



**ORIGINAL RESEARCH PAPER**

**Education**

**CONTINUOUS AND COMPREHENSIVE EVALUATION OF HIGHER ORDER THINKING SKILLS (HOTS) IN SCIENCE AMONG VIII STANDARD STUDENTS**

**KEY WORDS:** Continuous and comprehensive evaluation, Higher order thinking skill, science subject, VIII standard students.

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**ABSTRACT**

This study has been conducted to examine the Continuous and comprehensive evaluation of higher order thinking skills (HOTS) in Science among VIII standard students. Totally 150 VIII standard students has been taken from 4 schools in Madurai district. The random sampling technique was used in this study. Higher order thinking skill (HOT's) questionnaire prepared by the investigator was used in this study. Survey method was employed in this study. The data was analyzed statistically by using mean, standard deviation, percentage analysis and 't' test. This study revealed that "most of the VIII standard students in Madurai district have average level of higher order thinking skill. Also this study revealed that there is no significant difference in the mean scores of higher order thinking skills in science between male and female, but there is significant difference in the mean scores of higher order thinking skills in science with respect to locality, type of school and medium of instruction. From the findings of this research, investigator concluded that the school science teachers of Madurai district must follow "child's thinking-centered learning" to make continuous efforts for improving the higher order thinking skill in science

**INTRODUCTION**

The Continuous and comprehensive Evaluation helps in developing the higher order thinking skills of the pupils. Higher order thinking (HOT) is thinking on a level that is higher than memorizing facts or telling something back to someone exactly the way it was told to you. HOT takes thinking to higher levels than restating the facts and requires students to do something with the facts —understand them, infer from them, connect them to other facts and concepts, categorize them, manipulate them, put them together in new or novel ways, and apply them as we seek new solutions to new problems. In fact, the term "higher order" thinking skills seems a misnomer in that it implies that there is another set of "lower order" skills that need to come first. Students are expected to master the lower-order level thinking skills, which will help them in further stages to master the higher order skills.

**Need and significance of the study**

The first and foremost responsibility of the teacher is towards the welfare of students. The primary objective should be to treat each individual student as an end in himself and to give the widest opportunity to develop his skills, abilities and potentialities to the full. The teacher should also accept his responsibility in the realization of the social objective. This implies that education should be related to the life needs and aspirations of the students. From this point of view, the teacher himself should actively stimulate her mind to think deeply and prepare higher order thinking questions to inquire student's minds in science classrooms.

In upper primary schools, the students of VIII standard find difficulties to answer the questions in state level achievement survey, national level achievement survey and National means cum merit scholarship. In future days students will have to face competitive examination which are commonly based on higher order thinking skill. But the current evaluation system doesn't pay more attention to this aspect. So keeping in mind the future of the student community the investigator has decided to study the continuous and comprehensive evaluation of higher order thinking skills in science among VIII standard students.

**Objectives**

- To find out the level of higher order thinking skill (HOTS) in

science of VIII standard students.

- To study the effect of continuous evaluation of higher order thinking skill (HOTS) in science of VIII standard with respect to gender, locality, type of school and medium of instruction.

**Hypotheses**

- The level of higher order thinking skill (HOTS) in science of VIII standard students is high.
- There is no significant difference in the mean scores of higher order thinking skill (HOTS) in science of VIII standard students with respect to gender, locality, type of school and medium of instruction.

**Sample**

150 students of VIII standard in selected schools from two blocks in Madurai district.

**METHODOLOGY**

The investigator has adopted survey method for the present study.

**Tool**

Higher order thinking skill (HOT's) questionnaire prepared as a tool by investigator.

**DATA ANALYSIS**

Data were collected using the tool and analysis done by using SPSS. For analyzing data, the statistical techniques Mean, Standard deviation, percentage analysis and "t" Test were calculated.

**Hypotheses**

**Table 1.1- Level of higher order thinking skill of VIII standard students**

| Variable                    | Low |       | Average |       | High |       |
|-----------------------------|-----|-------|---------|-------|------|-------|
|                             | No. | %     | No.     | %     | No.  | %     |
| Higher order thinking skill | 26  | 17.33 | 89      | 59.33 | 35   | 23.33 |

From the above table, the higher order thinking skill in science of VIII standard students (150) were 26 (17.33%) falls under low level higher order thinking skill, 89 (59.33%) of them are in average level and 35 (23.33%) students exhibited high level higher order thinking skill.

**Table 1.2- Significant difference in the mean scores of higher order thinking skills of VIII standard students with reference to certain background variables**

| Sl.No. | Variables | Categories | N  | Mean  | SD    | Calculated 't' Value | Table Value | Remark |
|--------|-----------|------------|----|-------|-------|----------------------|-------------|--------|
| 1      | Gender    | Male       | 82 | 50.78 | 13.66 | 1.49                 | 1.96        | NS     |
|        |           | Female     | 68 | 54.31 | 15.16 |                      |             |        |
| 2      | Locality  | Urban      | 75 | 57.16 | 15.52 | 4.29                 |             | S      |
|        |           | Rural      | 75 | 47.60 | 11.48 |                      |             |        |

|   |                       |                |     |       |       |      |   |
|---|-----------------------|----------------|-----|-------|-------|------|---|
| 3 | Type of school        | Government     | 82  | 44.51 | 10.05 | 9.15 | S |
|   |                       | Aided          | 68  | 61.87 | 13.16 |      |   |
| 4 | Medium of instruction | Tamil medium   | 124 | 54.35 | 14.44 | 3.81 | S |
|   |                       | English medium | 26  | 43.00 | 10.13 |      |   |

From the above table shows that the calculated 't' value (1.49) is lesser than the table value (1.96). Hence the null hypothesis, "There is no significant difference in the mean scores of higher order thinking skill of VIII standard students between male and female" is accepted. The above table reveals that the calculated 't' value (4.29, 9.15, 3.81) are greater than the table value (1.96). Hence the null hypothesis, "There is no significant difference in the mean scores of higher order thinking skill of VIII standard students with respect to locality, type of school and medium of instruction" are rejected.

**Major findings**

- VIII standard students have 17.33% of low, 59.33% of average and 23.33% of high level of higher order thinking skill in science.
- There is no significant difference in the mean scores of higher order thinking skills in science between male and female.
- There is significant difference in the mean scores of higher order thinking skills in science with respect to locality, type of school and medium of instruction.

**DISCUSSION**

59.33% of VIII standard students have average level of higher order thinking skill in science and 29.33% of students have high level of higher order thinking skill in science. This may be due to teacher's are not using infusion approach and also not giving ample opportunity to encourage students to think deeply. Naturally students have thinking ability on their own. But they are not allowing thinking on their own, because our evaluation system also not supporting to think on their own and we give them ready-made question and answers and not allowing them to think deeply. And also the urban students are better in higher order thinking skills than the rural students. This is because of the urban students want to enrich their knowledge to develop themselves. Aided school students are better than government school students. This is because Government school teachers not allowing the students to think on their own than aided school teachers. Tamil medium students are better in higher order thinking skills than the English medium students. This is because of Tamil medium students had the ability to enrich them by knowing new facts and concepts through communication facilities which they get from the society. The performance of students in higher order thinking skills (HOTS) are average. This is because teachers are not giving much more importance to students in improving higher order thinking skills. If teachers give ample opportunity to students in improving higher order thinking skills, they can achieve in the competitive world.

**Educational Implications**

Based on the findings, the investigator gives the following educational implications.

Teachers must implement infusion approach to students for developing higher order thinking skills in science. INFUSION integrates direct instruction in specific thinking skills into content area lessons. Infusion lessons are crafted to bring into content instruction an explicit emphasis on skillful thinking so that students can improve the way they think. Classroom time is spent on the thinking skill or process, as well as on the content. Conducting a lesson using the four-step strategy to teach thinking is time well spent and will maximize our chances for real improvement in student thinking. It follows,

The teacher introduces students to the thinking skill or process by demonstrating the importance of doing such thinking well.

The teacher uses explicit prompts to guide students through the skillful practice of the thinking as they learn concepts, facts, and skills in the content areas.

The teacher asks reflective questions that help students distance

themselves from what they are thinking about, so they can become aware of how they are thinking and develop a plan for doing it skillfully.

The teacher reinforces the thinking strategies by providing additional opportunities for students to engage in the same kind of thinking independently.

So teachers must follow the technique of Infusion approach to promote higher order thinking skills.

**Recommendations**

Our students must be prepared to exercise critical judgment and creative thinking to gather, evaluate, and use information for effective problem solving and decision making in their jobs, in their professions, and in their lives. From the findings of the present study the investigator offers the following recommendations:

- Encourage students to ask questions in the classroom during teaching learning process,
- Lead students through the process of how to connect one concept to another.
- Teach students to make inferences by giving them "Real-world" examples.
- Teach students to use a step-by-step method for solving problems.
- Encourage students to think "Outside of the box" using creative senses.
- Make use of technology to ease the teaching-learning process.

**CONCLUSION**

To be able to reap the benefits of assessment for learning of science, a shift in the mindset of all concerned, particularly the teachers, is required. The science teachers need to be provided opportunities during pre-service and in-service teacher training to reflect upon and modify their views on assessment. To be able to use assessment to enhance learning of science in classrooms, an understanding of goals of science learning, the purpose of assessment and tools of assessment are required. The teachers need to be highly skilled and have a deep knowledge of subject matter to be able to ask right questions at the right time. There is also a need to recognize and value the different learning styles of learners. So our school science teachers of Madurai district must follow "child's thinking-centered learning" to make continuous efforts for improving the higher order thinking skill in science. This study will be more fruitful if the suggestions given by the investigator are taken up and applied for further research.

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