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ABSTRACT

This paper comments on three concepts in mathematics that need harmonizing: attitudes, mathematics, and evaluation. Some ways of evaluating achievement are suggested. Discusses portfolios as an evaluation process and provides information about additional assessment procedures.
(ASK)

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Attitudes, Mathematics, and Evaluation

by
Marlow Ediger

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ATTITUDES, MATHEMATICS, AND EVALUATION

There are three concepts in mathematics that need harmonizing. These concepts are attitudes, mathematics, and evaluation. Teachers of mathematics should stress the integration of these facets of learner achievement in teaching learning situations. Quality attitudes developed by learners assist in achieving knowledge objectives, such as vital facts, concepts, and generalizations. Good attitudes also help learners to achieve relevant skills ends. Among others, these skills objectives should definitely stress creative and critical thinking as well as problem solving. Subject matter achievement is then useful and used in problem solving. Evaluation emphasizes finding out what pupils have attained in ongoing lessons and units of study. Results from evaluation procedures should be used to help pupils achieve, develop, and grow sequentially in the mathematics curriculum. Thus, evaluation procedures used should assist pupils to attain vital goals of instruction (Ediger, 1997, Chapter One).

Evaluating Achievement

A variety of procedures should be used to determine how much each pupil has learned. Teacher observation is used frequently and can be excellent if quality criteria are used. Thus the teacher should notice if

1. a learner is improving in attitudes toward the curriculum area of mathematics. The pupil then needs to enjoy mathematics, its use, its structure, and, its patterns. Learners who like mathematics as a curriculum area volunteer to do extra work beyond that which is assigned. In his/her spare time, the pupil engages in reading library books on and solves personal problems emphasizing mathematics.

2. gifted and talented pupils show aptitude to excel in mathematical inquiry, as well as in acquiring salient skills, concepts, and generalizations. Selected learners will have long term goals in wishing to become an engineer, a chemist, or a mathematician. High

achievers in mathematics need to experience a challenging curriculum.

3. all pupils are achieving as much as individual abilities permit, regardless of capacity and socio-economic levels. Societal changes are rapid with the increased use of technology. Careers and occupations require increased abilities in decision making. Common labor positions are fewer and fewer in number in an age of computers, CD ROMS, video-tapes and disks, software packages, and multimedia approaches of learning in school and in society.

4. the self concept of the learner is more adequate to achieve more optimally. With a wholesome self concept, learners know they can and thus do achieve. Teacher observation of daily progress of learners is essential and quality criteria must be used in the evaluation process. Teacher observation is the most frequently used procedure of evaluation and can result in good methods to determine what learners have attained and what is left to achieve.

5. pupils individually are recognized for contributions made in the classroom setting in ongoing lessons and units of study. Each pupil can achieve optimally and should have esteem needs met when doing better presently as compared to formerly in mathematics (Ediger, 1996, 7-14).

6. learners attach meaning to what is being presented, either inductively or deductively. Meaning Theory needs strong emphasis in teaching so that pupils understand and comprehend knowledge and skills presented. Better use of mathematics can be made when subject matter and skills acquired are meaningful, not vague nor hazy.

7. purpose for learning is in the offing. With purpose, pupils perceive reasons for learning in mathematics. Vital knowledge, skills, and attitudes are then more likely to be attained. Taking time in a lesson to guide pupils to experience purpose for learning is time well spent.

8. interest in mathematics is being fostered. Attention of pupils needs to be in evidence if they are to achieve objectives in ongoing units of study. Attending is attained through interesting ways and approaches of presenting each lesson in mathematics. Various materials of instruction should be used here, such as concrete (items, objects,

hands on approaches, learning centers, project methods, and life-like problem solving), semi-concrete (illustrations, study prints, diagrams, charts, audio-visual aids, and diverse media in teaching), and abstract (textbook, workbook, library books, encyclopedias, discussions, reports, tapes, and listening centers). Good mathematics teachers diagnose pupil achievement to ascertain weaknesses in achievement. They wish to find out specifically where a pupil is not making progress. The specific problem of the learner may be knowledge or skill deficiency. When the specific is remedied, the learner might well improve in attitudes since continuous progress is more likely to occur. In addition to teacher observation, reputable standardized diagnostic tests may be used to identify pupil deficiencies in achievement. The diagnostic test will, in most cases, show where a learner is experiencing difficulties. Reteaching is then necessary to take care of the weakness. The standardized diagnostic test must have high reliability and validity. Otherwise little credence can be placed upon the results of the test. Results from the test must be useful to improve pupil performance and attitudinal quality.

9. quality teacher written test items can be very useful to evaluate teaching efficacy. The test items should cover what has been taught to be valid. Each test item must possess clarity so that the learner knows what is called for. The chances are better in having high reliability if clearly written test items by the teacher are in the offing. Good tests always possess quality reliability figures be it split-half, test-retest, or alternative forms reliability. From the test results, the teacher notices that which needs reteaching with the use of new or different teaching strategies. Positive attitudes should accrue from the evaluation if learners become increasingly proficient in the mathematics curriculum. Pupils then have a better chance of attaining objectives which should reflect positively in the area of attitudes.

10. a caring curriculum in mathematics needs to be in the offing. Here, the pupils and the teacher make honest and conscientious efforts to respect each other and work in the direction of having good human

relations. Providing assistance to learners who need help can aid in positive achievement of learners (Ediger, 1996, 155-159).

Constructivism as a philosophy of education emphasizes that pupils be heavily involved in the evaluation process. Here, pupils with teacher guidance decide upon what should go into a portfolio to indicate progress in mathematics. A quality portfolio might then contain

1. work samples of every day achievement.
2. cassette recordings pertaining to oral reports given and participation in ongoing discussions in mathematics lessons and units of study.
3. video tapes of the learner showing projects of completed collaborative activities in mathematics.
4. snapshots of individual endeavors, such as art products ongoing or completed, to show acquired concepts and generalizations.
5. self appraisal statements of the involved learner in reacting to questions of personal interests and motivation in mathematics achievement.
6. diary entries and logs kept on personal reactions to experiences in a mathematics unit or lesson of study.
7. journal writing to record feelings and values pertaining to ongoing tasks and accomplishments.
8. recorded metacognition endeavors to ascertain what has been learned and what is left to attain in specific tasks in mathematics.
9. records of progress made on teacher written tests as well as rubric results used to evaluate portfolio entrees.
10. collection of graphs, diagrams, and charts made by the learner to show mathematical data in the ongoing lesson or unit (Ediger, 1998, 203-208).

Portfolios may be shared with parents, the school principal and other responsible individuals. Portfolios involve pupil involvement in their completion. With parental participation in a conference setting, the pupil should receive additional home assistance to improve in the mathematics curriculum.

Additional Assessment Procedures

Standardized achievement tests may guide in evaluating learner progress in mathematics. The mathematics section of this achievement test generally stresses problem solving, computation, and concept development. The teacher and supervisor should appraise each pupil's results from the test to notice that which needs additional emphasis as well as stress in teaching mathematics. Standardized tests that possess high validity and reliability only, should be used to appraise learner progress. Pupils need to realize that testing is used to evaluate their achievement in order that better teaching will result due to having more knowledge by the teacher of learner areas of need. Testing should never be used to punish pupils, such as scolding them for not doing better on the test, nor should test results merely be shelved without any use made of the results. Rather the results are used to guide pupils to achieve optimally and continuously, not to make comparisons among pupils in mathematics achievement.

Anecdotal statements may be written by the teacher pertaining to each pupil's performance. Each statement written by the teacher needs to be brief and objective. It states precisely where the pupils is/ is not achieving effectively. The statement does not contain loaded terms, nor does it contain vaguely written content. The date for each statement should be indicated. If the mathematics teacher writes two anecdotal statements per day, one per student, then it does not take long to write them for an entire class. Thus if twenty-six pupils are in a class, it would take thirteen school days to have one anecdotal statement for each pupil in class. The teacher may compare earlier with later statements written to notice a pupil's achievement. Anecdotal statements written are for the teacher's records only, in recording observations made. They do not become a part of the permanent records of a pupil. Observations made by the teacher may be forgotten unless there is recording of a learner's progress. The purpose of anecdotal records is to have better knowledge of where each pupils is presently in

achievement. Guidance is then given each learner to develop into an optimal self so that the self concept improves. Improved attitudes toward mathematics should be an end result.

Each mathematics teacher needs to keep a journal to record present observations of pupil knowledge, skills, and attitudes in mathematics. An ongoing journal provides the teacher with information on diagnosis and remediation, as well as sequential progress, made in mathematics by a learner. Quality pupil attitudes should then be in the offing (Ediger, 1996, 3-25).

In Closing

The quality of appraisal procedures used in the mathematics curriculum should assist pupils to develop wholesome attitudes. Improved attitudes result when a learner has attained a better self concept. Wholesome self concepts come about due to a learner becoming more capable and proficient in mathematics. Evaluation results provide the teacher with necessary information on providing continuous sequential progress on the part of the learner. Pupils need to experience the best mathematics curriculum possible so that useful citizens in school and in society are an end result (See Berlinghoff, et. al., 1998).

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