

**LITRE ClassTech Assessment 2005-2006**  
**July 2006**

**Conclusions Based on Results of Surveys, Technical Staff Focus Group and Observation Study**

What follows is an overview or highlights and recommendations based on what the assessment team found after reviewing this year's ClassTech research. The more specific results from the faculty user surveys, technical support focus group and observation study may be found in the reports found at:

[http://www.ncsu.edu/classtech/survey\\_results/2005-06/](http://www.ncsu.edu/classtech/survey_results/2005-06/)

**Faculty technology use and teaching methods**

- In the survey results as well as the observation study, the majority of faculty used technology primarily to communicate information to students using non-static multimedia, as opposed to using any of the other nine methodologies measured that were adapted from Bruce and Levin's (1997) taxonomy. Even so, the use of multimedia can still be superior to just standing and talking to students as evidenced in the literature (e.g. Mayer, 2002, Phillips, 2005) and faculty's perceptions of student learning.
- More than half of the faculty surveyed feel that they cover course material in greater depth and at a quicker pace when using technology than when not. Very nearly half feel there is a greater variety of topics that can be covered and about 45% feel students are more involved in the learning process when using technology than when not.
- Generally, the equipment provided in the classrooms worked. The faculty knew how to use it, even though they sometimes had issues with it and needed just-in-time help. Overall they feel it's important for their teaching.
- Not surprisingly, those who requested use of the technology prior to the semester are more likely to use the equipment and to say that it is important for their teaching. This has implications for better scheduling processes, so that faculty can know that they will have such technology available.
- There was still reluctance on the part of some to invest time and energy in preparing material for use in multimedia classrooms because of uncertainty about whether these spaces would consistently be available for their use.
- On both the fall and spring surveys, almost 75% of the respondents asked for assistance at least once. A variety of training in multiple formats and time-frames is made available to faculty teaching in ClassTech-supported rooms. Instructors are encouraged to call for help and a phone is provided in each classroom specifically to provide assistance.

- Faculty in the observation study noted that they felt very comfortable using the technology. It had become a support mechanism for them, i.e. the focus is taken off of them directly and placed on the content or material being presented.
- Based on the interviews and observations, faculty generally do not have the knowledge to make the best use of the technology. They do know how to use the technology from a technical perspective—it's easy to use—but they have not developed the teaching methods to make best use of it (Austin, 2003; Backer & Saltmarch, 2000).
- Closely related, faculty use technology in ways that are familiar to them, based on prior knowledge and exposure to ways others have used technology. They tend to model on others' behaviors and their own experiences as students (Johnson, 1996). It is naïve to assume faculty will explore alternative ways of using technology. So, you can take a whiteboard or multimedia classroom and use it as effectively or as ineffectively based upon what you have been exposed to.

### **Student learning**

- Based on the results of the observation study, the way the material was presented (e.g., static/hardcopy or dynamic/computational) did not seem to increase students' performance if the actual cognitive demand was at the same level (Emerson & MacKay, 2006; Rice, Hiltz, & Spencer, 2005) or the materials were presented without structured instruction (cf., Bodemer, Ploetzner, Bruchmüller, & Hacker, 2005; Webster & Ho, 1997).
- If a faculty member's expectation was that students come back with a lower level of cognitive performance (assessed in this study using the SOLO taxonomy), then one's presentation method likely doesn't matter.
- The observational study would also seem to indicate that just because one has a higher variety of technology use and pedagogy use, and one is teaching to a higher cognitive level, it doesn't mean that faculty are going to get a higher level of student performance as assessed using higher level tasks. This is not entirely surprising since in general students have more difficulty doing higher cognitive work and because they are not exposed to this in all classes.
- Even when faculty use higher-level outcomes in their instruction, they tend to assess student learning at lower levels. Faculty assess less frequently at higher cognitive levels.
- It was noted in a surprisingly high number of cases that students were not actually taking any notes during many of the observed class sessions. There is an expectation that they would review the material later, by retrieving it from the web or other sources, but do they? Are students expecting merely to be

entertained during class? They appear to have an expectation that they will be able to get the information outside of class, particularly since so many ways exist to get to the information. This is reinforced by many faculty who hold the perception that technology improves student learning by providing students with access to course materials ‘anywhere anytime’ and on a 24/7 basis. (See Gay & Hembrooke’s, 2004, description of the time management challenges experienced by “wired” learners.)

### **Technology availability and design**

- ClassTech classrooms are designed to allow a presentation format of one to many and so reinforce this methodology (cf., Moore, 1992). They invite a more traditional lecture-style pedagogy versus SCALE-UP or other student-centered learning spaces that more readily encourage active learning (Duffy & Kirkley, 2004). What does the technology afford us to do? It would be different if the technology or the space was different. As Höök, Benyon, & Munro (2003) state, technology-rich learning environments are not traditional classrooms after the treatment has been applied but, rather, should be viewed as “... ‘places’ where social interactions are encouraged and which are visible through the configuration of the space and how people conceive of the various interactions in it” (p. 9).
- Can we get to a different way of looking at space needs, so that the first question is even beyond “What do faculty want to be able to do in this space?” to “What should students be able to know and do at the end of the course/curriculum?” Tomlinson-Keasey (2002), for example, describes instructional spaces that encourage “... lucid, problem-oriented, conversation-like presentations of learning matter” (p. 82).
- Currently we are building a lot of classrooms as part of the 2000 Higher Education Bond projects that are based upon relatively traditional teaching methods rather than more blended learning environments. The College of Design is likely one of the leaders on campus with moving forward in this area. Their curriculum lends itself well to multi-modal teaching and learning. Should more multi-purpose learning spaces be considered, and if so, what would they look like? Allen, Otto, and Hoffman (2004), thus, argue that media use be defined in environmental terms, “in an era when electronic information pervades virtually every aspect of everyday life...” and given that “... we are surrounded by ‘info-cocoons’ patched together from components such as facsimile machines, copiers, cellular phones, radios, TVs, and video games....” (p. 221).

### **General Recommendations**

- Resources exist, at least in ClassTech classrooms, to provide technical support. However, it is also essential to evaluate the resources available for supporting pedagogy and assessment of student learning. Bullock and Schomberg (2000) conclude that preparing faculty to understand “the pedagogical theories

surrounding successful use of learning technologies in higher education classrooms” needs to be the highest priority for institutions attempting to technologize their instructional settings.

- Faculty development on best pedagogical practices with the technology available in ClassTech rooms is needed. Having faculty work together in groups, mentoring, and modeling methods/pedagogies are effective strategies for faculty development (Bransford, Brown, Cocking, and National Research Council, 2000; Savery & Duffy, 1996).
- Create a well-chosen team to rethink the process for how classrooms are designed. One approach might be to pull together some faculty who are interested in the space design of classrooms—or “learning spaces” may be a better term for them—and come up with several new types to meet the changing needs. Then it might be possible to develop some technology standards based on the current set of standards. Reviewing our peer institutions’ work and researching other’s multi-year classroom and media design efforts around the broader higher education community is an important step as well (e.g., Oblinger, 2006; Bransford, Vye, Bateman, Brophy, & Roselli, 2004; Brown & Renshaw, 2000; Grabinger, 2004; Sutherland, Robertson, & John, 2004; Sutherland, Armstrong, Barnes, Brawn, Breeze, Gall, Matthewman, Olivero, Taylor, Triggs, Wishart, & John, 2004).

### **Recommendations for Further Assessment**

- Do faculty who have had access to technology actually use it in more sophisticated ways? Those who don’t necessarily have access say they would use it more if they had guarantees it would be available. But once it’s available, do their methods get more sophisticated, and if so, through what means?
- What kind of help are the 75% of respondents asking for? Faculty report the equipment is easy to use. They are also strongly encouraged to ask for help when they need it, however, what can drive down the number needing assistance?
- Can we accurately predict how many and what types of learning spaces will be needed? How can the university do a better job of getting ahead of the curve in provisioning technology in our learning spaces? As one of the survey respondents commented, “The more we add technology to our class, the more we find we need / want to add more.” Research on instruction in the digital university has implications for addressing these challenges (e.g., Duderstadt, Wulf, & Zemsky, 2005; Koch, 2003; Tomlinson-Keasey, 2002).
- Explore how the tools can be improved so they can help improve the pedagogy. How are the applications that are built used in the environments? Rappin, Guzdial, Realf, and Ludovice (1997) have observed that “The requirements of interfaces designed to support learning are different than for interfaces designed to support performance” (p. 485). Hannafin and colleagues (Hannafin & Kim,

2003; Hannafin, Oliver, Hill, Glazer, & Sharma, 2003; Hannafin & Peck, 1988; Orrill, Hannafin, & Glazer, 2004) have done considerable work on research and practice on learning and instruction with technologies that can assist in efforts to design for educational spaces (cf., Najjar, 1998; Squires & Preece, 1999; Stemler, 1997).

- Study the perception of both sides of PowerPoint: from the students' perspective and the faculty's perspective. How does that impact students' learning. Since PowerPoint is the dominant software tool being used, what are key factors that allow it to be used to enhance cognition rather than dull it?
- Identify ways students say they do learn through the use of technology and gather assessment data to support or refute their theories of learning.

### **Utilization of Observation Study Method on other LITRE projects**

- This rubric/method developed by the assessment team does not allow for studying student behavior in detail. It focuses on what faculty are doing with the technology and how they are doing it within the confines of a ClassTech room, which is in essence a more traditional teaching environment.
- The technology use studied was based on a single technology user at a time, generally the instructor, teaching or otherwise interacting with the entire class, utilizing the technology in a one-to-many environment. Can the research method be expanded to, for example, evaluate the use of computers in a lab environment, use of laptops, or technology use in non-traditional learning spaces?
- The assessment team found that the developed observation rubric, the use of SOLO taxonomy as a means to assess level of instruction and student learning, and use of the technology taxonomy to be very useful tools for assessment.

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