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Diagnostic Testing: A Technique to Enhance Mathematics Learning

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DIAGNOSTIC TESTING

Literally, diagnostic testing stands for the testing and evaluation programme carried out for the diagnosis of something. The diagnostic testing and evaluation programmes carried out in the field of education. Educational efforts are aimed to bring desirable behavioural changes for an all-round development, in the personality of the learner. However many times these efforts may not yield the satisfactory results or the individual students may not be duly benefitted through such efforts resulting into one or the other kinds of behavioural problems or educationally failure.

Going in this way, the need of diagnostic testing arises in the subject mathematics specifically at the time when a particular student exhibits some or the other signs and symptoms of his failure or difficulties with regard to the learning of the subject mathematics. Why is one subjected to repeated failure in the subject mathematics? Why is he feeling difficulty in learning a particular concept or skill in one or the other branches and topics of mathematics? Why is he not attending the classes in the subject mathematics? Why does he create fuss or problems in the mathematics class? Why does he hate the teacher of mathematics and his subject? The list may be quite exhaustive with regard to such day to day or occasional problems faced by a teacher of mathematics with his one or more students. Surely like a physician or psychiatrist, here he has to resort to the methods of diagnosing the learning and behavioural, difficulties of his students for chalking out some remedial programmes to overcome difficulties and enhances mathematics learning.

It can be easily concluded from the above discussion that diagnostic testing and remedial teaching are inter-related and complementary to each other. However, the diagnosis not followed by the remedial treatment is useless. Similarly, a remedial task not based on the diagnosis of the nature and extent of the weaknesses may prove not only the wastage of the resources but can also prove dangerous to the wellbeing of the affected persons. It is, therefore, essential that diagnostic testing in mathematics should necessarily be followed by the suitable remedial teaching. In fact, neither diagnostic testing nor remedial teaching should ever be considered in isolation. They should form a part of a cycle known as diagnostic testing and Remedial teaching cycle which may be considered to involve the following processes for its complete execution.

- 1) Diagnostic testing for knowing the child's weaknesses and learning difficulties in mathematics.
- 2) Hypothesizing the probable causes for these weaknesses and difficulties.
- 3) Applying remedial teaching for removing these weaknesses and: difficulties.
- 4) Evaluating the outcomes of the remedial teaching.

By applying the diagnostic testing, the efforts are made to know the nature and extent of one's weaknesses and difficulties in the learning of that particular subject say mathematics.

Once the weaknesses and difficulties regarding the learning of a particular concept, knowledge and skill area etc. are identified, efforts are then made to list out the probable causes responsible for these weaknesses and difficulties.

The diagnosis helps in diagnosing the weaknesses as well as strengths, therefore, diagnostic testing may properly carry out for knowing what is appreciable, original, and creative and above average among the generous, creative and meritorious students. Based on such diagnosis, the efforts should be made to harmless on their potentialities and maximise their strength for helping them further to grow and develop in the better way. Therefore, it is no harm in carrying out the diagnostic testing and remedial teaching programmes for the gifted, creative or meritorious

CONSTRUCTION OF A DIAGNOSTIC TEST

.In general this task may involve the following three stages

- A) Planning for the construction of the diagnostic test.
- B) Construction of the Diagnostic test.
- C) Administration and Interpretation of the Diagnostic test.

A. Planning. Planning is very much essential for the construction of a diagnostic test. Usually, it may involve the following considerations:

(i) Identifying the Areas of Weakness or Learning Difficulties. First of all the need of constructing a diagnostic test should be properly identified. It may be based on the findings of the achievement test, classroom drill, and practice work, homework, and assignments, classroom behaviour of the students etc. The performance and behaviour of the students of the class (or a particular student) during such evaluation encounters may provide a clue or evidence of some or the other types of weaknesses and learning difficulties suffered by the students (or a particular student) in one or the other learning areas of mathematics.

(ii) Isolating a Unit, Sub-Unit or Concept for Diagnosing in Depth. Suppose, section B of the class IX (or one or the other particular students) has demonstrated a quite poor performance in the subject mathematics. What are the different weak areas?

Certainly, it needs a careful analysis of the results of performance tests and academic encounter with the students.

(iii) Content Analysis. The contents of the sub unit or a single concept should then be further analysed to determine;

- ❖ the pre-requisite behaviour i.e. the previous knowledge, skills etc. needed for the learning of a particular sub-unit or a single concept
- ❖ the expected behaviour demonstrated by the learner after learning the contents related to that unit or a single concept:

(iv) Deciding About The Nature of The Items of The Test: A proper decision should then be taken about the nature and numbers of the items of the diagnostic test since it should be as exhaustive, detailed and lengthy as possible, hence there must be more weight age to the short and very short answer type questions in comparison to the large and essay type questions

(v) Taking Decision about Necessary Administrative Measures: It is better to take a decision regarding the various administrative functioning of the test before sitting for its construction like the time limit, direction for the proper administration at the test scoring and interpretation etc.

B. Construction of the Diagnostic Test; In view of the things planned at the planning stage now attempts should be made to select appropriate items for being included in the proposed diagnostic test. This selection is mainly focused on the following three aspects.

- a) The nature of the contents.
- b) The previous knowledge, skills needed for learning.
- c) The terminal behaviour i.e. knowledge, skills, and application etc. acquired by the students after studying the contents.

C) Administration and Interpretation of the Diagnostic Test: The constructed diagnostic test should now be administered to the class for knowing about the weaknesses and learning difficulties pertaining to the learning of the sub unit or a single concept. The necessary directions related to the proper administration of the test should here be clearly explained or demonstrated to the students. When they have finished their task, the answer sheets along with the test paper should be carefully collected for the analysis and interpretation of their responses. For this purpose, these may be scored on the basis of the scoring key and model answers suggested in the constructed test.

Diagnosis of the Weaknesses

Diagnosis of the learning difficulties can be carried out may now be understood with the help of the following Tables given below:

1. A student is unable to tell why the lines OA, OB, and OP are equal in the figure of the diagnostic test.
2. A student commits an error in the measurement of the length of the radius and diameter of the given circular figure.
3. A student is unable to recall the formula for the computation of the area of a circle.

4. A student provides the wrong answer to the problem.
5. A student is not able to write definition of circle
6. A student is not in a position to understand concentric circles and concurrent circles.

Remedial Teaching Programmes

Despite the different methods and techniques needed for remediation, there are guiding principles:

1. Remediation should be accompanied by the strong motivational programme.
2. Remediation should be individualised in terms of the psychology of learning,
3. There should be continuous evaluation giving the pupil a knowledge of results.
4. Remediation programme may not always need a separate time allocation but they will always need some extra work for both the teachers and the affected students

Students are given individual remediation as follows:

- 1 Drill work to practice problems.
2. The practice of geometrical figures.
3. Video clipping to remember the definition of concepts.
4. Review work for finding the areas.

A Post Test is conducted after Remedial Teaching and Results Are as Followed

Sl. No	Statistical Techniques	Pr Pre-Test	P Post -Test
I	Mean	59 59.3	7 70.2
II	SD	88.7	6.8

CONCLUSION

‘In this way the, corrective measures for the removal of the learning difficulties and weakness of the students in the subject mathematics must involve all the aspects and domains of the learner. Many times, the problems deficiencies and weakness do not arise On account of a single factor. There may be multiple numbers of causes, academic, physical or emotional in character responsible for one or the other learning difficulties and weaknesses of the students in a particular area of learning aspects of the subject Mathematics.