Glen Graham's ETEC 500 Final Exam Document

Posted on: Monday, December 2, 2013, **submitted on Sunday, Dec. 8, 2013 for grading**

ETEC 500 Final Exam—items in italics are usually from Dr. Newberry; **Bold is mine**.

This exam is designed to be done individually in less than three hours. You do not have to complete the exam in one sitting. You may (actually you must!) use the Internet and other resources to complete this exam.

This exam is due no later than midnight on Sunday December 8. Earlier would be better! You must email your response to this exam to the instructor. A Word document is preferred.

ETEC 500 is the introductory course in the Instructional Technology program. As such it covers a large number of topics, none in great detail. You will learn more about many of these topics in future classes. This exam is structured to determine your knowledge in some of the key content areas in the class as well as your current capabilities with some skill sets necessary for the program.

1. (1 point) What was the most important, useful or notable thing you learned in this class. Be sure to justify your answer. (3-5 paragraphs)

I was affected the most by the ARCS Model of Motivational Design, by Keller, of which I had not formerly heard. I first encountered it during my ETEC 500 reading at: http://www.learning-theories.com/kellers-arcs-model-of-motivational-design.html, and further research at: http://www.arcsmodel.com/. The reason that it had the biggest impact upon me is that I have been sensing dissatisfaction from many of the college students in my advanced courses that I teach, regarding microcontroller electronic design. At first, I attributed their dissatisfaction to their own lack of preparation for the advanced work that was now expected of them. But, the ARCS model convinced me that I shared the blame for their dissatisfaction.

Formerly, I had been teaching advanced electronics design topics the way that they had been taught to me, when I was an electronics engineering student at Cal Poly, Pomona. Advanced classes there were fused together into a senior project, rather than as traditional lecture-based courses. Students were required to conceive, plan, design, fabricate, assemble, test, troubleshoot, debug, and repair their own projects, based on their original investigations of market needs in the industry. Each of their projects would fill a market niche with innovative solutions of their own creation. Research was a huge part of that challenge. Now, I can see that there is a better way to get students to invent, that is much less like cutting them adrift in the middle of the Atlantic Ocean, in a row-boat.

After studying the ARCS model, I have decided that I want to encourage my students more, along the path to success. I have little problem with gaining their attention, or showing relevance. But, where I can make the greatest improvements to my instruction is in the area of confidence-building. For those who have never designed anything in their

young lives, it is a daunting requirement. I need to show them what success looks like, and demonstrate a creative process that leads to a finished product, so that they can model that behavior before I release them to their own devices.

On a smaller scale, I can show them all of the steps they must replicate in order to be successful on their much larger projects, so they have a model for success. I believe that breaking down much larger goals into a sequence of manageable steps will help them to have confidence in their own abilities to synthesize similar operations for their own benefit. This building of their confidence, before cutting them adrift, should be more like releasing them from inside the breakwater of their eventual port of destination. If they avoid the feeling of being lost, they can more easily build self-confidence. With confidence already aboard, I foresee their satisfaction naturally increasing. The ARCS model seems to be a wonderful tool for designing with the end-goal in mind.

2. (1 point) Help! My webpage doesn't work properly. Look at the following example and identify the error in the HTML that is causing my image to not appear:

```
<html>
<body>
<div>
<img scr=mypicture.html>
</div>
</body>
</html>
```

After reviewing your class tutorial on HTML, it would appear that the .html extension on the image file is of an incorrect format. Images should be of the .jpg, .gif, or other web compatible file formats, relevant to images. The .html is a valid format for a web-page file, but is not a valid format for a screen image file that is to be displayed within a web-page.

I referred to this site for confirmation: http://www.w3schools.com/tags/tag_img.asp

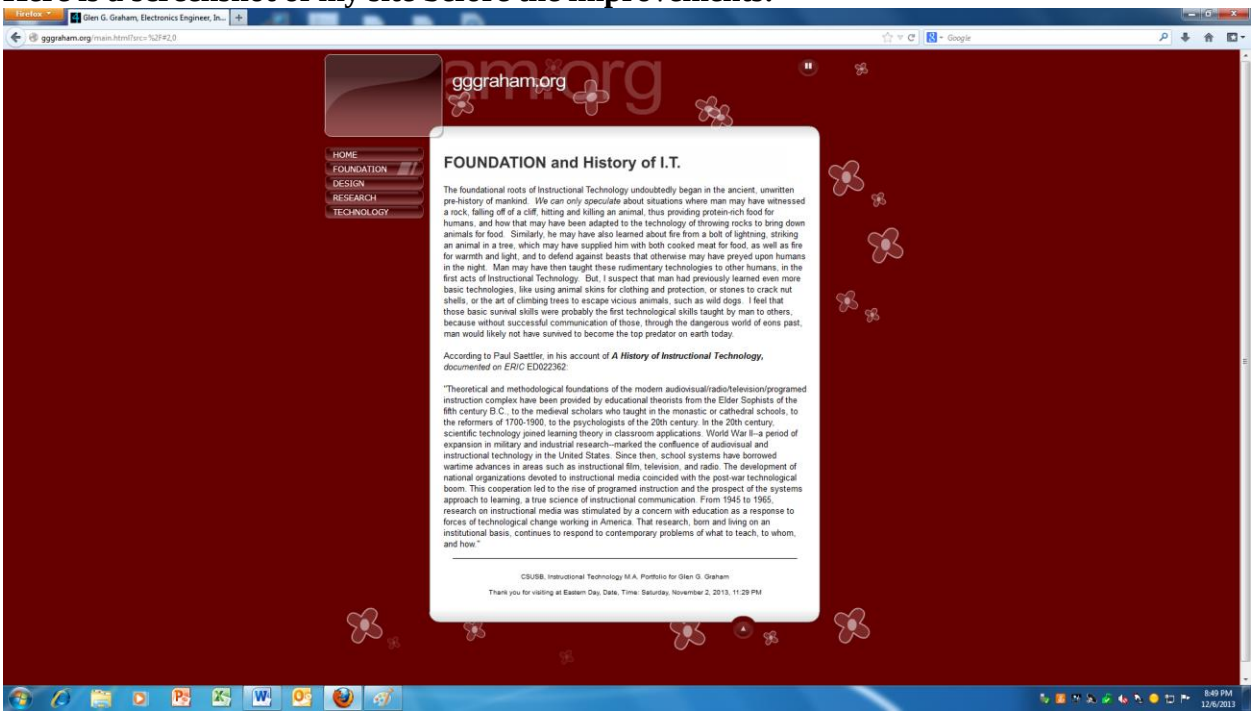
3. (2 points) Review the Foundation section of your portfolio. Analyze this section of your portfolio. Describe it (a screen shot would help) and identify strengths and weaknesses. Identify changes or improvements you need to make on this section of your portfolio. Make at least one of the identified improvements and provide the URL to the page.

The Foundation section of my portfolio has two main sections. The first section contains my speculation of how instructional technology might have developed, back into pre-history. The second contains a quotation from Paul Saettler, in his account of *A History of Instructional Technology, documented on ERIC* ED022362. It is factually based, rather than speculative.

The strength of the first section, as it was originally written, was that it tried to fill the gap from prehistoric times, out to Saettlers' 5 B.C., and attempted to provide a viable continuum of instructional technology within that time span. We know from archaeological studies that stone tools existed for over 2 million years, and that sophisticated cave paintings have existed for over 17 thousand years. But, the first section is still just my speculative story. The fact that it is just my speculation is the weakness of my first section. The entire Foundation section could be improved by removing my speculative story, in the first section, altogether. I will assume that 5 B.C. is good enough for a look back in time.

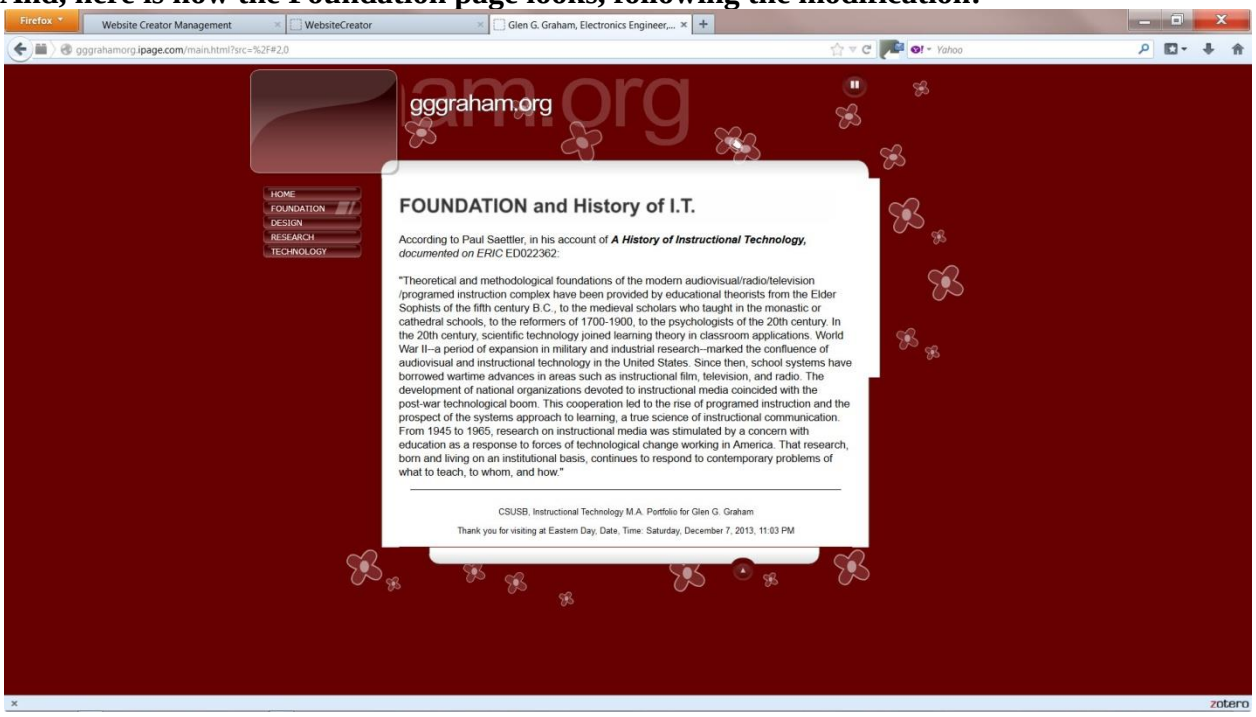
[Eventually, the other thing I want to fix on my site is to permanently silence the audio that repeatedly plays, every few seconds, while viewing any portion of my site. I have studied the html and java and have not found an effective way to silence it. I like the animations that play, which makes the site look alive, rather than dead. But, I find the audio annoying and distracting. I saw a java expert about this and he said that the audio and animations were integrated and embedded in the java-script and could not be altered without much more information, and deeper access. Someday, I will find another theme for my site and change over to it, instead of the one I originally chose. But, that will be a great deal of work for which I do not have time now. That will have to wait until the New Year's Break. Besides, that deals with the entire site, rather than just with improvements to the Foundation section, which is the focus of this part of the final exam.]

Here is a screenshot of my site before the improvements:



Here is the link to the Foundation page of my website, following the modification as requested: http://gggraham.org/main.html?src=%2F#2,0

And, here is how the Foundation page looks, following the modification:



4. (3 points) Explain why research is important to the field of Instructional Technology. Describe a research topic that is relevant to the field and provide at least three peer-reviewed journal articles that relate to your chosen topic. Use APA format for each citation and briefly explain the research method presented by the article and the findings.

Because one cannot always accurately intuit how to design an instructional program that will yield the most effective and appealing educational experience for one's students, research is necessary to showcase evidence that points to the best practices for doing so. Research is good for that purpose, especially when the research uses quantitative tools for statistically revealing significant aspects of instructional design and technology, for one's specific specifications, such as the utilization of technology in attaining the desired student learning objectives. Research can also reveal qualitative effects of various technological equipment and methods of integration into the classroom for maximum instructional benefit.

One example of how research can benefit instructional design and technology is the possible effects that result from students and the teacher using iPads in the classroom as part of a transformative student experience. A teacher might hypothesize that mobile computing tablets, PDAs, cell phones, laptops, or iPads, in the classroom would improve student attentiveness, engender greater creative expression, and engage learners in a more positive and continuous way than traditional methods of instruction. Research about the effectiveness of other such Mobile Computing Device (MCD) equipped classroom might support or discredit that hypothesis. Assuming that the results of the research supported the teacher's hypothesis, an argument could be made to administrators that MCDs should

be provided in the classroom. In any case, a teacher might use research to make a case for, or against, a particular instructional technology being used. In so doing, that teacher might avoid costly mistakes from faulty assumptions. Or, the teacher might use research to avoid the pitfalls, by navigating around the potential problems experienced by others, in similar situations. Active research is similar to the "scientific method." It begins with a hypothesis and then seeks evidence to support it, or refute it. The main difference between active research and the scientific method is that science seeks evidence by directly testing the hypothesis, whereas active research seeks evidence that is based on the results of testing that has already been done by others.

In this case, I will hypothesize that MCDs would benefit the effectiveness and appeal of the student experience in my classroom instruction and seek research to support my claim. In this search, I will examine four of the best peer-reviewed, scholarly journals on ERIC, that find hits on the search words/phrases of: Mobile Computing; achievement; improvement; effectiveness; and tablet PC.

As an engineer, the results that I tend to believe the most are those that are based upon statistical evidence of student performance improvements, from test-score data. This quantitative analysis seems most reliable to me, especially when compared to a control group.

The first article I found offered combined analyses, with both performance statistics, plus Likert-type student survey questions. It indicated that the iPad improved instructional effectiveness by increasing student interactions with the instructor, thus understanding, while enhancing note-taking, and allowed collaboration among peers. Test scores improved by a significant factor in this "interactive group," as compared to the traditional, lecture based instruction group. Also, according to Enriquez (2010), student retention of course information was also increased, and the student enjoyed iPad use.

In the remaining three studies, no statistical data on performance, or other data-measures, was offered. Only, qualitative data was captured in survey questions, of the Likert style, that indicated student attitudes about various aspects of iPad use.

The second article that I read reported on qualitative pros and cons about the tablet use in the classroom. According to Rossing, et al (2012), student attitudes about iPad use were generally more positive than negative in areas of information accessibility, collaboration, novelty, learning, convenience and usability. Students were surprisingly honest about the potential distractions offered by iPad apps in lecture halls, including email and social media. One other drawback was the learning curve for underprivileged students who had little technology exposure, which was also a distraction from learning. Beyond those negatives, the novelty of iPad use, the ease of use, versatility and shared experiences via the networked feature of the iPads enhanced the learning activities. The authors suggest cautions, but say those are manageable. The article definitely demonstrates that student attitudes and learning were generally enhanced by the use of iPads.

In the third article, according to Rogers and Cox (2008), students report that an instructional model based on a single tablet PC in science and engineering courses enhances classroom dynamics, teaching effectiveness, and student learning. Again, this used a Likert-scale question format for qualitative feedback, rather than performance data. And, the answers were more favorable to the use of table PCs than unfavorable.

The focus of the fourth article was about the use of a paperless laboratory for a Chemistry class. According to Hesser, et al (2013), not only did the experience save about 120 sheets of paper per student per semester, but it also scored very well on student self assessment (Likert-scale) questions, as well as open-ended. This allowed students to respond with degrees of agreement or disagreement on the chosen questions. And, it also included open-ended questions to allow students to talk about the things they liked best and the least in the interactive iPad classroom experience. As with the preceding studies, student responses were overwhelmingly positive about the use of iPad in the classroom, and yes, paperless chemistry classes were shown to thrive.

References

Enriquez, A. G. (2010). Enhancing Student Performance Using Tablet Computers. *College Teaching*, *58*(3), 77-84.

Hesser, T. L., & Schwartz, P. M. (2013). iPads in the Science Laboratory: Experience in Designing and Implementing a Paperless Chemistry Laboratory Course. *Journal Of STEM Education: Innovations And Research*, *14*(2), 5-9.

Rogers, J. W., & Cox, J. R. (2008). Integrating a Single Tablet PC in Chemistry, Engineering, and Physics Courses. *Journal Of College Science Teaching*, *37*(3), 34-39.

Rossing, J. P., Miller, W. M., Cecil, A. K., & Stamper, S. E. (2012). iLearning: The Future of Higher Education? Student Perceptions on Learning with Mobile Tablets. *Journal Of The Scholarship Of Teaching And Learning*, *12*(2), 1-26.

5. (3 points) Explain why Instructional Design is important to the field of Instructional Technology. Describe how you might use Instructional Design in your own career.

One can think of Instructional Design as the root process of creating the educational experience. Instructional Technology includes the devices, tools and methods that can be utilized to more effectively engage student attention and interest to accomplish the overall goals of the educational event. It includes an understanding of how students learn, and often uses models as frameworks to guide the design process. Instructional Design is so closely related to the field of Instructional Technology that the two names have been commonly merged into a composite descriptor, that is called Instructional Design and Technology (IDT). Here is a link to the IDT website at Virginia Tech, where it talks more about IDT: http://www.soe.vt.edu/idt/index.html

Instructional Design includes the knowledge of learning modes and the impact of various teaching styles, as well as the usual inclusion of a learning model, such as ADDIE, by Dick, Carey & Carey. ADDIE is a framework that includes Analysis, Design, Development, Implementation and Evaluation. In it, the Design phase is the process of assembling the strategic plan that may integrate technology in with the traditional methods and materials to support and enhance instruction that will be later developed, implemented, and evaluated. And, Instructional Design is the overall planning, development, use and assessment process that gives students an effective and appealing educational experience. Instructional Technology begins with Instructional Design and infuses technology tools to achieve some of those goals in ways that augment traditional teaching methods and materials.

This is what Ferris State (Michigan) University says about Instructional Design. "Instructional Design involves purposeful and systematic planning of a course (or components of a course). It is a process that begins with an analysis of the intended student learning outcomes, identifies teaching strategies and student activities to enable students' achievement of the outcomes, and ends with the development of multiple methods to assess whether and to what extent the outcomes were achieved. As noted, the process includes the development of instructional materials, activities, assessments, and evaluation of the effectiveness of the design and delivery. The process utilizes research on how students learn, best practices in teaching and learning, and guiding principles of instructional design practice." For your reference, the Ferris State (Michigan) University website at: http://www.ferris.edu/HTMLS/academics/center/services/instructionaldesign/whatisid.htm (2010) retrieved on 12-8-13.)

I believe that Instructional Design is the process of planning, creating, delivering, assessing, evaluating instructional materials, methods, and effectiveness, along with any corrective actions needed to yield superior positive educational experiences, and outcomes. It often is a re-entrant process of continuous improvement that iteratively fine-tunes potential reusable learning objects, methods, and delivery styles/modes, over time. Within that process, technological tools can replace or augment traditional delivery/discovery tools to enhance the effectiveness and/or appeal of the instruction.

Technology is becoming more and more a part of our everyday lives. Student perception is that they must be continually connected through technological devices to one another, and the web. It is not only natural, but expected, that teachers will integrate these and other technologies into the educational process to enhance the appeal and effectiveness of their overall instruction. Just as it is said that "a picture is worth a thousand words," an animated series of moving pictures can be worth millions of words, in terms of clarity that technology brings to normally abstract, or hidden, principles that can more clearly be seen when visually depicted, than by seemingly inadequate words. So too, can other technologies enhance the appeal and effectiveness of instructional design outcomes.

I plan to use instructional design in curriculum preparation and lesson planning. I will improve, based upon what I am continuing to learn. Things I have gleaned from all my professors at CSUSB continue to open my mind to new paradigms and frameworks that

will guide my way. This quarter, I learned about Keller's ARCS-model of motivation. I have already planned to integrate it into my course planning and implementation, on a daily basis. Information is not what has been missing. Motivation, however, can use a boost, and that is my next target for my own instructional design improvement. As I said before, "good enough" never is. And, as a technology teacher, I will continue to find more effective, efficient, and appealing ways to infuse technology into my instruction of electronics.