MOTIVATION-PERFORMANCE-ACHIEVEMENT CONSTRUCTS THAT INFLUENCE TEACHING AND LEARNING MATHEMATICS AT SECONDARY SCHOOL LEVEL

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ABSTRACT

For now, the public raise doubt as to why performance in secondary School mathematics at external examinations falls low. Many reasons had been suggested by evaluators and educationists. Years of experience of teaching secondary school mathematics reveal that students’ interest in mathematics need to be aroused through worked examples during class instruction. Teachers should expose students to as many different methods of solving a particular problem as will enable them to maintain cognitive harmony when confronted with complex situations. Mastery of skills to attain a competency level should be emphasized and vigorously pursued during class instruction.

INTRODUCTION

Traditionally, teaching was”” conceived as a process of making impression on passive pupils, hammering in the”” (Pinsent, 1962). This traditional view of teaching has given way to a different conception. Teaching is more than the delivery of a carefully prepared lecture. Basically, it is an activity designed by a person more experienced, more knowledgeable and more mature with respect to learning experience to further the education of another.

According to De Young 91950) “Teaching is the provision for experiences and guidance of activities”. This implies that both the teacher and the learner must be active in the process of teaching. The learning learns through some activities while the teacher does all he considers necessary to make the learning possible.
Saylor and Alexander (1974) opine that teaching is “the act of systematically presenting stimuli and or cues.” What they mean is that unless a situation is created for learning to take place as a result of some effort, the effort cannot be referred to as a teaching. For instance, a man cannot talk of having given a present to a child until the child has actually received the present from him.

For an effective learning to take place the teaching must first of all arouse the interest of the learner in the subject he intends teaching. Such tendency is “Motivation”. Motivation of a student’s interest must always precede teaching since this arousal will prepare the mind for attending to what is to be taught. In this paper an attempt is made to show how motivation of student’s interest in Mathematics influences performance for achievement of expected goal set by the teacher.

**USE OF WORKED EXAMPLES**

In the teaching of Mathematics at the secondary school level, a student should be motivated by the teaching through worked examples of different types. The student now uses this learned behavior to attempt similar problems. The speed or vigour with which the learned response is performed and the frequency of performance can measure the strength of motivation of the learner. How well the learner is motivated towards a successful goal can then be seen by the level of persistence with which the learner continues solving problems other than the types the teacher solved in the class.

**COGNITIVE ORGANIZATION**

With many and varied worked examples presented to the learner he will use the experience to advance in a consistent manner for the internalization of the concepts and theories that form the basis for understanding of the instruction. The mastery of these concepts and the understanding of the underlying theories
given an evidence that the guided examples presented by the teacher provide motive to maintain some consistency in his cognitive representation.

The learner, however, is disturbed whenever he comes across conceptual expectancies that are inconsistent with the experiences acquired from the worked examples. In such a situation, the learner falls back to the various types of the worked examples for deeper understanding of harder problems. This deeper understanding will therefore help the learner to re-establish cognitive harmony. It is the motive for this cognitive harmony that helps the learner to explore new areas relevant to his acquired experience and consolidate his skill by synthesizing many theories and concepts embedded in a particular mathematical problem for a correct solution.

**APPROVAL FOR A GOOD RESPONSE**

The drive that stimulates the learner to persevere mastery of higher skills that those exposed to the learner by the teacher through illustrative or worked examples during the class formal instruction brings the learner to a level of merit of reward. A learner who is being praised by the teacher or who has “A” scores has a stronger motive work than a learner who is constantly scolded for asking foolish questions or not attaining approved score for success. Reward or praise in the teaching of Mathematics at secondary school level is a strong motive for an expectancy of good response in either problem solving situations or applications of learned skills on complex situation.

**PERFORMANCE**

Once a learner’s interest in Mathematics has been aroused, he now learns with much seriousness and becomes anxious to test his skills and proficiency. He is best guided when he is first introduced to very simple problems based on recall and understanding of basic facts. Progressively, he improves his skills by attempting problems that elicit higher cognitive response. Hence, depending on
how many different methods of solving a particular problem the learner was exposed to, his contact with problem involving higher reasoning and logic ascertains his skills acquisition and strengthens his confidence. The learned response as outcome of proficiency attained as a result of consistently conscientiously acquired skills exhibits a performance that meets the approval of his teacher. Such a performance will depend on.

(a) The background or early motive provided at the beginning of instruction;
(b) The persistence with which the learner pursued the acquisition skills to meet the set goal;
(c) The understanding of the theories and principles involved in the topic taught and
(d) The consistency and ability in the applications of the theories and principles appropriately.

The cognitive representation of the sum total of the enumerated facts above brings about a good performance. It must be noted that where the facts of the instruction are not well grasped by the learner a not-too-good performance will be expected. It is obvious then that a good performance of a task at hand in secondary Mathematics is ensured only on the learner’s deep understanding of the concepts and theories relevant to the task.

A typical example is illustrated in a problem below:

**Problem:**

the interior angles of a pentagon are $X^0$, $80^0$, $(2x - 15^0)$, $(2x + 43^0)$ and $3x^0$. Find $x^0$ in order to solve this problem correctly, the learner must have known.

(i) What a pentagon is,
(ii) The sum of the interior angels of a pentagon
(iii) How to solve an equation
(iv) What type of equation will be formed, and
(v) How to form the equation.

Unless the students’ cognitive organization is sound, there is a tendency for wrong or uncompleted solution. On the other hand, a student who had studied conscientiously the theorems on polygons and was sufficiently motivated during class instruction will perform very creditably.

A mathematics teacher who is conservative in the selection of problems for illustrative examples during formal instruction does not give a motive for good performance. This is so because at the secondary school level, whatever cognitive response elicited by the learner on new or complex situations in Mathematics must have been experiential.

Based on this approach, an experiment was carried out in 1990. Two classes of the same school level in two different secondary schools not in the same location were used. During the first term of the school year, topics ranging from indices, progressions, sequences, latitudes and longitudes etc.; were taught to the two classes. In class A examples of various types were solved in the class. The number of examples solved during instruction in class B, was restricted but exactly the same number of topic were taught to the two classes. An assessment test was administered to the two classes at the end of the period used for the experiment.

Performance was as follows:

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<tr>
<th>CLASS A</th>
<th>SCORE (100)</th>
<th>CLASS B</th>
<th>SCORES</th>
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<td>025</td>
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<td>027</td>
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<td>037</td>
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In another term the approach was changed. New topics were taught different from those of first term. Class worked examples in different topics were restricted for class A and B was exposed to as many worked examples as varied in type on each topic during class instruction. During assessment test in items sampled from topics taught, the performance was as shown below:

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<tr>
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Generally, it was observed that performance was always high in the class that students were motivated through may worked examples in each topic taught. Problems solved and got correct were those resembled the worked examples either by the class teacher or found in the class text book. Problems that needed higher cognitive skill from students but which similar example were not solved in the class nor found anywhere in class text book were not attempted by many students.

The influence motivation has on performance depends on the complexity of the task at hand. When a learner starts working mathematical problems using very simple example on a particular topic. The motivation is higher as he gets examples correctly solved. The performance at this stage is very high. While motivation improves the performance of simple well – learned tasks, it impairs performance of more difficult complex tasks.

**FEAR OF FAILURE**

For a good performance, a will motivated competency level must have been acquired by the learner during class instruction in mathematics. We should know that the learning of mathematics makes use of cognitive phase of the skill development. Unless mathematics is taught such that learners overcome fear and have confidence in themselves, negative performance will always be expected. Fear of failure, when confronted with task involving thinking and logic discourages most learners from attempting difficult mathematical problems at secondary schools. As a result, negative distractions come in to decrease the level of performance already attained when less complex situations were encountered. This fear or lack of confidence is overcome when the skills are well mastered and sufficient practice done for proficiency and competency attainment.
ACHIEVEMENT

When the learner knows the goal for learning Mathematics, he should be motivated towards achieving that goal. A student who intends to become an engineer, a surveyor or a computer scientist knows that mathematics is unavoidable if he really wants to achieve his life ambition. As McClelland (1965) emphasizes, “the choice of how he or she wants to be is given to the student, but the development of the skills and behavior that provide the student with real alternatives is the responsibility of the school”. It is obvious that the continued development and strength of our nation will depend on schools encouraging our students to achieve what they choose as their life ambition.

CONCLUSION

In order to arouse a students’ interest in mathematics, worked examples of various types must be unreservedly done in the class as the exposure to different methods of solutions motivates the students to work on their own for acquisition and internalization of skills. Performance is impaired if students do not have sufficient guide to fall back on when they confront tasks that appear inconsistent with the previously acquired experience. Achievement is the accomplishment of a set goal. Hard work and self-confidence promote achievement and bring to realization a learner’s self-actualization. In all, for improved performance in students’ achievement in tests and examinations, sufficient motivation of students’ interest and ability to encourage perseverance and attainment of instructional objectives form the starting point.
REFERENCES


