Assessment Principle Project

Introduction

Like any legitimate research paper, a teacher's report of his or her students' achievement and progress must be supported by a multitude of sources. Imagine conducting a survey of favorite collegiate football teams in which all the participants attended Virginia Tech. Suppose how the limited diversity of participants might affect your data. Now imagine a classroom in which every student's grade was based solely on the average of his or her quizzes. The student's grade seems hardly representative, just like the favorite football team survey. Thus I arrive at my research question: *How many different types of sources do teachers use to gather information about how well their students achieve in their classroom?*

Literature Review

The NCTM (2000) has two guidelines for assessment in its Principle. It should serve as a tool to detect and enhance student learning (Summative), and as a tool for teachers to adjust instructional decisions (Formative). Ideally, though, Summative assessment can serve as Formative assessment, and *vice versa*. Formal assessment differs from Informal assessment in presentation: Formal assessments are planned in advanced and have a greater impact on students' grades while Informal assessments are more spontaneous and not as crucial to, or do not affect, students' grades. NCTM stresses that assessment should be an integral aspect of the classroom. Rather than interrupting instructional time, assessment should be a part of the normal flow of class. Feedback to the students is also important because it helps them set their own goals and become independent learners.

Aside from feedback to students, though, is feedback to teachers. The second point NCTM makes is that assessment be Formative in that it serves as a diagnostic tool, helping teachers make decisions on instructional techniques and methods. This brings me to my point made in the Introduction above. "Teachers should look for a convergence of evidence from different sources … thus [getting] a well-rounded picture and allowing each student to show his or her best strengths" (NCTM, 2000, p. 23). The Council also offers examples of assessment techniques commonly used by mathematics teachers, one of which is open-ended questions.

Goetz (2005) believes cooperation plays an important role in learning, and that "we should assess what we value" (p. 12). Ergo, his assessments in his precalculus classes contain cooperative activities in which students' grades are partially dependent on the interactivity and communication between the students. His tasks are posed as open-ended word problems with real-world applications. In one example, given a data set the students were expected to construct a mathematical equation that models that data. There was a diverse range of answers varying from polynomial to rational to exponential functions.

The students' grades were based on a grading rubric, which the students were aware of before the exam. One of the elements on the rubric took group participation into account, and the students were expected to explain the specific roles each member played in the cooperative activity. That way, each student would get the deserved amount of credit. Goetz believes in using assessment as a tool for learning, such that students will turn an exam into a learning experience. This corresponds with NCTM's view that assessment should enhance student learning.

Grading rubrics are essential for assessment. In my personal experience and from advice from my educators, I can report that students' scores on assessments without rubrics can become

subjective and open to interpretation, and are a potential source of conflict between teacher and parents. In order to provide an explicit and objective grade, a grading rubric must be used. The higher resolution a rubric has, the more accurate students' score will be on that particular task. Sometimes, though, teachers create rubrics that are hard for students to understand, thus the students might score more poorly than if they had a clear indication of what is expected of them. Brown-Herbst (1999) had her middle-school students construct their own grading rubric. Her class's rubric was based on a final draft submitted by teachers from twelve schools participating in a statewide project in Alaska. While constructing the rubric, her students had to interpret the language used by teachers to gain an understanding of the spectrums of performance. After three days of debate and discussion among the middle-schoolers, they finalized a rubric that was to be used on not only their end of year exam, but also on that project itself. In other words, the students were being assessed by their own criteria.

A project such as the one implemented by Brown-Herbst (1999) takes much time and planning, but the knowledge and skills gained by the students are worth it. Students reflected NCTM's (2000) Communication process standard: they translated mathematical teacher language into mathematical student language, and conveyed concepts and ideas to one another and refined them. Even previously implicit ideas have been made explicit by students who asked each other to clarify meaning; e.g., "[a] seventh-grade girl spoke up: 'I need to know exactly what the "math thing" is' " (p. 453).

A final example as another form of assessment is offered by Bailey and Chen (2005). They introduced the graphing portfolio, in which students are expected to "trace out" a picture or graphic by using functions (either cartesian or a combination of cartesian and polar) to illustrate the lines in the graphic. This method is slightly related to Goetz's (2005) example, in that students are working backwards with functions: given a function's graph (or a curve of best fit), they need to find the equation. Graphing portfolios are useful for an artistic and creative touch in a mathematics course.

Methods

As I was interested in finding out what my mentor teacher Mr. Noble uses for assessment, I conducted an interview with him and discussed the different methods he uses to gather critical information about his students' progress in his classroom. The interview was at most informal, consisting of only the one aforementioned question and casual conversation thereafter.

Results

Mr. Noble uses many different types of assessment in his classroom. The usual pencil-paper tests and quizzes provide guidance for Mr. Noble on how to modify the speed of his instruction. He said he uses the results of these examinations to decide on whether to reteach material or to move on.

He asks questions to the class, on a whole class level and also on an individual basis. He said he often "call[s] on a specific kid" to find out what they know. This enables him to check on the progress of that particular student, as well as provides evidence to the student's parent(s) if necessary. He also uses this technique to try to get the students engaged if and when they are not paying attention.

The third method of assessment Mr. Noble uses is one-on-one tutoring during class time; but he mentioned this is not as useful as tutoring after school or outside of class, because there is a limited amount of time in the classroom and the teacher-to-student ratio is too low. He uses the

in-class time for small checkups but the truly useful time is outside of class. During that time, assessment and instruction are merged. Mr. Noble stated that the best indication of how much the student knows is on a one-on-one basis. It helps the student stay on track, and because he is working with the student on a closer level, he is able to report to the student's parent(s) and notify them of their child's progress. In addition to notification, he also provides resources (e.g., professional tutors) to the parents if he feels they would find those resources useful.

The last type of assessment falls under the "summative" and "formal" categories: midterm and final paper exams. For the students who take the SOL test, the final exam is optional. That is, the SOL serves as the final exam for those students. However, Mr. Noble stated that the "SOL test is not a good indicator of what [the students] know," although it will be next year. Lastly, according to Mr. Noble, the SOL test is so late in the year that even though the teachers are granted access to their students' scores, there is not enough time to do anything with them.

Conclusions

The pencil-paper quizzes and tests fall in the Formal category, but could be considered Formative or Summative (or both), because Mr. Noble uses them for two purposes: to quantify how much content students know, and also to guide him in his instructional practices.

When Mr. Noble asks questions to the class or to an individual, he is using Informal Summative assessment. It is in an Informal setting because the student nor teacher were likely prepared, and it occurs in a spontaneous manner. At the same time, it is Summative because he asks these questions to find out what students know, and then uses this data to report back to the students and/or their parents.

The one-on-one tutoring inside and outside of class is what I believe to be Formal and Summative. The meetings are scheduled, or else the student purposefully asks Mr. Noble for help, which is more Formal than his second assessment technique, but is still Summative because this technique is used strictly to find out how much students know.

The last assessment type strictly falls under the Formal and Summative categories. The midterm and final exams are even more Formal than the frequent tests and quizzes, and Summative for the same reasons: to report students' knowledge. If the final exams and SOL tests are used in a Formative manner, they have a negligible effect on an individual teacher and his current class. Any instructional changes from this data would be made in succeeding years.

In conclusion, there are many options for assessing students. The presentation of an assessment can be Informal or Formal, and the results can be used in a Formative and/or Summative manner. With the use of tests, quizzes, questions in class, one-on-one tutoring, projects, portfolios, and many more options at teachers' discretion, teachers can gain a more accurate representation of how much their students know and how much they have learned and progressed throughout the classroom.

References

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