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WRITING *STANDARDS*-BASED RUBRICS FOR *TECHNOLOGY EDUCATION* CLASSROOMS

Contents

The use of rubrics goes beyond the simple need for objective grading in classrooms.

There is nothing more frustrating for a student than to receive a project assignment with little or no description of how it will be graded. The student completes the project and then the teacher picks a grade by some unseen checklist. For students, parents, school administrators, and a program advisory board, this method of student assessment would seem vague and unfair. Fortunately, there are excellent guidelines for developing student assessments in ***technology education***. This article focuses on one type of ***standards***-based assessment strategy.

Standards and Assessment

How do ***standards*** and assessment interact? Ravitch (1996,p. 134) found that "***Standards*** can improve achievement by clearly defining what is to be taught and what kind of performance is expected…They can raise the quality of ***education*** by establishing clear expectations about what students must learn if they are to succeed." A key point with ***standards*** is that they must be measured or assessed to know whether students are meeting the prescribed outcomes. According to Wiggins and McTighe (1998), there are six facets of evidence in ***standards***-based assessment:

1. The assessment strategy is valid, reliable, sufficient, feasible, student-friendly and based on authentic work.
2. The assessment is grounded in credible and educationally vital evidence of the desired outcomes.
3. Students will be able to exhibit the desired outcomes.
4. The proposed assessment plan is sound.
5. The assessment models are developed and made available to stakeholders.
6. It is clear what learners will need to know for the assessment.

The goals of ***standards***-based assessments are identified in Measuring Progress: A Guide to Assessing Students for Technological Literacy (ITEA, 2002) as:

- Provides specific targets and expectations for students to achieve.
- Allows students to learn how to evaluate their own projects and to be aware of their progress.
- Generates more information regarding how a student is progressing toward understanding the content.
- Uses a variety of means to communicate, such as multimedia, models.
- Encourages accountability of students and provides a means to demonstrate learning to parents, administrators, and the community, (p. 5)

The International ***Technology Education*** Association in 2003 released the book Advancing Excellence in Technological Literacy: Student Assessment, Professional

Development, and Program ***Standards***. Five assessment ***standards*** assist educators in ensuring their classroom assessments are ***standards***-based. These five standards are consistent with the goals of ***standards***-based assessment (ITEA, 2002) and the facets of evidence (Wiggins and McTighe, 1998). The five ***standards*** are:

- A-1 : Assessment of student learning will be consistent with ***Standards*** for Technological Literacy: Content for the Study of ***Technology***, (pp. 20-21)
- A-2: Assessment of student learning will be explicitly matched to the intended purpose, (pp. 22-23)
- A-3: Assessment of student learning will be systematic and derived from research-based assessment principles, (pp. 24-27)
- A-4: Assessment of student learning will reflect practical contexts consistent with the nature of ***technology***, (pp. 30-32)
- A-5: Assessment of student learning will incorporate data collection for accountability, professional development, and program enhancement, (pp. 36-37)

Standards A-2 and A-4 invoke assessment strategies that are objective, practical, and authentic. With the proliferation of new technologies and the ongoing use of project-based learning to teach about those new ***technologies***, there is a problem with evaluation of student performance in skills that do not lend themselves to clear-cut objective assessment. ITEA (2002) recommends that assessment criteria and evidence-gathering tools align to assess student performance. One effective means of assessing is a rubric.

Standards-Based Rubrics

A rubric is a two-dimensional matrix used to organize ideas (Figure 1). The rubric is generally used to assess a performance or process element — the major, critical attributes that focus upon best practices. A set of criteria is on the vertical axis, and the levels of performance are on the horizontal axis, forming cells or intersections. In these cells are descriptions of the student performance. The criteria are the conditions of a performance that must be met for it to be considered successful. The criteria may be divided into specific elements, dimensions, or traits. The levels of performance indicate how well the criteria must be met for the performance to be considered attained. These levels are linked to a scale that indicates the possible points or percent to be assigned, from low to high. The descriptors of performance in the intersecting cells either accurately describe each level of the performance or specify concrete examples or telltale signs of what to look for at each level of the performance.
Note. Performance or process elements are the standard to be assessed. The rubric is designed to assess the criteria within that performance or process element.
Rubrics are objective assessment instruments when they state specific criteria, define the exact ways students can meet the criteria, and assign a numeric score or percent to each level of performance within the cells. The individual cells can have weighted scores in order for the teacher to focus student attention on the most important aspects of the skill or project. Weighting should be based on the value placed on the criteria in the real world by professionals. When complete and valid, rubrics can be used to objectively evaluate students for assessment and accountability purposes.
According to Kachergis (2004), high levels of rubric use lead to increased academic performance scores. To test this theory the author designed a study to assess whether the instructional practices of performance-based, inquiry-based, and authentic-based learning strategies and rubric use were related to improvement on the science portion of the Connecticut Academic Performance Test (CAPT), as indicated by CAPT gains from 1995 to 2001. Data were collected for this study by a survey/interview of 63 Connecticut high schools and their 118 certified biology teachers, who had participated in the science CAPT administered within that same school district. Results indicated that schools having the highest levels of strategy and rubric use also demonstrated high CAPT gains and increasing CAPT scores over time.

Communication Technology Example

The sample product rubric (Figure 2) was devised for evaluating secondary-level communication ***technology*** students working cooperatively on thirty-second public service announcement videos for United Way® organizations. The project had various elements that matched up with specific technological literacy ***standards***: ethics (STL 4), design (STL 8, 10), use of communication ***technologies*** (STL 12), and effectiveness of the finished communication project (STL 17). Some of the criteria were weighted. Use of media was weighted at five percent, while the video effectiveness was weighted at 15%. Students in the class had a good understanding of what was expected of them on the project because the rubric was distributed with the assignment.
Note. The text in the STL column refers to the matching standard and benchmark (high school level) in ***Standards*** for Technological Literacy (ITEA, 2000/2002).

Building Rubrics

Although there are many sets of guidelines for writing rubrics, they all follow a similar path of eight steps. First, the teacher should find out how the real world defines quality performance or a product. Second, gather examples of student and expert work that illustrates a range of quality. Third, sort the samples into four to six groupings by quality of performance or product. Fourth, differentiate within the performance or product specific skills or attributes. Fifth, write descriptive statements for these attributes. Sixth, within the specific skill or attributes, write an operational definition at the different levels. Seventh, link your student and expert examples to the different criteria and levels for instructional, communication, and professional development purposes. (Pasco County, 1996; San Diego State University, 1999.)
In the final stage, teachers use the rubric in their classrooms and evaluate the results. Was it understandable to students? Did it capture the quality of skills or products as they are in the real world? Does the scale match the importance of the specific attributes through weighting? These questions will help the educator evaluate whether his/her rubric is valid and reliable to use. Validity indicates whether the rubric addresses the relevant ***standards*** and benchmarks, defines the criteria the students will be judged on, is easy to understand and administer, and gives students the opportunity to be successful at some level. A reliable ***standards***-based rubric will result in consistent scores, no matter the scorer.

Benefits of Using Rubrics

By using teacher-developed rubrics for projects and skills, students gain a clear understanding of what is expected of them to attain success. Explicit guidelines and feedback from teachers let the student know expectations and how to improve their performance. Students can use the rubrics to self-evaluate their preparation, performance, and quality of work. (ITEA, 2002.)
A benefit to the teacher is a reduction in subjective grading and time devoted to grading. In addition, ***standards***-based assessments help teachers to clearly define what is expected of students and therefore what logically needs to be taught to students. Rubrics are a direct way of implementing the STL technological literacy ***standards*** in classrooms. Evaluation of classroom rubrics can assist in refinement of lesson sequencing, content, and focus. Low class scores in specific criteria may indicate problems in instruction that can be changed. (ITEA, 2002.)
For administrators, parents, and advisory board members, classroom rubrics give clear indications of what the teacher is focusing on, what is being assessed, and how students are being prepared for technological literacy. The use of rubrics goes beyond the simple need for objective grading in classrooms. When properly designed, they provide a roadmap for student, teacher, and community success. For online assistance in writing rubrics, go to www.rubrics.com or http://rubistar.4teachers.org/index.php.
This is a refereed article.

Figure 1. Rubric components.

Levels of Performance (Novice to Exemplary)

Scale: 1-4, or percent (0-49%, 50-69%…)

Criteria: multiple conditions of the performance to be assessed

Descriptors of Performance (no or little, some, good,

complete and insightful) or specified concrete examples

Figure 2. Product rubric for public service announcement project.

Legend for Chart:

A-Criteria (Points/100)

B-Novice 0-49%

C-Developing 50-69%

D-Proficient 70-84%

E-Exemplary 85-100%

F-STL

A

B

C

D

E

F

Preproduction: Planning (10)

No or little evidence of planning, problem analysis,

or research.

Some evidence of problem and audience analysis, but

outline vague.

Good analysis of problem and audience. Concepts make

sense.

Complete and insightful analysis, content outline, and

treatment.

8-H 10-I

Script and Storyboard (10)

Incomplete or descriptions are vague.

Thumbnail sketches and script are illogical and do

not adequately describe storyline.

Includes scene numbers, video, and audio descriptions.

Story sequence is logical in script and Storyboards.

Detailed and logical shot sequencing, transitions, audio, and graphics included.

8-H 10-I

Production: Camera (20)

Serious problems with focus, steadiness, and framing.

Steady, but framing amateurish. Too many long, wide shots and too few close-ups.

Clearly focused and framed, with limited zooms.

Steady and creative shots that enhance video. Great use of close-ups.

12-0

Audio (10)

No original audio recorded.

Poor quality audio recorded from use of on-board microphone.

Correct microphones chosen, clear audio recorded with good levels.

Same as proficient. Room tone and sound effects recorded in field.

12-0

Lighting (10)

Poor ambient lighting choices: heavy back lighting.

Adequate lighting on subjects, some video noise.

Use of three-point lighting scheme. Bounce lit exteriors.

Excellent and creative use of lighting to propel story emotionally.

12-0

Post: Continuity and Pacing (10)

Shot sequencing is incomprehensible. Shots are left way too long. Edit points glitchy.

Shots are in adequate sequence, some attempts to make edit interesting. Transitions look gimmicky.

Pace and timing good. Clips move along, telling the story.

Moderate use of transitions.

Shots logically pace the story along in an interesting way.

Excellent use of transitions.

12-0

Use of Media (5)

No use of titles, graphics, or music.

Music does not fit video; stand-alone title taped with camcorder.

Good use of music, titles, and graphics.

All media work seamlessly to propel story. Clearly demonstrates understanding and application of media in videos.

12-0

Other: Video Effectiveness (15)

Does not meet project goals. Unclear message, very sloppy video.

Meets video goals. Topics presented with basic points covered.

Topic presented with insights. Client can use video to meet objectives.

Video is focused, with rich variety of supporting material. Client very satisfied.

4-H 17-N

Teamwork (10)

No teamwork or shared responsibilities.

Some teamwork but one person dominates decision making.

Group agrees on assigned roles and shares workload.

Cooperation and collaboration are routinized.

PHOTO (BLACK & WHITE)

References

*??? International **Technology Education** Association. (2000/2002). **Standards** for technological literacy: Content for the study of **technology**. Reston, VA: Author.*

*??? International **Technology Education** Association. (2002). Measuring progress: A guide to assessing students for technological literacy. Unpublished manuscript.*

*??? International **Technology Education** Association. (2003). Advancing excellence in technological literacy: Student assessment, professional development, and program **standards**. Reston, VA: Author.*

??? Kachergis, T. (2004). Instructional practices among science departments with high, moderate, and low gains on the Connecticut academic performance test (Doctoral dissertation, University of Bridgeport, 2004). Dissertation Abstract International, 64/11.

??? Pasco County, (1996). High school learning communities training: Student performance expectations and assessment. Land O' Lakes, FL: Author.

*??? Ravitch, D. (1996). The case for national **standards**. The Clearing House, 69(3), 134-135.*

??? San Diego State University, (1999). Guidelines for rubric development. Retrieved July 12, 2004, from http://edweb.sdsu.edu/triton/july/rubrics/Rubric%5fGuidelines.html

??? Wiggins, G., & McTighe, J. (1998). Understanding by design. Alexandria, VA: Association for Supervision and Curriculum Development.

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