it is thinking about our own thinking and reason them by analyzing the elements so that we arrive at an inference.

Basically I am not a person who writes and writes things; instead I can talk for hours together. When we were asked to write the reflection of our thinking, I was not interested. Then after writing two or three reflections I developed the interest and started reflecting on things that were happening around me.

### **Theme 1: reflecting on one's own thought process, patience to listen**

I was a short tempered person, where I take decisions so quickly without even thinking about the consequences, but after undergoing the training on critical thinking, I started reflecting on my thoughts and I am able to make better decisions than before. For instance, I will argue for everything with my father be it a small or major discussion and it will not be a healthy arguments most of the time. It will be like that even before I joined B.Ed. I will not have patience to listen to whatever he says. But when I went for my vacation this time, my father was telling me regarding

my brother's carrier since he was worried. My dad wants him to pursue higher studies, but my brother wanted to work. As usual my father asked me for a suggestion. I replied him politely that let Manikandan (my brother's name) do whatever he wished to do, do not impose your desire on him. I told my father not to scold him unnecessarily or hurt him with words. All these things I was telling in a polite way, I didn't talk with him the way I used to do before. And to my surprise my father had also agreed to whatever I told him and he said he will support my brother as well.

I am more attracted to the traits that were taught in Critical Thinking, which talks about intellectual humility, empathy, perseverance, autonomy, courage, confidence in reasoning, integrity and fair-mindedness. As I said I am able to reflect on my own thoughts now, I ended up following few of the above mentioned traits. I had many incidents in my life where I gave up on myself, for instance as soon as I had completed my 12th grade, I joined CA classes just because my friends did. My parents asked me twice before signing the application, I told them that I am going to join this course and I went for CPT classes for a month and a week before my exam, I got scared and I told my parents that I will not be able to pursue further and told them to get me admitted to B.Com. My father was upset and then he agreed and made to join in a college nearby my place. This was the first thing where I lost confidence on me and gave up. The next incident was during my UG, where I again took a wrong decision of joining ICWA with one of my friend, again where my father was asking me will I be able to do it this time. I said with full confidence that I can do it and he made me join. As like the previous incident, I dropped this after a month. Where I was regretting for my behaviour and was feeling bad for my giving up nature and deciding on things quickly without thinking about the pros and cons.

### **Theme 2: pursuing the trait of Perseverance**

Another incident that happened when I was in the middle of my B.Ed course, where I felt I am unable to manage my studies and household chores and I decided to quit and told my in-laws and husband as well. But somewhere down the line my inner conscience was saying that I have chosen this profession out of my own interest and it is not the right decision to quit the course. I was confused and was reflecting on my initial decision of taking this profession then thought my conscience was right and I should not give up on this and sustained my studies (TH-13). I developed the trait of

perseverance after this incident and till date I am pursuing that trait of not giving up. And it was because of critical thinking I was able to pursue this trait. And also I realised that I should not depend on others for any decision and I should take decision for myself.

### **Theme 3: reasoning through the decisions**

After studying Critical Thinking, I am able to reason through my decision confidently and I am able to think in a wider angle and my thought process has widened from narrow one. I am able to consider the viewpoints of others and able to question them, which gives me the clarity of the information whatever I am perceiving.

Thus, Critical Thinking had changed my life from being a quick decision maker to a person who take decision after reflecting through the elements of thinking. From a person who doesn't like to write things earlier to a person who note down each and everything. From a person who give up on things easily to a person who strive hard to achieve success. Finally, I am moulded as an individual who will be able to propagate this critical thinking to students and help them to reflect on their thinking.

### **Consolidation of the case**

Before the intervention she was bit short tempered. After the intervention she is able to reflect on her thoughts and that how she is able to make better decisions. She did not have patience to listen to things (example quoted of her father), now she is able to politely talk about things. The aspect that critical thinking is about analyzing, assessing and improving can be the reason for this difference. One has to analyze thinking and assess thinking. Analysis requires time and assessing takes time. The overall process takes time. So, instant responses can be reduced. She was able to show perseverance in one of a difficult situation of her life (leaving B.Ed program).

She is able to think on a wider angle as she is able to consider various points of view in the decisions (ex. Intellectual autonomy). She is able to make decisions based on reasoning (intellectual autonomy). This helps her to achieve clarity of

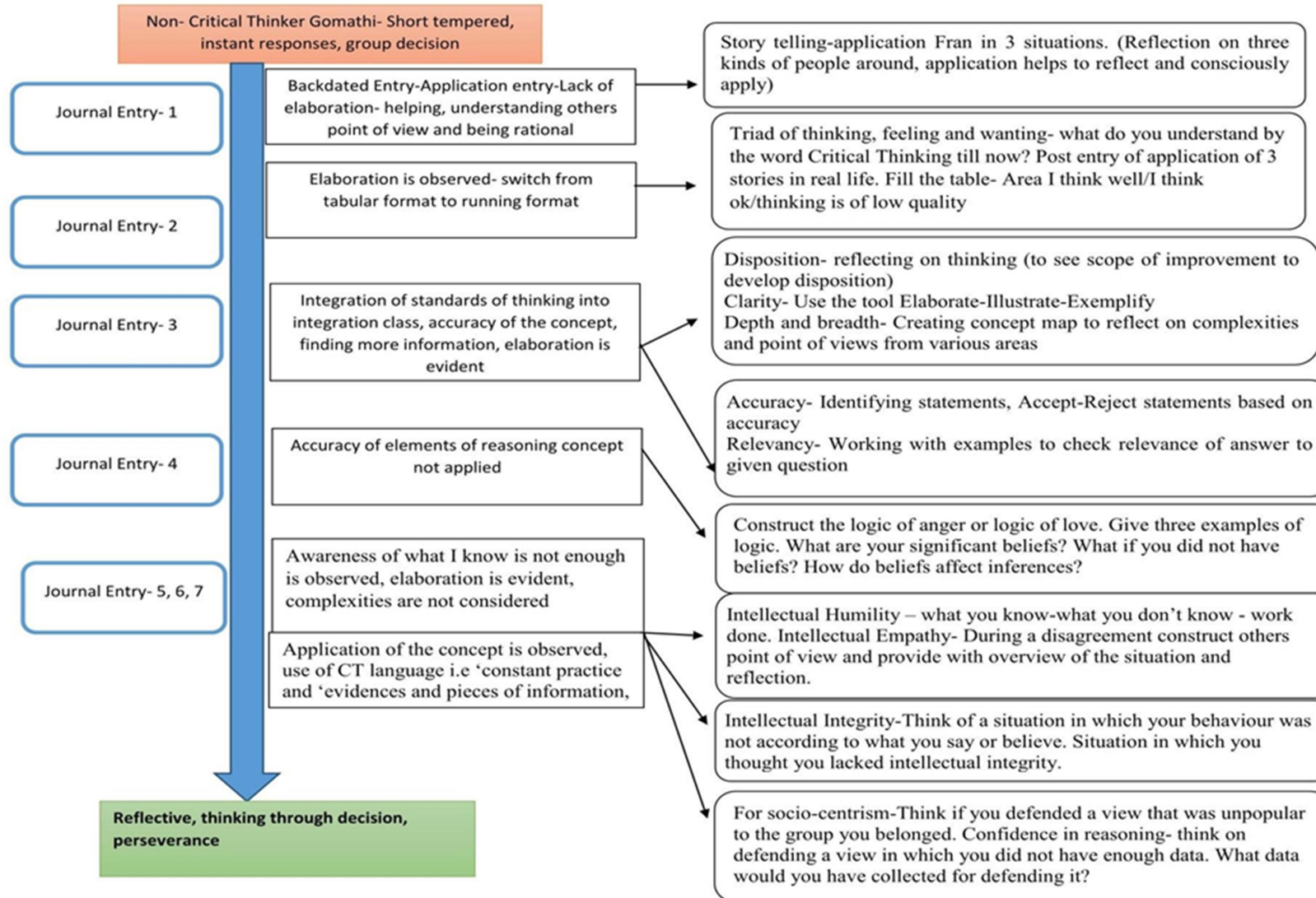
information. Thus, she is able to move from a thought that was quickly converted into action to a person who takes decisions/actions after reflecting through elements of reasoning. Earlier, she did not like to write but now she is able to note down each and every point for clarity

Broad themes emerging out of the journal entries

- Helping to understand others point of view
- Able to recognize faulty concept and research it in depth
- Able to understand overestimation about herself
- Helped in dealing with language barrier
- Helped in dealing the relationship with aunty
- Able to write things in an elaborated way
- Instant responses have reduced
- Did not quit the program

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 31 Consolidation of the Profile B



Following is a case of profile C who performed poorly in analysis of the article test. Her scores in post test showed negative difference when compared with pre-test

### 3. Profile-C

#### Brief description of the Case

This profile is 24 years of age, fair and 5'2 feet tall. She is of 49 kilograms. She has completed her Bachelor's in English Literature. She has English and S.S as her methods. She has performed poorly in the scores. She has round shaped face with black eyes. She has done her Bachelor of Science from Maharaja Sayajirao University.

Table 38 Score on Standardized test of Profile – C

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
2	4	0	1	0	5	4	0	3	0	1	0

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1.5	1	0	0	1	0	0	0	0	0	0	0

- Pre-Test Total =12.5
- Post-Test Total=11
- Difference in pre-post- test scores =(-1.5)

#### Journal Entry 1

#### Work Out with the Character of Fair-minded Fran

She is writing the first entry as to the work given by her mother and she is getting irritated because of that but then she has written that, *“mother’s intention was that she wanted me to do something for her and she helps me. And I learn from this situation I did help my mom”*.

### **Researcher's Observation:**

The profile is getting irritated and then she is helping her mother to do the work. She has understood Fran as helping her mother. The next two entries are not relevant. The first entry is quite accurately written but the next entries are written with little understanding of the concept. That shows that she has understood it but not written it clearly and accurately. Also a backdated entry is written by the case.

### **Journal Entry 2**

#### **Researcher's Observation**

Personal entry is a backdated entry. The academic entry seems to be fine. But then she has not reflected upon the triad of thinking, feeling and wanting. It doesn't reflect how she is able to correct the thinking aspect in the triad of thinking, feeling and wanting but then traces of the aspect is seen in the form of handling situation of being introvert. She has written that, "*I am an introvert person so I can't mingle with batch mates easily so I find the topic which helps me to mingle with them.*" Elaboration is not seen much. Accuracy is present only in academic entry.

### **Journal Entry 3**

She has mentioned about integration class that, "*I was accurate to the topic and precise. I collected too much information from Google and YouTube and articles and also correlated it with example of real condition that is relevant about the topic*"(TH-3.1).

#### **Researcher's Observation:**

The profile is using standards of thinking to take up integration classes. She is referring to lot of information for an accurate class. The concept is accurate and elaboration is observed.



#### **Journal entry 4**

##### **Logic of Anger, Fear and Subject**

She has written that, *“We should not underestimate people. Without understanding and judging don’t come to outcomes”*.

##### **Researcher’s observation**

She is not able to write precise and specific entries. Accuracy and elaboration is not seen. She has written that, “you have to observe and analyze everything but then how it relates to entry is not understood”.

#### **Journal entry 5**

##### **Intellectual traits**

##### **Intellectual Courage**

She has written a back dated entry. She has written about her friend who tried to survive in a situation when her father died. She is trying to fulfil their wants but then how does it relate to the trait of intellectual courage is not known. She has written about the courage about sharing cultures of each and every person. She has talked about having food by understanding cultures of each other. She has talked about intellectual courage in the sense of holistic judgment. (TH-19)

##### **Researcher’s Observation:**

She has taken bravery as facing a situation bravely which is not actually true. It’s bravely facing thoughts that are not in alignment with one’s own.

##### **Intellectual Humility**

She has talked about intellectual humility but hasn’t understood the actual meaning of it. She has explained about how she has taken science in spite of being interested into commerce.

### **Researcher's Observation:**

The profile is observed to be posting a backdated entry. This backdated entry deals with liking commerce but not knowing it much and then taken science for her stream. The lack of elaboration makes it difficult to understand the journal entry.

### **Intellectual Perseverance**

The profile is using Intellectual Perseverance to communicate with intelligent people. She has understood perseverance to be lot of patience in doing things. She is not able to communicate with people because they are intelligent so she will try to communicate.

### **Intellectual Integrity**

She has understood the integrity to be speaking in someone's front. The profile is observed to be not going in to the depth of the meaning of trait intellectual integrity

### **Consolidation of the case**

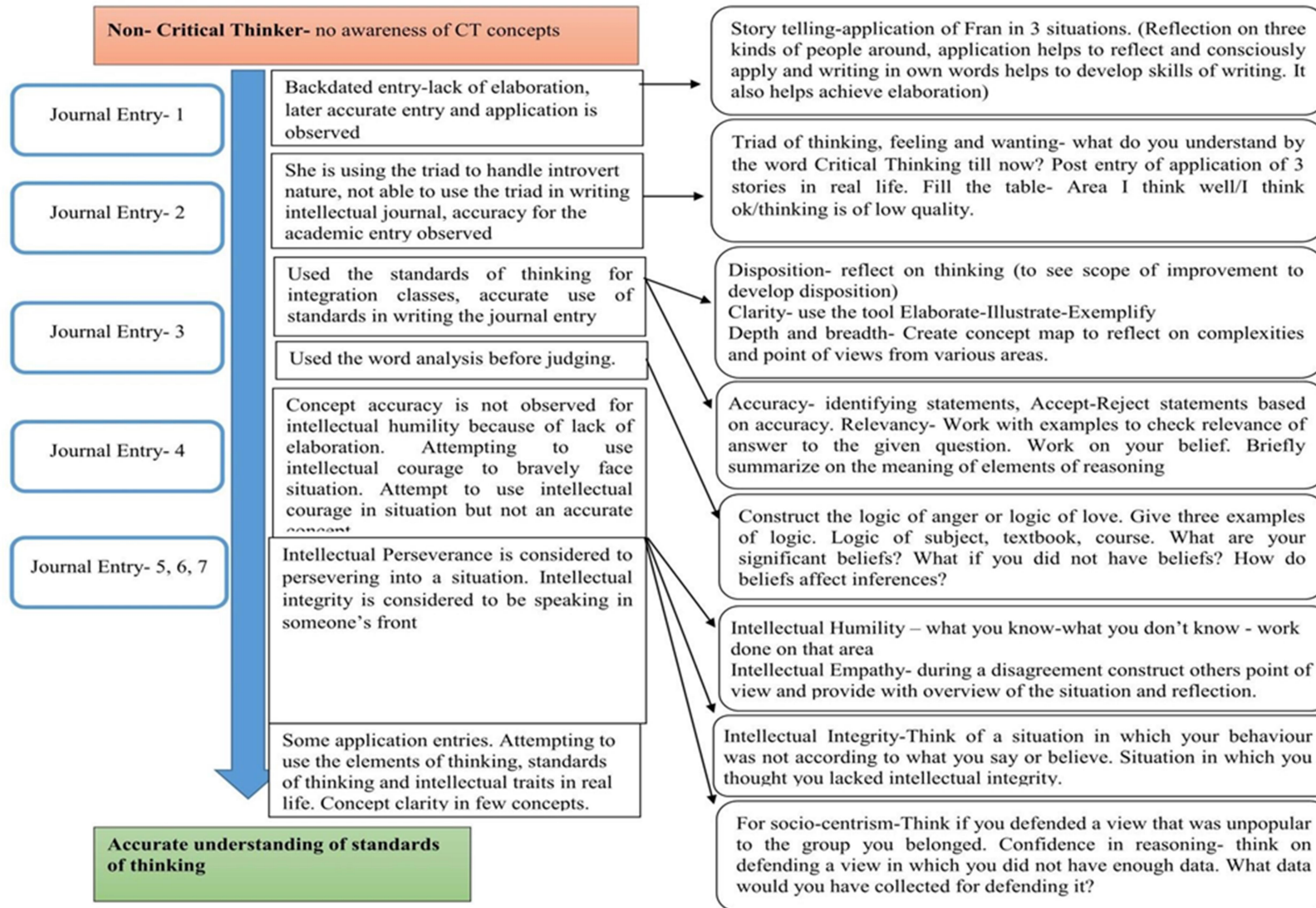
The profile is observed to be understand the meaning of CT in a narrow-way. She is not seen to be applying it in real life. The entries written are backdated entries. Only few entries talk about accuracy of the entries. Concept clarity in certain concepts is observed. They are not elaborated as well.

Broad themes emerging from the case

- Helped in understanding mothers feeling
- Helped in handling introvert behaviour
- Helped in integration class
- Helped in communication

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 32 Consolidation of Profile C



#### 4. Profile D

##### Brief description of the Case

Profile D is young girl who is of 26 age. Her Height is 5'3 and weight is 65 kg. She stays with her parents who are working. Her face is oval shaped with round eyes. Her educational qualifications are Masters in Accounts and Financial Management with PGDCA. Her methods in B.Ed are Commerce and Economics

Table 39 Score on Standardized test of Profile – D

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6	6	6	2	1	4	5	5	3	1	0	3

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	4	0	3	0	1	0	0	1	0.5	0	1

- Pre-Test Total = 27
- Post-Test Total = 30.5
- Difference in pre-post- test scores = 3.5

#### Work Out with the Character of Fair-minded Fran

##### Journal Entry 1

She has talked about a situation wherein she was demanding phone from her father without thinking about the renovation cost that was happening in their house. She has written that, “*when I was demanding a cell phone while the renovation was happening, I was thinking like Sam, demanding expensive things without thinking about my parents. After thinking, I realised I should understand about their situation and should not demand it*”.

### **Researcher's Observation:**

Concept clarity is observed. She has understood Fran in the terms of understanding father's situation and not demanding expensive phone. The student teacher is able to understand the meaning of Fair-minded Fran accurately here. The entry seems to be relevant to the area being reflected into in that week.

### **Journal Entry 2**

Area of journal entry is not mentioned. She has mentioned about an incident with watchman for parking space. She couldn't park as it did not have any space and move a complete circle in the university for which she shouted on the watchman. She has reflected that, *"after thinking on this situation I felt bad that I shouted on him and said sorry for behaving so badly. From next day I started parking outside the college every day (TH-24).*

### **Researcher's Observation**

Researcher could not post the entry on Triad of thinking, feeling and wanting. Reflective concepts like thinking and action are observed. The profile has reflected on her action later. She has changed the action after reflecting. Lack of elaboration is also observed. Accuracy is not observed.

### **Journal Entry 3**

#### **Standards of Thinking**

She has written the entry that can make integration class better (TH-3) (TH 5.2). She has written that, *"I should be clear in the topic that I am taking. Without clarity I will not able to deliver right information to the students. I also learnt to consider the point of view (TH-1.2) of the other people, should consider the opinion and reinforce them if they are right. My information should be logically connected to the topic, and then only students will be able to connect"* (TH-20).

### **Researcher's observation**

The entry needs elaboration. The profile is using standards of thinking for integration classes. The entry that is written on personal front relates with the critical thinking dimension of stopping to complain and concentrating on the aspects that can solve problem. She has clearly stated that, "I should not concentrate on my problems as everybody has some problem due to which they are like this so should try to understand them and not complain about everything".

### **Journal Entry 5**

#### **Logic of Anger, Fear and Subject**

Researcher's observation: she has not practiced the entry but has just mentioned about how it can help her out with to understand it in a better way.

### **Journal Entry 6**

#### **Exercising fair-mindedness**

She has posted a backdated entry for personal situation. She has posted an entry that talk about fair-mindedness in the sense that she persuaded her to attend the classes so that it's not unfair on the part of her friend to miss the classes.

#### **Intellectual Courage**

She has posted just one entry of intellectual courage. She has mentioned that she is an atheist and doesn't believe God. She has written that, "*I don't believe in God and doing Pooja and all, I always have conflict with my parents on this topic. So she has mentioned that, "I did not do Pooja but also convinced her not to force me to do such things and in that case even I will not questions her beliefs.*"

### **Researcher's observation**

This precisely does not show the concept of intellectual courage. The profile is mentioning about situation that she is facing in which she is not asking to question their beliefs and in return is not allowing them to question hers.

### **Intellectual empathy**

For this she has mentioned a situation where she has considered her sister's point of view. She is able to get the meaning accurately.

### **Egocentrism**

She has reflected on egocentrism of other person in interdisciplinary course. She should have reflected on her own thinking that's where her mind is trapping her from being egocentric.

### **Socio-centrism**

This time also she has reflected on group thinking in social setting and not reflecting about her process of thinking. She has reflected on why girls are not allowed to touch holy things. That is socio-centrism in effect. She tries to argue with her and the mother's answer is we are no one to question the things. She has also reflected on her assembly group that, *"in group when we used to discuss about the assembly works and ideas I used to go with the group i.e. I use to agree with them with whatever they said. I never expressed my views. But later I used to express my views and idea (TH-23). I did not go with the group now, I started expressing myself. I overcame socio-centric behavior (TH-7.1).*

### **Researcher's Observation:**

Explicit mentioning of overcoming socio-centrism has been mentioned. Application is also observed. Questioning beliefs that are socially made is also written. (TH-4)

### **Critical thinking stage: Challenged and Beginning Thinker**

She is able to question her own thought process.

### **Barriers to Critical thinking**

- Not able to think according to the structure
- Reacting and then thinking sometimes

- Ignoring other's point of view
- Not able to express properly
- Language as a barrier
- Egocentric thinking as a barrier

**Consolidation of the case:**

The entries seem to be quite precise. Not much elaboration is seen. Sometimes she has posted backdated entries and sometimes the concept posted in the entry is not accurately understood. Somewhere by the end of the week the concept of socio-centrism is understood.

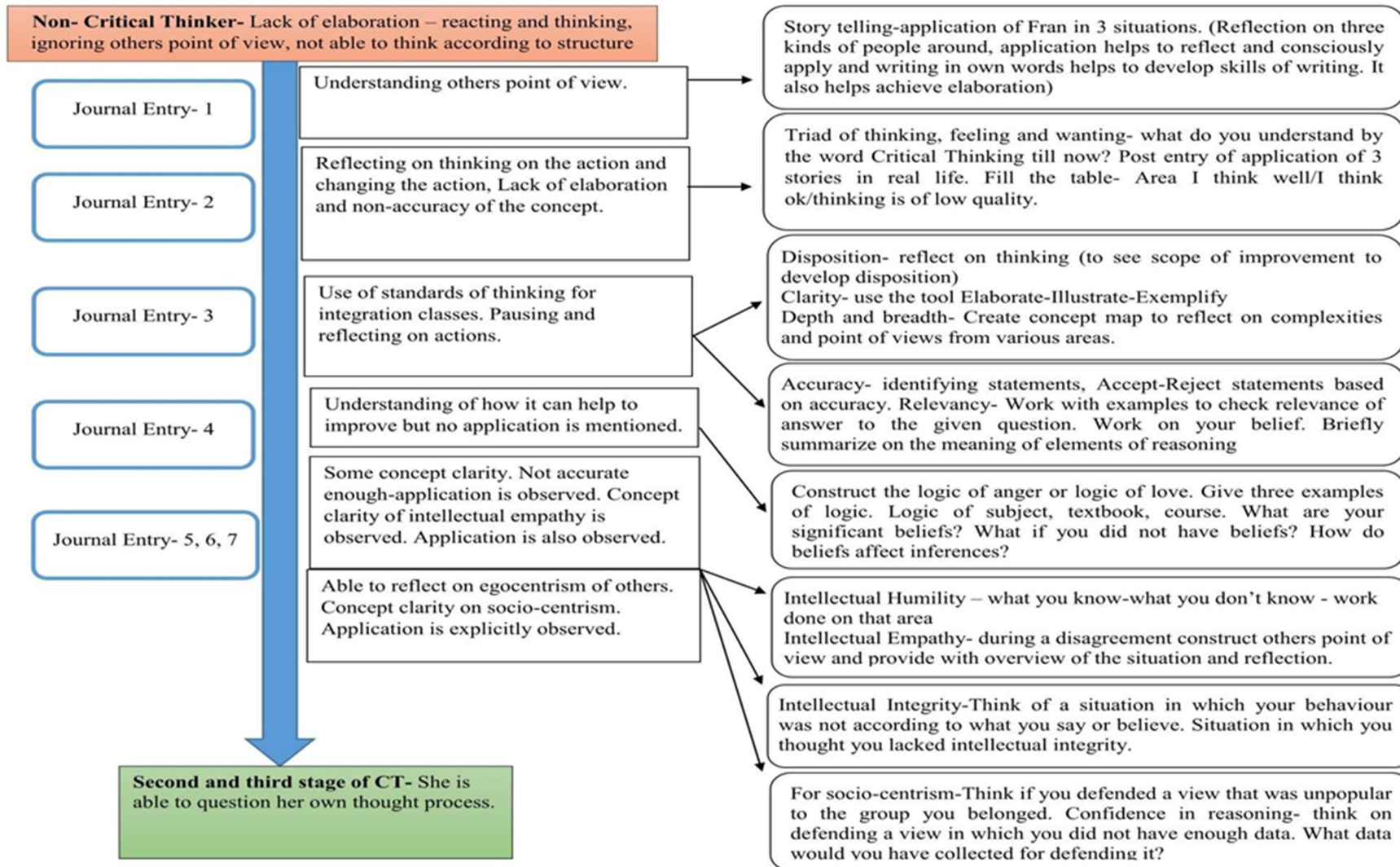
Broad themes emerging out of the case

- Understand parents situation
- Realization of mistake
- Helped in integration class
- Helped in understanding others
- Helped in being fair
- Understanding others egocentric tendencies
- Helped in independently expressing her views

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking.



Figure 33 Consolidation of Profile D



## 5. Profile-E

### Brief description of the case

Profile E is around 5'3" inches. Weight is 63kg. She has completed her Masters in Hindi Literature. Her complexion is light brown with an oval face and bright eyes. She is confident, hardworking, patient, creative and friendly. She belongs to Hindi and Social Studies method.

Table 40 Scores on Situation Test of Profile – E

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6		Q.7	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6	10	6	9	2	9	2	3	3	4	2	10	4	10

Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	7	0	10	3	7	0	10	4	10	2	1

- Pre-Test Total = 39
- Post-Test Total = 100
- Difference between scores = 61
- Highest improvement: Q.9 (Intellectual Perseverance)

### Journal Entry -1

#### Work out with the Character of Fair-Minded Fran

She has understood Fair-minded Fran as being impartial and resolving disputes by listening to the ones who had disputes (TH-26). One of her best friend was involved in it. She has written that, *“my best friend had an argument with one of our friend, earlier I would have taken the side of my best friend but instead I chose to be impartial. I calmed down, listened to their problem, heard their sides and finally resolved their dispute amicably”* (TH-9.1).

### **Researcher's Observation:**

She is pointing to quite a few elements of Critical thinking like being impartial, listening to others, calming down to listen. She has also written two more entries wherein she has referred to the character of Fair-minded Fran as being helpful, caring, sharing etc. She is using almost all traits of Fair-minded Fran. Clarity and accuracy of the concept is also evident.

### **Journal Entry-2**

#### **Triad of Thinking, Feeling and wanting**

Referring to the incident of electricity mishap, she has written that, "Sometimes things may not go our way and emotionally charged decisions only make things worse and we should try to keep control over our nerves and calm ourselves down so that we can take a smart and a fruitful decision".

She has further mentioned an incident that is talking about being selfish. She has written that, *"I should think about my loved ones emotions too. I went out with my relatives for their work and then finished up my pending work after that"*. She has further elaborated on writing that, *"humans don't naturally consider the rights and needs of others but we should apply the intellectual standard of fairness to our thinking"*

### **Researcher's Observation:**

She has mentioned the words like emotionally charged decisions, control over nerves, humans don't naturally consider the rights and needs of others, fairness to thinking, being selfish (story of Fran, Sam and Nancy mentions)". It is possible that the pointers have emerged from the story of Fran in the First week's activity. This also indicates that she is using the fabric of Critical Thinking language in her written work and reflecting on it.

### **Journal Entry-3**

She has mentioned an assembly incident wherein how she reasoned with the students who were not ready to discuss and think about the assemblies during the recess time. She made them understand that there is no other way out other than doing this work in recess. This can be attributed to the element of reasoning; overall reasoning required to work (TH-6)

She herself has mentioned that, “it is making me more open-minded (TH-18), who is ready to make changes in life by making changes in the thought process. It helps me to understand the actions and situations from different perspectives. This can be attributed to the standard of point of view (TH-1.3) in standards of thinking Researcher’s Observation:

The student teacher is seen using the Critical Thinking language continuously in the diaries. That shows that she is consciously using this language in the written communication. Her self-account that she is thinking from different perspectives itself is indicating that she is able to understand how a human thinks as he usually has a narrow point of view. This also indicates that she is able to think differently as she is incorporating other point of views. This can help her to have a broader point of view.

### **Journal Entry-4**

#### **Logic of Anger, Fear and Subject**

In this week the student teacher has compiled the logic of completing homework regularly on time. During this course it is observed that she has gone through the complete process logically. She has also drafted logic of solving conflict with her friend. She has framed logic of her subject which is little unclear at the point of concepts and ideas. She mentions as an example that, ‘I directly ask problems to him and clear the issues’. This may not be the accurate idea of ‘Concepts and Ideas’. Researcher’s Observation:

She has not understood the meaning of ‘concepts and idea ‘very clearly. She is clear with the concepts of purpose, questions, information and inferences.

## **Journal Entry -5**

Intellectual traits- Intellectual Humility, Intellectual courage, Intellectual Empathy

She has referred to one of her friend in this case. Her friend is quite pompous in the classes and talks a lot in the class. She has further mentioned that, “she should give correct and relevant information. But maybe I was wrong; maybe she is like this only does not think much only keeps on saying. So as to judge her for the first time I should have known about her unknown part which I really don’t know”.

### **Researcher’s Observation**

She is seen to be using intellectual humility as in the unknown part that is not known to us of others (TH-27). One should try to know what others are saying so that it becomes clear as to judging them. That communicates that the student teacher trying to understand others before judging them. She is trying to see the unknown part of others that is not known to her. That clearly can be attributed to the concept of intellectual humility.

### **Intellectual Courage:**

She has written about conversation between herself and one of her friends. She is interacting with her about belief in God. She has written that, “I don’t believe in God, I am an Atheist and I don’t follow any such rituals. When I said that, she was shocked and looked at me negatively that I am doing a wrong thing. I did not tell her to not to believe in God but then I was just justifying my views about it”.

### **Researcher’s Observation:**

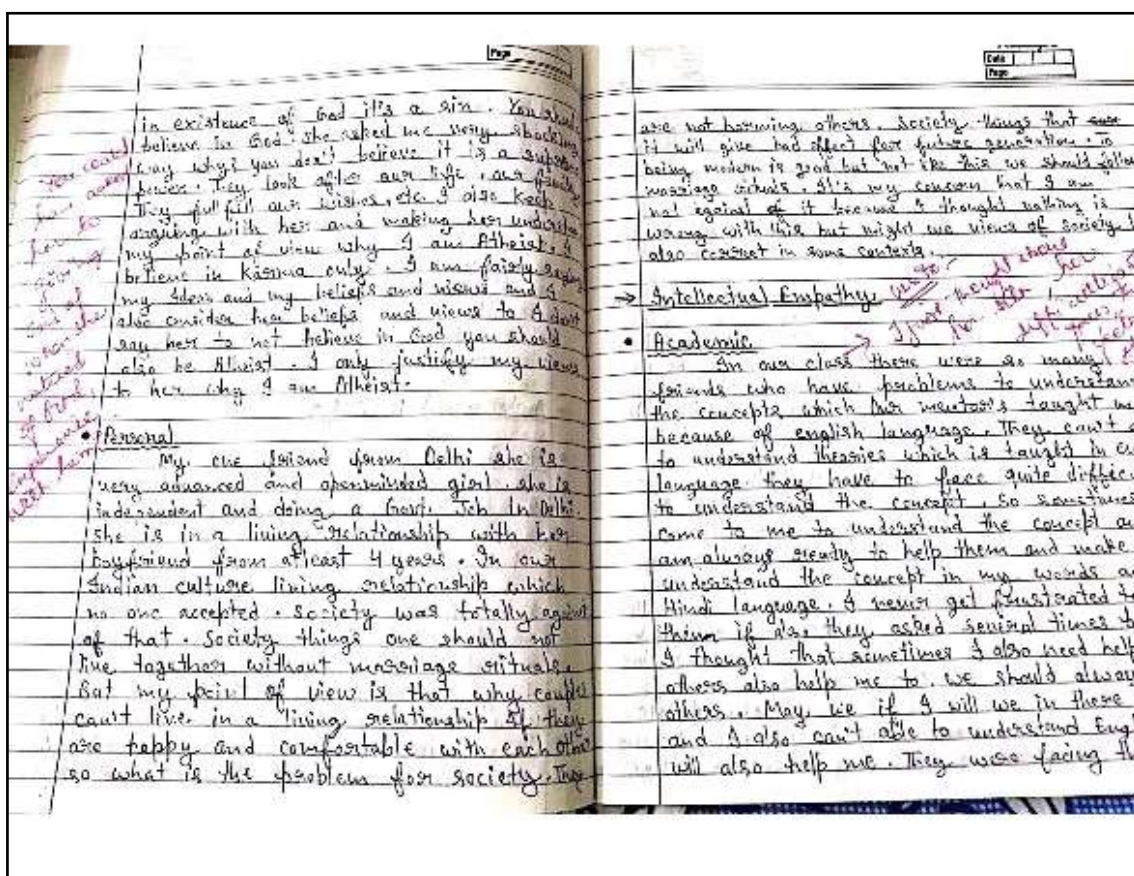
She is mentioning about how she is able to accept others views and how others are not able to leave their own views and beliefs that are long held. She should have further elaborated the implications of the above situation. The understanding of intellectual courage is evident but then the further elaboration on what should be and what should not be could have been stated.

## Intellectual Empathy:

In this case there are many students in the class who do not understand English. With this reference she has mentioned that she reasoned with the students who do not understand English with questions. She has mentioned that the students are not able to understand the theories which are taught in English language, they face lot of difficulties to understand the concept. I never get frustrated to answer them if also they ask several times because I thought that sometimes I also need help and also others may help me to. So I thought if I am in their place I would also face the same problem. So we should understand others by putting our self in their place.

Below picture is of intellectual journal of profile E on Intellectual Empathy as well as Researcher's Feedback on the Journal Entry

Figure 34 Posting of the Journal Entry 5 in the Intellectual Journal of Profile-E



**Researcher's Observation:**

She has thought from their point of view and made them understand it as much as possible

**Intellectual Perseverance**

She has written that, 'In her elective class she actually had a differing point of view with one of the classmates'. She continuously kept her questioning to understand what she was trying to say. She also came to an understanding that her views were also correct. Her friend is not able to explain but after questioning even she became clear as to what she is trying to say.

**Researcher's Observation:**

She has used intellectual courage to reason out what other person is trying to say. She has used intellectual perseverance to continuously to understand what she is trying to say. Confidence in Reason

In this situation she has mentioned that, she has confronted her classmates who say that 'Bihari's are bad'. She has made her understand that how can she generalize this statement. Every state has some good and some bad. She has to have lot of evidence and information to say what is good and what is bad. (TH-25)

**Researcher's Observation**

She is able to put her point of view with reference to what is being inferred in the conversation. She is able to justify the person that if you don't have enough evidence you cannot pass on such loose statements. She is also standing for the truth with right questions. She is observed to using multiple traits in one situation Intellectual Integrity

She has written that one of her classmates is very short tempered. She noticed her temperament quite a number of times but then once while in discussion she again started shouting on her. She has written that, " I feel bad but did not say anything to her and said yes you can continue but later on I went and asked her that is this the

right way what you do and what you did". She also realized that she had done wrong and she is short tempered.

### Researchers Observation:

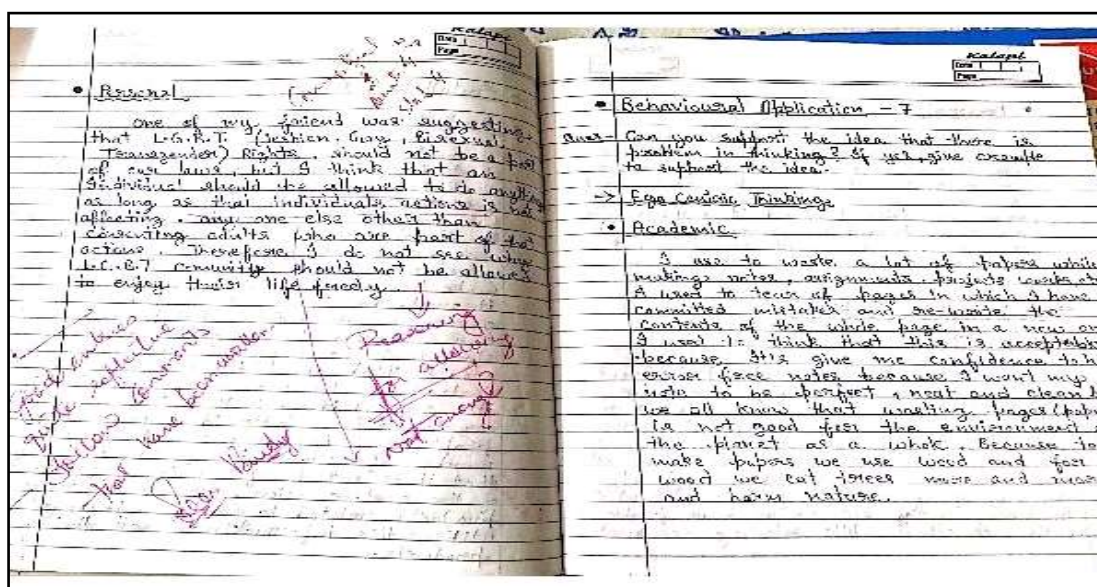
In the above case very few people can actually confront things that are not right. She is able to do that, that itself shows that she has Intellectual Integrity to do that.

### Egocentrism

She has mentioned that, *"I waste a lot of paper while making notes, project works etc. I used to think that this is acceptable because it gives me confidence to have error free notes because I want my notes to be perfect, neat and clean. But then it's not good for the environment"*.

Below picture depicts the journal entry of Profile E on Egocentrism as well the feedback of researcher to improve on the thinking dimension

Figure 35 Posting of the Entry on barriers to Critical Thinking in the Intellectual Journal of Profile -E





**Socio-centrism**

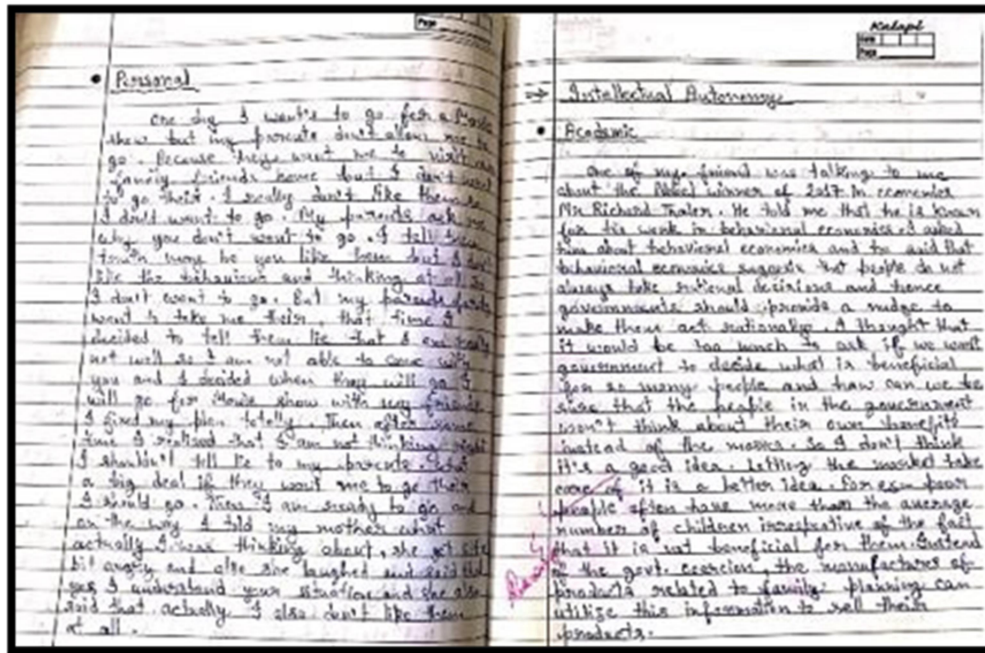
The concept of socio-centrism is not accurately understood. She is referring as ‘ I wanted to make presentation by reading a video but my group wanted to make presentation from a book so I did not argue much and went with the group’s idea  
 Researcher’s Observation:

In the above entry I can’t see the case to elaborate on the conclusion or the reasoning that will go beyond saying that where in the above entry she was egocentric. She has assumed that the reader will understand the concluding remark of the action done.

Below pictures explicitly shows the difference between Journal entry 1 and Journal entry 6 in terms of elaboration of profile E

Figure 36 Comparative picture of elaboration on the Journal entries of Profile – E

Journal Entry - (Person) - 1				Journal Entry - (Person) - 2	
Sr. No.	Person	Situation	Date/Time	Description	Reflection / Take-aways
1.	Mami (My friend)	Shopping event	Suburban 22.07.2017 Thursday	She gets money from home to give a treat to our friends and also for DJ Party. When we start she shows us, if we don't do DJ Party and give that money, she who voted this so can we do that. We discuss and agree in her point of view and I thought and decided to donate some of money in an old age home.	We always have enough to share and care and make others happy we should always have a helpful nature.
2.	Me & Brothers (Saurav & Saanav)	Having Meal with my Brothers	Gurukul Residence (my home) Plot 301, Golea 23.07.2017 Sunday	My brother & Me watching movie at home. Our morning having yummy pasta for us. suddenly my brother's pasta plate was fell down. My mother told me to share my pasta plate, initially I didn't want to share but then I realize that I should share as sharing is caring and I love my brother.	Caring fills our heart with joy. It like food fills our stomach. And it is caring to witness love.



### Stage of Development: Beginning Thinkers stage

She has written that, *"Her arguments are not affected by biases. I don't make unreasonable assumptions. I make sure that my thoughts are based on reasoning. I am using elements and standards of thinking in my thought process"*. (TH-14.1)

### Barriers to Critical Thinking:

- Laziness to practice
- Lack of experience and knowledge
- Lack of time
- Lack of writing skills to express the application
- Communication gap.

### Self-evaluation:

Initially she has understood the concept of critical thinking as being impartial, being helpful and caring. (Story of fair-minded Fran), It is quite evident that the diary entries involve the Critical Thinking language. Implications are missing for giving for the situations. She is also seen to be asking other student to using evidence while making an argument or an inference (using facts and data to infer).

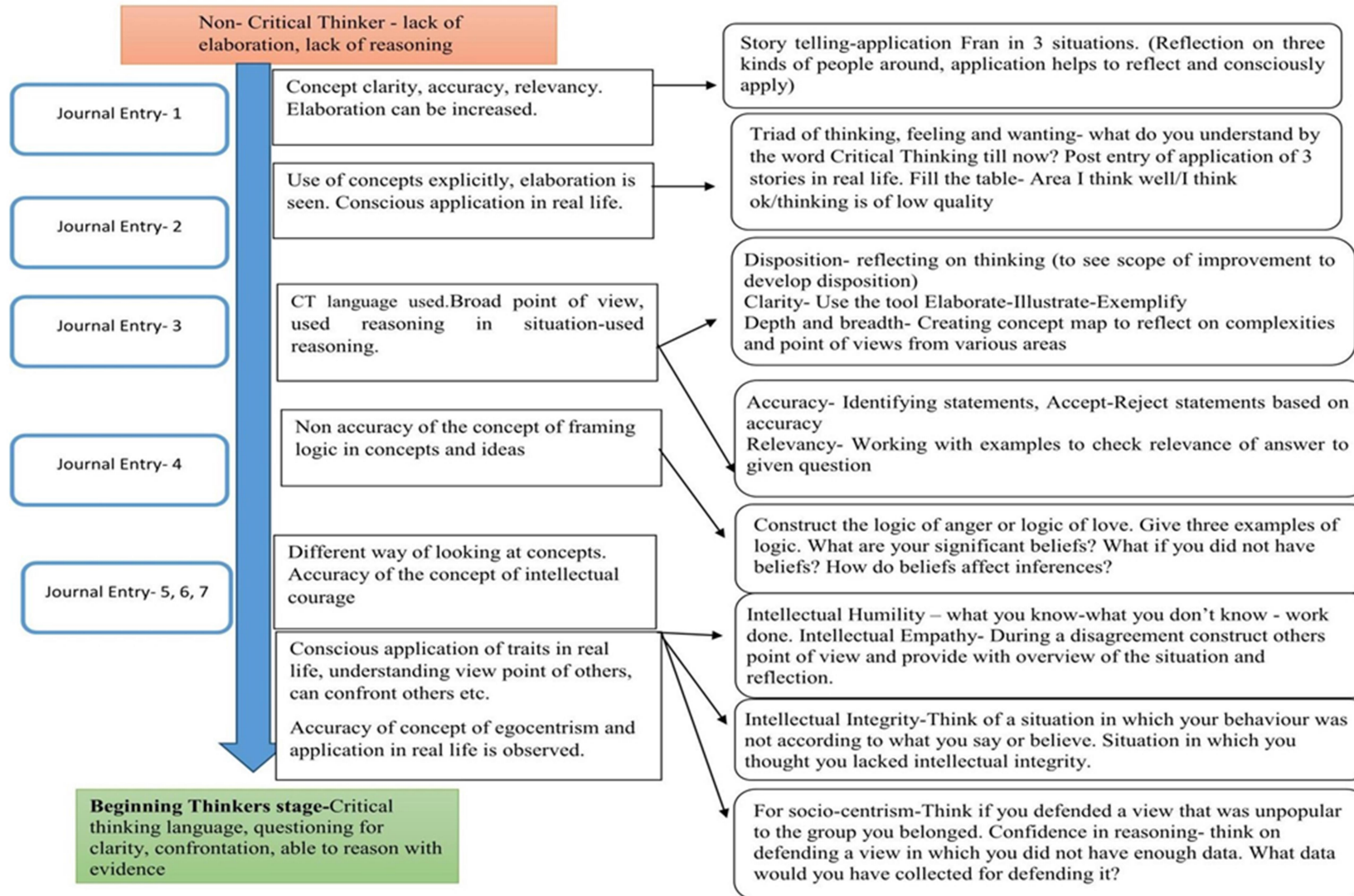
During intervention she was seen actively discussing the concepts in the class. Post intervention also she was quite eager to solve issues that were related to personal with the help of critical thinking. She was not knowing her hidden feeling. She is trying to work on her unknown part of herself (intellectual humility). Her heavy emphasis is seen on point of view aspect of critical thinking (point of view-standard as well as element). She was little resistant about others point of view into a situation. Earlier she was not very clear about what and how to pursue. She can take decision by reasoning. She is now much clear about her goals and purposes. (Elements of reasoning). She is able to think logically. (Logic). She is able to reason with evidence (information as an element of reasoning)

Broad themes emerging from the case:

- Helped in being impartial
- Helped in close relationship be dealing with emotions
- Open-mindedness
- Helped in knowing unknown part of friends thinking
- Questioning beliefs like being atheist
- Tried to understand friends reasoning
- Dealing with friends
- Questioned classmates generalization of about a particular class of people
- Confronting things that are not right

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking.

Figure 37 Consolidation of Profile E



Following will describe the case of Profile F that performed well in situation test

## 6. Profile – F

### Brief description of the case

Profile is 5'4 feet in height and has a diamond shaped face. Her qualifications are M.SC Mathematics. She has method of Mathematics and Science. She is fair in complexion with oval eyes. She comes from Gujarati family background and settled in Vadodara. She is quite shy in her nature while she is with her peers in the class

*Table 41 Scores on Situation Test of Profile – F*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6		Q.7	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6	9	2	9	2	3	3	4	2	10	4	10	5	7

Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	7	0	10	3	7	0	10	4	10	2	1

- Pre-test Total = 42.5
- Post-test Total = 101
- Difference between scores = 58.5
- Highest improvement- Q.9 ( Perseverance), Q.11 (socio-centrism)

### Journal Entry-1

#### Exercising Fair-mindedness

She has given three situations in which she could help. She went to Ahmedabad with her mother, helped her with the project and also corrected papers of her colleague who was quite busy in that week. She has written that she has felt happy, good and responsible.

**Researcher's observation:**

She has understood Fran as being helpful. The entries lack elaboration. The comprehensive concept of Fran is to be understood by her.

**Journal Entry -2****Triad of Thinking, Feeling and Wanting**

She has written about the class wherein the teacher asked to come and revise the class. She did not want to but then chose not to ignore the situation. She had stage fear which she could remove because of the way she thought about it (TH-2.1). She has written that, *"I have stage fear, but I have to come forward and tackle that situation, try to take better decisions and not panic". In the second situation she has mentioned that, "in past I reacted very aggressively and used to scold my brother and the result was that he started hiding the marks and his studies were affected. This time I did not react like last time, I talked to my brother and understood the situation and I got to know that he did not understand the concepts properly. I also talked to his sir".* (TH-16)

**Researcher's Observation:**

I can see a bit more elaboration on the entries. I can see clarity of concepts. She could change the way she thinks and found out a better alternative for what she was doing. That helped her find the solution for her brother. She has stopped to react

Journal Entry-3

**Standards of thinking**

I started to deal all situations based on standards. I analysed based on standards. Am I clear in what I am dealing? Am I accurate and relevant? In earlier times I never went in depth, never used much information, I was not able to analyze because I did not know about critical thinking. I applied this in real life by taking integration classes (TH-3) (TH 5.3). I used information from NCERT textbooks as well as CBSE textbooks. I also referred to information from internet and also took suggestions from my friends. My logic was clear for teaching the students.

### **Researcher's Observation**

She is using the Critical Thinking language in the classroom. She is mentioning of going in depth of situations. She has also mentioned about application of the concept in integration class. This clearly shows use of critical thinking standards in her academic life. Explicit use of questions is observed

### **Journal Entry -4 Elements of Reasoning**

She has reasoned with the formal structure of reasoning. She also has carved out logic for going on leave for some days. She has written that, "I am able to give reasoning and come with proper outcome and I am thinking in all aspects".

### **Researcher's Observation:**

She could have drafted this in much better way. A little naïve reasoning is observed here. The depth is missing. Elaboration is possible.

### **Journal Entry-5**

#### **Traits of mind**

#### **Intellectual Humility**

She has written about how she was tricking her mind for not submitting the journal entries on the date given. She is able to reflect on tricking about her assignment in this course itself. I am trying to be fair now with my assignments (TH-17.1). She was ignorant that her mind was tricking her. (TH-28)

#### **Intellectual Courage**

She has mentioned about how she did not like ICT classes and ignored its importance. She has further elaborated that, "*I am trying to use intellectual courage by taking interest in the classes. I am trying to develop new ideas and learning from internet*".

### **Researcher's Observation**

Intellectual Courage is used here in taking interest in the class. Novel way to understand it

### **Intellectual Empathy**

She has written that her friend had come to ask about the difficulty that she had with some assignment. She has further written that, "I put myself in Riya's place and realized that I should help her and can sit down with her for 10 min. this can happen with me or anyone of us".

### **Researchers Observation**

She has precisely mentioned that she has put herself into the shoes of others. This has indicated that she has consciously tried to understand other friend.

### **Intellectual Perseverance**

For this journal entry she has mentioned that she had a presentation to be made on one of the subjects. The group members said " itna hi hai". After the presentation of one group they realized that the information was less. Then I tried to find more information on internet like what is the equality of teacher in Switzerland? What is the literacy rate of Switzerland? I was continuously striving to achieve my goal and I have taken my goal and I have taken much information and I was happy. If I would have stopped before that means I gave up but I have not given up".

This indicates that she tried hard to find relevant information for the presentation. This indicates conscious use of intellectual perseverance.

### **Intellectual Autonomy**

She has written about a topic suggestion by one of her friend for her integration class. She said yes but then wondered and then sat down and researched on it very well and then decided to take it. She has written that, "Now I reason also and analyze and give credit to person who originally suggested that".



### **Intellectual Integrity**

She has mentioned in the journal entry about expectation from her husband that, “I always expect my husband to call me rather than me. When I understood about intellectual integrity first we should behave like that rather than expecting from others. We should think on their point of view also”.

#### **Researcher’s Observation:**

She has accurately understood and applied the concept in her personal life.

This can attributed to intellectual integrity taken up in the class

### **Barrier to Critical thinking Egocentrism**

Here the profile is mentioning that, “She has mentioned that when my mentor was giving remark for my lesson then usually before I used to validate myself and argued that I was right, but then now I try to hear and reflect on it”(TH-18.1).

#### **Researcher’s Observation:**

This is a significant dimension of egocentrism that she has accurately mentioned. Reflection is observed.

### **Stage of thinking- a Beginning thinker’s stage**

I am able to analyze any situation and use standards and elements many of the times

### **Barrier to Critical thinking**

- lack of time
- egocentric thinking and socio-centrism

### **Self-Evaluation**

Before the intervention she did not analyze the situations. She did not give credit to the ones who suggested ideas. But now she is able to analyze each and every

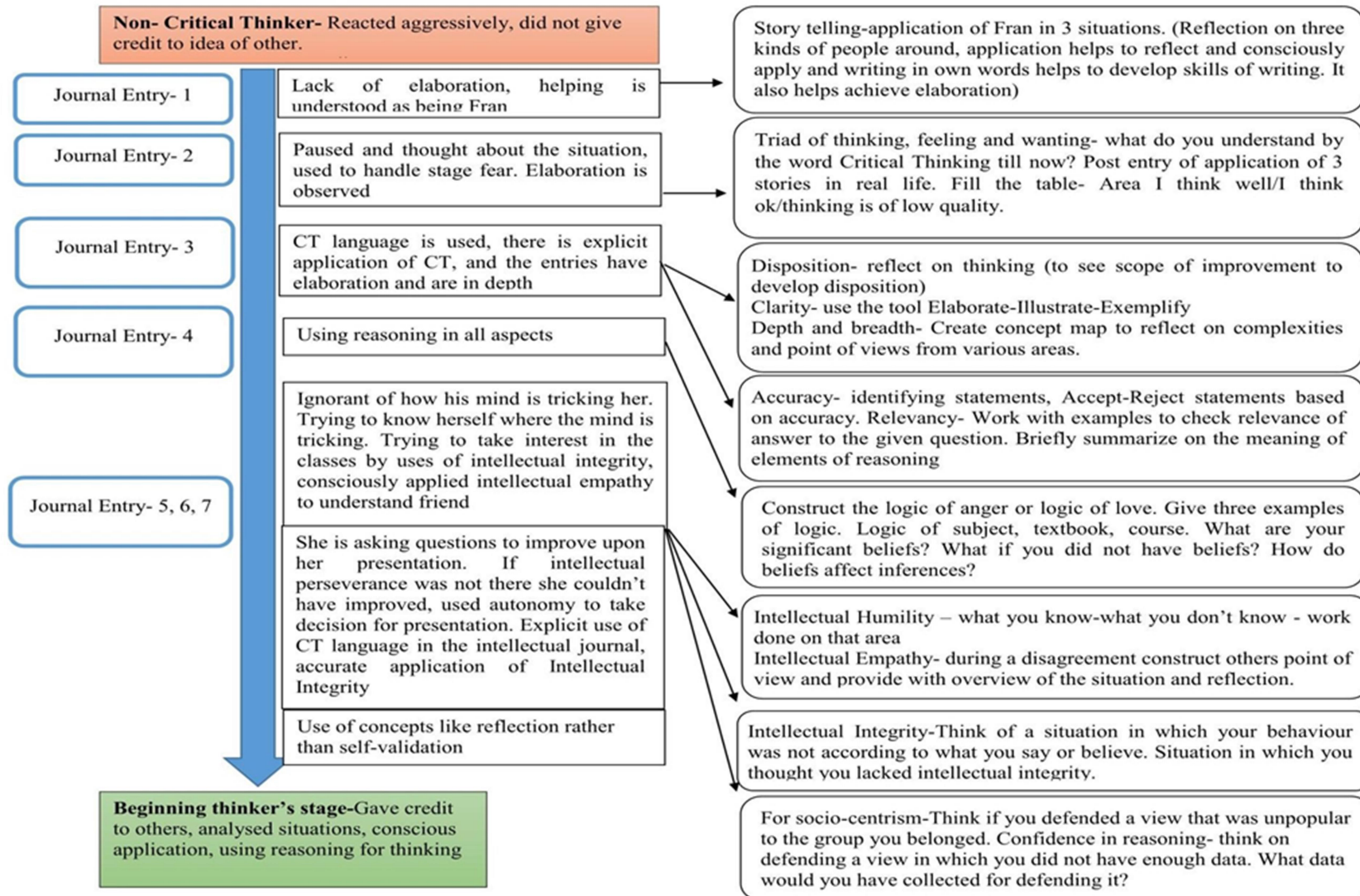
situation. She is able to think and reason through it in past I reacted very aggressively and used to scold my brother and the result was that he started hiding the marks and his studies were affected. The profile is observed to have elaboration on the entries. It is observed that the profile is clear in her concepts.

#### Broad themes emerging out of the profile

- Helped others like mother, colleague
- Could handle stage fear
- Could handle aggressive behaviour
- Dealing with integration classes
- Helped in submitting things on time
- Creating interest in classes
- Helped in creating relevant presentation
- Dealing of relationship with husband
- Could listen to remarks of mentor with open-mindedness

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 38 Consolidation of Profile F



**Following case will describe the case of Profile G that performed poorly in situation test**

## 7. Profile – G

### Brief description of the Case

Profile G showed poor performance in situation test. Profile G is around 22 years of age. Her height is 5'2" and weight is 60kgs. She is a short and fair. She belongs to a Gujarati Family. She lives with her parents. She has done her Masters in accounts and financial management and her methods/electives are commerce and economics. She resorts to structured thinking and is instinctive in her thinking. She is also observed to be quiet in the class

*Table 42 Scores on Situation Test of Profile – G*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
4	5	4	5	3.5	0	3.5	2.5	3.5	1.5	0	0

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
3.5	0	4.5	2.5	0	3	4	0	4	5	3	2	1	3.5

- Pre-Test Total = 38.5
- Post-Test Total = 30
- Difference in pre-post- test scores = 8.5

### Journal entry 1

#### Work Out with the Character of Fair-minded Fran

The student teacher here writes about helping a blind man cross a street. She has mentioned in the journal entry that, “ this incident filled me with deep sense of satisfaction. I felt that helping the needy person is the duty of 'every responsible

citizen”. Another incident also talks about helping an aged lady with a torn bag she had”. She has again reflected upon getting satisfaction by helping others”.

**Researcher's Observation:**

She has understood the character of Fran in terms of helping people. The concept is clear and accurate

**Journal Entry 2**

Then she has mentioned about assignment four that is no area of application of critical thinking is written. She has again mention same aspect that," I felt satisfied

that because of me someone has gained confidence". She has also written about helping colleague and coming out with the reason of why he was having problem in his work".

**Researcher's Observation:**

She has reflected on the concept Fair-minded Fran in a way that is helping friend in this entry as well. She is observed to be writing entries with no accuracy of the concept.

**Journal Entry 3**

She has mentioned on preparing food for father when mother was not around in the house. She has mentioned about, "I felt satisfied after doing this".

**Researcher's Observation:**

The profile is again not applying the concept taught in the class. She is posting a non-accurate and non-relevant entry.

**Journal Entry 4**

She has tried to help a child who was lost in front of the mall. She has written that I did something new because of which I succeeded. I did little effort and someone was benefitted

### **Researcher's observation**

The case has not written about any aspect of critical thinking of journal entry nor has she mentioned any specific critical thinking dimension being applied. She has again mentioned of helping in the form of effort and benefit

### **Journal Entry 5**

This is a backdated entry. Again, no area is mentioned. No clarity, accuracy and relevancy is observed in the area of journal entry

### **Journal Entry 6**

#### **Area: courage-personal**

She has mentioned that she took the B.Ed. very lightly and then understood its importance after giving the exam. She has written that, "that she has decided to face the situation with courage and without fear (TH-2.2).

#### **Researcher's Observation:**

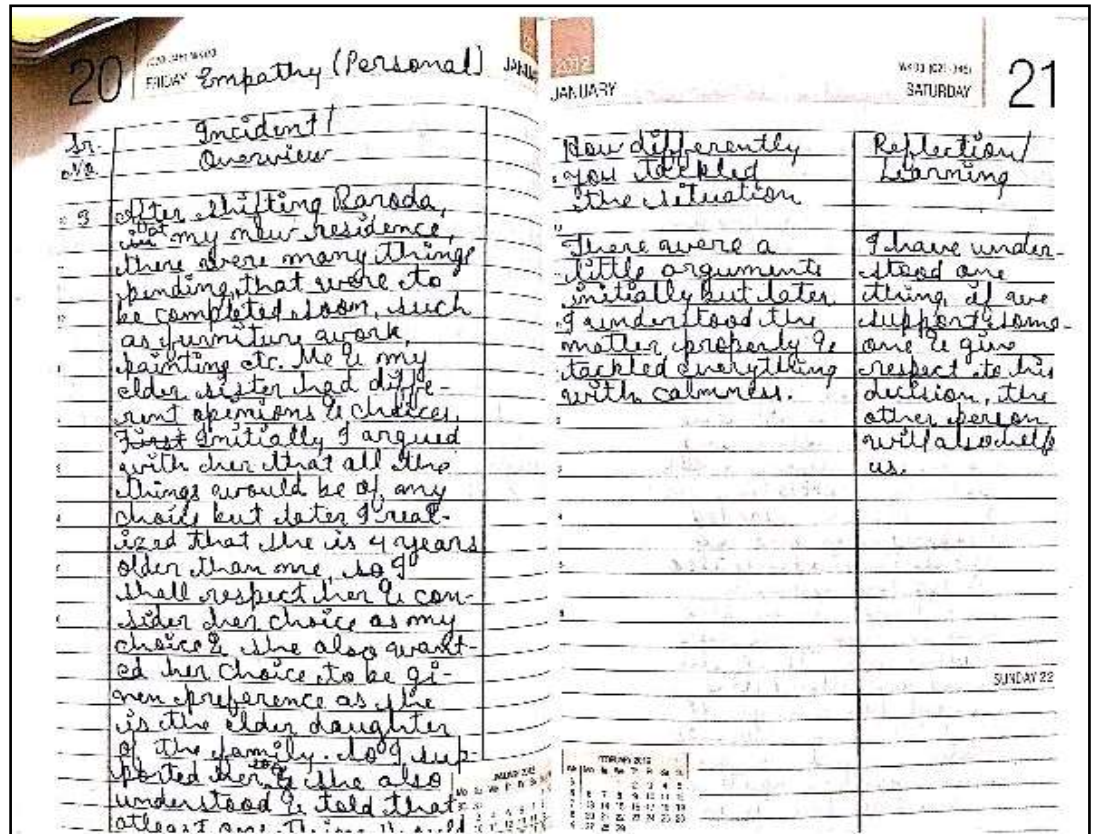
She has talked about facing a situation without any fear in this entry of intellectual courage. She has misunderstood the concept but at-least this journal entry mentions area of journal entry and is bit relevant to what is being to be reflected upon. She has mentioned courage as in trying to give best in a situation.

#### **Intellectual Empathy**

She has written this entry bit precisely. She has mentioned that they were getting their house ready to live. So many things were remaining and both the sisters had a different choice. She has mentioned that, " initially I argued with my elder sisters choice but then I realized that she is four years older than me, so I shall respect her and consider her choice as my choice to be given preference as she is the elder daughter. She has written that if we respect someone the other person will also help us".

Below figure shows entry of Intellectual Empathy in Intellectual Journal of Profile G

Figure 39 Posting of the Journal Entry 6 in the Intellectual Journal of Profile-G



**Researcher’s Observation**

Intellectual Empathy is understood from the point of view of the sister. The entry is elaborate

**Intellectual Humility**

It is written that, “I felt much satisfied that due to me, discrimination between rich and poor was removed at least in my society”.

**Researcher’s Observation**

Humility is understood in the sense of discrimination between rich and poor. The entry is also backdated entry.

**Egocentric thinking**

She has written about shopping of things that she wanted and she started crying for it.

**Researcher's Observation:**

The concept is not accurately stated

**Socio-centric thinking:**

She has mentioned that, “by reading the story of this boy, i realized that we should listen to everyone but should do the things of our own”.

**Researcher's Observation:**

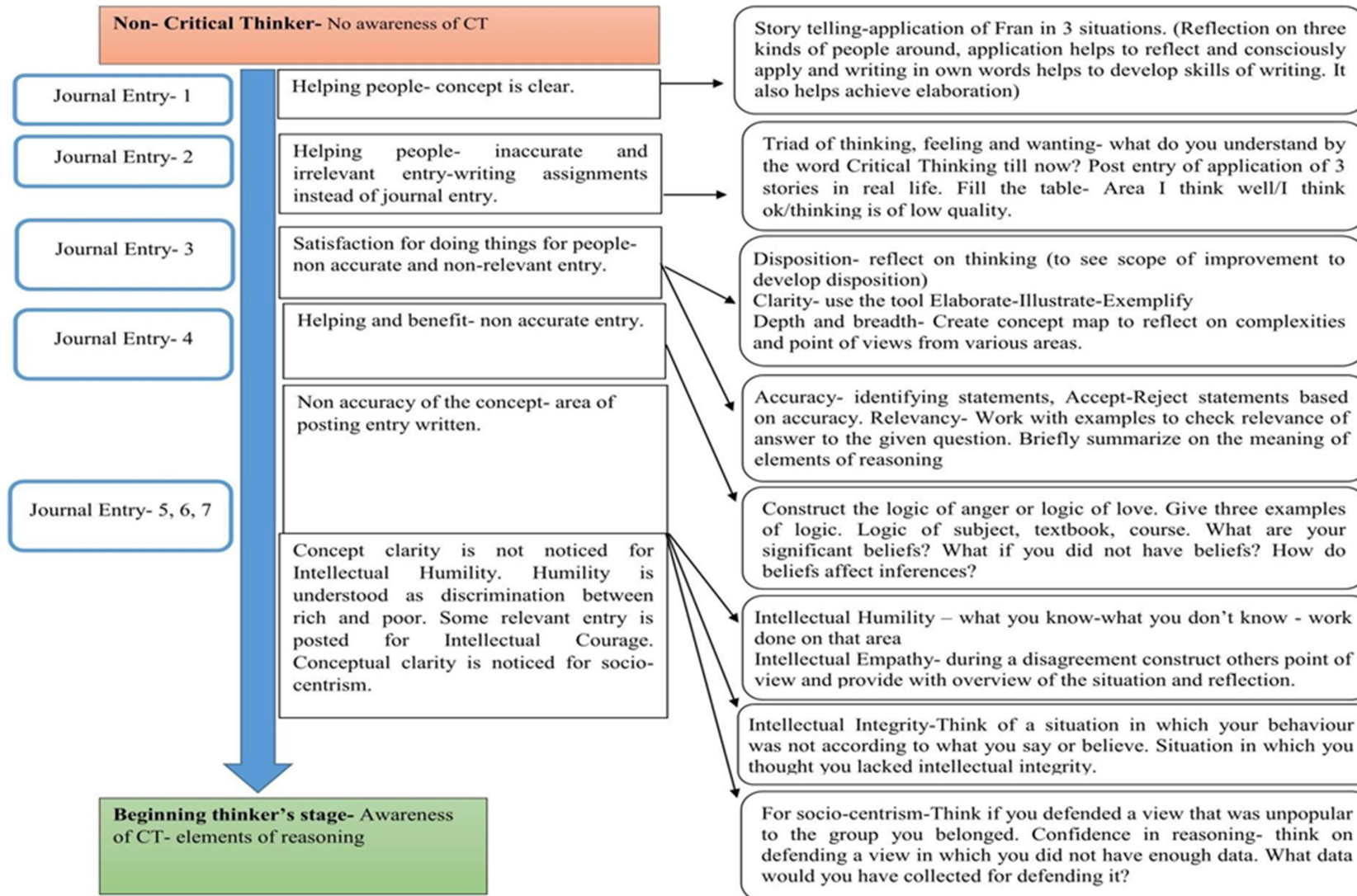
Both are backdated entries. The developmental phase is not written. The socio-centrism concept is related to the entry. Some conceptual clarity is evident  
Broad themes emerging from the profile

- Helping people
- Helped child to find mother
- Doing things of our choice

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking.



Figure 40 Consolidation of Profile G



## 8. Profile – H

Profile H is 26 years of age and 5'0 feet of height. She is wheatish in complexion, with a long hair and diamond shaped face. She always wears bindi on her face and is quick to respond in critical thinking classes. She belong on traditional Marathi family. She is married with an eight month daughter at home.

*Table 43 Table of Pre-Post Test Scores on Standardized test and Situation test of Profile-I*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
3	7	0	4	5	10	7	9	4	7	0	3

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
0	8	1	4	1.5	1.5	0	2	1	2	1	2

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6	3	5	10	0	8	5	3.5	0	9	5.5	2.5

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	9.5	5	9.5	0	8.5	0	9	0	8.5	0	6.5	0	0.5

### For analysis of article

- Pre-Test Total = 23.5
- Post-Test Total = 59.5
- Difference in pre-post- test scores =36
- Highest Improvement – Q.3 ( Concepts and Ideas)

For situation test

- Pre-Test Total = 31.5
- Post-Test Total = 88
- Difference in pre-post- test scores = 56.5
- Highest Improvement – Q.10 ( Intellectual perseverance)

### **Journal Entry 1**

The profile has posted the entry writing that, “I went to shopping with my father so instead of buying expensive clothes I picked up medium range clothes”. She is also posting the entry that, “I made some food for my mother so that she can take rest”.

### **Researcher’s Observation:**

The profile is observed to have understanding of Fran as helping mother and also by considering the aspect of thinking from father’s point of view (TH-1.4) so that she doesn’t buy expensive clothes. The concept clarity of application is not observed as she has posted backdated entry. Lack of elaboration. Purpose of writing entries is missed

### **Journal Entry 2**

#### **Triad of Thinking, Feeling and Wanting**

She has written she was feeling like fainting in the assembly and writes that, “I think I went home and leaving that is good because I did not feel well. So that was the right decision for that day. She is also mentioning that, “the skill of taking decision of right decision at right time comes and improves to think about myself deeply”. She has also mentioned that, “ I feel scared of assemblies because I have stage fear so to handle assembly I understood the meaning of each and every word and I improved my English so at the right time I am taking the right decision so that things work well”.(TH-6.1)

**Researcher's Observation:**

The profile has posted an application entry that means that the purpose of writing entries is clear to her. She has not used the aspect of thinking, feeling and wanting in the entry. The shift from backdated entry to application of the concept in real life is observed. The entry has elaboration. The profile is mentioning about CT helping in decision making so that she removes stage fear.(TH-2.3)

**Journal Entry 3****Elements of Reasoning**

She actually tried to understand the anchoring of the assembly through this structure. She has fitted the elements into the explanation of the assembly anchoring. By looking at the reasoning structure she was able to conduct a good assembly. She has written that the, "implication of this performance was I lost my stage fear because of well anchored assembly and this increased by confidence". She also reasoned through doing the B.Ed.programme.

**Researcher's Observation:**

Concept clarity is evident. Elaboration is explicitly observed. She has used purpose to loose the stage fear and has reasoned through it. Logic of assembly and stage fear is clear

**Journal Entry 4**

Her extent of ignorance for taking care of animals was evoked by looking up to the knowledge of her husband towards it. She has written that, " I have to develop my knowledge and gain mastery in science along with my knowledge for teaching students".

**Researcher's Observation:**

The concept clarity of the profile is clear. Elaboration is observed. Awareness of ignorance is clearly observed

### **Intellectual Empathy**

She has written how she tried to understand her friend who was not able to understand and create sentences of her own to write the journal entries. She has written that “that we have to practice to make ourselves put into others place to understand their problems and their troubles”. She has further written that, “ I will try to make my friend understand things in English. I will understand her”. She has also written, “I was thinking like a critical thinker, I recalled the concept and used it”

### **Researcher’s Observation:**

The profile is trying to understand her friend by thinking about the background of her friend. She is also observed to understand the problem of her friend in attempting sentences in English

### **Intellectual Courage**

She has written that I faced this when I removed my bangles while making food in the kitchen. I forcefully realize to accept my intellectual courage but it was difficult for me to maintain happiness in our home. She has written in the entry that, “what was the purpose of doing such sum”. The purpose is getting good marks and I fail to recognize this view”.

### **Researcher’s Observation:**

The profile is observed to use purpose in Intellectual Courage. Integration of elements of reasoning with Intellectual Courage is ideal. The observation is rare.

### **Intellectual Perseverance**

She has written about trying out making a food dish which will be very traditional. She has reflected on her thought process that I thought about the trait that madam had explained; “Now I think critically that if we keep on doing hard work we can definitely achieve skills and goals. We can keep on achieving different kinds of information of various cultures and traditions.

### **Researcher's Observation**

She has accurately understood the concept of intellectual perseverance. She is showing concept in the form of achieving different kinds of information of various cultures. She is also remembering the lecture and relating it with where it is applied (TH-19.1)

### **Intellectual Integrity:**

She has mentioned an incident wherein she had to share her lunch but then due to her medical conditions she was not able to. She was also habituated with the group and having lunch with them. She then revealed the truth that she can't share lunch with them and she has written that, "They understood my feelings as well as they joined with me also in canteen."

### **Intellectual Autonomy**

She is mentioning that the trait is within her but she has to keep on improving it. She has realized it and also reflected upon improving it. She has written that, "with the help of Critical Thinking development I have understood it that I have it I have to ablaze it more and practice it by thinking critically."

### **Researcher's Observation:**

It is observed that she has reflected on the skills she has and also reflected upon that she has to improve it

### **Confidence in Reason:**

She has mentioned that, "I was made foolish by one of the leader who suggested things for betterment. She has mentioned that the leader provided for evidence and information but that was wrong. We came to know after examining it. I was made foolish by him."

**Researcher's Observation:**

Usage of words like evidences and information. Reflecting on examine in information so that we do not get fooled.

**Egocentrism:**

She has mentioned about her mother-in law who fed her daughter mixture of separate things that spoiled her health. She then blamed her for that. She has spotted egocentrism within her mother in law saying that, "she is trying to maintain her own beliefs but sometimes she blames others for her wrong habits".

**Researcher's Observation**

She has spotted that in her mother-in law and also tried to understand why she is doing it. She has also reflected on herself that she should take care of her daughter rather than blaming it on her. That shows she has displayed courage to understand her point of view.

**Socio-centrism**

She is mentioning here that, "I am happy to think critically and take right decision. I do not want to be part of parties and I am happy to take one step ahead and do not become Socio-centric thinker and bombarded with thoughts of others.

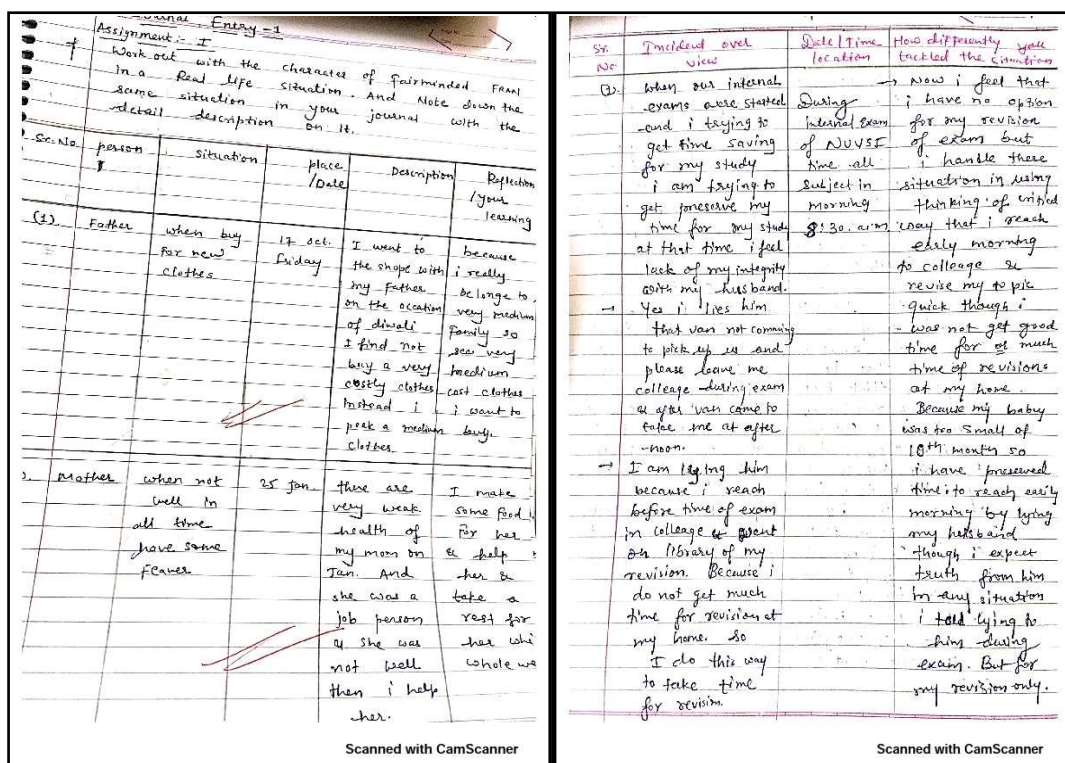
**Researchers Observation:**

Usage of concepts like bombarded with thoughts mother. Mentioning that I am happy to think critically and take one step ahead

## Comparative Picture of Intellectual Journal of Profile I so that elaboration can be explicitly observed

First picture is from Journal Entry 1 and second picture from Journal Entry 5

Figure 41 Posting of the Journal Entry 6 in the Intellectual Journal of Profile-I



Stage of Development: Challenged thinker's stage: sometimes falls prey to Socio- centric thinking, not able to reflect upon some issues in life, reflection is quite important to change oneself. She is trying to become specific.

### Barrier to Critical Thinking- emotional nature, egocentrism

#### Consolidation of the Case:

First two entries for the case lack clarity, accuracy, precision, elaboration. She is able to understand the concept very well only after 4th week. From the Intellectual Journal entries it is evident that she is able to understand and relate to traits very well. Majority of the entries that she has written reflects that she is able to understand the context of the entry in her personal life. She is able to accurately put her thought



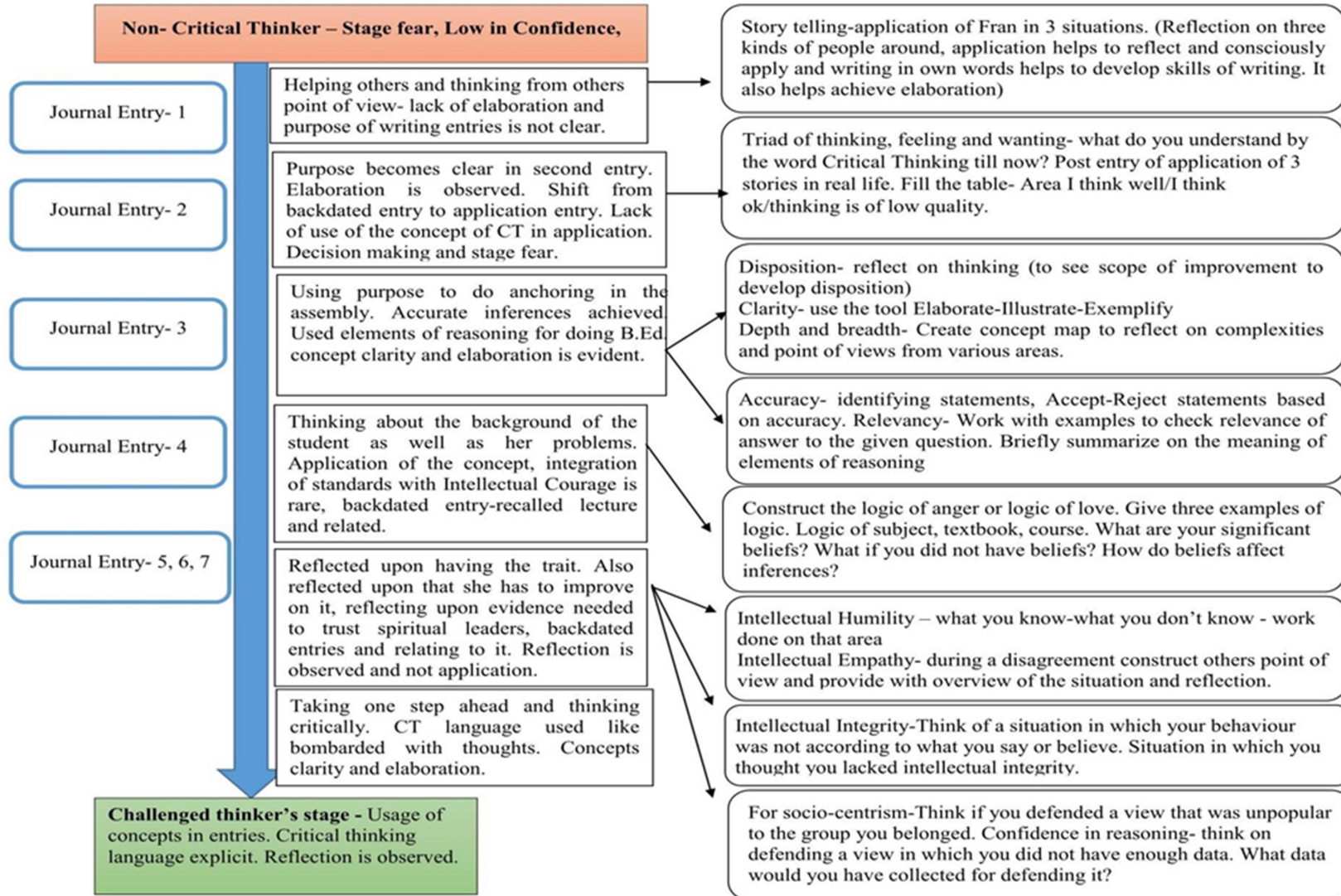
process for intellectual traits in personal life. Lot of elaboration is seen into the case 5th, 6th and 7th entries. She is able to reflect on her thoughts now. She is able to reason and able to think about implications of the thought process

Broad themes emerging out of the profile

- Helping and thinking from others point of view
- Helping her to make right decision
- Helped in conducting good assembly
- Could deal with stage fear
- Questioned beliefs of wearing bangles
- Helped in understanding different cultures
- Helped in maintaining relationship with mother in law

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 42 Consolidation of Profile H



## 9. Profile –I

### Brief description of the Case

Profile I showed significant improvement in standardized test as well as situation test. Profile I is around 23 years of age. Her height is 5'2" and weight is 57 kgs. She is a short and fair. Her eye colour is dark brown with long hair. She belongs to a Maharashtrian Family. She lives with her parents. She has done her Masters in accounts and financial management and her methods/electives are commerce and economics. She is quite moody person and doesn't think much before reacting. She did not much come to inquire into many entries but was always quick to submissions, interactive and scored very well in the post tests.

The below table shows scores of the pre-intervention and post intervention of the profile J on standardized test.

*Table 44 Table of Pre-Post Test Scores on Standardized test and Situation test of Profile-J*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
4	6	6	8	4	10	7	4	1	4	4	7

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
0	8	0	8	1	2	3	2	2	2	1	2

### Pre-Post Test Scores of Situation Test

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6		Q.7	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	10	6	8	5	8	3	6.5	4	1.5	5	9	4.5	10

Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6	10	6	10	1	8	4.5	10	3.5	9	3	5

Pre-test total = 56.5

Post-test total = 105

Difference in scores = 48.5

Significant Improvement- Intellectual Perseverance

### **Journal Entry 1**

#### **Work Out with the Character of Fair-minded Fran**

This student teacher has begun with the understanding of helping and obeying others as the character of Fair-minded Fran. In one of her entry she has written that, “Dad works hard for us. So I can at least give him some happiness by letting him watch the news channel as he loves news”.

#### **Researcher’s Observation:**

As can be seen from above she has thought about her dad to give some happiness as he wanted to see some news on Television. The thought that is evident in the above situation is about ‘thinking about others’. The profile is relating the Fran part to thinking about others. The entries are very shortly elaborated. The depth is not observed. Concept clarity is observed. She also mentioned Fran in the entry from the point of view of helping and obeying others along with giving satisfaction

### **Journal Entry-2**

#### **Triad of Thinking, Feeling and Wanting**

The student teacher has written while she is describing her assembly performance that was to be done along with her assembly group members. She is writing here, “that she was frustrated with two members of the group and how they were not able to understand that the classical steps of the dance were not suitable to the members who had no training into it”. She writes further that, “Still I tried to make myself calm and thought to keep quiet and let them also help to take initiative and give simple steps for the dance performance”. She is further mentioning that, “i have

understood how this triad works. We can process our thoughts and analyze things through Critical Thinking. This gives us clear picture which helps us to understand the things and also we can achieve clarity on execution”.

**Researcher’s Observation:**

She is trying hard to be patient and think about how her frustration can spoil what was happening. Instead, she calming herself down which means that she naturally thought about thinking dimension so that things don’t become complicated unnecessarily. Her second entry is little elaborated than the first one. Also the language she has written is easy to understand and communicates the situation clearly. She has understood the essence of being patient here which may not be exactly right but she is reflecting and stopping to create any scene which one unnecessarily creates because of reacting instantaneously. She has mentioned about “thinking and analyzing” which will help to understand the situation in a better way. The feedback that elaboration is required might be one reason that has affected elaboration positively.

**Journal Entry 3**

**Standards of Thinking and Elements of Reasoning**

She has mentioned that, “Till now we were not aware of how we think, now we know the criteria based on which we think”.

She has explained how ‘clarity’ the first standard of thinking has helped to improve her classes that she took in micro teaching. She has also mentioned that, “Ifirst had conceptual clarity about the topic, rehearsed it and then gave it in front of people then it was much better”.

**Researcher’s Observation:**

The profiles journal entry written in the Intellectual Journal is very elaborate this time. She is explaining each and every aspect with lot of depth. She is attempting to use standards of thinking in micro-teaching classes. She has mentioned how clarity can help to make her classes better. She has also mentioned about how criteria of

thinking can help to think better. This has to be attributed to the standards of thinking that were taken up in critical thinking classes.

#### **Journal Entry 4**

##### **Logic of Anger, Fear and Subject**

She has written how logic of anger and logic of course has helped to give clarity in the subject. She has framed logic of anger for her assembly work and has written that, “everything was good but at the end members changed their role and because of which the assembly did not go well. This incidence led in making me angry on some members but then I thought, that there is no need to get angry or there is no use in getting angry”.

##### **Researcher’s Observation:**

The profile has made the logic of anger but again has not given the reasoning for the above entry. She has framed the logic that can be framed with depth. One thing is explicitly observed that she has gone through the exercise of framing the logic of it. She has exercised her thought through that structure. She has also attempted to reason out with getting the migration certificate. The concept of logic is clear to the profile.

#### **Journal Entry- 5**

##### **Fair-mindedness-Intellectual humility, courage**

The student teacher has mentioned her presentation that she did in the class.

She had presented a power point presentation in the class about ‘World Trade Organization’. The presentation was not very well done. Before I could give up my comments she said that I am falling short of few points which I could have mentioned. Not only this but she also has mentioned in her Intellectual Journal writing that, “the realisation of the content and then to work on it is what intellectual humility talks about”. This can be explicitly attributed to the aspect of intellectual humility of intellectual traits.

### **Researcher's Observation:**

The profile has used Intellectual Humility to understand what she does not know. She has also applied it in her class presentation and realized the improvements to be done and has done those improvements. Concept clarity with accuracy is observed. Elaboration is also observed.

### **Intellectual Courage**

She has written how the discussion started in the class for which she was very confident. She has elaborated saying that, "I did not know few points but still did not accept the point of views and got stucked on the part which I knew. Soon, after some time I got angry that I don't know this topic, but I tried to accept the others point of view (TH-1.5) and then tried to study the concept from different angle" Researcher's Observation

An explicit application of intellectual courage in the class is seen.

### **Intellectual Empathy**

She has written that, "some students did not send their parts of the presentations, i thought from their point of view thinking that they might need some help so i helped them by giving basic understanding that was needed".

### **Researcher's observation:**

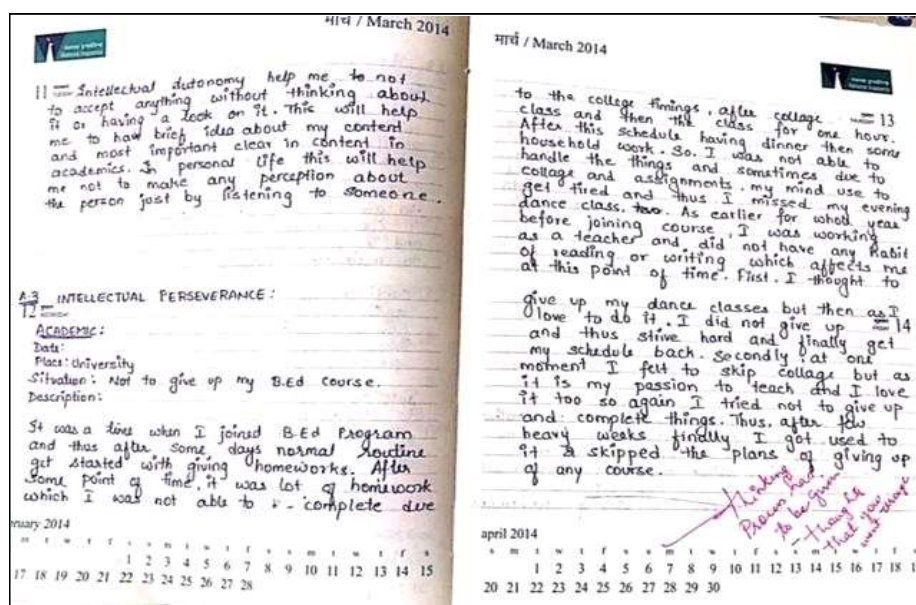
The entry is relevant and clear. The elaboration is also consistent. She has thought from other's point of view to apply Intellectual Empathy

### **Intellectual Perseverance**

She has mentioned that, "I was not able to handle things and got tired and thus missed on evening dance class. I did not give up and thus strived hard and finally got my schedule back. Secondly at one moment i felt to leave college but i tried not to give up and got used to it. I then skipped the plans of giving up of any course".

Below figure shows journal entry of Intellectual Perseverance in the Intellectual Journal Of Profile J

Figure 43 Posting of Journal Entry 5 in the Intellectual Journal of Profile I



### Researcher's Observation:

The thought at the end that says that I skipped the plans of giving up course explicitly shows that the profile is using the language of Intellectual Perseverance in the writing of Journal Entries. Clarity of concept is observed along with its elaboration

### Intellectual Integrity

There was no cooperation present in the group of presentations. One of the student teacher blamed her for taking the credit of the presentation. In response to this she asked the student teacher, "What initiatives have you taken for the presentation.

She also asked certain questions to her that asked her about not mailing things on time. She became speechless and then started to work on the task properly".



## Researcher's Observation:

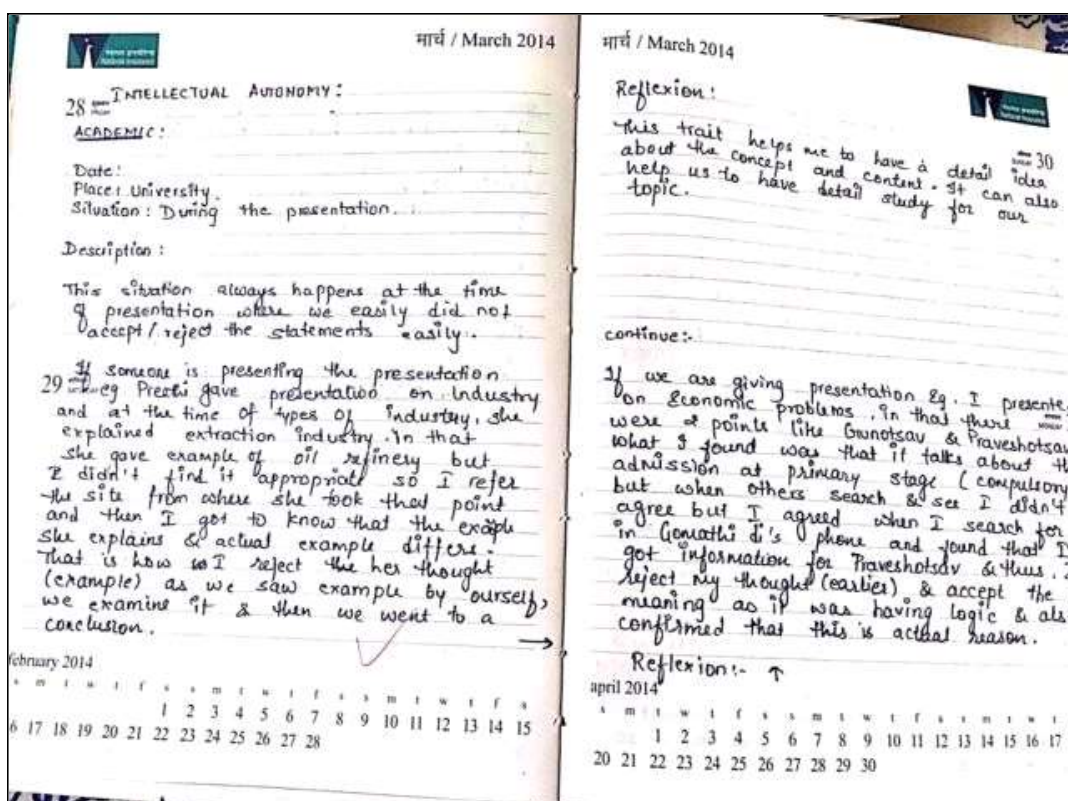
The profile is using questions to explore truth of another person. She is observed to be applying the trait of Intellectual Integrity. She is also reflecting on that speaking truth may make others realize their mistakes and then work on it.

## Intellectual Autonomy

She is mentioning about a student teacher who is presenting a presentation in her elective class. She has written that, "One example that the presenter gave i was not very sure of the example. I referred the site from where she took the point and then got to know that the example she explained and what is there on the net is different. That is how I reject her thought as i saw example by myself so that i can examine it and then went to the conclusion.

Below picture is of Profile I on Intellectual Autonomy in the Intellectual Journal

Figure 44 Posting of Journal Entry 6 in the Intellectual Journal of Profile I



## Figure Intellectual Autonomy

### **Researcher's Observation:**

The profile is observed to be using Critical Thinking language. Examples are, 'rejecting a thought', 'went to a conclusion', 'examining it'. This entry infers that she easily doesn't accept or reject statements but examines it herself.

### **Confidence in Reasoning**

The profile is mentioning about presentations she is doing in her electives. She is mentioning in the case that, "I covered 5 economic problems which affects economy. I collected the information which I found appropriate. There were many data's related to the topic but what I found relevant was kept on my slides though there was lot of information on the slide. The content is clear in my mind; it was relevant, precise and accurate".

### **Researcher's Observation:**

The profile is observed to be applying the trait in her electives presentation. It is also observed that she is using the fabric of Critical thinking language in the intellectual journal. Clarity of concept and its elaboration is observed

Profile J is able to understand the concept of traits of mind very well. The above three traits are very well related with the situations. The student teacher has explained in one of her personal situation that she tried not to give up the thought of not giving up and tried again and again to convince her mother of the differences that they had during the Diwali days.

The mentioning of the word thought and not giving up itself conveys the fact that she is thinking about her thinking process. Mind is getting tired but she is not giving up her thought. To think about the thought and reflect upon it gives an idea how the student teacher is learning to reflect and be consistent in her thought process.

## **Barrier to Critical Thinking**

### **Egocentrism**

The student teacher has mentioned how the assignment of creating webpage was not been completed because she could not confront the doubts with the teacher. She has further added that, “I did not clear my doubt because of my egocentric thinking that I will not let my impression down in front of everyone by asking questions. I cleared the doubts with my friend and showed to sir that I am the one who worked hard for understanding this. Then I thought that this egocentric thinking of mine did not make me realize at that instance that I did not alone understand the programs”.

### **Researcher’s Observation:**

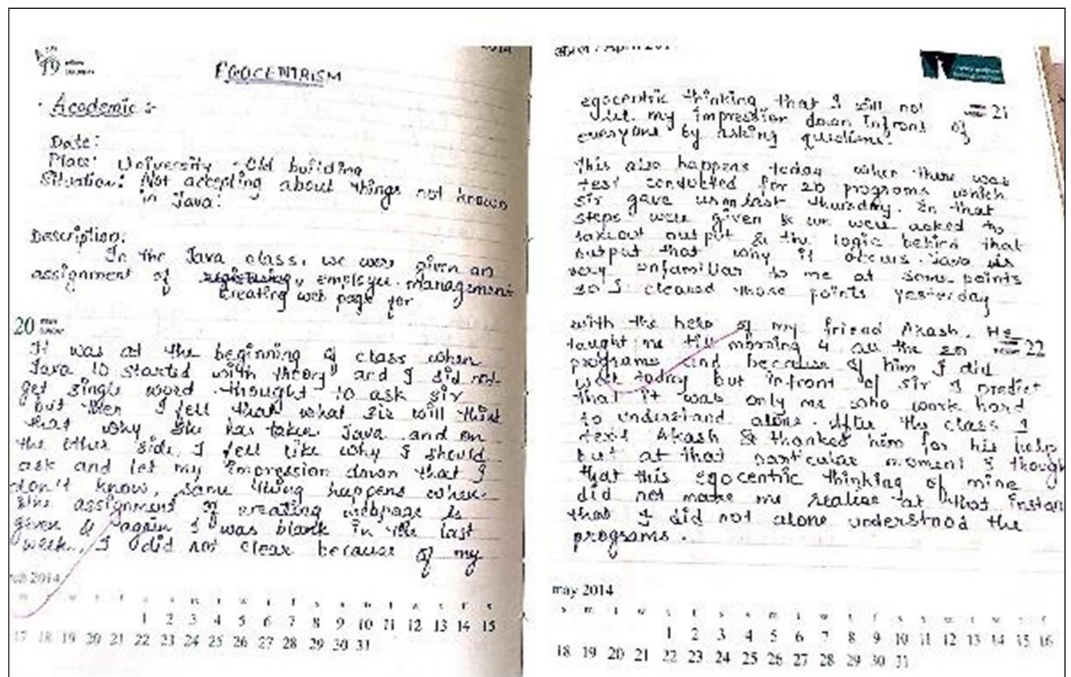
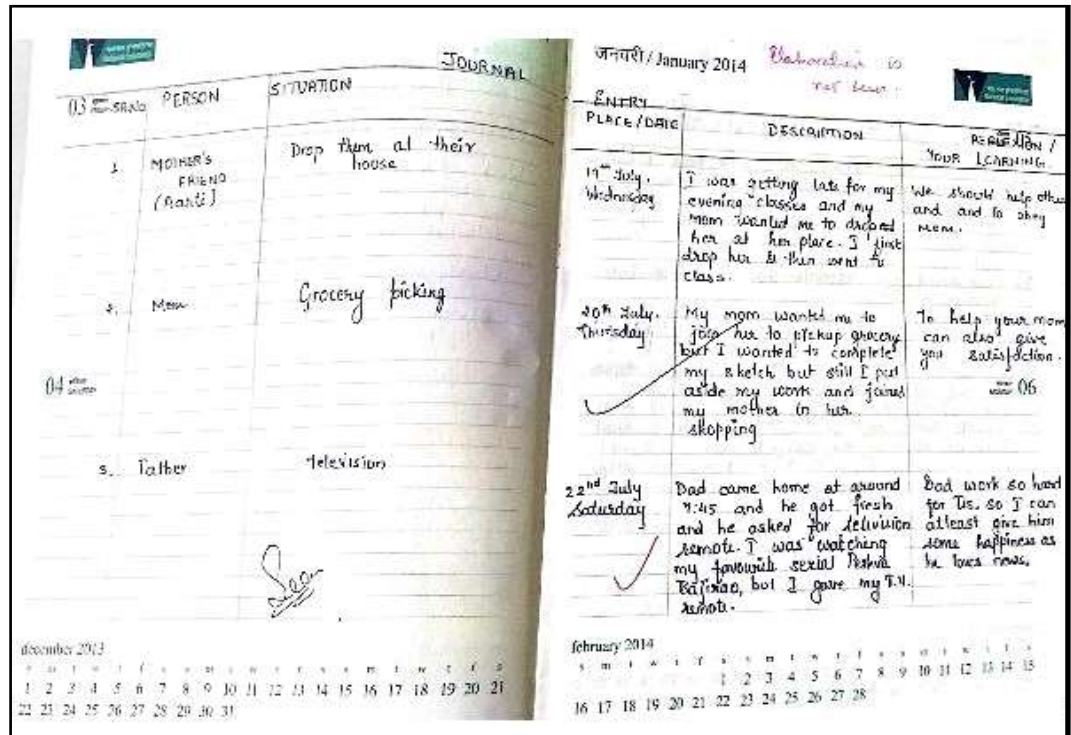
The aspect of reflecting on egocentrism is very properly placed. The statement in the above paragraph that says that, “I thought that this egocentric thinking” .shows her reflection on her self -validating or protecting ego.(TH-10.1) But again the part of reasoning is missing

### **Socio-centrism**

She could identify socio-centrism in the university itself. She has written that she had just come back from Jaipur. “Madam asked to revise the content of Socio-centric thinking which I had missed because I was out for those days, then also I could not ask questions because I thought my friends had understood it so no point in asking I will just take down the notes”.

Below picture shows a comparative idea of Journal 1 and Journal 7 on Elaboration of Profile I

Figure 45 Comparative picture of elaboration on the Journal entries of Profile I



**Researcher's Observation**

She hasn't understood the concept of Socio-centric thinking very well but then she has tried to reflect upon group behavior and how we conform to it. She has also reflected that how this habit of not asking questions can make the content unclear (Th-

5.1). But the aspect of reasoning is missing. I think if I would have given the feedback on the entry that the reasoning part is missing, the thought could have had deeper implications

**Stage of Development:**

Challenged thinker Stage. She is aware about her actions. She also has lot of questions. She has started to think about her actions based on standards. She can reflect on conversations with friends. She is ready to enter the third stage. Since this is not a continuous phase she is in second stage.

**Significant Barriers to Critical Thinking:**

- Emotional person
- Over thinker with whom she is attached.

**Consolidation of the case:**

In the initial stages of Intellectual Journal writing she has understood Critical Thinking in a narrow form of critical thinking as in helping, obeying, caring and being patient. It is seen that the entries are written from submission point of view. Slowly she is seen to pause down in terms of situation and then thinking about it before reacting. (TH-16.1) She is also seen to be organizing her thought process based on standards of thinking taken up in the classes. Lack of reasoning in writing entries is somewhere observed. Keenly she is seen to practice intellectual traits in the classroom situations like intellectual humility, egocentrism, intellectual perseverance etc. elaboration is also seen from second/third week of posting the entries. Clarity is observed in taking integration class because of logic.(TH-3.3) Aspect of depth is noticed in the third week which was not evident in the initial weeks

Before the intervention she was a person who did not analyze the situation very well. She was also very short tempered. She used to react very soon to situations without much thinking. She was also very narrow about others point of view and could accept things easily because of lack of intellectual courage. She was also struggling in written communication. Post intervention she has started to use standards in writing answers. Also while talking and getting information she is seen to

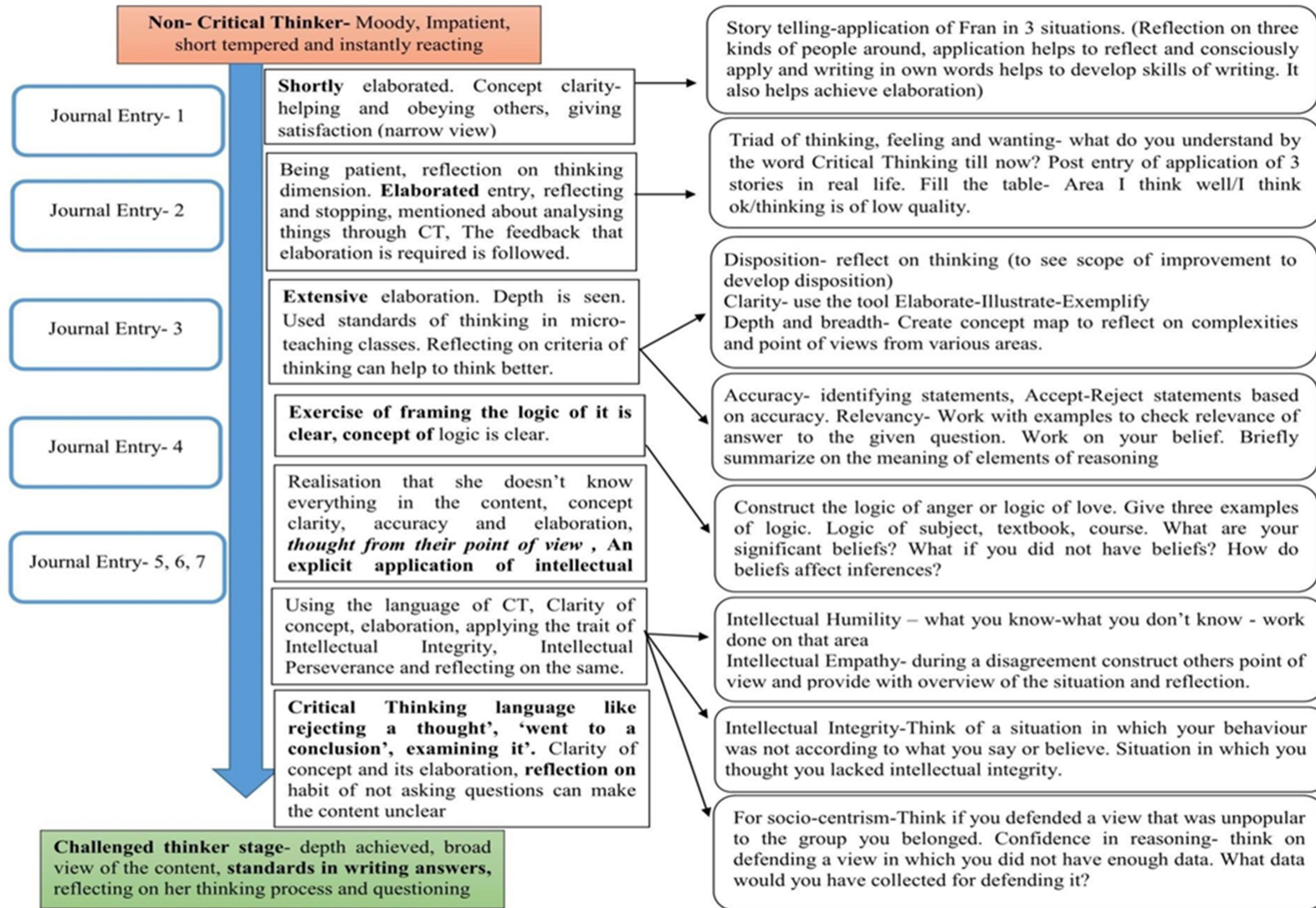
use standards. She was able to reason well and handle situations in a better way. She was able to continuously reflect on her thinking process. She is not able to write things in a logical way. She questions the information given. She has also started to take initiative to take Critical Thinking in her own classes by way of incorporating standards of thinking and elements of reasoning in the classes like “ what is the purpose of studying business?, why to study it?, how this will help?. Before beginning with new chapter she asks the students to elaborate upon the answers written to bring more clarity into it

### **Broad themes emerging from the case**

- Helped in understanding needs of father
- Helped in dealing with assembly group members
- To know how she thinks
- Integration classes
- Dealing with anger
- Realization of superficial content
- Reflecting on incidents
- Understanding group thinking and how it works on her

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 46 Consolidation of Profile I



## 10. Profile –J

### Brief description of the Case:

Profile J is 27 years of age, fair and 5'6 feet tall. She is of 52 kgs with spectacles on her face. She has completed her Bachelor's in English Literature. She has English and S.S as her methods. She has shown major improvement in the scores and is seen to be asking many questions for clarity in situations, journal writing etc. She has displayed intellectual humility and integrity numerous numbers of times. She has explicitly taken that up as part of journal work for her students in her school.

Furthermore, she also conducted action research on explicitly taking up critical thinking in her teaching Poem in English subject

*Table 45 Scores on Situation Test of Profile – J*

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6.5	10	0	0	6	4	5.5	10	6	10	5.5	10

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	10	6	10	5	10	5	10	5	10	5	3.5	6	3.5

- Pre-Test Total = 66.5
- Post-Test Total = 101
- Difference in pre-post- test scores = 34.5
- Highest Improvement –Q.7 (Empathy), Q.9 (Perseverance), Q.10 (Perseverance), Q.11(Socio-centrism)

### Journal Entry-1

#### Work Out with the Character of Fair-minded Fran

Here it is noticed that the profile has posted a backdated entry. This entry deals with the admissions of her post-graduation. She writes that, "I could have become a selfish Sam like other students but chose to become Fran".



### **Researcher's Observation:**

The purpose of writing entries is missed. It is observed that she has understood Fran as being honest. The use of the concept is the intellectual journal is observed. In the first entry she couldn't understand that it was to be applied in real life. She wrote an entry that was backdated.

### **Journal Entry 2**

#### **Triad of Thinking, Feeling and Wanting**

She has written that how the triad helped her out in changing the way she was not being confident about herself. (TH-2.4) She has further written that, "I have to change my thinking and pushed myself on stage to get self-confidence". She could also see that the triad working out for herself in the form of getting positive comments in the assembly. She further has mentioned on this that, "we just have to work on our thinking; the rest will be done automatically. I have a long way to go in this direction". That shows that the thinking dimension of not being confident was corrected by her to push herself to the stage.

She has also mentioned in one of her entry with her brother that how she tried to act like Fran and not stretch things that are not needed. She has written, "I tried to act like Fran, just tried to think from his perspective rather than being judgmental and seeing things from surface level". This time I thought in depth".

### **Researcher's Observation:**

Explicit usage of Triad of Thinking, Feeling and Wanting. The mentioning of the words like 'depth' and 'from his perspective' in the initial stages reflects that she was also grasping the points that were just mentioned in the class.

### **Journal Entry 3**

#### **Standards of thinking and elements of reasoning**

She has mentioned in the entry about her integration classes that lasts for about 10 minutes. Her class finished in just 6 minutes. She has added that, "I finished

the class in just 6 minutes instead of 10 minutes as I did not go to the depth of the content nor I was able to make a logic of my whole class, instead it was scattered ideas in the class. I should be able to integrate all things logically so that there should be one link in which children should be able to flow with me”

**Researcher’s Observation:**

Explicit usage of standards of thinking for integration classes is observed (TH-3.4). She has begun to mention words like depth and how she collected the information from all the sides and logic in clarity, accuracy, precision, depth and breadth. The ‘good’ remark for the class indicates that standards of thinking work.

Concept clarity and elaboration is in depth.

**Journal Entry 4**

**Parts of reasoning**

The profile has incorporated elements of reasoning for planning an assembly. She has also mentioned about how her assumption with reference to that her friends will work hard on the presentation of the assembly proved wrong. She has revealed this understanding at the end of the entry that, “I have the habit of helping people, & many a times people start taking advantage of it”. (TH-31)

**Researcher’s Observation:**

The profile is using the elements of reasoning for planning an assembly. (TH-6.2). In this logic she assumed that the other student teachers will work hard for it and it proved wrong. The implications were that she ended up working hard for it and no one supported her.

## **Journal Entry 5**

### **Fair-mindedness**

#### **Intellectual Empathy**

It was a small act where I found myself to be intellectually empathetic, when I tried to reflect to some of the situations in these days, as mentioned by her while trying to understand her mother. She has also written that, “I may end up using it majority of times in my life when I have started to use it”. She has also written the word “intellectual” to reflect upon rather than just being empathetic. She also written one situation that mentions about a student teacher was not taking initiative so she has written that, “i tried to engage her in one task and i also told one of the student teacher to help her because i tried to see the thing from her view point and told the other student teacher to be around if she needs help”.

#### **Researcher’s Observation:**

She has used the word ‘intellectual’ for reflecting back on the situations happening around. She has explicitly applied the trait on one of the student teacher.

#### **Intellectual Courage**

She has mentioned of using this trait when it was essentially required to understand others point of view (TH-1.6) and for a topic which was much disliked by her. She has written that she has, “different viewpoints, opinions, and positions from the group because she is matured as she has faced incidents in her life. But she has to change assertively with them so that they can be together and she can influence others. She is also reflecting that she may require intellectual courage to face them.

#### **Researcher’s Observation**

The profile is trying to use intellectual courage to face others and then influence them positively.

### **Intellectual Humility:**

She has also written about the unknown/hidden areas that we are not sure off of others. We have to see situation from both the sides and understand what the other person is going through so that we are able to clearly recognize the complexities behind it. One very good reflection in her Intellectual Journal was, “I came to know that we shouldn’t take things for granted, it somewhere shows overconfidence towards that thing. Instead we should try to understand the thing in depth and then we should decide (TH-5.2), otherwise our ignorance can lead us to some problems in our life too. This incidence showed me the unknown part of my identity-which I try to say myself that I know this thing though I may not know it in that detail that I should know”.

### **Researcher’s Observation:**

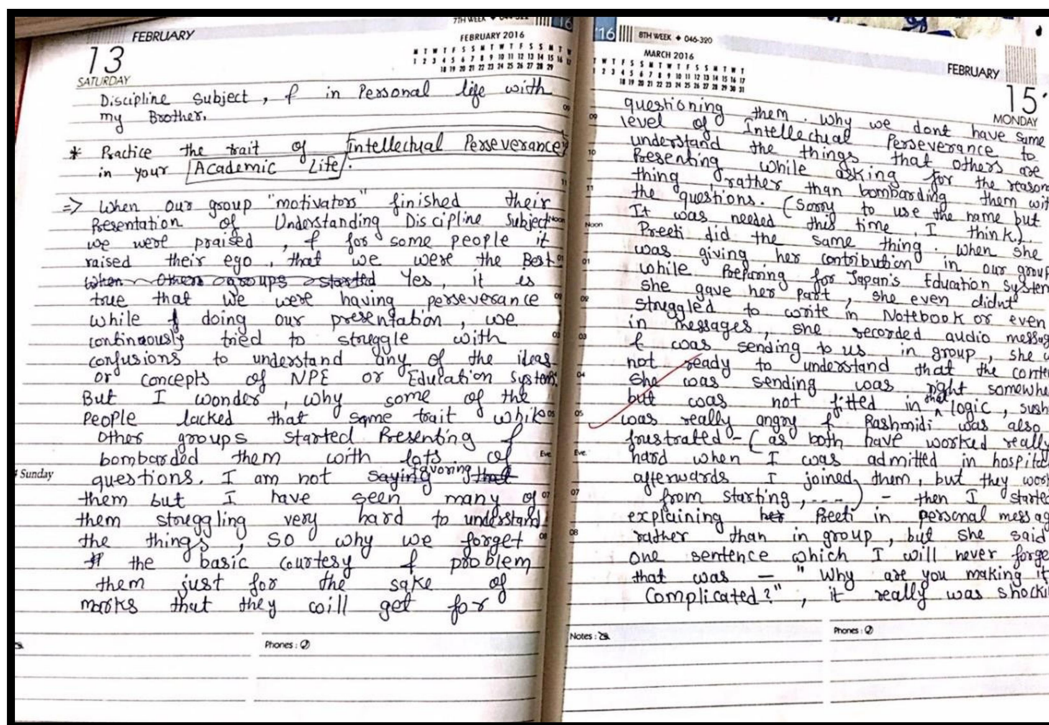
The profile is using intellectual humility to unknown part of hers. She is reflecting that we boast on this unknown part saying it is known

### **Intellectual Perseverance**

She has come out with a different understanding of the trait. That shows her involvement into it. I can find the detailed elaboration to it that talks about how she is so into writing the entry. She has written that, “Why can’t we question ourselves and persevere to answer the questions. Persevere into explaining others what they don’t know is one way of looking at perseverance, she has added.

Below Figure shows an entry on Intellectual Autonomy in the Intellectual Journal of J

Figure 47 Posting of Journal Entry 5 in the Intellectual Journal of Profile J



### Researcher's Observation:

Right from loose entries that don't talk about thinking pattern she is trying to reflect upon her thinking process and explicitly using words like thinking. That major shift is seen. From very short and precise entries I can see a thinker who's eager to reflect on her thinking as seen in the entries. Each entry from journal entry is written in depth. She is seen to be continuously questioning about the functioning of things. (TH-4.1)

### Confidence in Reason

She has written how she used lot of information from the sources to go ahead with a Jet Ski ride. She has also written that, "She will personally go and clarify things with one of the faculty for not providing information on time for attendance purpose and not by assuming things".

**Researcher's Observation:**

She is asking for providing her with information only then she can agree with things.

**Intellectual integrity**

She is writing in the context of her university friend who has changed her behaviour. She has written that, "I would never trouble others by not saying anything and changing my behaviour with them. This is integrity that we all require in our life to have good relations". (TH-8.1)

**Researcher's Observation:**

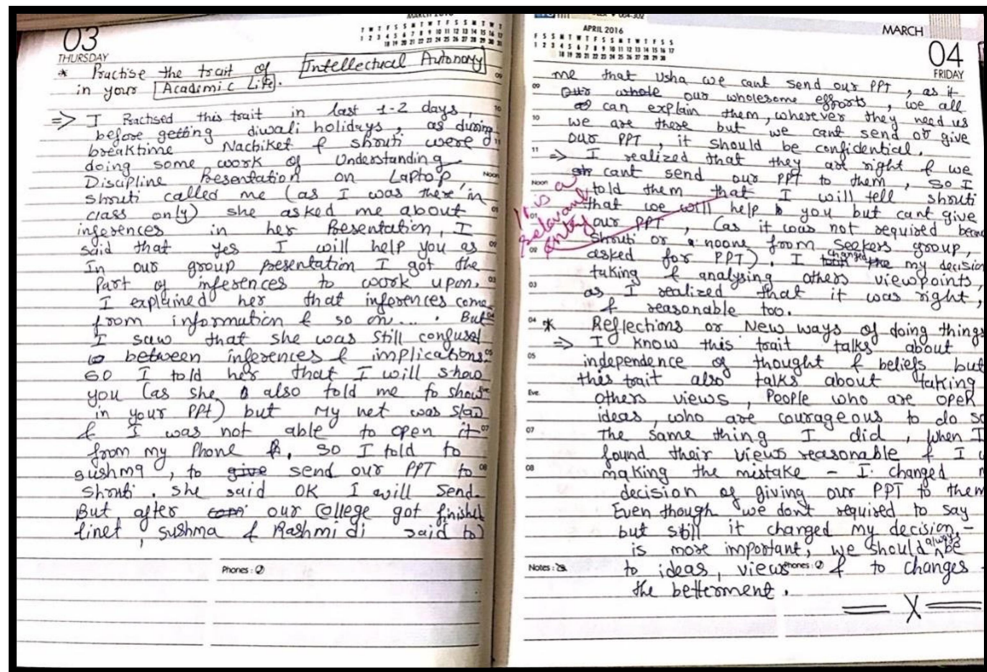
She is using intellectual integrity to have better relationships. She is reflecting on the usage of the trait. Using concepts and ideas like, "I wanted to hold her to the same standards of evidence and proof that i was applying".

**Intellectual Autonomy**

She has written that, "I used my thinking rather than accepting others viewpoints without critically examining it". Th-12

Below Figure shows an entry on Intellectual Autonomy in the Intellectual Journal of K

Figure 48 Posting of Journal Entry 6 in the Intellectual Journal of Profile J



### Intellectual Autonomy 1

#### Researcher's Observation:

She has also mentioned about not giving her presentation to other group. Explicit usage of CT is observed. Concepts like critically examining and always open to ideas are used in the entry.

#### Egocentric thinking

How academically she became egocentric is evident from a very small instance. She has also written how she can't change others but can change herself. She has written that "I was not able to see the person in need in front of me, yes I became egocentric somewhere to do my mock interview in a perfect way by saying that I had already informed her and now I can't help you if you haven't done things properly".

**Researcher's Observation:**

It is observed that the profile is strongly reflecting on her thinking process. Even on small things like why she is not able to follow the right path of thinking. Socio-centric thinking

She has mentioned how she's started to reflect on things. She has mentioned that, "I am not planning to follow the patterns or practices set by society, as I am not planning to get married". "I may be alone many times but I can't conform to the wrong things set up by the society or any particular group".

**Researcher's Observation:**

She is not ready to follow practices of the society that are not right with the understanding of socio-centrism.

Stage of development: beginning thinkers stage

Barriers: Peoples ignorance towards their duty, Emotional nature, perfectionist

**Self-Evaluation: An account of students thinking**

Critical thinking subject started with a pre-test, which was very big one, many things were there in the test, which seemed to catch my attention because it was not something of our regular syllabus but something different. Then the process part of CT classes and it ended with post- test. But this process part was very interesting one, because when I reflect on those months, I can see myself changing by continuously working on myself and to be precise-my thinking, that's where the CT comes into play.

When I came for B.Ed. in Navrachana University, I was completely lost because of 2-3 failures. (Could not get job for which I was working hard) and that too because I did not compromise on my principles and values ( by not paying bribe in the interview). So somewhere I always knew what should be done and not but many a times after doing that, I felt whether it was right or wrong. That's where it started playing its role by giving me the rationale behind things, I was doing. That logic of



CT for my thinking, made me confident for what I was doing. Though because of meditation I always had a habit of reflecting on my thinking process but CT helped to organize my thoughts and also the best thing that CT did was it helped me to see where my mind is trapping me to wrong things or rather say fooling me, so that I can catch it, stop it and change it. Because it is very subtle, the way our mind deceives us by showing the wrong things in right way to satisfy our egocentric tendencies. I felt that my students were arrogant to me, when asked to my senior teachers of the school, they said “scold them like anything” and I did that for 2 days but somewhere I was feeling very bad from inside, the voice that was telling me that I did not come in teaching profession for these things and when I talked to my mentor (researcher) she just said one thing to me that don't be very strict, Usha, just reflect on your thoughts and see that it is not for satisfying of your egocentric tendencies, that war in my mind ended with this talk and so, I realized that it was my ego that stopped for my rational thinking by showing me the right direction.

Critical thinking has helped me a lot in changing my personality from an emotional girl who used to take decisions on basis of her emotions sometimes or otherwise feeling bad or guilty on my decisions but CT gave me a logic for the decisions taken even if consequences are not favourable.( which happens very frequently these days). CT made me very confident person because I know what I am doing is right now. Instead of thinking about other people's views I can think about reflecting on my thinking process and change it as and when required because CT helps us to change our focus from mistakes of others to improvements needed in our thinking.

The best thing CT did is that it distanced me from many people to whom I did not conform or those circles in which I did not fit because consciously I rejected to be a socio-centric person. But on the other hand CT also gave beautiful relations with those my thinking matched or those who can listen and change for betterment.

CT helps me in fact now in my field, as I am able to share my personal life experiences with my students, as how I apply the traits in my life and what are its pros and cons, and what are its results too. I am still not able to give theory of CT to my students but yes I do carry forward it from my mentor to my students, as I wrap it in

their moral of poems and stories which has developed a very nice bond with my students too because they can connect to me in a better way now.

### **Consolidation of the case:**

Before she did not have rational behind doing things. After the intervention she has become confident for what she is doing. Before the intervention the thoughts were unorganized. She used to use wrong methods in controlling the class like scolding and insulting. Before she was an emotional girl who used to take decisions based on her emotions.(TH-11)

After the intervention the thoughts became organized and had a structure.(TH-21) She is also seen to be carefully reflecting on logic behind doing things. She is also able to see where the mind is fooling for wrong things. She is also able to reflect on her egocentrism that stops rational thinking. She uses her own understanding now to understand students. She is able to develop bond with the students. She has started to use logic to make rational decisions rather than based on emotions. She is able to focus on mistakes of others to improvements needed in her thinking.

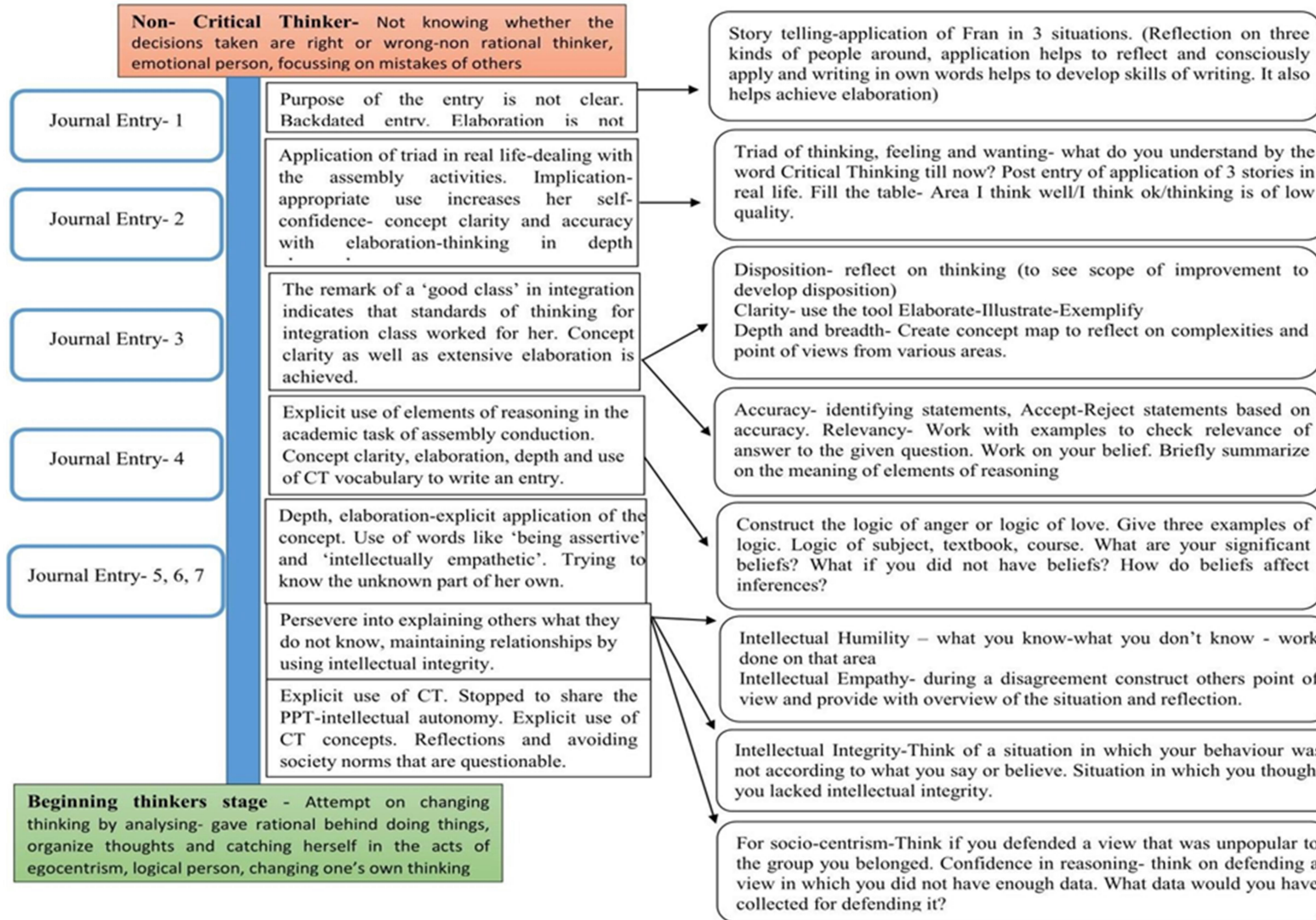
### **Broad themes emerging from the profile**

- Working on thinking
- Stage fear
- With integration classes in depth, also helped to get 'good' remark from mentor
- Helped in planning an assembly
- Did not allow somebody to take advantage of her
- Group members
- Helped in knowing her unknown part
- Helped in persevering to answer the questions
- Reflecting on use of CT for maintaining relationships
- Helped in questioning authority
- Helped in catching herself in act of egocentrism
- Logic helped in taking rational decisions rather than emotional decisions

- Organization of thoughts

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

Figure 49 Consolidation of Profile J



## 11. Profile – K

### Brief description of the case

This profile is around 37 years old and height is around 147 cm. She weighs around 47 kg. She is short in height and has curly hair. She is brought in Indian orthodox Brahmin family. She is mother of two children and settled in Vadodara for last 12 years. Her methods are Science and Mathematics. She is quite dedicated to her work and works for smaller details of everything.

Table 46 Scores on Situation Test of Profile – K

Q.1		Q.2		Q.3		Q.4		Q.5		Q.6	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
5	10	5	8.5	5.5	10	4	8	5	2.5	5	10

Q.7		Q.8		Q.9		Q.10		Q.11		Q.12		Q.13	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
4.5	10	7	6	4	9	4.5	6	3	10	5	6	7	8

- Pre-Test Total = 64.5
- Post-Test Total = 100
- Difference in pre-post- test scores = 35.5
- Highest Improvement – Q.11 ( Socio-centrism)

### Journal Entry 1

#### Work Out with the Character of Fair-minded Fran

To work out with this character the student teacher helped one lady who was looking for auto in the rainy days. This lady had a duty (going to work) to do and nobody was helping her out. Autos did stop but were demanding more money. She has written that, “I could have proceeded without helping her (which we usually do), but my mind directed me not to do so” (TH-9.2).

### **Researcher's Observation:**

Working out with the character required her to think about someone who needs help and she could help her out which would usually not have been done in regular course. As this is the first entry elaboration is required. Further the character of Fran is confused with kindness other than considering the rights and needs of others. She has used the words like 'but my mind directed me not to do so'. This is showing conscious application of the character of Fair-minded Fran. The concepts like directed me to do so provides an understanding of using the concepts of CT in intellectual journal

### **Journal Entry 2**

#### **Triad of Thinking, Feeling and Wanting**

She has mentioned about quitting the B.Ed. program as her son was terribly getting affected. The son is in the playschool and she had received a call that that child is terribly crying. She has written that, "yes that's true at that point, "the quitting instinct came to my mind very strongly". I felt terrible and I cursed myself for my son's situation. But then I paused, analyzed the situation. This was bound to happen when I suddenly step out of my children's routine. They are sure to miss me. I directed my thoughts on the positive side and reflected back on few situations and reassured myself that things will settle down after few days." She is seen to be taking lot of help so that she doesn't quit. She has reflected on the triad of thinking, feeling and wanting. She has mentioned, "We should align to the dimension of thinking, feeling and wanting and align them properly and fairly before taking any decisions".

Below Figure shows an entry on Thinking, Feeling and Wanting in the Intellectual Journal of profile K

Figure 50 Posting of Journal Entry 2 in the Intellectual Journal of Profile K

Expt. No. / Name :		Page No. _____
		Date _____
	Learning to balance various feelings <del>as</del> of motherhood as well as the challenges of <del>the</del> the course.	
	Hence, this way, I suppressed the "quitting instinct" and re-assured myself to handle the situation in a balanced way with no extreme decisions.	
	<u>Thinking</u>	
	<u>Critical Dimension You Understand :-</u>	
	(a) <u>Thinking</u> — Our mind compels us to think negatively sometimes. We should refrain from such <del>any</del> instant negative thoughts. Rather we should analyse the situation from different angles.	
* In this incident, the 'Feeling' dimension dominates over thinking & wanting.	(b) <u>Feeling</u> — When posed with life's challenges, it is an obvious characteristic of human beings to feel worried, stressed and terrible. We should learn to handle our feelings properly. (Of course feelings are very important and cannot be removed totally from our thoughts. But we should try to balance our feelings as far as possible)	
	(c) <u>Wanting</u> — We should be clear about what we want <del>to</del> to achieve in life. And try to balance thought and feelings accordingly.	
	(4) <u>Reflections / Learning :-</u>	
	Out of the incident, I have learnt that challenges are a part of our lives and we should <del>structure</del> <del>our</del> our thinking-feeling-wanting and align them properly and fairly before taking any extreme decisions. If this is done, we can surely reach our goals.	
	Teacher's Signature _____	

She has mentioned about quitting the B.Ed. program as her son was terribly getting affected. The son is in the playschool and she had received a call that that child is terribly crying. She has written that, "yes that's true at that point, "the quitting instinct came to my mind very strongly". I felt terrible and I cursed myself for my son's situation. But then I paused, analyzed the situation. This was bound to happen when I suddenly step out of my children's routine. They are sure to miss me. I directed my thoughts on the positive side and reflected back on few situations and reassured myself that things will settle down after few days

### **Researcher's Observation**

The explicit usage of words again that is 'I directed my thoughts' gives an idea that the conscious application of Critical Thinking is happening. She is using the Triad of Thinking, Feeling and wanting to not quit the program. She is also avoiding quitting by pausing and reflecting on it. Usage of concepts like 'pausing and analyzing 'and directed my thoughts to do so'' shows reflection on thoughts. Processing of thoughts through the triad. She is observed to be taking lot of help so that she doesn't quit.(TH-13.1) She has reflected on the triad of thinking, feeling and wanting. She has mentioned, "We should align to the dimension of thinking, feeling and wanting and align them properly and fairly before taking any decisions".

### **Journal Entry-3**

#### **Logic/Elements of reasoning**

She has written about how she became angry when the maid took leave for the weekend. She reasoned with the logic of getting angry on her. She has mentioned that, "we should not act without thinking and reasoning. We should not get directly angry on the other person. We should question ourselves whether we are justified in doing so? Whether we are basing our anger based on some information? We should also try to analyze the consequences of our action, we will be able to handle the situation differently. I am really happy that I questioned myself and handled the situation differently. Or else I would have to face an unbearable consequence".

#### **Researcher's Observation:**

She has used the logic as well as applied it. Also the application of the logic has given positive consequences. She is also mentioning about questioning herself because of which the situation could be handled

#### **Researcher's Observation:**

She is seen to be reasoning and reasoning based on information. She is also consciously analyzing her consequences which is implications. She tried to handle situation by thinking and reasoning.



**Journal Entry-4****Logic of Fear, Anger and Subject**

She has reasoned through the logic of fear. She has written, “I have understood how to relate and defend the concepts of my subject. She has also written how angry she was when son didn’t score well in exams”. She has framed logic of anger. In academic entry she has written about her presentation of English subject.

She questioned her in terms of why is she avoiding the situation? This question made her attempt the presentation and finish the task.

**Researcher’s Observation:**

She has framed logic of anger for being angry on her son for not getting good grades. That aspect of framing logic of anger was taken explicitly in the class and that is observed to be used by student to think rationally and reason with the student teachers who avoid it without reason. (TH-2.5)

Below Figure shows an entry on Logic of Anger in the Intellectual Journal of profile L

Figure 51 Posting of Journal Entry 4 in the Intellectual Journal of Profile K

Expt. No. / Name :	Page No. _____ Date _____
	about other's situation. They don't even bother to keep up their commitment. They just want to postpone things without any solid reason.
	Purpose of my anger → Non-committal, irresponsible, indifferent non-bothering attitude.
	Questions → How can someone be so indifferent? (in spite of me preparing the whole matter for <del>that</del> that person) How can one be so non-bothering when they have group commitments?
	Information, Data → Group presentation to be made. Matter was ready. PPT ready. Everything ready. I had come mainly for presentation.
	Inference → I inferred from this situation that how much ever you help a person, <del>but</del> <sup>unless</sup> they have <u>intrinsic</u> motivation, nothing can be changed.
	Concepts & Ideas → The concept that is associated with this incident is that we are supposed to keep up our commitments. We cannot just run <del>away</del> away carelessly from our assigned task.
	Assumption → I <sup>had</sup> assumed that every one <del>can</del> will keep up their commitment. I assumed that every one will be responsible enough.
	Implication → In this situation I got irritated and curtly to the person that she is not fair in trying to postpone things unnecessarily. She can be careless & non-bothering towards individual assignments, but not in the group tasks. Moreover I questioned why she <del>and tried</del> <sup>(if at all)</sup> is trying to avoid the situation in the last minute.
	Consequence → We went ahead & gave our presentation. She just read out her part (to which she was not even bothered that she lose marks). We were supposed to present it. But she just read it out. But was surprising is after the presentation, she came to me and said "we finished it today". She was not bothered <del>at all</del> <sup>that</sup> she <del>may have</del> read it out just plainly instead of presenting. She was anyway happy that

### Journal entry-5

**Traits of mind-Intellectual humility, Intellectual courage, Intellectual empathy Traits to be mentioned explicitly**

#### Intellectual Humility

She has mentioned about the presentation done in the classes that, "all the traits are interlinked and are like pieces of a puzzle. She has further written that each and every presentation is helping me towards becoming more and more nearer to the trait 'intellectual humility'. Every academic presentation is supported by feedback provided during and after the presentation.

### **Researcher's Observation:**

An idea that all traits fit into a puzzle and they work together is significant. Realization after the presentation that there is lack of information on the subject is also significant.,

This shows that she is trying to know what she does not know especially in the academic presentations of her method

### **Intellectual Courage**

She has mentioned that she is fearful of Math subject and quotes an incident when she went out to discuss with her friend about the topics that she would take for integration. The friend rudely answered to the question saying that, “you don't worry about that aspect. Our topic would never coincide because I am at higher level and will choose only higher math concepts unlike you”. “I faced this with a lot of courage and though initially I was angry, later I realized that I shouldn't think much about such things. Though it was painful for me I faced it fairly from my part”. (Separate courage from observation) and faced that part by doing lot of research on the work  
Researcher's Observation

The student teacher is fairly facing ideas and beliefs of other student teacher and working on the parts that can be improved. She is taking every opportunity to understand what lacks in her and improves in it

### **Journal Entry -6**

#### **Intellectual Perseverance**

She has written about math subject wherein she has written how difficult it was to come out of it as it had been long time. She has written that, “I locked myself in a room. One Sunday, read the chapters, googled a bit and solved 30 problems (by trying to understand it through logic). I totally dedicated myself to the subject, I really enjoyed it then. If we pursue something with great perseverance it will not disappoint us. It will be of benefit to us only”.(TH-15.1)

### **Researcher's Observation:**

The above example clearly shows how the student teachers pursued something in spite of intellectual difficulties in the task which amounts to intellectual perseverance

### **Confidence in Reason**

She has written that few of the group members brainstormed a lot while preparing for the presentation. "We made points, discussed, debated on the points and tried to make presentation as presentable as possible to the best of our knowledge. We realized that helping each other and doing a lot of research on the subject definitely increases our confidence and we can reason with others confidently if we have done enough research and presentation for the same".

### **Intellectual Integrity**

She is mentioning about helping the weaker students here in the class and the intelligent students are asked to help them achieve a basic standard. She is writing that, "the intelligently active students should help the inactive students by will and not by force". She has written about how she told truth to the elderly person who was enjoying making comments on the family of hers. She has written that she spoke ill about her family. She went and confided in her by saying that, 'she should mind her words and questioned her if her children are looking after her well.

### **Researcher's Observation:**

She is observed to mention this with truth in the intellectual journal. She has applied the trait in the intellectual journal

### **Intellectual Autonomy**

She has also mentioned about how people do make comments on the presentations made but then she modifies only when the ideas are desirable and they are their own

### **Researcher's Observation**

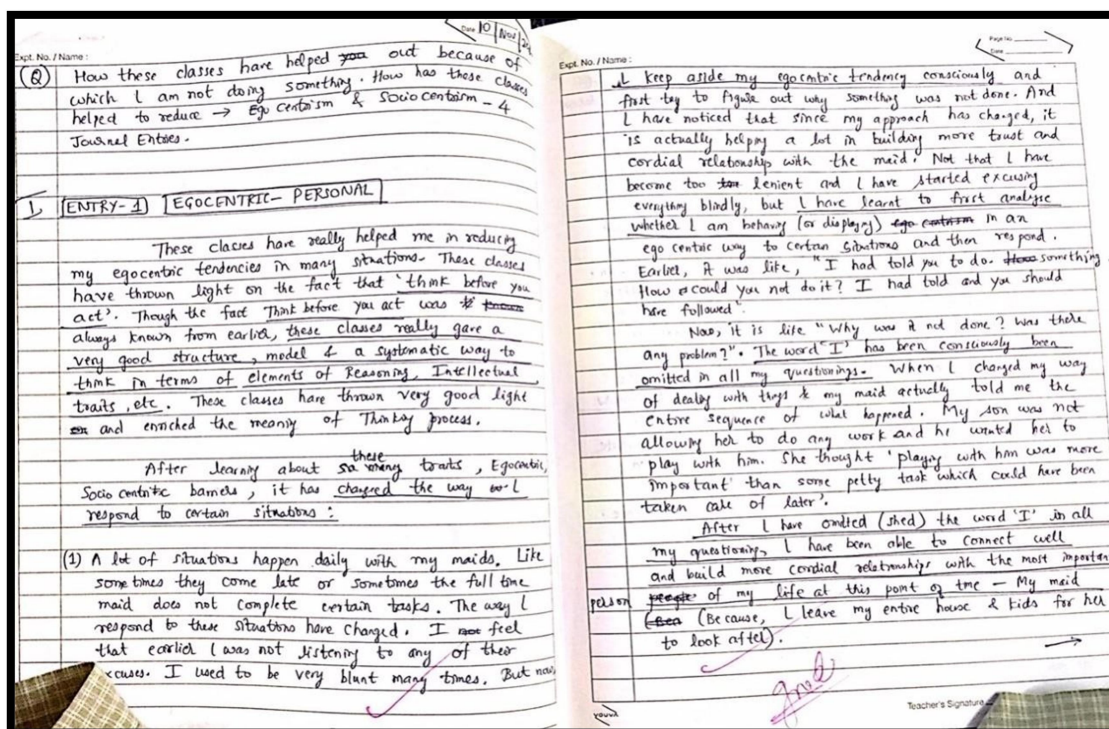
Elaboration is extensively observed. Clarity of concepts is observed. They are accurate and precise. This clearly indicates her independent thinking in terms of talking about things that are based on information that is accurate. (TH-12.1) Changing information in the presentation only when she is convinced for the same

### **Egocentric thinking**

She has written that, "These classes have really helped me in reducing my egocentric tendencies in many situations. I keep aside my egocentric tendencies consciously and first try to figure out why something was not done. It's helping me to build more cordial relationship with others. (TH-8.2) I have omitted the word "I" in all my questioning". I have also started to question whether is it out of my helpful nature that I complete others part in my assignments or I want to finish things as early as possible without delays. Such reflections are helping me to reflect on my egocentric tendencies.

Below Figure shows an entry on Logic of Anger in the Intellectual Journal of profile L

Figure 52 Posting of Journal Entry 7 in the Intellectual Journal of Profile K



### Socio-centric thinking

Somewhere I was becoming part of Socio-centric thinking by saying yes and conform to group decisions. But after the classes I realize that it was my Socio-centric thinking that was making me accept mechanically the decisions of the group but now I distance away from it tactfully. Academically I have not yet reached a stage of bluntly telling no to things I am not convinced but Socio-centric tendency of me has reduced to the extent of tactfully distancing myself from the group (TH-4.2)

### Researcher's Observation:

She has reflected on egocentric tendencies in terms of helping others so that she can finish task on time not for the sake of helping. This means that she is doing it for herself. She is able to reflect on her thinking process. She is also distancing from the Socio-centric tendencies

### **Stages of development:**

#### **Between Second and Third stage-**

I am aware about my ignorance of knowledge I continuously question my assumptions I have started to question my implications of my thought process and I am able to reflect on my egocentric and Socio-centric tendencies. I have started to reduce my cribbing I immediately question myself and then I immediately withdraw my cribbing. I have started to consciously think about my thinking process. I scan my mind as well others mind

Barrier to thinking- Socio-centric tendencies, authority of other person, play-safe attitude, time constraint, being emotional, ego-centric tendencies, people who are committed to put you own

#### **Self-Evaluation**

Critical thinking course has greatly impacted the entire thinking and action process in me and the entire class.

Provided structure and standard to assess ideas, thinking and actions, helped to deal with various points of views

It has provided us a structure and standard to compare our daily actions. (TH-21.1)It has been effective in impacting the way we think and act. Example: before this course, we all were thinking and acting in our own ways. Sometimes good and sometimes bad i.e.; random thoughts and actions. But after having studied critical thinking for almost one year, those random thoughts and actions have been converted into structured and reason thoughts and actions

I used to make many impulsive decisions earlier. But now, I reason through the things and take rational decisions and this has really brought me much peace! I have realized that when we think critically over the issues and take decisions rationally, so many daily problems can be avoided. And importantly it brings confidence in us because we are sure about the decision we have taken and it helps us to stand by our decisions. Whereas standing by decision is on one side, critical

thinking has also taught us to consider the others point of view. In this process, CT has helped us to view the issues in different angles and from various view points and such decisions are always the best decisions.

### **Able to identify rational as well as irrational decisions**

Critical thinking has really impacted the entire class many of us already can see a huge change in ourselves because of critical thinking. It is like a Ripple Effect. One such course has changed the thinking pattern of the entire class and is moving out to the society as well through us, the future teachers. We are now able to identify and differentiate between rational/ irrational decisions, made by us for others.

I specially have learnt to stand up for my decisions (though need to improve upon this) and have been able to constantly compare my thoughts if they are being influenced by group thinking. (TH-7.3)

One best part of critical thinking has done to our entire batch is that, it has completely transformed our thinking process. Though our decisions many times get influenced by group thinking, it has only been in the positive direction because, a big batch of logical/rational thinkers.

### **I use logic to reflect on issues in a logical way**

Earlier to this course, I never used to reflect on issues in a logical way. But after having studied and practiced critical thinking for last one year, one thing has really changed is that, I now reflect on every issue, incident and thought. (TH-20.1) That has really helped me to make necessary corrections to my thoughts and actions constantly. These reflections have almost become a part of daily routine. After this course, I have been able to identify many intellectual traits from people around me and also whenever I see the news over TV, I try to identify the various people who give their opinions with respect to their integrity, hypocrisy etc. ( me being a big fan of news channels)



### **Developed Intellectual Perseverance and Autonomy**

Another thing that has really made an impact is that after this course, I have developed perseverance and autonomy. I was a bit weak in autonomy of decisions but now I have learnt to analyze things and stand by my decisions (because I am now confident that the decisions I take all reasoned decisions). I also now analyze my thoughts and decisions whether it is really my own thoughts or if I am being influenced by the group or social group that I am associated with.

Having said all these, not all times I am able to stand up for decisions, but I am also not that person who never used to stand up for myself, critical thinking has really impacted on me.

- ( another important thing I would like to add is that, after studying critical thinking, I have also been reflecting on my past incidents, the decisions that I had taken as a HR- manager, whether my decisions were right or not, the instances where I should have stood by my decisions but I did not, etc.) (TH- 10.2)

### **Consolidation of the Case.**

Before the intervention she had her own ways of acting. These were good sometimes and sometimes bad. She had random thoughts and actions. She has given an example of socio-centrism and giving into it. She used to take impulsive decisions

After the intervention. Now it has been converted into structured and reasoned thoughts and actions. She is able to use logic and reasoning based on it. She is also able to view issues from different angles. She is also able to stand up for her decisions. She is able to differentiate between rational and irrational decisions. She is also able to reflect on the issues in a logical way. She is also able to identify many intellectual traits even while watching television debate shows

This profile is studied as the researcher could see an explicit improvement in this case. This case has also followed the aspect of critical thinking in the school that she has been placed in as well as a part of action research. Thus there was a strong source of information that suggested improvement in the case. The criteria was not

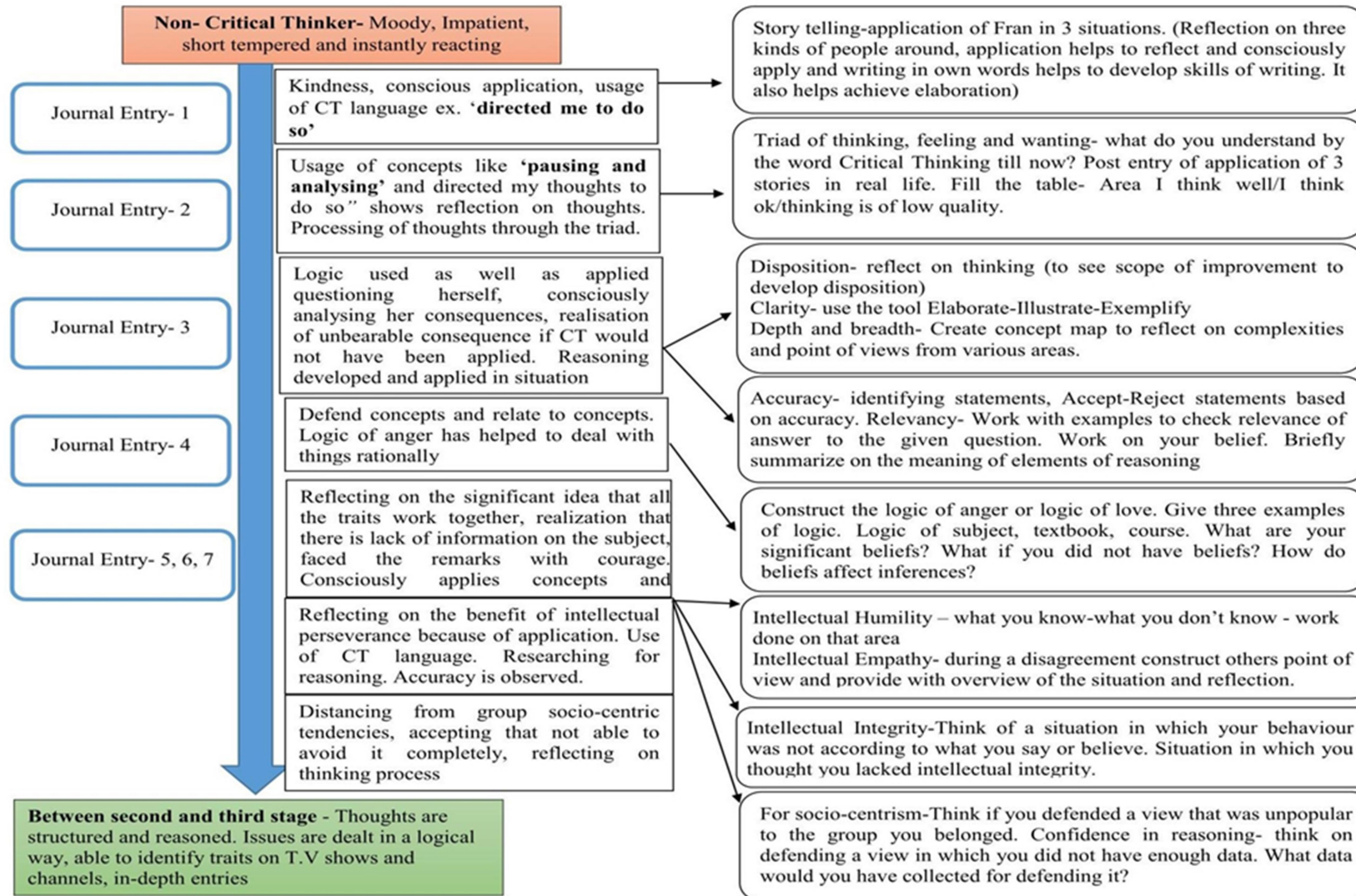
based on marks but based on observation of researcher in the field. The case was constant touch with the researcher to understand the concept and its application. The in-depth entries posted in the journal. The active listening of the case in the classroom setting etc. is also significant for considering it a case

Below figure gives a consolidation of the profile to understand the development of the student teacher over the period of eight Journal Entries along with the strategies taken up for the Critical Thinking

#### Broad themes emerging from the profile

- Direction of mind and helping someone, conscious application
- Helped not quitting, process thoughts through triad
- Helped in dealing with angers
- To question others with the help of logic specifically purpose
- Helped in presentation to deal with logically
- Helped in dealing with the remarks and understanding oneself
- Helped in dealing with the content in depth
- Dealt with the presentation in depth and reason with others
- Helped in questioning and telling truth
- Questioning oneself and understanding self.
- Understanding socio-centric tendencies of oneself
- To deal with points of view
- Able to identify rational and irrational decisions by questioning
- Usage of logic to reflect in a logical way

Figure 53 Consolidation of Profile K



## 5.7 Consolidated Themes

Following are the consolidated broad themes emerging from all the above profiles. The themes have been arranged in terms of most recurrent themes are cited first and then the later ones.

### **Integrated positive outcomes from Multiple Case Studies.**

1. Understanding other's point of view in various domains like personal domain, professional domain and subject domain is the most emerging theme from the Profile studies. This theme comes out in various forms from the profile studies. Profiles have been found to be quoting that, "I got angry when she kept on asking about the assignment again and again". "But then I tried to think from her side, when I did that I realized the difficulty she faced in understanding English". Another profile is found to be quoting, "While taking an Integration class I learnt to consider the point of view of the other people, should consider the opinion and reinforce them if they are right". One more profile is found to be quoting when she has to manage class assemblies that, "It helps me to understand the actions and situations from different perspectives. This can be attributed to the standard of point of view in standards of thinking and I have to consider students point of view". ( point in the intervention program-standards of thinking-breadth, elements of reasoning-point of view and intellectual traits of mind-intellectual empathy-

Strategy- understanding that you had a disagreement with someone chalk down your point of view and others point of view and seek consolidation for the same, making a concept map for the academic concepts and explicitly seeking breadth and point of view- two application entries- personal and academic for each)

2. Dealing with anger, fear and negative emotions by deeply understanding feelings for others, by using logic cycles and using the triad of thinking, feeling and wanting. In this case the profiles have found to be quoting, "I could more deeply understand my various feelings for others". I would like

to thus put myself through the logic cycles whenever I feel anger or fear”. “I can handle negative feelings if I am able to answer the questions of the logic cycle”. Another profile put forward that, “I have stage fear, but I have to come forward and tackle that situation, try to take better decisions and not panic’. One more profile communicates that, “I have to change my thinking and pushed myself on stage to get self-confidence by using Triad of Thinking, Feeling and Wanting”.( point in the intervention program Triad of thinking, feeling and wanting as well and elements of reasoning- strategy is frame logic of fear, anger, love and subject-strategy- frame the logic of subject).

3. Dealing with integration classes with the help of collecting in-depth information, asking questions and creating logic for the topic of presentation in the integration class. Here the profile has mentioned about integration class that, “I was accurate to the topic and precise. I collected too much information from Google and YouTube and articles and also correlated it with example of real condition that is relevant about the topic”. Another profile quotes, “I started to deal all situations based on standards. I analyzed based on standards. Am I clear in what I am dealing? Am I accurate and relevant? In earlier times I never went in depth, never used much information, I was not able to analyze because I did not know about critical thinking. I applied this in real life by taking integration classes. One more profile says that, “I finished the class in just 6 minutes instead of 10 minutes as I did not go to the depth of the content nor I was able to make a logic of my whole class, instead it was scattered ideas in the class. I should be able to integrate all things logically so that there should be one link in which children should be able to flow with me” (standards of thinking-micro assignments on standards of thinking- 2 application entries-)
4. Questioning beliefs, authorities and classmates generalization about particular class of people by clarifying and persevering with questions. In this third most recurrent theme the profiles were found to be quoting, “Why can’t we question ourselves and persevere to answer the questions.” Another profile seems to quoting, “She will personally go and clarify things with one of the faculty for not providing information on time for

attendance purpose and not by assuming things”. (Point in the Intervention program-intellectual traits of mind-confidence in reasoning and intellectual courage-think on: have you defended a view in which you did not have enough data. What data would you have collected for defending it?)

5. Understanding superficial knowledge of oneself in subject and recognize faulty concepts to research out, identifying arrogance in work and towards subject and researching out in depth. Here in this theme the profiles were found to be quoting, “Madam asked to revise the content of Socio-centric thinking which I had missed because I was out for those days, then also I could not ask questions because I thought my friends had understood it so no point in asking I will just take down the notes”. “I have learned questioning and researching deeply in the content that I study. Instead we should try to understand the thing in depth and then we should decide otherwise our ignorance can lead us to some problems in our life too. This incidence showed me the unknown part of my identity-which I try to say myself that I know this thing though I may not know it in that detail that I should know”.(point in the intervention program-intellectual traits of mind-strategy- intellectual humility- make list of things you know, list of things you don’t know and improvements done in what you don’t know)
6. Conducting assemblies in the classes with ease with ease in handling stage fear by understanding each words meaning to speak in English and reasoning with the students to coordinate and work in team. Here the profile quotes that, “I feel scared of assemblies because I have stage fear so to handle assembly I understood the meaning of each and every word and I improved my English so at the right time I am taking the right decision so that things work well”. Further another is seen to put up how she reasoned with the students who were not ready to discuss and think about the assemblies during the recess time (point in intervention program-triad of thinking, feeling and wanting-2 application entries-logic of fear-draft the logic of fear-2 application entries)
7. Understanding group thinking and how it works on others by expressing one’s views in the group and getting aware where it works and reflecting on whether the thoughts are influenced by group thinking. Here the profile quotes that, “I did not go with the group now, I started expressing myself. I

overcame socio- centric behavior. Another profile quotes that, She did it the way the group thought and did not think about the accurate way of doing it. She has not applied the concept but has caught herself in the act. This means she is able to have awareness of the concept. One more quote is, “I specially have learnt to stand up for my decisions (though need to improve upon this) and have been able to constantly compare my thoughts if they are being influenced by group thinking”. ( intervention program- socio-centrism)

8. Developing cordial relationships by monitoring anger, improving oneself, integrity in thoughts and reducing egocentric tendencies. Here the quotes written by profile are, “If I had not known or deliberately practiced CT, I would have never been able to control my anger and it would have adversely affected my relationship with my friend. Another quote is, “I would never trouble others by not saying anything and changing my behavior with them. This is integrity that we all require in our life to have good relations”. One more quote is, “These classes have really helped me in reducing my egocentric tendencies in many situations. I keep aside my egocentric tendencies consciously and first try to figure out why something was not done. It’s helping me to build more cordial relationship with others( mother, friend, husband, peers, neighbors- three kinds of thinkers- 2 application of entries of fair-minded Fran)
9. Being fair by explaining and reminding one’s mind of Integrity, being impartial, staying calm, listening to others problems and directing mind. Here the quotes are “I tried to explain my mind that I shall receive what suits me the most and not helping my good friend would be incorrect on my part”. Another profile quotes, “chose to be impartial. I calmed down, listened to their problem, heard their sides and finally resolved their dispute amicably. One more profile writes, “I could have proceeded without helping her (which we usually do), but my mind directed me not to do soTh-9( overall concept of critical thinking is being fair-minded)
10. Reflecting on incidents such as egocentric tendencies within oneself and mind along with reminding of being thoughtful because of Critical Thinking. Here the quotes are, “Then I thought that this egocentric thinking of mine did not make me realize at that instance that I did not

alone understand the programs”. “It was like; while shouting a part of me is reminding to which I believe is ‘CT’ to calm down because of which I could calm myself within a few seconds, apologized to him for shouting but also at the same time made my point very clear and asked him politely never to repeat this careless action to me”. (intellectual journal that allows for reflections)

11. Taking rational decisions rather than emotional decisions by working on thinking process. The profile quote is “We just have to work on our thinking; the rest will be done automatically. I have a long way to go in this direction”( reasoning-inference correction tool)
12. Independent thinking through issues while considering others point of view using standard of thinking of ‘Relevancy’ and critically examining it such as academic presentations. The quotes here are, “Thought my aunty was saying for my good, I should look at my situation as well. But will consider her opinion and make my own decisions accordingly”. Also mentions about how people do make comments on the presentations made but then she modifies only when the ideas are desirable and they are their own. Another profile quotes that, I used my thinking rather than accepting others viewpoints without critically examining it”.( Point in the intervention program-intellectual traits of mind-thinking independently)
13. Continuing the B.Ed program by using the Triad of Thinking, Feeling and Wanting, reflection and inner conscience. The Profile quotes here are, she has reflected on the triad of thinking, feeling and wanting. She has mentioned, “We should align to the dimension of thinking, feeling and wanting and align them properly and fairly before taking any decision. Another profile quotes, “But somewhere down the line my inner conscience was saying that I have chosen this profession out of my own interest and it is not the right decision to quit the course. I was confused and was reflecting on my initial decision of taking this profession then thought my conscience was right and I should not give up on this and sustained my studies”(intervention program-intellectual traits of mind-intellectual perseverance)
14. Understanding that thinking can be biased and has to be reflected upon by using elements of reasoning and standards of thinking and not making



unreasonable assumptions. Here the profile quotes that, “Her arguments are not affected by biases. I don’t make unreasonable assumptions. I make sure that my thoughts are based on reasoning. I am using elements and standards of thinking in my thought process”. (lecture)

15. Efficiently conducting the tasks by using all sources of information of a topic for presentation and using trait of Intellectual Perseverance. Also thinking consciously on doing tasks. Here the profile quotes at different situations that, “I locked myself in a room. One Sunday, read the chapters, googled a bit and solved 30 problems (by trying to understand it through logic). I totally dedicated myself to the subject, I really enjoyed it then. If we pursue something with great perseverance it will not disappoint us. It will be of benefit to us only” Further the student teacher has mentioned that “our action is the result of how we think”. She is further mentioning that “rather than thinking what work has been allotted is a burden and saying that I can’t do”, I have started to stop for a while and think about ways of how efficiently I can finish all the jobs”.
16. Thinking before reacting by coming forward and tackling situation rather than aggressively looking at the situation. Here the profile again quotes at different situations that, “I have stage fear, but I have to come forward and tackle that situation, try to take better decisions and not panic’. In the second situation she has mentioned that, “in past I reacted very aggressively and used to scold my brother and the result was that he started hiding the marks and his studies were affected. This time I did not react like last time, I talked to my brother and understood the situation and I got to know that he did not understand the concepts properly. I also talked to his sir”. ( Point in the intervention program assess reasoning, analyze reasoning and improve)
17. Making relevant academic presentations and class projects by breaking the content into parts of reasoning and standards of thinking. Here one profile quotes in two different journal entries that, “Breaking down the parts of reasoning forces me to think the path through which my mind travels”. “I would want to become more “precise” in whatever I do and I say as well think so as to avoid error”. Then she has mentioned that I first understood the whole purpose of the project clearly so that she could work with her

father to design the same.( intervention program-standards of thinking, elements of reasoning-usage of logic-strategy-draft logic)

18. Understanding egocentric tendencies of oneself, others and being open-minded: Here one profile is found to be quoting that, “it is making me more open-minded, who is ready to make changes in life by making changes in the thought process. It helps me to understand the actions and situations from different perspectives. Another profile mentions, “when my mentor was giving remark for my lesson then usually before I used to validate myself and argued that I was right, but then now I try to hear and reflect on it”
19. Understand different cultures because of collection of information on various cultures. Here the profiles quote on understanding different cultures for holistic judgment. Also one profile is quoting of collecting information of various culture to infer upon.( intervention program-intellectual traits of mind- intellectual courage- 2 application entries)
20. Reflecting in a logical way by considering opinion and connecting information logically to the topic. This helps students to connect with the topic. The profile communicates here, I also learnt to consider the point of view (TH-1.2) of the other people, should consider the opinion and reinforce them if they are right. My information should be logically connected to the topic, and then only students will be able to connect”(intervention-elements of reasoning-logic)
21. Organization and direction of thoughts by using structure of reasoning. The two profiles quote that, “after having studied critical thinking for almost one year, those random thoughts and actions have been converted into structured and reason thoughts and actions”. ( structure of thinking-all assignments)
22. Handling introvert behavior by asking questions and seeking relevancy of others opinion. This helped training of mind. The quote expresses the way profile handled introvert behaviour. “I understood the fact that, the more I asked, the more I learned and the more I was clear with my concept the more I was able to participate and help others in the class. “I started shaping up my mind and kept on being open to putting ideas in front of 50 students”, “This training of mind helped me to change my thinking”.(

intervention program-triad of thinking, feeling and wanting-post three entries where you are changing the first aspect of thinking so that you can change the way you feel and want)

23. Helped in communication and independently expressing views. The quote of the profile is, “in group when we used to discuss about the assembly works and ideas I used to go with the group i.e. I use to agree with them with whatever they said. I never expressed my views. But later I used to express my views and idea ( intervention program-intellectual traits of mind-intellectual autonomy-overall writing skills and oral skills development through journal writing, standards of thinking-clarity and discussing issues in the class)
24. Realization of mistake by thinking in the incident and improving it. Here one profile is observed to be quoting in the Journal that, “after thinking on this situation I felt bad that I shouted on him and said sorry for behaving so badly. From next day I started parking outside the college every day”.
25. Confronting people and standing for right things. ( intervention program-intellectual traits of mind-intellectual integrity- strategy-Michael lynch article on intellectual integrity- elaborate on the 4 pointers on which intellectual integrity is defined)
26. Being impartial and resolving disputes by listening to others.( 3 kinds of thinkers-2 application entries of fair-minded fran)
27. Knowing unknown parts of peers thinking by consciously trying to know what others are saying. “One should try to know what others are saying so that it becomes clear as to judging them”.( intervention program-intellectual traits of mind-intellectual humility)
28. Meeting deadlines and submit assignments on time by not allowing mind to trick. Here one profile quotes that,” She was ignorant that her mind was tricking her” and she was not submitting assignments on time.
29. Disengagement from fights that will not help by repairing ego and avoiding irrational thoughts. Here the profile communicates that, how that self- validating ego was not allowing her to work and focus on tasks that were important. She has used words like “repairing ego” and “irrational thoughts”. She mentions at the end how the indulgence into a fight that was already over would not help her now.

30. Dealing with language barrier by constantly practicing and understanding what others speak. One of the profile is communicating here that she did not know Hindi, so she has written that, “after constant practice I was able to speak few sentences in Hindi and also I am now able to understand what others speak”.( intervention program-intellectual traits of mind-intellectual perseverance)
31. Not allowing to take advantage of oneself by understanding by reflecting on the how advantage was taken. The profile is communicating the understanding of how people take advantage by saying that, “I have the habit of helping people, & many a times people start taking advantage of it” shows her reflection on understanding the aspect.( intervention program-intellectual integrity)
32. Understanding that thinking is momentous and affects walks of life by realizing through Critical thinking classes. A profile quotes here that, “till now she could not realize that this word “thinking” was that momentous”.( lecture)

## **5.8 Findings from the Profiles studied**

The student teachers have realized how thinking is important, which they never realized before. From a naïve thought they are able to have deep thought process. They are able to distinguish between intellectual humility and intellectual arrogance. They have also identified the fact changing the way one thinks can help to build bond with others. Taking a deliberate pause is important to realize things.

Actions remain unclear and irrelevant when standards of thinking are not followed.

As rightly said by Paul, It is possible to take charge of our emotions. Emotions are the driving force of human life. In the same perspective student teachers also quoted that Negative feelings can be tackled when logic cycle is followed. They are able to understand their feelings deeply. (Through the logic of fear, anger and love).

They are able to know how reasoning is actually done. They have moved from unorganized thinking to a structured way of thinking, they have got tools, rather a framework to improve their thinking process.

**In France, Descartes wrote what might be called the second text in critical thinking, Rules for the Direction of the Mind in which he wrote that, “Every part of thinking, should be questioned, doubted, and tested.**

On the same line students are also able to question their thought process. They are able to realize that they should not act without thinking and reasoning. Because all actions depend upon thinking. Our feelings and wanting can be disruptive when thinking is biased. One can achieve better work-life balance because of right thinking process. According to Richard Paul in his book *Thinker's Guide for Students on How to Study and Learn* places the idea that elements of reasoning help students to think deeply through content and develop intellectually. The student quotes while analyzing subject through logic that “I learned that creating the logic for my subject is pushing me and checking my knowledge of the subject”.

It also helped them to question themselves whether they know their subjects very well or not. They were able to clarify doubts with their respective mentors to bring clarity for the aspects of logic cycle like purpose of the subject, questions that the subject puts forth, the information that it brings in etc. They are able to identify and reflect on self-pitying and self-validating behaviour. They are able to reflect on group thinking. They are able to accept, identify that they mechanically accept and conform to the group decisions and now it has reduced. They have started to think seriously and consciously about their thinking process. They are able to reflect upon logic and purpose behind their behaviour. Standards of thinking and elements of reasoning helped them to take integration classes in a better way. They are able to think critically about what they are learning in through the subjects. They are able to think from different angles and point of views. They are able to understand the fact that emotionally charged decisions can make things worse. They are able to see where they trick themselves (through the concept of weak sense critical thinker, sophist and con-artist). They are able to realize how they should not use unreliable sources of information, how to not make unreasonable assumptions

The impediments to the critical thinking process from the journal entries seem to be time constraint, being emotional, intellectual laziness to practice, practice with people who are in power and hold authority, practice with people who are unreflective thinkers, group thinking, not being able to communicate accurately and clearly, lack of experience and knowledge in critical thinking, failing to control biases and ending in faulty thoughts

What actually helped them out: theory taken in the classes, tools for thinking process (structure for critical thinking, elements of reasoning, intellectual traits), framing the logic of the subject (helped them to realize the inconsistencies and lacunae's in information regarding the subject, appreciate the subject matter, defend the concepts of the subject, reason out topic in a systematic way, push and check knowledge of the subject), relating the content with real life examples, discussions about logic of the subject, triad of thinking, feeling and wanting, article on intellectual integrity ( most significant learning-legality is not morality),logic of fear, anger and love, journal helped to create awareness about themselves and various behavior.

Journal entries helped to sneak peek into the lives through the new learning that took place, assignments helped in reinforcing what was learnt.

### **Conclusions reached from the Multiple Case studies.**

1. Critical Thinking Intervention Program (CTIP) improved students thinking process by making them realize that thinking is important to develop deep thought processes.
2. Student teachers were able to realize that change in thinking can help develop bond with people.
3. The Student teachers were also able to identify that taking deliberate pause is important to realize thinking.
4. It also helped the student teachers to ascertain that thinking is unclear and irrelevant if standards of thinking are not used in the assessment of thought processes.
5. The Student teachers were able to distinguish between Intellectual Humility and Intellectual Arrogance.

6. The student teachers also improved on handling emotions by using logic cycles used in the intervention program.
7. The Student teachers moved from unorganized thinking to structured thinking using the elements of reasoning framework along with tools and Critical Thinking framework.
8. Student Teachers were able to question their thought process. They were also able to realize that they should not act without thinking and reasoning.
9. The Student teachers also realized that feelings and wanting can be disruptive when thinking is biased.
10. Lack of Conceptual Clarity, non-relevancy of application, posting backdated entries were repeated errors observed in cases that least scored in the achievement tests.
11. The Critical Thinking Intervention also brought awareness on achieving better work-life balance because of tools of Critical Thinking Intervention Program based on Paul's Approach.
12. They were able to realize how they should not use unreliable sources of information, how to not make unreasonable assumptions.

### **5.9 Consolidation of All Profiles through Mapping Students Thinking Process**

Mapping the students thinking process from the profiles analyzed is part of the consolidation process of the profiles. This is being put into this tabular form so that thinking can be traced in terms of how it developed over a period of 50 hours and one complete semester. It shows consolidation of eleven profiles in these eight weeks.

Each entry was posted on these application pointers. The first entry is: Work out with the character of fair-minded Fran. The second entry is Triad of Thinking, Feeling and Wanting. The third entry is about the Standards of Thinking and Elements of reasoning, Fourth entry is on the Logic, Fifth entry on the Intellectual traits of mind, Sixth week's entry continued with Traits of mind, and in the Seventh week student teachers were to post the entry on Barriers for Thinking. The last entry was to be posted on- where they stand in terms of development of thought process. Each week's development of thinking process of the profiles was traced from the Intellectual Journal. They were traced based on standards of thinking that are Clarity, Accuracy, Relevancy, Precision, Depth and Reflection on thinking process. Certain

concepts of Critical Thinking that is Clarity, Accuracy, Precision, Relevancy, Depth, Breadth and the opposite of the concepts that are Lack of elaboration, Non-relevancy were used in the process of mapping.

- The terminologies used in the table are used in the students mapping table in the following way:
  - These terminologies have been used for the posting of seven journal entries
1. Clarity- The text has elaboration and examples wherever needed., clarity in language
  2. Accuracy- The text details are consistent with the expectation of the application of the entry
  3. Precision- The text is detailed at a satisfactory level
  4. Relevancy- The text is relevant to the entry title; non relevancy – the text is not relevant to the entry title
  5. Depth- It explores the complexities of the thinking in the entry text; Lacks Depth- it doesn't explore the complexities of the thinking in the entry text
  6. Reflection on the thinking process is questioning the thinking. Ex. Case G is seen to be reflecting on a situation that our mind may tell something in terms of both positive as well as negative. We should reason out and find out whether these thoughts are relevant?



Table 47 Mapping of thinking process using standards of thinking for all the profiles.

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
<b>1) Standards Of Thinking And Elements Of Reasoning</b>										
Clarity, accuracy, elaboration	lacks depth	Clarity to some extent	Clarity, accuracy and relevancy	Clarity, relevancy	Lacks depth	Clarity	Lacks depth and clarity in written communication	Lacks depth ( does it mean it has all other elements)	Non-accurate and non-relevant- not applicable	Clarity, Accuracy,
<b>2) Triad Of Thinking, Feeling And Wanting</b>										
Clarity, accuracy, depth, reflecting on thinking process	Clarity, not relevant to the concept,	Clarity,	Clarity, relevancy	Clarity, reflection on thinking,	Reflecting on thinking,	Clarity, lacks depth	Inaccurate and Irrelevant	Clarity ( elaboration) accuracy, depth	Clarity, accuracy, precision	Clarity, accuracy, elaboration, reflecting on thinking
<b>3) Work Out With The Character Of Fair-Minded Fran</b>										
Clarity, accuracy, precision, elaboration, depth, reflection on thinking, using Critical Thinking language while posting entries	Clarity, relevant, accurate	Clarity, precision, relevancy	Clarity, accuracy, precision, relevancy	Clarity, relevant, reflection on thinking, elaboration is seen	Strongly reflecting on thinking process, elaboration, clarity in concepts	-	Clarity in written communication, elaboration, accurate	Clarity, accuracy	Clarity, accuracy, precision, depth	Clarity with lot of elaboration, reflective thinking
<b>4) Elements Of Reasoning-Logic Of Subject, Logic Of Love, Logic Of Fear, Logic Of Anger</b>										
Clarity, accuracy, reflection on thinking	Clarity- all other aspects missing	Clarity and accuracy	Clarity, precision	Clarity, elaboration, depth, accurate and relevant	Lot of elaboration is seen, accuracy of the concept and journal entry is also observed	clarity in communication not concept expected to be written	Not Posted	Clarity, accuracy	Clarity, accuracy, relevancy, precision, depth, reflective thinking	Clarity, accuracy, relevancy, precision, depth, reflective thinking
<b>5) Intellectual Traits Of Mind:- Intellectual Humility, Intellectual Courage, Intellectual Empathy</b>										
Clarity, accuracy, depth, elaboration, reflecting, clarity of concepts	Clarity, accurate, not very relevant (understanding of few concepts)	Clarity and accuracy	Clarity, relevancy and precision	Clarity, accuracy, elaboration, depth, relevant	Clarity Elaboration, depth, accuracy, reflecting on thinking process	Clarity, precise and relevant	Clarity, Elaboration, Accurate for Personal Life, Inaccurate for academic life, traces of reflection on thinking	Clarity (elaboration), accuracy, relevancy, elaboration	A complete entry	Entry is not very accurate, depth, accurate

6) Intellectual Perseverance, Intellectual Integrity, Confidence In Reason, Intellectual Autonomy										
Clarity, accuracy, depth, elaboration, reflecting on thinking	Clarity, accuracy, relevant, bit elaboration seen		Clarity, accuracy and precision	Clarity, elaboration; can be done at conclusion, <b>reflection on thinking</b> , depth, relevant and accurate	Clarity, accuracy, elaboration, depth and reflective thinking	Missing	Clarity, accurate for personal life, elaboration, traces of <b>reflective thinking</b>	Clarity (elaboration), accuracy, relevancy, reflecting on thinking	A complete entry	A complete entry. Clarity, accuracy, depth, breadth, reflective thinking
7) Barrier To Critical Thinking: Egocentrism, Socio-Centrism										
Clarity, accuracy, elaboration, reflecting on thinking, clarity of concepts	Clarity, accuracy		Clarity, precision	Clarity, accuracy		Missing	Clarity, <b>accuracy to an extent</b> , reflection on thinking	Clarity, accuracy, relevant, <b>very well elaborated</b> , reflecting on thinking	A complete entry	A complete entry
8) Which stage do you belong in critical thinking development, barrier to development										
Stage: Beginning Thinker, Barrier: Socio-centrism, egocentrism, intellectual laziness, when others donot practice Critical Thinking, unconscious ignorance of situations, unable to communicate properly	Stage: Beginning Thinkers, Barrier: socio-centrism, intellectual Laziness	Not specified	Stage: 2 and 3 stage Barrier: written communication, language, egocentrism	Stage:Beginning Thinker, Barrier: Laziness to practice, lack of experience and knowledge, controlling biases and faulty thoughts, lack of time, written communication, communication gap	Stage: Beginning thinker, Barrier: lack of time, egocentrism and socio-centrism	Missing	Stage: Challenged Thinker's stage, Barrier: Emotional,	Stage: Challenged Thinker, Barrier: emotional, over thinking, thinking that people will take her for granted		Stage: Between Beginning Thinker and Challenged thinker Barrier: Socio- centric thinking, authority of other person, people who are unreflective in nature, Play safe attitude, time, egocentrism, too emotional, people who put you down

The above table shows the development of thought process. During initial week sample A, D, E, G, I, J could achieve clarity. Sample B, C, F, H have posted entries that were not in depth. In the second entry sample A, F, G were seen to be reflecting on the thinking process. In the third entry sample F was seen strongly reflecting on the thinking process. Further majority of the samples had achieved basic components of standards of thinking like clarity, accuracy, precision. Sample A in this entry was seen to be achieving standards of thinking criteria. Also the sample was seen to be using Critical Thinking language in this entry. In the fourth entry sample F was observed to be elaborating on the entries extensively. Other samples except C, E, I was observed to achieve clarity and accuracy. In the sixth entry D, E, F, G could achieve majority of the standards of thinking including depth. Sample I missed on the entry completely. In the seventh entry sample I have not posted the entry. In the seventh entry sample G could post a complete entry. The eight entry discusses on the barriers to the thinking process and the stage in which they lie at the end of the intervention program.

#### **5.10 An overview of the cases**

The Eleven cases presented above are of teachers who have shown significant improvement in their behaviors in dealing with their thought process. These student teachers became more organized in their thought process. They were more truthful and showed empathy. They were found to be helpful and showed empathy to their peers. They were able to reflect on where their minds tricked them.

In general, after the intervention program the teachers who were either more unorganized in thought process became organized, started to reflect on their thinking process.

#### **5.11 Focus Group Discussion**

Focus Group Discussion is qualitative research technique that helps researcher to probe into the thought process of student teachers about the development of the critical thinking abilities. This technique was taken up to understand how the process was, to understand the various point of views on the development of Critical Thinking abilities in them and also to know to what extent it was useful to them. This method

was essentially adopted to probe into what, how and why of various aspects. There was no preconceived hypothesis; rather the interview proceeded from the cues obtained from their responses. For the unstructured discussion the respondents were students of one of the electives. The number of participants were seven in number and they were given the numbers of Student 1, 2, 3, 4, 5, 6, 7 to preserve the identity of the student.

The Researcher began the discussion with the question:

Tr: What aspect of Critical Thinking did you use? How has critical thinking helped you?

Student 1: When we know purpose. For me.. How has it helped me?

**Broad theme 1: We know the purpose; we achieve depth by knowing the purpose of what we do.**

**Purpose helps achieve clarity, depth, logic, written communication, better answers and also helps to ask questions.**

Student 1: To write an assignment or Answers in the question papers, when I know why I am doing it I am in a better situation to put it up in my writing. Now when I am writing why I am writing it. I am very much clear into it.

Before I use to do it vaguely. Now, I know 'why' if I writing it. I can reason and justify every answer that I write. Because of it my answers have got depth into it. I use this in my thinking: Logic is there, purpose of why I am doing this? What is the purpose of studying it? Any concept to be applied in classrooms if not there then? Why do we study it? If not then where how why?

Student 1: We search for answers

Student 2: we get answers also of the above questions Student 1 :ya we get answers also.

Do you get the answers or you purposefully seek it? Now we know why? Student 2 may be.

Earlier we didn't have question. It was like we have been given and we have to do it Student1: we seek. First we had to for the sake, now I know why

**Theme 2: alignment of thoughts, organization of thoughts**

Student 3: I don't remember any example but alignment has happened in thought process.

Teacher: Has it become organized?

Student 3: yes. I cannot explain with specific example, but yes

**Theme 3: Intellectual perseverance and reasoning**

Student 4: we have started to reason. Last week I was reading a chapter in economics.. I could not understand chapter, my mother was giving me tea. I was thinking that why I am not understanding it. Then I thought I should keep it. But then I thought, why?

This kind of reasoning never happened before. Then I thought about what can be the extra knowledge for the subject so I checked on net.

Before it was like when I did not understand I just stopped and closed it.

Teacher: so this kind of reasoning was never developed?

Student 4: No it never happened before.

Teacher: Do you see perseverance developed? Do you see rather intellectual perseverance developed?

Student 4: We also question. We try to connect

Student 5: yes, connections have been established. Now we want to understand it. We want to understand the connection

**Theme 4: Patience has developed (helped in doing the assignments seriously with interest)**

Student 3 (suddenly interrupting in between): now patience has developed. With patience I want to do it .Mind has developed interest. For me it's like, Even if time is taken up we will do it. Pehle aisa thaki we did things in haste.

Student 5: jaise, first I had done assignment like that. But this time I have done assignments seriously. I have read and read and with patience

**Theme 5: We have started to think where we lacked ( Intellectual Humility)**

Student 3: we have started to think. Patience and interest. And we are thinking about its relevance. How that has developed?

Teacher: It's happening because of CT and not because of any other variable? How can you ensure that because there are many things are happening?

Student 3: We have understood problems in our thinking. Where we lacked? We have understood that ye kaam aise hi hota hai.

Student 4: eisa kaam karenge to samajh mein ayega Teacher: how your thought process has changed?

**Theme 6: we have stopped over-generalizing (an aspect of egocentrism)**

Student 6: if somebody is wrong then I did not like that person generally. Now, if I don't like somebody I don't like that person for that situation. We don't judge overall. I don't have ego. At a particular point and situation I don't like that person.

Student 4: (with a smile) yes madam she is right

Teacher: what helped you to understand that you should not over generalize? One should detach

Student 6: ek kahi padahaya tha. Overgeneralization..... Uske baad se hi  
Teacher: egocentric thinking

Student 6: yes

Student no.??: this is very good thing. One of my friend. I had a fight with her. She met me near the lift. I asked her how you are. I asked her by myself. She did not take initiative

**Theme 7: Sometimes we have failed because of Critical Thinking- Barrier to Critical thinking**

Student 4- hum fail bhi bahot hue hai madam. We applied CT and we failed. We had relations personally wherein we apply CT, then people left us. They said faltoo hai ye Teacher: Why do you say so?

Student 7. When we start to listen to others point of view, we are losing self-respect. They don't listen to us.

We do but other person does not support. Teacher: then what do you do?

Student 7: then we leave. After a point we leave

**Theme 8: My thought process has become broader, I reflect because of diary reflections**

Teacher: how you're thought process as changed?

Student 1: I would accept something if the other person is more knowledgeable. But now I am in a position to counter him.

Earlier it was very narrow. My thought process has become very broad. I have understood the fact that whatever they say is not always right.

I listen then I reflect before I give answer. I do that on the spot only. My thought process would have travelled. It was because of diary reflections. I used to think when I wrote diaries. So I used to think and then I use to realize,

brainstorming and. In brainstorming for the situations to be written for the diary my thought started travelling then I have to catch that thought.

Teacher: are you able to control your thought process?

Student: If people don't listen. Ultimately if people don't understand. I jump. Unless I prove it. I have high amount intellectual perseverance. No one likes arguing. This has become part of my personality.

### **Theme 9: Diary work has helped in reflecting**

Student 3: We have started to think a lot because of diary work. Earlier I did because I had to submit. I can now see that I have alignment. The same situation can be handled in a patient way. I had anger. Somehow I am able to control it.

Teacher: Any improvement in academics? Student 3- I have started to achieve depth

Student 7: I try to understand. I used to write like that. Teacher: How did you attribute this to critical thinking?

Student 1: Because of diary reflections. Diary has basically helped to reflect

### **Theme 10: The way it has been taught (Pedagogy)**

Student 3- it has the way it's been taught. Through situations and examples and discussions. That's why I am able to relate to it.

Teacher: Can you see the change in you? Student3: Because of the way it was taught.

Student 4: Example of reflection. I thought I should say sorry and admit my mistake. Last one month se ye ho raha hai.

Student 4: mujhe to abhi aa rahi hi.

Student 2:-Because of the break. After the classes, we have got space to think



## 5.12 Interpretation

In the above interaction students are denoted with S1, S2, S3, S4, S5, S6, and S7. The discussion as said lasted for about 40 minutes. Few irrelevant points have not been considered for the interpretations. To steer the discussion in the right direction the first question that was put up was: How critical thinking has helped you in differing ways?

Below are the significant pointers that emerged out of the discussion:

1. Critical thinking has helped the student teacher to seek purpose in what they do. Seeking of purpose has them to understand assignments in a better way. This way they are able to achieve clarity into doing what they do. Before they did not seek the purpose and hence the tasks/assignments were done vaguely. Now, because of seeking purpose clarity is achieved. Further, it has helped them to achieve depth since they sought answers for lot of questions as to what, why, where and if not here then where? Before the intervention they did not have questions, it was that something is given and it has to be done. Now, they try to know why by looking at the purpose
2. It helped them to align their thought process; that is organization of thoughts. They have understood now standards of thinking and elements of reasoning.
3. They have started to reason and reason with lot of perseverance. They are trying to continuously understand things that are complex. Earlier if they did not understand complex things they stopped. They closed it. But now they try to connect, reason and question. So; reasoning, building connections and questioning has helped to build interest in the subject. Now, even if something is going to take lot of time they can wait. Earlier, the assignments were done in haste. But now, they are done with lot of reading and with patience
4. They have started to think with patience and interest. They are also thinking about relevancy of things. They have also understood problems in their thinking process. They are able to understand where they lack. They are also able to understand how things are to be done.

5. Their thought process has changed in terms of overgeneralization of any aspect. Their thinking is happening in situations. The thought process has become broader. Earlier they used to accept things that are spoken by people who are more knowledgeable. But now, it's not so, they are able to counter. Earlier, the thought process was narrow because it did not allow them to counter a person who had more knowledge on something
6. There is also a barrier associated with critical thinking. Some people have left them just because they applied critical thinking (what aspect of CT is unknown). Sometimes they thought that they lost self-respect because they tried hard to understand others point of view but others did not. They noticed a problem in critical thinking when they apply but others don't.
7. The thinking and writing about application of aspects taken in the classes has helped them in reflecting about their thinking process. Earlier the entries were made for the sake of it but after some time it helped them to understand and reflect on things. These reflections also helped them to achieve depth.
8. The way it was taught helped them to connect to it. The content was explained with lots of real life examples of the teacher. It was also understood through discussions and situations. This helped them to relate to it and thus bring interest into it.
9. After the space of around two months now they have actually got time and space to reflect about it. So now it has started to sink into their minds

### **Conclusions from Focus Group Discussion**

1. Critical thinking Intervention Program facilitated the student teachers to improve on Reasoning skill especially seeking 'purpose 'of any task.
2. Organization of thoughts and thought Connectivity that is a cognitive skill improved with Critical Thinking Intervention program

3. Reasoning skill which is a mental process was strengthened by using the Intellectual Traits of Mind particularly by means of Intellectual Perseverance
4. Critical Thinking Intervention Program improved Reflective Abilities of Student teachers thereby bringing depth in the academic work
5. Metacognitive Skills improved due to the Critical Thinking Intervention Program

Below is the descriptive feedback for the intervention program. The questions asked were

What are the most evident parts of the intervention program that made an impact on the student teachers, what were the not so evident parts of the intervention program and what are the improvements that can be pursued by the researcher in the intervention program.

### **5.13 Descriptive Feedback**

The aspects of the critical thinking intervention that were significantly and repeatedly liked were:

- The students teachers were able to reflect on their thinking process
- They were able to start to think, this process had started consciously, they had come across tools that can be used to apply in real life,
- They were able to take stand now
- They got an awareness of the tendencies of egocentrism and were able to handle situations in the class.
- The student teachers further mentioned that they were able to think through the issues explicitly, they were able to stop before reacting, were able to think about oneself, were able to stand for their own rights, it had changed the way they think.
- Furthermore, the structure of thinking, reasoned thinking, helped to enhance academic performance.

Structure of thinking helped to organize thoughts, journal entries helped to reflect, examine situations that went unnoticed, lots of examples were given in the class. The content and methodology and activities with the mentor's attention were significant. The examples of naïve, selfish and fair-minded thinker gave a direction of not becoming naïve/selfish.

The in depth explanation plus lot of examples, journal entries, teaching methodology, logical explanations, concepts that were taken in depth as well as breadth that the concepts taught can never be forgotten. The concept mapping also proved helpful to understand.

The significant things that were disliked in the program or for the program or for the concept of Critical Thinking/ general dislikes were:

- The time factor; the amount of time allotted to critical thinking was less, it was also inferred that it shouldn't be there for only a semester but can be extended to second semester to get insight into further complexities of the subject.
- Furthermore, it was very difficult to cope with people who don't apply critical thinking. The concepts can be simplified for clearer understanding.
- Thinking in depth is difficult. It was also inferred that it can't be applied (Critical Thinking) in every situation, its time consuming to think in depth
- Writing of entries to communicate, finding situations to write, traits had complex terminologies and more practice was needed.

The aspects of the intervention program that can be improved upon:

- Critical Thinking can be a part of curriculum, language of critical thinking can be easier, there can be more stress on real life application, more examples of the concepts can be added, it shouldn't be limited to five months, some more practical classes can be taken, and viva can be conducted.

### **Conclusions from Descriptive Feedback**

1. The Tools used in the Critical thinking Intervention Program has helped the student teacher to reflect on their thinking process consciously. The improvement in the reflective abilities aided in bringing depth to the academic work provided.
2. The student teachers awareness of egocentric tendencies improved due to the Critical Thinking intervention program. This also helped them to handle the in-class situations.
3. The Structure of thinking provided in the intervention program and the skill set of reasoning supported in improving academic performance of the student teachers
4. The student teachers reflected that the idea of applying Critical Thinking in each situation is difficult can reconsidered. They also reflected that disposition is one important aspect of Critical Thinking
5. Journal Entries helped to reflect on situations that went unnoticed and unexamined in the real life.
6. Pedagogical techniques like In-depth explanation of the content, real life examples related to the content, logical connectivity during the class and concept mapping helped students to connect and develop interest in the Critical Thinking classes.
7. The student teachers suggested that Critical Thinking Intervention program can be made part of the curriculum itself, recommended on the simplicity of the language that can be used in the intervention program, also commented on viva that can be used to assess the level of Critical Thinking skills.

#### **5.14 Limitations to the study**

This study titled, “Developing, Implementing and Assessing an Intervention Program based on Paulian Approach to Navrachana University for student teachers of Vadodara” was limited to the following aspects.

- A Disposition inventory could have been administered on the student teachers before the actual implementation of the intervention program.

This would have helped in understanding the ‘willingness’ dimension of critical thinking.

- Student teachers socio-culture background and language literacy were different. The understanding of these variables could have helped the researcher in conducting the research in a smoother way.
- More focused and intermittent discussions could have been done conducted in a greater depth to get more outcomes.
- This particular model to Critical Thinking required cognitive and philosophical dimensions of critical thinking to be transacted. This made the intervention program lengthy and challenging to transact.
- The specific terminologies of Paul’s model to Critical Thinking also had to be simplified to be understood by student teachers as they come from varied backgrounds specifically the students who had language barrier.
- The student teachers came from varied backgrounds as to; majority of the students were married and had things to cater to and along with this there were many assignments and work of other courses. Amidst this it was quite challenging for the researcher to keep the motivation of the students high.

Nevertheless, despite the obvious limitations of the study, certain observations and findings from the data were so consistent across a wide variety of student teachers that we believe the study unequivocally establishes some findings beyond question.

### **5.15 Suggestions based on work done**

The present study offers suggestions for further research based on the context of the findings of the study so that further research can be carried out.

1. Further studies can be carried on the ‘disposition’ to use Critical Thinking before implementing the intervention program. Further, the relationship of disposition to use critical thinking and development of critical thinking skills can be checked
2. A survey on Critical Thinking based on Paul’s Model to Critical Thinking can be carried out to understand how much of the Standards

of thinking, Elements of reasoning and Intellectual Traits of mind are fostered into a typical class situation and day.

3. A study that can assimilate Richard Paul's Critical Thinking model i.e. aspects of Critical Thinking into the Lesson Plan construction can be carried out. A well-structured lesson can be created and its effectiveness can be checked from students' point of view as well as teachers' point of view.
4. The effectiveness of such lesson plans can be checked and can be further standardized. This standardized lesson plan can be developed in such a way that it can be used across grades, boards and schools.
5. Development of Intervention Program for In-Service Teachers can be considered.
6. This developed intervention can be used to train the in-service teachers and its effectiveness in enhancing critical thinking skills as well usage of the same can be checked.
7. Development of Intervention Program for students of various grades and various levels that is Pre-primary, Primary, And Secondary and Higher Secondary can be considered.
8. The Impact of such a model on Informed Decision Making of Sample can be thought of considering specific situations for decision making.
9. The impact of Critical Thinking on reading, writing and speaking abilities can be checked.
10. Construction of Critical Thinking Tests and further standardizing them for various levels like teachers, students, management professionals can be carried out.
11. A longitudinal study can be undertaken to see the after-effects of the Critical Thinking skills being enhanced. This longitudinal study can study the positives and negatives of the skills and its effect on Decision making