

Assessment Methodology in Technical Courses

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Abstract

Columbus State Community College is committed to assessment (measurement) of student achievement of academic outcomes. This process addresses the issues of what each student needs to learn in his or her program of study and if each student is learning what they need to learn. The assessment program at Columbus State Community College has four specific and interrelated purposes:

1. to improve student academic achievement;
2. to improve teaching strategies;
3. to document successes and identify opportunities for program improvement;
4. to provide evidence for institutional effectiveness.

The Computer Information Technology (CIT) department at Columbus State is actively engaged in studying and implementing “best practices” in assessing students in technical programs. Responding to workforce needs requires that our students are evaluated according to the specific standards currently in use in their particular field.

This presentation will discuss assessment practices beneficial to technical programs such as ours and will focus on standardized assessment practices such as program rubrics, quizzes, tests, and assignments, as well as the meta-cognitive techniques of student self assessment, minute papers, etc

Assessment in Technical Courses

Assessment in the college classroom is a difficult task. In addition to the outcomes that need to be measured in each class, our department has identified several formative and summative outcomes we would like our graduates to achieve, and our college has identified general education outcomes that need to be considered, as well.

If you take all of these outcomes and then add a complex theory of learning styles, such as David Lazear’s concept of multiple intelligences, the task of assessing necessary outcomes appropriately becomes weighty.

How do you take all of these learning styles into consideration when overlaid on all the outcomes to be measured? We are left with the task of employing a variety of tools that will accurately measure how well our students have learned the specific material for each class, as well achieved

the more global outcomes required by our department and the college. Some tools, like the rubric, are geared toward accurate advertisement and evaluation of certain competencies. Others, such as a one minute paper, or journal, are geared toward more self awareness and understanding of what one knows or is learning. Below are some assessment methods—our “toolkit” that can be used in a variety of technical classes and for many different learning styles

Rubrics

According to the teachervision.fen.com site, a rubric is a “scoring guide that seeks to evaluate a student's performance based on the sum of a full range of criteria rather than a single numerical score.” A good rubric takes the guesswork and subjectivity out of grading. In computer programming courses, a rubric looks for the presence of specific aspects of a good program. Is the logic sound, is there documentation, are variables defined correctly, and does it work? These concepts can all be woven into a good rubric. But what is a good rubric? Below is an example:

CPT262 CLIENT/SERVER SYSTEMS LAB 1 GRADESHEET

NAME _____

	Points Possible	Student Score
File System diagram	_____	_____
OU diagram	_____	_____
Create container	_____	_____
Create users	_____	_____
Login scripts	_____	_____
Home directories	_____	_____
Assign rights	_____	_____
NDS security	_____	_____

This rubric helps teachers measure specific desired results and lets the student know just what was correct and what was missed. In addition, a Rubric should be given to a student when the assignment is made, so that the student knows what will be expected.

Peer Review

Having students review each other is another useful tool in assessment. Our final project course uses peer review to get an inside view of what students thought of their team members contribution to the project. This review is weighted in such a way that it can increase or decrease a student's score by one grade letter.

ATTENDANCE: Out of 100, rate this individual's attendance _____

PARTICIPATION: Based on 100, rate this individual's participation in the team activities.

_____ Do responses make logical sense?

_____ Is the student verbally participating?

QUALITY: Based on 100, rate this individual's quality of written work _____

(Appropriate format used, is spelling correct, is it legible/formalized, and is it applicable?)

COMPLETION: Based on 100 rate the individual's preparedness for meetings and group activities

_____ Assignments completed on time?

_____ Member was prepared for meetings
(assigned reading, agenda, etc.)

TEAMWORK: Based on 100, rate this individual's willingness to work with your team _____

Highest Possible Score 700, this individual's total score: _____

COMMENTS (Required):

Traditional Tests and Quizzes

Regular written tests are the staple in most classes. These tools allow the teacher to ascertain what the students are learning. But a good written test is a challenge. Tests can and should include a variety of methods, i.e., multiple choice questions, essay questions, true/false questions, the dreaded fill-in the blank, and reproducing lab work. As technical teachers, we sometimes bypass questions that measure what we are teaching, because they become difficult tests to grade. We must be sure we include those components from our courses, that actually measure what we've been teaching.

A non-traditional spin on tests and quizzes that help to accomplish this goal are weekly, non-graded "quick quizzes" that a teacher can use to make sure the students are staying current with their reading and understanding the main concepts therein. These quizzes are not anxiety producing since they are not graded and have the added benefit of acting as a study guide to larger, graded exams.

Below is an excerpt of a quick quiz used in PC Operating Systems:

Quick Quiz (Chap 11)

1. In Windows 9x, disk compression works by creating a special file called a _____.
Answer:
2. A temporary storage area in the RAM for data being read from or written to a hard drive is known as a _____.
Answer:
3. In making backups using the child, parent, grandparent method, how often is the grandparent backup made?
Answer:
4. Creating a replica of a hard drive so that the drive can be used on a new computer is known as _____.
Answer:

5. What does RAID stand for?
Answer

Another example of a testing method is the following, used in a Networking class:

Essay question: (5 pts)

Compare and contrast Novell and Windows 2000 in the way they create users, assign security and profile the user. Which do you prefer? Support your answer.

That same test includes the following types of questions:

Repeaters work at the _____ OSI layer.

- a. DATA LINK
- b. APPLICATION
- c. PRESENTATION
- d. PHYSICAL

On a(n) _____ network, all workstations must wait until they have control of the token packet to use the network.

True/False Users may have rights to directories but not individual files on a NetWare LAN.

- | | |
|--------------------|------------------------------------|
| _____ PRESENTATION | a. bits, circuit boards and cables |
| _____ SESSION | b. routing information |
| _____ PHYSICAL | c. creation of a connection |
| _____ TRANSPORT | d. end to end checking |
| _____ NETWORK | e. encryption, compression of data |

Labs

What would a computer class be without labs? Lab assignments show us day to day how well students are “getting it.” We don’t have to wait until a mid-term (5 or 6 weeks into the quarter) to evaluate student progress. This is the best part of teaching programming: those “aha” moments when you see it all coming together.

When asked what they most want to see from their students, most teachers will say the ability to take what they’ve been given and use it in another way. That’s the satisfaction of watching students work through lab projects. They take the pieces you’ve given them and put them together to solve a problem.

Below is an excerpt from a programming lab:

Programming 1

Lab Exercise #3 – Adjusted Gross Pay Report, utilizing MP, DP, and ROUNDING

Management has decided to adjust the Rate of Pay for employees who work either 2nd or 3rd shift. Those employees who work 1st shift will not receive any increase at all. The following table summarizes:

SHIFT	RATE OF PAY
1	No Increase
2	10%
3	12%

INPUT: Input consists of the 80 byte fixed unblocked disk file. The file layout is the same as Lab 1 and Lab 2.

OUTPUT: Create a report listing the Employee Name, Employee ID, Shift Code, Hours Worked, Rate of Pay, Gross Pay, Adjusted Rate of Pay and Adjusted Gross Pay for each employee.

These hands on assessment methods really help those students who can visualize a problem, but may have trouble logically deciphering the same concepts on a multiple choice exam.

One Minute Papers

A discussion on assessment would be incomplete without recognizing the importance of meta-cognition and use of meta-cognitive techniques in assessment. Essentially, meta-cognition is the learner being able to stand outside himself and objectively know what he knows. In other words, the learner should be able to understand what he didn't know before, and how that vacuum was filled with the appropriate knowledge, skills and/or attitudes to form a complete comprehension. Also, it may be that learner is on the road to understanding, but should see the path before him in order to realize what his next steps should be.

One of the best tools in promoting meta-cognition is the "One-Minute Paper," as suggested by Angelo and Cross. A one minute paper is used during the last few minutes of class and helps students to identify the concepts they're struggling with. The assignment is simple: Have students use half a sheet of paper and write 2 things: the most important thing they learned today, and the thing they understood least today. It helps them to clarify what they need to know (meta-cognition), and the things that will help you as a teacher understand what you need to better emphasize.

Journals

Journaling helps students build that meta-cognitive road map to success. The key to journaling is that consistent effort by the student and feedback by the instructor is crucial if the student is to buy into it. At least weekly, progress must be mapped by the instructor, with constructive and appropriate statements to the student to provide for additional reflection. The downside to this is that more time is needed by the instructor and student to be able to make this successful, even though the technical aspects of the course need to be covered.

Group Work

The best tool I've found for helping students to understand technical material is group work. I do not use it at the beginning of the quarter, but about half way through when I know the various abilities or liabilities, and what personalities are at work in the class. I don't let students pick

their own groups, but group them according to my perception of what each needs to get from the whole

The group size should be limited to three to enable students to contribute equally. Each person is told what the lab will consist of, and it's up to each member of the group to decipher the problem and decide what he or she will contribute. The group lab is generally based on a homework assignment they've been given the class before, so students are highly motivated to contribute. Groupings are for the class period only and likely are different in subsequent class periods. After the work of the group is completed, the class is reconvened and each group's project is critiqued in a non threatening manner by the class and instructor. Bonus points are given for the group lab on an equal basis. Real world problems are given for students to apply logic problem solving. An example of a group work problem is below:

Chapter 2 In Class Exercise:

In groups assigned by the instructor, come up with flowchart and pseudo code solutions for the following example

You need to clean the floor! You have to have certain equipment (e.g. mop, broom, dustpan) and cleaning product (MopnGlo or whatever). We are going to assume that all equipment necessary is available, but you need to check and see if cleaning product is available. If it is, you can use it. If not, you will either borrow some from the neighbor OR go to the store and buy some. You need to clean the floor in the right order. Each use of the mop is defined as 5 strokes. You need to check after each mop use if the floor is finished. If it is, you have to see if it passes inspection. (Your spouse, significant other, or very intrusive aunt will inspect the floor. If that person does not deem it clean, you must do it again) If the floor is not finished, you have to see if the mop needs rinsed. Then you use mop again. You keep up in this fashion until the floor is finished. When the floor has passed inspection, clean your equipment and put away supplies and equipment, and enjoy a beverage of your choice!

Conclusion

Our main goal in this presentation is to offer our colleagues useful, understandable and tangible tools in helping students succeed. We will be offering examples of our work throughout this presentation and encourage other faculty to call on us to discuss whatever practices may need clarification.

References

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