CHAPTER IV

ANALYSIS OF DATA AND INTERPRETATIONS OF RESULTS

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RESULTS AND DISCUSSION

4.0 INTRODUCTION

This chapter deals with the presentation of data and their analysis to draw the results. The objectives wise result and discussion also form the part of this chapter under different headings.

OBJECTIVE 1: To study the attitude of pre-service trainee teachers towards 5E model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through 5E Model.

The first objective is to understand the attitude of pre-service trainee teachers towards 5E model of creating learning situations based on Likert scale. Scores of pre-service trainee teachers were analyzed by computing mean and standard deviation.

Table 4.1: Mean and standard deviation of pre-service trainee teachers score

N	Minimum Score	Maximum Score	Mean	Standard Deviation
60	21	69	50.28	9.16

The total score, which could be obtained by a pre-service trainee teacher in the attitude scale used for the purpose of this research, was 105. From the table 4.1, it can be observed that the mean of all the scores of attitude of pre-service trainee teacher towards 5E model was found to be 50.28. The minimum score obtained by a pre-service trainee teacher was 21 and the maximum score was 69.

From the table it can also be seen that the standard deviation for this set of scores signifying the attitude of pre-service trainee teacher toward 5E model is 9.16. The discussions for the results found here have been taken up in the objective no. 2.

Based on the data found in table 4.1 three categories were made from the existing pool of pre-service trainee teachers. The categories were found using the formula-

Mean ± Standard Deviation

These categories were

1. **Positive** towards 5E model on constructivism
2. **Neutral** towards 5E model on constructivism
3. **Negative** towards 5E model on constructivism

Table 4.2: Number of pre-service trainee teachers under different categories

Serial no.	Attitude towards 5E Model	Number of pre-service trainee teacher
1	Positive	7 (11.66%)
2	Neutral	41 (68.33%)
3	Negative	12 (20%)
Total		**60**

From table 4.2 it can be seen that 68.33% (41) pre-service trainee teachers are neutral toward the 5E Model of creating learning situations. Again, 20% (12) pre-service trainee teachers were found to have a negative attitude towards 5E Model of creating learning situations. A very few 11.66 % (7) of pre-service trainee teachers were found to be sympathetic in their attitude towards 5E Model of creating learning situations. The various reasons of their attitude were found using an open-ended interview, the gist of which has been explained in objective 2.

Findings: The following were the findings with regard to Objective 1.

A clear majority 68.33 % (41) of pre-service trainee teachers had a neutral view towards 5E Model of creating learning situations. Whereas a few 20 %(12) number of pre-service trainee, teachers held a negative attitude, even fewer 11.66%(7) were in support of 5E Model of creating and learning situations.

OBJECTIVE 2: To study the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through 5E Model.

The above –mentioned Objective required an up and close interview with all the pre-service trainee teachers (participants). Therefore, the researcher constructed an interview schedule, which was recorded like while interviewing the participants and later reviewed to get a general idea of their attitude and the same time an in-depth understanding of the reasons why they held this attitude. A summary of the responses given by various participants has been presented along with the open-ended questions, which were put to them.

Q 1: Hi there! How was your internship program?

This question was asked with a view to get a general idea of their in totalum experiences during their internship. The following were the various responses-

- Most of the participants enjoyed their internship program and found teaching through 5E Model a unique *live meets life* experience.
- Some participants also mentioned that it was an all together exciting event as the 5E Model had been implemented in their teaching institution for the first time.
- This internship experience was also a wealth of lifelong learning experience for some participants.
- On the contrary, a few participants felt that it was a period of confusion, as the 5E Model was implemented for the first time in the institute hence insufficient training was given to them before going out in the field.

Q 2: Could you please tell me about the process skills that were useful to you in creating and implementing the learning situation?

There are different types of process skills namely: communication, experimentation, observation, classification, inference, critical thinking, reflective thinking, interpretation and problem solving skills. Participants found observation skill and communication skill as one of the most useful skill during their internship program. Some of the participants went so far as to tell the researcher that though these skills were easy to learn they were more so difficult to apply in real classroom situations. This can be attributed according to them, to the fact that they were not well versed with actively using these skills in their life prior to the internship program. However, there were few process skills, which they were not able to implement in the classroom situation, like, critical and reflective skills. In addition, they had many doubts in inference and interpretation skills.

Q 3: Were your learners able to internalize the process skills that you used and were they able to apply them in the classroom situation?

According to a majority of participants the learners were able to internalize the process skills, but at a very superficial level. When asked the reason of this, the responses were as follows:

- Some of the participants were candid enough to confess that they themselves were not very well acquainted with these skills and hence not well equipped with the methods to help the learners internalize them as well.

- In addition to that, it was sadly noted by the researcher that B. Sc. B. Ed. VIII semester was not even oriented on a basic level to the process skills prior to their actual internship period unlike B. Ed. II Year.

Q 4: Among all the 5Es, which stage was easy to create and execute and which stage was problematic? Explain?

The easiest phase according to a majority of participants was **Engage.** The Reasons cited by the participants were-

- It was easier for learners who were habitual to the behaviorist classroom situations to be actively involved in a new method of learning, using teaching aids.

- Engage phase at times brought out the prior knowledge of learners.

- This phase also helped in getting full co-operation and utmost attention of slow learners, mischievous learners and even the ones who were not interested in the classroom process at all.

Evaluation is the phase which majority of the participants found difficult to execute. The reasons cited by them are as follows:

- The rubric was a new concept for the participants hence making them unfamiliar with the process of using it.

- The participants also mention the tediousness of keeping meticulous records of each child impractical and hence they could not successfully execute this stage.

- Group answering was another issue that the participants faced while evaluating as it was difficult to differentiate the level of understanding displayed by a single learner answering in chorus.

Q 5: What were your experiences with the 'Engage' phase?

Engage phase as in response 4 was easy to execute for most of the participants but difficult to organize. The organization part posed a difficulty because many schools did not provide the optimum use of ICT either to the participant or for the use of learners. It was possible for the participants to generate a curiosity among the learners as they had been deprived of a rich learning environment in the traditional classroom setting. The participants' provided the researcher with an array of examples where it can be clearly seen that the act of

31

engaging learners proved to be a successful one. Chosen among them are a few, which have been mentioned below:

- One of the participants, while dealing with the topic of herb and shrubs, generated curiosity in the classroom by bringing actual herb and shrub specimens.
- While dealing with the topic "pollution" in a primary class the participant asked the learners to cite examples of where they experienced polluted environment. The learners were very involved while citing examples such us marriage ceremonies, traffic signals and a unique example of noise pollution-the mixer grinder in kitchen.

Q 6: While executing 'Explore' phase, how did you form groups in the classroom and what were the difficulties you encountered?

The participant came up with the following strategies while forming groups-

- On the onset when the class was not very familiar, the participant opted for random group formation on particular basis.
- As the familiarity increase, the participant tried to make heterogeneous groups with learners of different cognitive abilities.
- Some of the participant ensured leadership among the group to be on a cyclic basis so that equal opportunity was granted to each member of the group to lead as well as to follow.

The participants encounter the following problems while forming groups-

- The classroom physical infrastructure that is the bench arrangement did not allow heterogeneous group formation.
- The seating arrangement in the classroom was random and pre decided. Much of the time was consumed asking the students to change their places according to the groups.
- Affinity and friendship towards certain children in the classroom and hostility towards others made group formation for the participants very difficult.
- The group formation in general was very time taking.
- Most of the classes had a large number of students and hence while forming groups the number of members in each group exceed making discipline a problem.
- Due to the participants' own lack of experience in dealing with groups, it was difficult for them to maintain a constant attention over the entire classroom.

Q 7: What, according to you were the groups learning experiences of the learners / students?

All groups participated during the group discussion. They shared their life experiences with each other related to content and context. The most obvious advantage of this exercise was that the pre-formed groups in the class became very much forgotten and learners enjoyed their heterogeneity. They also found sharing their previous knowledge a very refreshing and satisfying experience with everyone in the class. This phase helped them to socialize more. The learners tried to work in groups by learning to organize and jot down the summary of their group discussions.

The participants also faced certain problems in the group formation phase. At times, the learners were not able to organize the information they had. Some learners were not interested in the group procedures and some others would disrupt group activities if they felt that the group did not give sufficient importance to them. In pre-service trainee teachers' classes but also in permanent faculty classes few learners were not only sleeping, completing their homework or simply looking outside the classroom.

Q 8: During the phase 'Explain' were learners making meaning out of the group discussion. Were they able to explain the concepts in their own words?

Yes, the learners were, with the help of their peers, able to make meaning and organize at first in a raw manner but latter in a more organize manner. At times, the learners would also deviate from the topic, as they would branch away from the main idea.

Examples 1: In the chapter Separation of Substances in class VI, the learners explained the concepts of winnowing, sieving, threshing and hand picking etc, based on their group discussion. They were also able to better explain the processes involved and cited various examples from the daily life where these processes were employed. After the discussion, the learners were also able to present their data sequentially.

Example 2: During the learning of chapter Communicable Diseases in class VII the students discussed in a group as to the diseases they and their sibling had. During the discussion, the learners exchanged thoughts on the common diseases they were prone to and tried to trace the origin of these diseases through discussion. While presenting the data the students first talked about the diseases they suffered, their symptoms, and their causes. When probed further the learners even came up with ways to prevent these communicable diseases.

Q 9: As a facilitator, did you help learners in clarifying and modifying their understanding of learning aspect?

Yes, most of the participants were successful in clarifying and modifying learners understanding of learning aspect. The reason that the participants could do so according to them was that the 5E Model makes the learners mind very flexible and ready to accept any change. At times, the learners would misunderstand or not understand at all. In such situation, the participants would gently guide the learners to the proper meaning of the concept.

Being a facilitator the participants made themselves always available to the needs of learners in clarifying doubts and satisfying queries and they would ensure proper encouragement whenever a learner was in need of support to raise doubts.

The learners were occasionally so into the learning that they would bring working models attempted by selves in the classroom and hence encourage others to explore the practicality of the concepts learned in the classroom.

For example: learners of class VI, while learning the chapter Electricity made working models of circuits using conductors and insulators without being asked to do so. They felt highly curious once they understood the concept of electricity flowing like water hence they could not refrain from trying out the activities given in the textbook themselves.

Similarly, another group of learners who were being taught the chapter relating to growth and Development in Plants tried out to observe the Germination of the seeds by keeping black grams etc in wet cotton to practically see what they learnt in the classroom. They brought their germinated seed in the classroom, which was a cause of much hype and further questions raised by learners.

Q 10: What are the difficulties that you faced during the phase of elaborate? Explain your observation.

The participants on a whole, pointed out to lack of time left during the period as the greatest difficulty. Most of the participants could not save enough time from the three previous phases to conduct the elaborate phase successfully. The time was less owing to various factors such as-

- Too much time in grouping.
- If the groups were large, explain phase took more than the usual time.
- Many questions would be raised which would deviate from the topic and would take a considerable amount of time for the whole discussion to be brought home.
- Extra time taken by the teachers prior to the trainee teachers' period.

Q 11: Were learners able to apply the new concept learnt to real life situation especially in terms of critical and reflective thinking among learners?

According to participants, the 5E Model is an extremely useful and potent approach in developing critical and reflective thinking among learners. The participants observed various indicators where they identified critical and reflective thinking among learners.

For example:

- While learning about fire extinguishers a very observant learner ask the participant the reason due to which the pray coming out of deodorants catches fire when brought near a flame.

- Another learner while learning about rainbows had a very simple question-why is the rainbows in the shape of an arc?

- A learner while learning about respiration in humans asked the participants –why is particularly oxygen essential for our respiration? What makes oxygen different from other gases?

- While studying the chapter Metals and Non-metal, the learners were inspired to cite examples of rusting from their daily lives. Learners came up with some very interesting example such as-bathroom doors are nowadays made of fibers.

- Learners were able to link two chapters Microorganism: Friend or Foe; and Changes around us and hence were able to explain the Chemical Changes in turning milk to curd by citing the microorganism responsible for it.

- Learners were able to link the concept of "indicators" to their daily lives while studying the chapter Acid and Bases –by identifying 'haldi' (turmeric) as an indicator.

Q 12: Could you please highlight the issues that were problematic and the issues that were satisfactory throughout 5E model of learning situation in details!

Being a new method, the participants faced a number of problems in implementing 5E Model of creating learning situation. These problems have been briefly discussed below:

1. **Problems with 5E Model:**

    a. During the phase Evaluate, the participants faced a number of problems like insufficient time allotment, lack of proper acquaintance-ship with Rubrics, confusion in understanding specific terminologies in rubrics, inability in preparing rubrics due to lack of sufficient pre-internship training.

    b. As the learners were used to behaviorist approach of teaching –learning they would respond to question of evaluation in a bookish manner despite being

discouraged of the same. The participants also confess to not being able to ask application level question or domain specific question.

c. The participants also encountered a problem in evaluating the learners when they would give collective answers. It took a lot of discipline and patience for the learners to learn and wait for their turn.

d. The participants faced a problem in evaluating divergent and critical thinking, however impressive it might be, as most of them evaluated the learners in the achievement test manner.

e. Evaluation was a problem when the class consisted of more than forty children.

f. Some of the students had communication problems, as they were too shy to interact with the different teachers. This created a problem in oral evaluation of student.

g. Rubric was every participant's bone of contention as it was very difficult to be executed in the Indian context of classrooms consisting of fifty to sixty learners.

2. Problem with Physical infrastructure

a. 5E Model requires at times the use of multimedia and ICT. Some of the schools to which the participants were sent to did not have this facility freely available.

b. Traditional classroom have the row wise seating arrangement, which posed a significant problem for the participants while making groups.

c. Learners, not used to the constructivist classroom setting, were bound to the teacher for instructions, and could not function properly at all without the participant's instructions and continuous disciplinary monitoring.

d. Time proved to be the biggest issue in implementing the 5E model of creating learning situations. The traditional 35 to 40 minutes of classroom time was mostly wasted away in forming groups or explaining instructions. Most of the participant pointed out to the rarity of being able to complete a single lesson with all 5Es implemented in the same period.

e. The regular teachers were not very supportive of the new approach of teaching-learning as they felt inferior to it, and were of the opinion that it isn't a very practical approach in the Indian context where to finish the syllabus was the paramount for a teacher.

Q 13: How practical in your opinion is the 5E Model of teaching in the Indian context?

This question elicited the strongest responses from all the participants. The problems faced by them in the 5E model condensed to their understanding of it in the single question of applicability and validity in the Indian context. The majority of the participants were of the opinion that 5E model is not at all suitable to the Indian context. The following were the responses of the participants when asked about the reality of 5E and the Indian Education System.

- Only a few of the respondents were convinced of 5E model's practicality in Indian Education. They had the reservation that this model is suitable only for pre-primary and primary learners, because the content in this standard allows for greater options and variety in implementing the 5Es.

- According to the participants, it was a very difficult, if not impossible job, to change the perception of learners used to traditional teaching of calk and talk to a new and more diverse form of learning. As most of the participants had themselves been a part of the traditionally taught class of learners, they had problems themselves accepting, implementing and training themselves for an altogether different pedagogical approach.

- Lack of proper pre-internship training by the institution was cited as a major deterrent in successfully implementing the 5E model of creating learning situation.

- The physical infrastructure was not supportive of implementing the 5E model of creating learning situations; right from the arrangement of the benches to availability of the instructional materials to evaluation procedure.

Q 14: Is teaching through 5E effective in all children of all age groups? Why not?

All the participants held the opinion that teaching through the 5E model was not well suited for the children of all age groups. They cited the following reasons for their opinion.

- Children in higher classes of today are used to the behaviorist approach of teaching learning, and hence not flexible enough to learn through the new approach.

- The content, as it grows abstract, it is more difficult to be taught using the 5E model of teaching.

- The learners are used to mugging up the answers rather than making meaning of what they learn. To inculcate a habit like reflective and critical thinking is a work best done when young.

- Higher classes do not have the patience and curiosity to learn a new topic, as learners are constantly being pushed in the rat race of competitive examinations, most of which check their knowledge acquisition skills and not knowledge construction skills.

4.3 DISCUSSION

A clear majority 68.33 % (41) of pre-service trainee teachers had a neutral view towards 5E Model of creating learning situations. Whereas a few 20 %(12) number of pre-service trainee, teachers held a negative attitude, even fewer 11.66%(7) were in support of 5E Model of creating and learning situations.

As the 5E Model of constructivism have five phases i.e., engage, explore, explain, elaborate and evaluate. Out all these phases the participants found some phases difficult and some easy. Participants found engage phase as one of the easiest phase because of many reasons: it were easier for learners who were habitual to the behaviorist classroom situations to be actively involved in a new method of learning, using teaching aids. Also at times, this phase brought out the prior knowledge of learners and one important aspect of this phase is that it helped in getting full co-operation and utmost attention of slow learners, mischievous learners and even the ones who were not interested in the classroom process at all.

In the next phase i.e., Explore, participants used different strategies for the formation of heterogeneous group. In the beginning when participants were not very familiar with the learners, they opted for random group formation but as the familiarity increases, the participants tried to make heterogeneous groups with learners of different cognitive abilities. In this phase participants stumble upon few problems like classroom physical infrastructure, seating arrangement of learners, learners friendship and hostility toward other learners and most important this phase is time taking.

During explain phase, the learners were able to make meaning and organize at first in a raw manner but latter in a more organize manner. At times, the learners would also deviate from the topic, as they would branch away from the main idea. In the next phase i.e. elaborate; the participants on a whole, pointed out to lack of time left during the period as the greatest difficulty and most of the learners could not save enough time from the previous phases to conduct the elaborate phase successfully.

In the last phase, Evaluate, participants considered it as the bone of contention due to various reasons like insufficient time allotment, lack of proper acquaintance-ship with

rubrics, confusion in understanding specific terminology in rubrics, inability in preparing rubrics due to lack of sufficient pre-internship training, encountered a problem in evaluating the learners when they would give collective answers, it took a lot of discipline and patience for the learners to learn and wait for their turn.

The participants faced a problem in evaluating divergent and critical thinking, however impressive it might be, as most of them evaluate the learners in the achievement test manner, it is also a problem when the class consisted of more than forty learners.