

**Classroom Technology Assessment and Research:
Exploring Technology as a Learning Tool
May 7, 1997**

Tod Treat
Natural Sciences/Chemistry
Parkland College
ttreat@parkland.cc.il.us
217-373-3709 (voice)
217-351-2581 (fax)

Lisa Hinchliffe
Academic Technologies
Parkland College
janicke@parkland.cc.il.us
217-351-2596 (voice)
217-353-2241 (fax)

The Classroom Technology Assessment and Research Initiative (TechCARI) provides an opportunity for faculty members to collaborate in examining the impact of technology on learning in their classrooms. Underlying the initiative is the understanding that technology is a means to the end of excellence in teaching and learning and not an end in itself. TechCARI is a component of the larger Classroom Assessment and Research Initiative sponsored by Parkland College's Center for Excellence in Teaching and Learning. Parkland College is a public community college with approximately 10,000 students, 150 full-time faculty and 300 part-time faculty.

Problem Statement

Faculty members at institutions of higher education throughout the United States and the world are being encouraged to infuse technology into the curriculum they teach. Early innovators have enthusiastically embraced technology and found innovative ways to include technology in their courses. Other faculty members are more skeptical and want to understand how technology helps in the teaching and learning process. Parkland's Fall 1996 Faculty Professional Development Needs Survey indicated that faculty were interested in learning more about technology, teaching and assessment. Additionally, Parkland's Instructional Technology Strategic Plan [Draft, 1997] has as a strategic action to "Assess efforts to integrate technology in teaching and learning in order to recognize successful use and direct future improvements." Faculty from the Center for Excellence in Teaching and Learning and the Department of Academic Technologies responded to these issues by creating the Classroom Technology Assessment and Research Initiative.

Program Description

The Classroom Assessment and Research Initiative (CARI) is part of a broader program to meet the professional development needs of faculty. The Center for Excellence has two major initiatives: the Mentoring Program and CARI. In addition, the Center hosts various

workshops, discussions and other learning opportunities throughout the semester, particularly during each semester's Preparation and Development Week.

The Classroom Assessment and Research Initiative is based on the concept of Classroom Assessment as described by Thomas A. Angelo and K. Patricia Cross in Classroom Assessment Techniques: A Handbook for College Teachers. Classroom Assessment helps teachers better understand what and how students are learning in their classrooms and what methods work best for facilitating learning in a given classroom. Classroom Assessment Techniques are a powerful means of increasing student motivation and enhancing learning. A Fall 1996 survey of 250 students in 18 courses found that 49% of the students thought that the use of CATs helped them learn more than if CATs had not been used, 90% thought that the use of CATs showed that the instructor cared about the opinions of students, and 63% would like to see CATs used by their other instructors. Faculty Research Project Reports also indicate that student learning is improved by the use of CATs in the classroom.

Faculty using Classroom Assessment Techniques systematically solicit anonymous feedback from students and analyze those responses to get insight into what and how the students are learning. The feedback is formative and faculty are encouraged to make instructional adaptations during the semester in response to student feedback. The methodology of Classroom Assessment is summarized in the Feedback Loop. (See Figure 1) By following the process depicted in the Feedback Loop faculty receive information from students through CATs and then respond to that feedback and adapt their teaching.

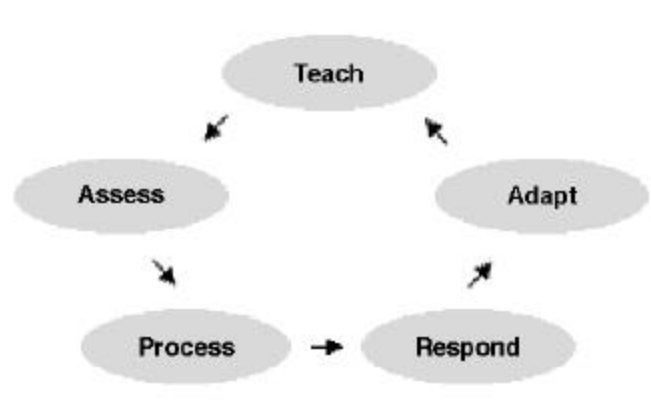


Figure 1: The Feedback Loop

In the introductory CARI series for New Classroom Assessors and Researchers, faculty learn how to identify their primary teaching goals, how to use CATs to assess whether students are reaching those goals, and how the feedback process can establish a dynamic partnership with students. During the semester, faculty are required to attend six CARI workshop sessions, participate in collaborative group activities based on their primary teaching goals, administer CATs to their students, and present a final written Classroom Research Project Report. In a Fall 1996 survey of new CARI participants, 83% identified CATs as being useful for obtaining feedback on student learning and 92% encouraged other instructors to learn about CATs and Classroom Assessment.

Graduates of the introductory CARI series are invited to continue their study and use of Classroom Assessment Techniques. The three continuing CARI courses are: (a) Learning Issues in Action, a group basing their discussions on Classroom Research: Implementing the Scholarship of Teaching by K. Patricia Cross and Mimi Harris Steadman, (b) CultureCARI: Connecting Cultures in the Classroom, and (c) TechCARI: Exploring Technology as a Learning Tool. Faculty who participate in any of the courses are given the necessary instructional materials and a light lunch is provided during each workshop session at an approximate total cost of \$100 per participant. Facilitators receive a stipend and formal recognition for their work. As of Spring 1997, over 75 faculty from a wide variety of disciplines have participated or are currently participating in some level of the initiative. A Classroom Assessment and Research via E-Mail online discussion group is available for faculty who are unable to attend a CARI course and for any CARI participant who is interested in discussing teaching and classroom assessment with a larger group of faculty. Over 50 faculty are currently participating this discussion group.

TechCARI, following the successful model of the introductory CARI series, has two key components: (1) classroom assessment and research, and (2) supporting, challenging and encouraging colleagues. Faculty participants apply what they learned in the introductory CARI series to issues related to using technology to enhance and extend learning. Group discussions and presentations by the participants foster collaboration and a supportive environment for exploring technology as a learning tool. During Spring 1997, six two-hour sessions focused on developing technology-focused CATs (TechCATs) and teaching strategies which incorporate technology. In a departure from the CARI structure, TechCARI did not have regularly scheduled discussion sessions for informal dialog and feedback. Instead, TechCARI participants were encouraged to use FirstClass, an electronic conferencing software program, which allows discussion without requiring a set meeting time. TechCARI participants were also invited, but not required, to participate in the Classroom Assessment and Research via E-Mail online discussion group.

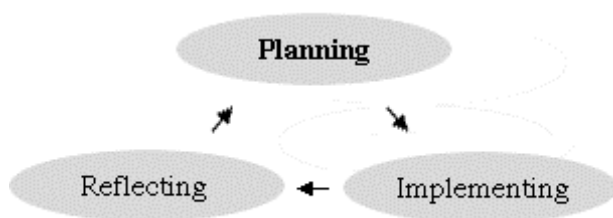


Figure 2: Classroom Assessment Project Cycle

The six two-hour sessions followed the general structure of the Classroom Assessment Project Cycle as explained in Classroom Assessment Techniques. (See Figure 2) The first two sessions concentrated on planning; the next three sessions on implementation; and the final session on reflection. During the planning stage, faculty reviewed how to

identify their primary teaching goals, determine their assessable questions for their Research Projects, and develop technology-focused Classroom Assessment Techniques (TechCATs). During this stage, participants also read and discussed “Asking the Right Questions: What Does Research Tell Us About Technology and Higher Learning” by Stephen Ehrmann (<http://www.aahe.org/tltr-ch2.htm>) in order to better understand the

larger context of the issues they were exploring. Faculty assessable questions for Spring 1997 included:

Does the interactivity of the World Wide Web draw students into controversial subject matter which they would prefer not to explore?

Will reluctant students engage in e-mail discussions more readily than in oral face-to-face discussions?

How can chemistry mechanism software be integrated into an organic chemistry course to enhance learning?

During the implementation stage, faculty used a number of TechCATs to explore possible answers to their assessable questions. Faculty members shared student responses to TechCATs with other participants and discussed how to interpret those responses. Through these discussions, faculty were better able to determine what type of feedback to give their students. Faculty also read selections from The 21st Century Community College: Technology and the New Learning Paradigm (League for Innovation in the Community College, 1996) in order to continue exploring the larger context of technology in higher education.

The reflection stage consisted of faculty presenting their Research Project Reports. These reports included the details of what TechCATs were administered and what teaching adaptations were made during the semester, as well as a short essay in which faculty members reflected on the semester as a whole and summarized the insights they gained. To provide structure and guidance for the report, Project Report Questions were distributed which participants were asked to address. (See Appendix A)

Process

During TechCARI, the facilitators encountered a number of challenges that indicated mid-course adaptations were needed. In an effort to increase participation in TechCARI, two sets of sessions were offered, one on Thursdays and the other on Fridays. The Thursday group had four participants and the Friday group had six. FirstClass, an electronic conferencing software, allowed the two groups to dialogue asynchronously while accommodating the scheduling conflicts which made it impossible for all ten faculty to meet together. Use levels in FirstClass were disappointing. Faculty were asked via a TechCAT what barriers to posting messages in FirstClass participants were experiencing, lack of time to access and/or learn a new software program was identified as the primary barrier. There was also a general sentiment that participants preferred to discuss TechCARI issues with their colleagues in-person rather than virtually. In response to this feedback, the facilitators of TechCARI shut down the FirstClass TechCARI discussion group was shut down, switched to electronic mail for TechCARI communications and reserved additional time in the course sessions for dialogue.

In addition to recognizing that a virtual conversation will not adequately supplement in-person discussion, the facilitators also recognize that a critical mass of participants is necessary for successful in-person dialogue. The small number of participants in the Thursday sessions was especially problematic. The facilitators will require that at least six participants in each session to insure that discussions are active and stimulating to participants. The experience of other CARI courses suggests that 10 participants is optimal to guarantee lively discussion that still allows all faculty to participate fully.

The course content was also the source of some difficulties. Faculty participants repeatedly expressed misunderstanding about the difference between Classroom Assessment and Research and traditional research methods. Future TechCARI courses will more carefully distinguish between the two as well as delineating the particular benefits of Classroom Assessment and the Research Project.

The facilitators have recognized the importance of using general CATs and ContentCATs to supplement the use of TechCATs. ContentCATs ask students to demonstrate skills and/or knowledge that they will also be asked to demonstrate via traditional homework or testing. In a number of projects, students seemed to “warm” to TechCATs when the use of TechCATs was preceded by a number of general CATs. When combined with a general CAT or a TechCAT, the ContentCAT provides a way of categorizing the responses to the CAT with which it was combined, i.e., responses from students who demonstrated the skill and/or knowledge vs. responses from students who do not. Future TechCARI Classroom Research Projects will be required to incorporate both TechCATs and general CATs or ContentCats.

Finally, several projects pointed to the need to carefully plan what technologies will be used in the classroom and how they will be used. One participant reflected in her final report: “When I sent to do CATs around the issue of the impact of the web on student willingness to engage the subject matter, I discovered that I hadn’t really planned enough opportunities for the students to interact with web technology. If one is going to do a TechCARI project, one needs to carefully plan how technology will be included in the course.” In the future, TechCARI participants will not only complete the Teaching Goals Inventory, but also a Classroom Technology Inventory created by the TechCARI facilitators. The Classroom Technology Inventory will be designed to assist faculty in reflecting on how they plan to use technology and in support of which teaching goals.

Outcomes

TechCARI has led to a number of useful results. The Center for Excellence is maintaining a library of exceptional project reports for use by faculty in the future. The Center is hoping that this compilation will allow newer faculty to gain insights into how they can improve their teaching through student input.

Faculty who graduated from the course this semester overwhelmingly indicated that they would continue to use CATs to assess learning in their classrooms. Faculty also found

themselves reflecting more on their courses. As one participant from English stated, "...it did not take me long (only a few minutes into designing the CAT) to realize that assessing the impact of word-processing upon "learning " in composition entails defining, first of all, what is exactly it is that is "learned" in a composition class."

The facilitators have been able to identify characteristics of good participation. To be successful, faculty need to be motivated to explore the environment in their classrooms, including an openness to change if student responses indicate its appropriateness. Faculty need to be familiar with the concepts of classroom assessment. A commitment to spend time on course reflection and planning is essential, and, finally, a strong, integrated approach to use of technology, to be elucidated by the classroom technology inventory, will allow development of a useful classroom research project.

TechCARI has also proven to be successful at facilitating part-time faculty involvement and interdisciplinary dialogue. Of nine participants in TechCARI, three were part-time. Many more have expressed interest in participating in the future. Increased communication across disciplines at the College is increasing morale and collegiality among the faculty. The dialogue often leads directly to changes in the classroom. For example, one faculty member in Agriculture, who was exploring the use of a CD tutorial, was lamenting the lack of participation by students. The students were using the CD on their own as a supplement to the lesson. Upon the advice of another TechCARI participant from a different discipline, the faculty member integrated the CD into a lecture and then asked the students about how helpful the CD proved to be when presented in this way. Student responses were overwhelming which led to great enthusiasm on the part of the ag instructor.

Conclusion:

TechCARI is succeeding in helping faculty look critically at the use of technology in their classrooms and change its use to maximally benefit the students.

Appendix A:

TechCARI Classroom Research Project Questions

What was your assessable question?

What did you learn through your classroom research project? Did you obtain useful answers to your assessable question? Please explain.

What specific Classroom Assessment Techniques (CATs) did you use to collect data? (Please include a copy of each CAT that you used in your report.)

How did you summarize student responses to the CATs that you used to collect data? (Please include a copy of the summaries in your report.)

How did you communicate the results of this project to your students? What were their reactions?

In what ways has this project affected your teaching? Please give specific examples.

In what ways has this project affected student learning in the class you focused on? Please give specific examples.

What surprised you most in doing the project?

What have been the most enjoyable aspects of the project?

What has been the least enjoyable aspect?

What would you do differently next time?

Were new assessable questions generated by this project? What are they?

Appendix B:

Description of a Proposed Assessable Question

As usual in my ESL classes I have a few students who are reluctant for several reasons to engage in class discussions. I want to see if I give all the students access to e-mail if those reluctant students will engage in e-mail discussions more readily than in oral face-to-face discussions.

I have requested and received e-mail accounts for the classes I'm teaching this semester (two sections of ESL 101 -- College Composition for those students whose first language is not English). As of this minute, I don't know how to show students the procedure for accessing those accounts, but I should have that information soon.

On the syllabus for the class, I announced that 10% of the grade would come from class involvement: oral participation and active participation in group work. Still some students have not participated voluntarily in class. I will announce that they can get points for that portion of their grade by recording e-mail discussions they are having with classmates about the topics we are discussing in class. My hypothesis is that those students who already are participating will be those who take most advantage of the e-mail. But I hope that isn't the case, or at least that the e-mail possibility will draw in a few of the "shy" ones.

Appendix C:

Facilitator Feedback to a Proposed Assessable Question

I'm glad to see you beginning to articulate your ideas. I want to encourage you to ask a more specific assessable question rather than one so general. (*Do certain specific electronic media (CD-ROM multimedia demos, web pages or computer labs) improve student learning?*) Though you have limited technology to electronic media, your question is almost as general as the overall idea of TechCARI -- to assess if and how technology improves learning. A big question!

Perhaps you can focus on one type of media and examine it in multiple ways, i.e., use more than one type of CAT over the course of the semester. This is usually more powerful than examining many ideas in the same way, i.e. using just one CAT, because you get more depth to your analysis.

Appendix D: TechCAT and Student Responses

Assessment 1: Chem 201 Models in Lecture

2/7/97

In this course, hand-held models have been used in lecture as topics are presented. Please answer the following three questions concerning the use of models in lecture.

1. How is the use of models helping you understand the lecture?
2. How is the use of models hindering your understanding of the lecture?
3. What would you suggest to improve the use of models in the lecture?

The responses were overwhelmingly positive...not one student felt they were a distraction from learning. Students found the ability to actually manipulate the angles very helpful to helping them see the interactions. Students also appreciated the ability bring the structure into a truly three-dimensional form, rather than trying to visualize a 3-D structure on paper.

Students had a number of ideas on how to improve the use of models:

"use bigger models, yours are too small to see"

"tell us which models to make the day before class. Often, I am still trying to build the model and you have already gone onto the next one."

"have more model-based lectures"

"require the models for the course"

This, I felt, was a good indication that my attempts at using the models were helping...