

ALTERNATIVE ASSESSMENT METHODS BASED ON CATEGORIZATIONS, SUPPORTING TECHNOLOGIES, AND A MODEL FOR BETTERMENT

Marion G. Ben-Jacob¹, Ph.D. and Tyler E. Ben-Jacob²

¹*Mercy College, Department of Mathematics and Computer Sciences,
555 Broadway, Dobbs Ferry, New York 10522, Ph. 914-674-7524, Fax 914-674-7528*

²*American University of Antigua, Medical School, University Park,
Jabberwock Beach Road, PO Box W 1451, Coolidge, Antigua, Ph. 845-558-4292*

ABSTRACT

This paper explores alternative assessment methods from the perspective of categorizations. It addresses the technologies that support assessment. It discusses initial, formative, and summative assessment, as well as objective and subjective assessment, and formal and informal assessment. It approaches each category of assessment from the perspective of its goals. It describes the capabilities of the popular technologies that facilitate assessment. It then maps out a strategy for improved self-assessment that is based on the concepts of mathematical modeling and reverse mathematics.

KEYWORDS

Assessment, Technology, Mathematical Modeling, Reverse Mathematics

1. INTRODUCTION

Assessment is an integral component of improved education on the part of faculty, students, and programs. It provides feedback from which those involved can learn and make the necessary changes to enhance the learning environment. Technology can support and facilitate the process of assessment. This paper discusses the delineation of different categorizations of assessment, the technology that can facilitate assessment, and a model based on mathematics concepts that can be easily and directly applied to improve self-assessment.

2. ASSESSMENT

Often assessment is classified by types. The first category is divided into initial, formative, and summative. Initial assessment is the amount of knowledge and skill level exhibited at the beginning of a learning environment. It is used as a benchmark for the progress made in the educational process. Formative assessment is the measurement of progress made along the way. The goal of formative assessment is to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. Summative assessment measures the progress made at the end of the class or time period allotted. It is used for evaluation purposes.

It should be noted that among academics there is considerable dialogue as to whether the emphasis should be placed on formative or summative assessment in a college or university level course. This manifests itself in a core course as to the importance or percentages allotted to quizzes, short papers, and interim projects as opposed to that allotted to term papers, cumulative final exams and term projects.

Assessment is also delineated by objective and subjective. The simplest determination is that objective assessment has one answer and subjective more than one. Objective question types include true/false, multiple choice, and multiples response, etc. Subjective questions included extended-response questions and essays.

There is also formal versus informal assessment. Informal assessment is based on observation and discussion whereas formal assessment encourages a written evaluation. Formal assessment uses supporting data on which to base conclusions. The data comes from the tests that have been previously used and statistics such as percentiles or standard scores, often termed standardized measures, against which present outcomes are compared. On the other hand, informal assessments are content and performance based. One might give a student a short story to read and evaluate the numbers of tested words correctly read. A score of five out of ten words might be the result of this type of informal assessment (Weaver, 2013). One can also ask student to do an oral presentation with or without a PowerPoint presentation or develop and present a digital story. Digital storytelling is the use of computer based tools to relay information; the presentation employs some type of multimedia (Robin, 2014).

Independent of the type of assessment used, the goals are similar if not the same. Betterment or improvement is the ultimate target (Palomba & Banta, 1999). Success can be demonstrated in different ways, including higher grades on exams, improved writing skills on papers and essays, and more cogent verbal discussion on the part of the student. From a pedagogical perspective, success of assessment can be gauged by changes in teaching styles, assignments and projects that enhance the outcomes of student learning.

3. TECHNOLOGY

Technological tools have been developed to support evaluation techniques as well. One of the more popular ones is the use of clickers in the classroom. A question can be posed to the class by the professor with multiple choices. Each student has his own personal clicker with possible answers and corresponding numbers or letters, depending on the option choices. With a countdown timer students must respond in a timely fashion not allowing for any outliers such as looking up answers in a book, etc. Following completion of the countdown the results appear with a distribution of percentages across the board per the choices. The professor can assess the class as a whole, and each student can individually assess himself based on his class standings as well. Each clicker has a special ID code and only one ID is code connected to each of the user's account. The mean, median, and mode can be calculated per student compared to that of the class ("Iclicker," 2011).

Blackboard, a popular platform for teaching online, has tools built in for assessment. It is also compatible with the use of clickers. Blackboard offers many options such as uploading exams or assignments that will be graded right away. provided for such a survey. *Blackboard* allows for grading of discussion postings; comments on the part of the instructor can be entered as well. *SafeAssign*, a plagiarism prevention tool, is compatible with *Blackboard* as well. *SafeAssign* is integrated within *Blackboard* and prevents plagiarism by detecting unoriginal content in students' papers within the course. In addition to locating plagiarized material, *SafeAssign* can be used to illustrate proper citations for students. ("Blackboard," 2011).

4. MATHEMATICS

In addition to statistics, the mathematics concepts of reverse mathematics and mathematical modeling can be applied to self-assessment. Generally speaking, mathematical proofs are derived from hypotheses or certain axioms that are accepted as true. Logical implications are formed based on the accepted truth of the axioms. Reverse mathematics seeks to determine which truisms are required to prove theorems (Cobb, 2009).

Another applicable mathematical concept that we need to consider is that of mathematical modeling. Mathematical modeling describes a system or environment or situation using mathematical terminology. Certain assumptions for the model which may or may not be true are made. After the model is developed, the assumptions can be changed, developing a more accurate model. Mathematical modeling is used in different disciplines to help explain an entire environment, to determine the status of its components, and to make predictions ("Business," 2013).

5. SELF-ASSESSMENT

Students are always questioning how to perform better in a course and improve their grades. Initially, one could itemize the characteristics of a successful student: 1) Determine the grade for which to strive (2) Attend all classes (3) Pay attention to lectures/discussion (4) Ask questions in class (5) Visit professor during office hours if extra help is needed (6) Do all homework assignments in a timely fashion (7) Get tutoring from help/learning center (8) Watch videos about subject matter (9) Take practice quizzes to measure self-progress (10) Do extra practice in a lab manual.

Applying the concept of mathematical modeling, we reiterate the fact when designing a self-assessment plan, we usually do so optimistically. Its purpose as with other models is to promote productivity. The assumptions or axioms can be altered for a given conclusion.

6. COURSE ASSESSMENT

Course assessment is either done by an individual faculty member for the class he is teaching or by a group of faculty. If the latter is true, generic guidelines for a rubric may be designed and each professor can tweak them to suit his perspective and class. The rubric developed is dependent on the subject matter as well. We will discuss a basic freshmen mathematics course a basic freshman English course for the sake of comparison. Mathematics is a universal language and not a subjective discipline. An answer to a problem is correct or incorrect. The process of algorithm used in solving a problem is critical as it should work for all problems of the same ilk.

Assessment on the part of the instructor is based on percentage allotment, i.e. how much credit toward the final grade should be based on a midterm or final exam. Our contention is that even if one believes strongly in formative assessment, significant emphasis needs to be placed on a final exam. Quiz grades can let students know which topics they have mastered and what they still need to review, but if one does not retain the information from a basic math course at the end of the semester, it will be difficult to succeed in the next course. Mathematics builds on itself content-wise. Assessment in a basic English course is more subjective. The usual components include comprehension, grammar and expression of thought. Given a specific rubric, the students can achieve higher grades, knowing where to emphasize their work, i.e. on their weaker areas.

Again, consideration has to be given to focusing on summative or formative assessment. Perhaps, the institution wants to see how far the students can improve as it is a basic course. Even if this is true, we believe that a certain benchmark must be achieved by the end of the semester, i.e. summative assessment is important as well. Independent of one's major, a student needs to be able to write in a clear, grammatical way in order to succeed in advanced studies and in a profession.

7. CONCLUSION

The goal of this paper is to bring to light the importance of assessment in the academic environment and some of the technologies that facilitate it. Student self-assessment and rubrics for assessing the performances of students are fundamental for academic success. Assessment can be instituted via quizzes and exams, and via projects that included oral presentations, written papers, PowerPoint presentations and digital storytelling. The approach presented in this paper can only help charter the course for enhanced academic performance.

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