

## Snapshot

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- Institution:** The University of Iowa, a doctoral-granting, four-year, public institution, RU/VH classification (very high research activity), with approximately 20,000 undergraduate students and 10,000 graduate and professional students
- Timetable:** August 2010 to January 2012
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The University of Iowa's Transform, Interact, Learn, and Engage (TILE) project encompasses a commitment to an active-learning pedagogical philosophy that infuses technology into collaborative learning spaces. The project is designed to foster collaboration and student interaction with both peers and faculty in an effort to enhance student learning outcomes.

The design of the TILE classrooms is based on the SCALE-UP model of classrooms that are configured to support collaborative learning.<sup>1</sup> TILE classrooms contain round tables that seat nine students. The instructor's station is in the center of the room. Each table has three networked laptops and its own dedicated wall-mounted monitor that can display data from a laptop on the table, the instructor's screen, or work from other laptops around the room. There is also ample whiteboard space for students and instructors to use during group activities. Figure 1 shows a 27-seat TILE classroom, and Figure 2 is an 81-seat TILE classroom.

**Figure 1. A 27-Seat TILE Classroom**



**Figure 2. An 81-Seat TILE Classroom**



## 1. Project Overview

### 1.1. Project Goals, Context, and Design

To assess the impact of TILE classrooms, we undertook a study to investigate student perceptions of the factors that helped them learn subject material in TILE classrooms; why instructors in TILE classrooms used specific strategies; and how students perceived the effectiveness of those strategies. Our study was guided by the following questions:

- How do instructors use the tools in the TILE classroom to support their teaching strategies, and why do they use those strategies?
- What kinds of teaching strategies in the TILE classrooms do students prefer and why?
- Do students who report a more positive experience in the TILE classrooms also earn higher grades than students who are not enthusiastic about their experience in TILE classrooms?
- Does the layout of the TILE classroom and the technology (especially the laptops) cause problems for instructors that they do not encounter in traditional classrooms?

### 1.2. Data-Collection Methods

The university's first TILE classroom came online in fall 2010. At the end of that semester, we conducted a small-scale study of student outcomes in TILE classes. That work, which included the development and testing of a survey instrument, interview questionnaire, and observation protocol, served to help inform a larger, more comprehensive study that we undertook in spring and fall 2011 and which is the focus of this case study.

For the initial study in fall 2010, we first identified four TILE courses and four non-TILE courses that had been taught by the same professor in a traditional classroom in a previous semester. We also secured approval from the institutional review board (IRB) at the University of Iowa to collect students' final grades, GPA at the beginning and end of the semester, SAT and ACT scores, gender, and high school GPA for a quantitative comparison of outcomes between TILE and non-TILE courses. The registrar supplied us with this data after receiving notification that our research had the proper IRB approval. All of the research procedures for this study were also approved by the IRB.

In spring and fall 2011, we gathered data from students in TILE classes (both undergraduate and graduate) and their instructors so that we could learn about how faculty designed their instruction and how students responded to learning activities in TILE classrooms. Our methods enabled us to learn how instructors adapted their teaching to the TILE environment and how the new tools made it possible for instructors to expand the learning objectives that they wanted their students to achieve. This more comprehensive study was also approved by the IRB.

Specifically, we collected data from interviews with faculty, focus groups with students, student surveys, classroom observations, and students' academic data.

- *Interviews.* We conducted semi-structured interviews with instructors at the beginning and end of the semester. We first asked professors why they decided to teach a course in a TILE classroom and how they planned to use tools available there. At the end of the semester, we asked about their attitudes toward teaching in the TILE environment, which strategies they used and whether they believed those strategies were effective, and what they learned during the semester (see protocols in Appendices A and B).
- *Focus groups.* We conducted focus groups with students to get a better sense of their perceptions of the space, the available technology, and impressions of their learning experiences in this new environment (see protocol in Appendix C).
- *Surveys.* We administered four surveys to students in TILE and traditional classrooms. We surveyed each class at the beginning and the end of the spring semester. The purpose of the surveys was to capture students' initial attitudes about their learning environments and compare their initial attitudes to those at the end of the semester (see surveys in Appendices D and E).
- *Classroom observations.* To learn how instructors used the tools in the TILE classrooms to facilitate different instructional activities, we observed every class meeting of every TILE course that was part of our study, using an observation protocol that we developed (see Appendix F). For the logs, we found it helpful to define activities such as "class discussion" and "lecture" because originally different observers had different conceptions of these activities (see definitions in Appendix G).
- *Students' academic records.* To investigate whether there were connections between student answers to survey questions and their final grade in the course, we collected students' ACT scores, SAT scores, cumulative GPA, University of Iowa GPA, gender, class, and final grade in the course.<sup>2</sup>

### 1.3. Data-Analysis Methods

To analyze both qualitative and quantitative data, researchers used a variety of electronic tools and a systematic method for understanding the overall themes in our data.

#### *Analysis of Quantitative Data*

To analyze the quantitative data, we used the statistical package SAS to compute both descriptive and inferential statistics, and we used Excel to develop charts and graphs because it is more flexible for developing visual displays of data.

*Comparison of final grades in TILE and similar non-TILE courses in fall 2010.* As stated above, we identified four TILE courses and four non-TILE courses that were taught by the same professor in a traditional classroom in a previous semester. We looked at the GPAs of TILE and non-TILE students at the beginning of their respective semesters to ensure that the two samples were not significantly different

in terms of prior academic achievement. Those GPAs were not significantly different, and so we had no evidence to indicate the two samples had different levels of prior academic achievement.<sup>3</sup>

*Analysis of student outcomes and student survey responses from spring and fall 2011.* We not only collected students' academic records, but were also able to supplement our analysis with students' responses to beginning-of-semester and end-of-semester surveys. Our data set included 324 student records. We computed the overall and class-specific means, medians, and standards of deviation for all of the responses to the student surveys. This enabled us to understand students' attitudes toward their activities in TILE classrooms. For example, we analyzed the results for a question about problems with technology to better understand how our colleagues could provide better support for faculty and students in TILE classrooms.

In addition to developing a prediction model for students' grades in TILE classrooms, we also sought to analyze the data to better understand the factors associated with students' desire to take courses in a TILE classroom.<sup>4</sup> Our main outcome variable was student responses to a question that asked them to rate their level of agreement with this statement: "I would like to take another class in this room." We used the other questions in the survey (for example, about students' perceptions of the usefulness of the laptops, round tables, and wall-mounted monitors) to try to determine which factors were most closely associated with students' overall opinion of the TILE learning environment.

#### *Analysis of Qualitative Data*

In order to capture the teaching and learning activities, what teaching strategies TILE instructors used, and how they used the tools to facilitate learning in TILE environment, we used various instruments such as beginning-of-semester and end-of-semester interviews, classroom observations, and focus-group interviews.

Each data set was useful for capturing different information. For instance, beginning-of-semester interviews provided valuable information about the goals of the course, as well as TILE instructors' expectations of the teaching and learning processes and the use of technology and learning tools in the room. The end-of-semester interviews offered insights from TILE instructors' reflections on their teaching strategies, their classroom activities, and the dynamics of group work. Focus-group interviews with students allowed us to gather information from students' points of view about their attitudes toward the TILE environment and perceptions of collaborative activities, as well as about the usefulness of the tools and the equipment in the room for their learning. The classroom interviews allowed us to take a closer look at how the actual teaching and learning process took place, the strategies that instructors adopted to integrate the tools and the equipment in the room, and the obstacles that TILE instructors and their students encountered in their teaching and learning process. In other words, each of our data sources was a perfect tool for data triangulation.<sup>5</sup>

## **1.4. Findings**

We drew complementary insights from our quantitative and qualitative research.

#### *Quantitative Research*

- *In our first small-scale study of student outcomes in TILE classrooms in fall 2010, the students in four TILE classes achieved, on average, higher grades than students who had taken the same course with the same professor in a traditional classroom.* This finding was in line with previous research that has demonstrated the value of technology-infused learning spaces.

- *Our analysis demonstrated that students' perceptions of the usefulness of laptops and how much they participated in class were significant predictors of their final grades in the TILE courses.* This supported our observation that students were more engaged in class when the activities required them to be active participants in their learning, and it also supported our observation that students benefited from having access to networked laptop computers. In addition, our quantitative analysis demonstrated that students' enthusiasm for taking additional TILE courses could be predicted by their attitudes toward the usefulness of the technology, how well the layout supported the activities, and how well the course material fit the TILE environment.

### *Qualitative Data*

In order to discuss the findings from our qualitative data, it is important to look at the research questions. As noted, our study investigated why and how instructors use the tools in the TILE classrooms to support teaching strategies, and it sought to examine the teaching strategies that students prefer. The findings from our qualitative data suggest the following:

- *TILE instructors used the tools and equipment in TILE classrooms either to improve their teaching strategies or to try teaching strategies they had not employed previously.* The tools and the equipment in the TILE classroom provided TILE instructors ample opportunities to improve their various teaching strategies or accomplish learning activities that they had not undertaken in previous classes. Many TILE instructors knew what activities worked well in their courses in traditional classrooms and adjusted and refined those activities by integrating the tools in the TILE classrooms.
- *In some cases where technology-related problems seemed to impede the process of teaching and learning, TILE instructors were eager to make changes to their teaching strategies.*
- *Students in TILE courses showed a more positive attitude and increased engagement by the end of the course.*
- *Students preferred activities that were specifically designed to enhance their understanding of the teaching materials.* They valued the integration of tools in class activities to improve their understanding of the subject matter and help them retain the information presented.

In brief, our qualitative data complemented our quantitative analysis. Some of our quantitative findings resonate with the stories of our participants and the atmospheres of the classrooms, which we were able to witness firsthand.

## **1.5. Communication of Results**

After the first semester of our research, we communicated our results in an in-depth report to stakeholders in the university's Office of ITS-Instructional Services, as well as those in the Center for Teaching and the Office of the Provost. Our initial reports began a conversation about how the results could be used to enhance the process of preparing faculty to teach in the TILE classrooms. In a series of meetings, our colleagues began to use the findings to support a new training program for instructors who want to teach in TILE classrooms.

To clearly support the quantitative findings for an audience unfamiliar with statistical methods, we summarized the results in plain language and provided charts and graphs. It was vital for us to present our findings in different formats for different audiences, in that our audiences also included stakeholders with backgrounds in quantitative research who appreciated more detailed discussions of our findings.

Based on both qualitative data and quantitative input, we developed narratives about our findings. Our stakeholders appreciated the stories because they encapsulated meaningful insights and experiences from TILE instructors and students in the TILE classroom. We also communicated our findings informally to various teams under ITS-Instructional Services that were responsible for making sure that the learning tools, software, and equipment in the room worked well.

## 1.6. Influence on Campus Practices

Our quantitative findings have influenced the way that ITS-Instructional Services and the Center for Teaching design and implement training programs and ongoing support for TILE instructors. Our finding that students appreciate course design that suits the special technology and layout of the TILE environment, as well as the ability to fluidly use the technology to support their learning activities, has led to greater attention to helping faculty redesign learning activities for the TILE classroom. In addition, some of the other findings, such as students' perceptions of technology problems in TILE classrooms, have prompted our colleagues to consider ensuring that faculty's technology needs are supported from the outset.

Our qualitative findings provided a valuable addition to our quantitative study through richer and more in-depth narratives of each case. TILE instructors' and students' reflections about their experiences in the TILE classroom and rich descriptions of the actual teaching and learning process have afforded our stakeholders the ability to better understand the potential of TILE classrooms, the possible drawbacks of those spaces, and the types of support our institution should provide to assist TILE instructors and students in designing good teaching materials and activities and in using the tools and the equipment effectively.

## 2. Reflection on Design, Methodology, and Effectiveness

### 2.1. Project Design, Data Collection, and Analysis

On reflection, the design of the project was effective because it enabled us to gather information that has helped our colleagues refine the administration of TILE classrooms and faculty development programs for instructors who teach in TILE classrooms.

Several other key findings from our research design and data-collection methods are also instructive.

- *Obtaining IRB approval benefited our project.* By going through the process of obtaining approval from our institutional review board to conduct human-subject research, we paid close attention to the design of our research methods because the entire plan had to be submitted to our IRB for approval. This helped the team solidify its plan before embarking on data collection. In addition, we believe that faculty participants were more likely to be honest with the researchers because our research protocol stated that we would protect their confidentiality. The assessment team wanted to create an atmosphere in which participants could be open about their experiences.
- *Classroom observations were an effective tool for learning about activity in TILE classrooms.* Classroom observations proved to be well worth the time we spent because we learned firsthand about the process of teaching and learning in TILE classrooms. At first, we intended to use the observations to quantify the kinds of instructional activities that happened in different TILE classes (e.g., Professor Jones had 40 minutes of discussion and 20 minutes of lecture), but we found that they also helped us craft narratives that captured valuable information about how students and instructors used (or did not use) the available technology in the classroom and how future training could be tweaked to promote better use of the technology.

- *Interviews provided critical knowledge about instructors' decision-making processes.* Interviews with faculty members were useful because they gave us a window into how these instructors made decisions about designing their TILE courses. We also learned about their attitudes toward their training. With this method we learned about the processes of instructors who had very successful courses in TILE classrooms, but we also learned what faculty felt was lacking in TILE classrooms and what kind of training they wished they had had.
- *Teamwork gave us the ability to research more classes.* Because the research involving ethnographic methods was so time-consuming, it was essential to have more than one person working on collecting data. We were able to work with every faculty member who consented to be in our research study. Had only one person been tasked with this project, we would have had a less rich set of observations, interviews, and focus groups.

*Limitations of our research design and data-collection methods.* There are several lessons that we learned that we hope will inform our design of future assessment projects involving the TILE classrooms.

- *We could not observe professors' teaching styles before they began teaching in the TILE classroom.* Thus, it was not possible for us to make claims about how training for teaching in TILE classrooms influenced teaching in TILE classrooms.
- *In some classes we had a lot of missing data because students were not present when we administered the end-of-semester survey.* We tried to use the online survey tool Qualtrics to collect additional responses from students who were not in class when we administered the survey, but few students responded to our electronic survey. We might have had better results if we had administered the paper survey over several days, but we were also trying to avoid taking up too much class time.
- *Although our research protocol enabled us to observe all of the classes in TILE classrooms, we did not incorporate a procedure for observing class sessions that occurred outside of regular class time.* In the future, we should try to also observe review sessions or other special meetings that can help us learn about how instructors and students interact in the TILE classrooms.

#### *Further Reflections*

One critical lesson was how to best disseminate our findings to people involved with TILE classrooms. Our first report was too long and detailed for some and did not elicit much feedback. We found better success in communicating more casually about our findings and recommendations for course design and instructor training in TILE technology in hallway conversations with colleagues. Information channeled that way was in turn shared with supervisors, who began to ask us about how they might incorporate our findings into their work.

While our initial goal was to compare TILE courses with those held in traditional learning environments, we discovered that, in order to specifically help our colleagues improve teaching and learning, more focused questions would be more productive. Thus, we benefited from being able to alter our research questions midstream and focus on questions whose answers would have maximum benefit to our colleagues.

Finally, our project has also led us to consider research questions that have a wider focus than our original assessment research, such as what kinds of “evidence” departmental executive officers need to see before they will begin facilitating wider adoption of TILE classrooms.

## 2.2. Effectiveness and Influence on Campus Practices

The most apparent evidence of the impact of our evaluation was the institution's decision to build more TILE classrooms and the adoption of TILE-like approaches to teaching and learning in numerous departments across campus. After we communicated our findings to the stakeholders in the provost's office, ITS-Instructional Services, and Center for Teaching, as well as in meetings with leaders in many departments across campus, some colleges decided to use the TILE approach to increase student engagement and improve learning outcomes. A department in the university's College of Liberal Arts and Sciences used funds from grants to build TILE-like classrooms to transform lab classes from recipe labs (lab sessions using step-by-step instructions to solve problems) into more collaborative lab sessions.

Stories about successful teaching and learning processes in the TILE classroom appealed to campus leaders and inspired many faculty members to move all or some of their courses to TILE classrooms. TILE instructors also mentioned that the pedagogy they used in the TILE environment often influenced their courses taught in traditional classrooms.

### Acknowledgments

The authors would like to thank Maggie Jesse, Senior Director, ITS-Instructional Services, and Jean Florman, Director of the Center for Teaching, who both provided valuable support and feedback during this assessment project.

### Supporting Materials

- Appendix A: Protocol for Beginning-of-Semester Interview with TILE Faculty
- Appendix B: Protocol for End-of-Semester Interview with TILE Faculty
- Appendix C: Protocol for Student Focus Groups
- Appendix D: Beginning-of-Semester Survey for Students in TILE Classrooms
- Appendix E: End-of-Semester Survey for Students in TILE Classrooms
- Appendix F: Classroom Observation Protocol
- Appendix G: Codes for Classroom Observations

### Notes

1. R. J. Beichner et al., "The Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) Project," in E. F. Redish and P. J. Cooney, eds., *Research-Based Reform in University Physics*, vol. 1 (College Park, MD: American Association of Physics Teachers, 2007).
2. To facilitate efficient storage of information, we used a variety of conventions for identifying research participants and electronic information. We assigned specific identifiers for each instructor and used pseudonyms to protect the confidentiality of our participants. These identifiers were six-digit codes such as 020301: The first two digits signify that this person is in our second study, the second two digits stand for the specific course, and the last two digits stand for the person (the instructor or student in the course). We applied this code to all of the paper surveys, enabling us to keep track of all the information for students.

We also used a naming convention for all of the documents, such as interview transcripts. For example, Int\_First\_020301.doc was the transcript of the first interview with the instructor of the course labeled "3." This naming convention helped us to be able to look at any file name and understand what it contained—critical for a research project that involves many documents.

All of our data were stored in networked locations that are accessible only to the members of the research team. This ensured that our colleagues involved in the TILE project could not obtain access to sensitive information that we collected under the guidelines of the IRB.

3. Garrett M. Fitzmaurice, Nan M. Laird, and James H. Ware, *Applied Longitudinal Analysis* (Hoboken, NJ: Wiley-Interscience, 2004). To examine whether students in the TILE classes and students in traditional classrooms had significantly different university GPAs at the beginning of their respective semesters, we used SAS to conduct a nonpaired t-test with the alpha level set to .05. We used the "PROC MIXED" procedure in SAS to construct a linear mixed model for predicting a student's final

grade. To construct the model, we first selected the main effects from the available measures of prior learning, and UI GPA was the best predictor according to the F-statistic. We then incorporated the two-level categorical value of classroom (TILE or Traditional) to build the final model. All main effects were significant at the alpha .05 level, with the main effects of classroom type and UI GPA.

4. For the prediction model, we used the PROC MIXED procedure in SAS to compute a linear mixed model for predicting students' final grades in a TILE course. Because our data set for our more comprehensive study included many more variables than our initial data set from fall 2010, we needed to build our prediction model by adding one variable at a time to determine its association with our outcome variable. Our prediction model consisted of several main effects (students' attitudes toward their classroom activities, the technology and layout of the TILE classroom, and how well students believed the course material fit the special learning environment). We included a random effect to account for the intraclass correlation due to students having the same instructor, and modeled the covariance with an unstructured correlation matrix with the main effects of attitudes toward aspects of the TILE classroom and the random effect of instructor.
5. The first set of data we collected was from the beginning-of-semester interviews. After we completed the interviews, we downloaded the audio files to a shared location that can be accessed only by the researchers. After we stored the interviews, we used Express Scribe, a free transcription software program, to facilitate transcription of the audio files. The program allowed us to use foot pedals and headset in transcribing several hours of interviews easily and quickly. We stored our observations, interview transcriptions, and journal entries in a OneNote notebook that each researcher could access. OneNote is one of the Microsoft applications that allowed us to store our various sources of data in one notebook. The software enabled us to read each other's data and develop an understanding of similarities and differences across the different cases that each of us was observing. OneNote really helped us efficiently access all of the data without having to open multiple files at the same time.

In OneNote, we created separate sections for interviews, classroom observations, and focus groups. Under each folder, we made separate pages for each instructor. The second set of data that we collected was from the classroom observations. Each researcher took the classroom observation protocol to record the teaching and learning activities in TILE classrooms. In addition to OneNote, we used Excel to record the activities in five-minute intervals. The other data set we gathered was from the focus group and end-of-semester interviews. After completing those focus groups and interviews with TILE instructors, we used Express Scribe to transcribe the audio files and stored the transcription in OneNote.

When we finished gathering the data for our study, we printed all materials and began to make notes or short comments on every source of data we collected. This part was crucial because we used these notes as a basis for preliminary coding across cases, such as reasons for using TILE classrooms, advantages of TILE environment, technology-related problems, and many other codes that emerged from our data.

The next step was to use ATLAS.ti to do more in-depth coding. Using ATLAS.ti, we applied our preliminary codes to our transcriptions and classroom observation notes. We transferred all the interview and focus-group transcriptions as well as the classroom observations into ATLAS.ti. We assigned a specific identifier to each data source. We created another password-protected shared location to store our data because we conducted collaborative data analysis. The first stage in our data analysis in ATLAS.ti involved assigning our preliminary codes to each data source. For instance, we identified a particular chunk of words, sentences, or paragraphs in each of our data sources and assigned one or more codes to them. This method allowed us to extract emerging themes from our data and draw logical interpretations based on our research questions for our findings.

# Appendix A: Protocol for Beginning-of-Semester Interview with TILE Instructor

## Interview 1

1. Which course are you teaching in the TILE classroom this semester?
2. Please describe the goals of the class.
3. How did you hear about the TILE classroom?
4. Why did you decide to teach this class in the TILE classroom?
5. What kinds of technology do you regularly use in your teaching?
6. Do you prefer certain kinds of technology in your teaching?
7. Do you think technology can ever impede the learning process? If so, why?
8. How are you planning to use the TILE environment in your class?
9. Does the technology in the TILE classroom meet your needs, or do you have needs that it does not meet? Could you please elaborate on your answer?
10. In what ways has the TILE Institute prepared you to teach in this classroom?
11. Is there anything about the TILE classroom that you want to tell us that we have not asked about?

## Appendix B: Protocol for End-of-Semester Interview with TILE Instructor

### Protocol for Interviewing Faculty at End of Semester

1. Which class did you teach in the TILE classroom?
2. Have you taught this class before? If so, how many times have you taught it, and have you ever taught it in a similar classroom?
3. What were the advantages of teaching in the TILE classroom this semester?
4. Were there any disadvantages to teaching in the TILE classroom this semester? If so, what were they?
5. In what ways did the TILE Institute prepare you for teaching in this environment?
6. In what ways did the TILE classroom help students meet your goals for the semester?
7. Can you recall a time when the activity in the classroom went especially well and a time when the activity did not go well? Could you please tell me about both of those times?
8. Would you teach another class in the TILE classroom? Why?
9. If the classroom could benefit from any additional technology what would that be?
10. Is there anything else you would like to tell me that I did not ask about?

## Appendix C: Protocol for Student Focus Groups

The researcher will remind the students at the outset of the agreement to record the focus group section. The researcher will verbally verify that all participants still agree to be recorded, which they agreed to in signing the consent form. After reminding students of this condition of the research study, the researcher will proceed with recording the focus group.

1. What were the advantages and disadvantages of being in the TILE classroom? Why do you think so?
2. Was the course material a good fit for being in this classroom?
  - a. If yes, why?
  - b. If no, why not?
3. Did you have any problems with using the laptops or the wall-mounted monitors in class?
4. Describe any problems with using the laptops in class.
5. Describe any problems with using the wall-mounted monitors in class.
6. Were your activities outside of class (homework and major assignments) different than the activities outside of other classes?
  - a. If yes, how?
  - b. If no, why not?
7. Were you prepared to use the technology in this room, or would you have liked some training in how to use the room?

## Appendix D: Beginning-of-Semester Survey for Students in TILE Courses

### Possible Items for a Scale to Administer to Students (Beginning)

Please print your name and e-mail address.

Name:

E-mail address:

For each question, please circle the answer that is most appropriate.

1. Have you taken a class in this TILE classroom before?
  - a. Yes
  - b. No
2. Why did you decide to take this class?
  - a. It is a requirement.
  - b. It is an elective.
  - c. Other \_\_\_\_\_
  - d. Unsure
3. I decided to take this class because it is being held in this TILE classroom.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
4. I am interested in taking this class.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
5. In general, group activities in class help me to learn.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree

- d. Strongly Disagree
6. Using a laptop in class helps me to learn the course material.
- a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
7. The physical layout of this room is helpful for interacting with other students and the instructor.
- a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree

## Appendix E: End-of-Semester Survey for Students in TILE Classroom

Please print your name and e-mail address.

Name:

E-mail address:

Please select one answer for each question by circling the answer that is the most appropriate.

1. Group activities in this class helped me to learn the material that we were supposed to learn.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
2. The wall-mounted monitors were useful for learning in this class.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
3. Sitting at round tables was helpful for group activities.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
4. The laptops on the tables were NOT helpful for activities in this class.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree

5. I was comfortable using one of the room's laptops to display my work on a wall-mounted monitor.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
  - e. We did not use laptops to display our work on the wall-mounted monitors.
6. The glass whiteboards were useful to my learning and engagement in class.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
7. This kind of classroom was appropriate for the material we learned in this class.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
8. How often were there problems with technology that interfered with activities in this classroom?
  - a. Very frequently
  - b. Frequently
  - c. Seldom
  - d. Never
9. Coming to class every day was important for my learning.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree
10. Compared to my level of participation in other classes, this class required me to participate more often.
  - a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree

11. When you consider this class, were you more or less interested than you are in other classes?
- a. Less interested
  - b. More interested
  - c. About the same
12. Did you participate in more or fewer group activities in this class than in your other classes?
- a. More group activities in this class
  - b. Fewer group activities in this class
  - c. About the same
  - d. Not sure
13. I would like to take another class in a TILE classroom.
- a. Strongly Agree
  - b. Agree
  - c. Disagree
  - d. Strongly Disagree

# Appendix F: Classroom Observation Protocol

Date:                      Instructor:

Time:                      Observer:

Do students work in groups?

- If no, how would you summarize the class?
- If yes, are the students interacting, or are they silently working separately to solve a problem?
- What is the emotional attitude of students? Is it engaged, neutral, or ambivalent?
- How long is the group work session?
- Does the instructor visit with the groups? If so, is the instructor observing or interacting with group members?

Do students or the instructor use the screens around the room?

- if so, how do they use the screens?

Other notes:

Select: Lecture, class discussion, small-group discussion, collaborative activity, individual work, exam, other

Time	Summary of Activity

## Appendix G: Codes for Classroom Observation

### Codes for Classroom Activities

#### TILE Research Study, Spring 2011

Code	Description
Lecture	The instructor delivers course content in a lecture. The instructor may ask a few questions to engage students, but this activity is centered on the instructor delivering information.
Class Announcements/ Policies/Housekeeping	Instructor delivers information about elements of the course that students need to know, but not about the course content. This code applies to announcements about projects, due dates, and other housekeeping issues.
Breaks	Time to rest.
Collaborative Activity	Students work together to complete a project in class.
Discussion	Students and instructor talk about an issue related to the course. The goal is for the students to engage more deeply with the subject matter by learning from each other's ideas.
Testing/Exams	Assessment activities.
Videos	Students watch an online video or DVD.
Individual Work	Students complete a short assignment such as in-class writing or reading that they complete on their own.
Dismissed Class	Class was let out early or canceled.
Missing	We did not observe the period.
Misc.	Miscellaneous activity that does not fit any of the codes in this list. (Please make a small description of the activity so that we can determine if it needs a code).