

Work In Progress: Providing Interactivity in a Technology-Rich Classroom

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Abstract – In increasing numbers, universities are providing wireless access to the Internet in classrooms and are requiring entering freshmen to have laptop computers. Moreover instructors are requiring students to bring their laptop computers to class and are designing lectures with the assumption that their students have access to computing and the web. What is currently lacking is software that can support teaching and learning. This short paper briefly describes an ongoing effort at Clemson University to develop a web-based tool, MessageGrid, whose primary objective is to support interactivity in a technology-rich classroom. We give an overview of the tool and how instructors are currently using it in their lectures and outline plans for future development.

Index Terms – Laptop computers, new pedagogical tools, technology in the classroom.

INTRODUCTION

The classroom is changing before our very eyes with more universities requiring entering students to come with laptop computers with wireless capability [1-7]. Before being asked, students arrive on campus with laptop or tablet PCs, PDAs, and smart phones. Powerful technology has become commonplace and a growing number of instructors are eager to take advantage of the tremendous potential that this technology can bring to the classroom. Instructors scan the classroom to see row after row of laptops each with a student eager to put it to use. It is at this point that a sobering fact quickly becomes obvious to both instructor and student: there is a *surprising scarcity* of software that can facilitate teaching and enhance the learning process in the classroom. Up until recently, instructors and students have had to rely primarily on PowerPoint, browsers, applets, and Journal to help them take advantage of the equipment so readily available.

The basic question confronting laptop course faculty is: *How can the laptop or tablet computers available to the students be used to deliver course content more effectively in and out of class?* How can the instructor turn the computer into a tool that draws the students' attention to the day's lesson and encourages student participation in class activity?

We at Clemson University have been working on a web-based software tool whose primary objective is to *facilitate*

recitation and classroom interaction in a laptop-enhanced classroom. The tool, called *MessageGrid*, enables an instructor to design classroom experiences, tailored to support the lesson for the day, and to engage the students by having them respond to questions, assignments, projects, and the like, by posting their responses on the grid. Figure 1 shows an example of a newly-created, empty grid. In this example, months are listed on the left and three categories of responses are listed across the top. This particular grid could be used as a suggestion box for students in a class or members of a team. To respond, a web client clicks on a *post* link and submits a response which may be in the form of text, html, images or a

hyperlink to *any* object that can be displayed by a browser.

A group of Clemson faculty has been using an early version of *MessageGrid* during the fall 2004 and spring 2005 semesters. The almost *instant* appeal of *MessageGrid* among instructors from very different academic disciplines was a pleasant surprise. The instructors participating come from the departments of languages, general

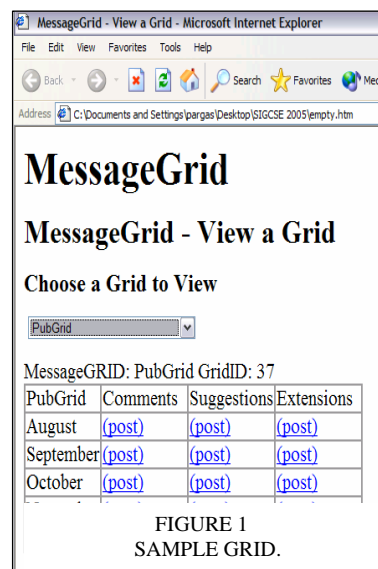


FIGURE 1
SAMPLE GRID.

engineering, nursing, psychology, English, sociology, distance education, statistics, mathematics, accountancy, education, performing arts and computer science.

For example, after reviewing tree traversal and discussing examples of recursive algorithms, a computer science professor asked students to develop and post recursive solutions to a specific problem. One student did not submit a solution. Another made three attempts, the third submission almost correct. As students posted solutions, the instructor scrolled down and across the grid and orally critiqued randomly selected solutions. Some students specifically *requested* that their submissions be evaluated. At the end of the period, most saved the grid (an html page) for future

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review. *MessageGrid* provides a convenient and orderly way for an instructor to receive and review student work. The tool provides the students with the ability to participate in an exchange not just with the instructor, but with others in the class.

An engineering professor plans to use *MessageGrid* to conduct a *review session* through the Internet on days when the professor has to be out of town. The plan is to interact with students through a grid, answering from a conference site questions that students are entering from their dorm rooms.

To facilitate class discussion in an upper level Spanish class for health professionals, a languages professor created a grid with student names and seven topics as labels. Her students have a week to research all seven topics, provide a link to a resource such as a news article or a position paper accessible on the web related to the topic, and to enter a personal opinion on the resource.

A nursing professor asks each of her students to give a 10-minute presentation once during the semester, two students per class meeting. She created a grid with dates of class meetings for rows and two columns labeled "Student 1" and "Student 2". Each student assigns himself or herself to a class meeting by posting his or her name to one of the grid cells. Students are to prepare abstracts and PowerPoint presentations and post these under their names over the course of the term. This gives the professor a chance to review and critique the student materials before each presentation date.

A statistics professor is considering creating a grid where students submit links to Excel spreadsheets containing results students obtained running an assigned experiment. In class, he plans to select several student sample data sets, cut-and-paste their data into a master spreadsheet, and run pre-designed macros on the combined data illustrating the objectives of the exercise.

A psychology professor uses a grid to introduce the students to the process of reflection. He labels two columns "Artifact" and "Meaning". In the first, students briefly list and describe a technical paper, presentation, or any work that the student completed in any previous course. In the second, the students reflect on what the paper reveals about their abilities or talents. The exercise is designed to introduce the process of digital reflective portfolio construction to help students conduct self-analysis leading to self-awareness. Reading other students' reflections provides a student with a greater variety of self-analyses from which to refine his or her own.

PLANS FOR FUTURE DEVELOPMENT

The immediate future of *MessageGrid* is busy. A list of suggested improvements has emerged from several *MessageGrid* user group meetings. Suggestions include: (1) a *clicker* function that allows the instructor to quickly develop a question with five radio-button answers, poll the class for answers, and immediately display histogram results, (2) an

anonymous posting mode under control of the grid owner so that students feel freer to express their opinions, (3) grid owner control over column widths and row heights, (4) automatic refresh of client browsers upon submission of new grid entries, (5) tying *MessageGrid* to the university registration system, (6) allowing instructors to edit student entries, (7) the ability for a grid owner to "freeze" a grid preventing further posting, and (8) the ability for students to conveniently submit objects (files, documents, images) created on a Tablet PC. Work has already started on some of these improvements. These and other improvements will continue through the 2005-2006 academic year.

The following list describes the general tasks to be accomplished:

- Develop and incorporate technical improvements listed,
- Formally evaluate *MessageGrid* use in courses,
- Develop website documenting *MessageGrid* development and use.

Our primary *pedagogical* objective is to document the different ways that instructors use *MessageGrid* in their courses. We plan to draw from the experiences of the group of professors currently participating in this study and others who may join later and to list as many examples as we can of new pedagogical approaches or techniques using *MessageGrid*. Each will be accompanied by student and faculty evaluation of the technique.

We continue to develop *MessageGrid* and are currently designing a plan to formally assess its efficacy in the classroom. We are also working to provide access to *MessageGrid* to instructors outside of Clemson who would like to use and evaluate *MessageGrid* in their courses. Interested parties may send email to pargas@clemson.edu.

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