

Assignment P5: CS6750 Spring 2019

Dan Higgins
Daniel.higgins@gatech.edu

Design Principles and Heuristics (from Lesson 2.9)

Question 1

Question one asks us to explore the OMSCS program as an example of where technology and society are intersecting.

First, we describe a **specific positive effect** of the Georgia Tech OMSCS Program. There are so many positives to choose from, but for this question, I referenced back to my Statement of Purpose on my application to the OMSCS program. “I am attracted by the value of the program and not for cost alone as I am fortunate to be able to afford a more expensive program rather what excites me about the cost is the ability to study with talented individuals across the globe who may otherwise not be able to afford such a program. The commonality among us should be an excitement to learn and give back from what we have learned and not geography or economic status. GA Tech's ability to reach such a diverse community of exceptional students only stands to help create and foster academic excellence.”

CS7650 HCI is my 7th course in the program, and I am happy to report that I have personally been able to study and share experiences in group projects with students from China, India, and Italy. The OMSCS program through its use of technology does bridge societal boundaries. And I believe that the relationships developed in the program will be as useful as the knowledge gained from learning new technologies.

A **potential negative effect** is that the gender gap that currently exists in the technology sector and with CS students, in particular,

will continue and be fostered by the program. As of March 2019, the OMSCS program has only 14.9% Women participating. (GA-Tech, 2019). And even though many articles have discussed the excellent ways technology programs like OMSCS can server underrepresented people the program has not yet been able to address this problem adequately. In a 2017 article Shana Vu (Vu, 2017) reviews the work of Lina Sax who was awarded a \$2 million grant from the National Science Foundation to study this complex problem. In the article, one key adverse effect sited is due to the lack of good introductory CS courses. I understand that OMSCS is a master's program, but GA Tech could potentially offer classes aimed at "readying students" for OMSCS and thus improve these low numbers.

The program can be structured to preserve the positive effects while limiting the negative effect by expanding upon the uses of technology and focusing it in the direction of the underserved communities. By improving the gender gap inequality OMSCS program would not just help women; it would benefit all students in the program and potentially foster change in other similar programs.

Question 2

Identify an area you encounter regularly where political motivations are determining the design of technology. First, **describe the area you've selected**. The area I have selected is Health Information Systems. A health information system (HIS) refers to a system designed to manage healthcare data. This includes systems that collect, store, manage and transmit a patient's electronic medical record (EMR), a hospital's operational management or a system supporting healthcare policy decisions. (Brook, 2018)

Describe the stakeholders in that area. Health information systems have many stakeholders often with conflicting **motivations**. Here we will cursorily review three. The first is the patient. The patient wants

their health data protected and kept private, but they also want to benefit from the knowledge doctors gain from seeing many other patients with similar ailments or problems. Additionally, the patient wants high quality and reliable health care at an affordable cost. From this insight, we understand that the design of the technology must specifically take the individual patient's privacy into consideration while also managing the potentially conflicting interest of leveraging that patient's information to help caregivers in decision making and at the same time keeping down the cost of the software.

The second stakeholder we will look at is the doctor. The doctor wants to get high-quality reports and statistical analysis from the HIS so she can provide the best diagnosis and treatment to the patient, but she does not want to spend the time required entering all the necessary details into the system as this would take time from her primary responsibility which is the patients care. We should note that the doctor is paid for seeing patients and is not paid to enter data into an HIS. We recognize that the design of the technology must specifically consider the doctor's needs. As the doctor's skills are required for the system to have high-quality data. Thus the HIS must provide a simplified and efficient means of information entry as well as providing useful information that is helpful and pertinent to the specific patient's needs.

The third stakeholder we will look at is the hospital or hospital administration staff. The hospitals are typically responsible for the care of the data in there HIS and ensuring that only appropriate patients and personal, and authorized third parties have access. The hospitals are also interested in the health of the overall patient community which sometimes conflicts with individual patients needs. The hospitals affect the design of the technology by pressing the need for security. Asking if the data must be kept on-premise or questioning if the cloud is secure from privacy breaches. The hospitals administration staff also manage the physical infrastructure at the hospitals which includes the networks and computers that the HIS must run on which must also be taken into consideration when designing the system.

Mental Models and Representations (from Lesson 2.10)

Question 3

Redesign: Piazza message post redesign.

I have chosen to redesign the Piazza message post for this question.

Figure 1. provides a current state view of the post screen with a few of the weakness of the current design highlighted.

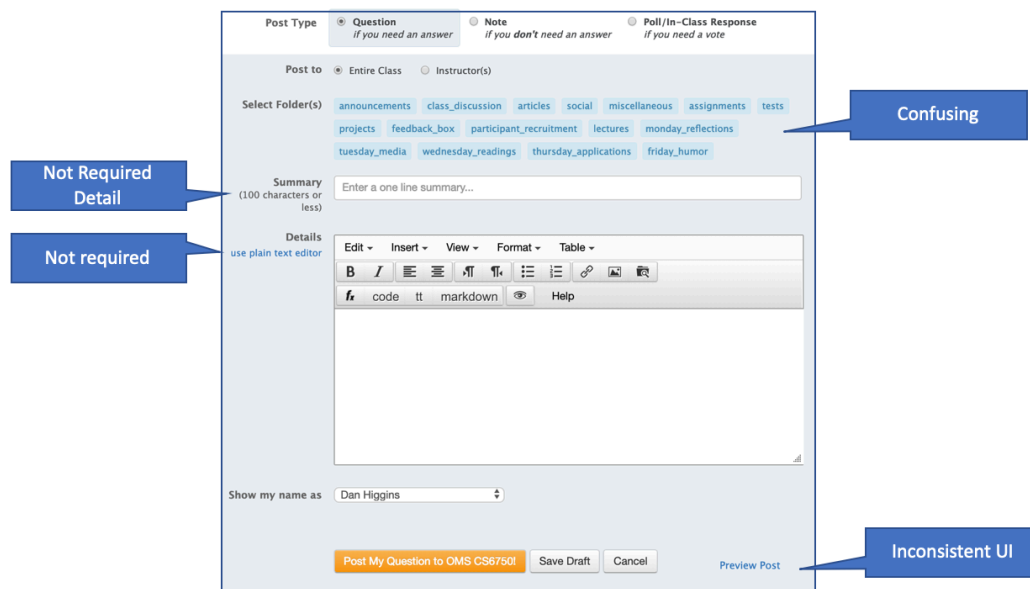
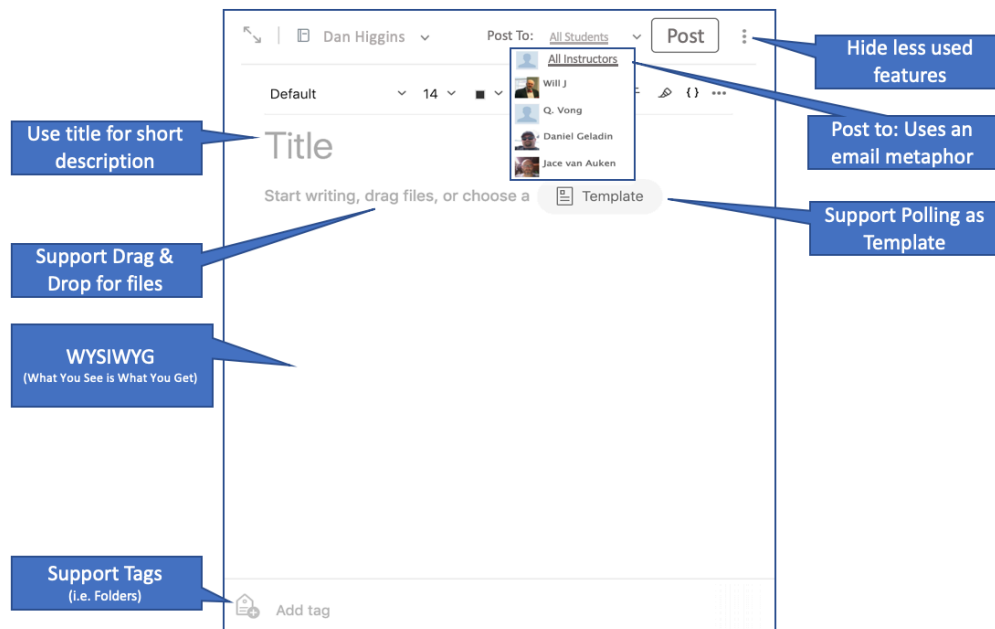


Figure 1

Justification:

1. Our redesign first takes a **Processor View** of the interface design here we evaluate our interface with a quantitative perspective. Looking at how quickly the user can complete the task of writing a post and how quickly they might react to the amount of incoming stimulus when presented a post screen. Our redesign shown in Figure 2. Simplifies the interface making it faster to type a post and quicker just to get started with the task by removing unnecessary buttons from the screen,

2. Next, we take the **Predictor View** of the interface design focusing on a qualitative perspective. “It must help the user learn what they don't already know and efficiently leverage what they do already know.”(Joyner, 2017) Here our redesign takes advantage of the email metaphor which is a common design known to most users.
3. Next, we apply **Direct Manipulation** as a design technique simplify file uploads with drag and drop directly onto the post canvas.
4. Next, we apply concepts from **Visual Perception** to our design. We do this by not relying on color as a queue to accomplish the task of posting in case we have color blind users. We do however provide pictures of instructors to simplify identification through visual cues.
5. Finally, we apply **UI Design principles** – We use *grids* to layout the interface, we use *white space* and *gestalt principles* to group functional components, our new design *reduces clutter*, and uses *grey scale* to improve the interface.



Question 4.

Selected Paper: The trouble with autopilots: Assisted and autonomous driving on the social road

Author List: Barry Brown, Eric Laurier

Summary: The paper reviews videos recorded by drivers of autonomous vehicles mostly Tesla's. The researchers wanted to focus on real-world drivers, so the videos were not produced for the research instead they are downloads from drivers who put video on YouTube (10.5 hrs., 63 Individuals, 9 Countries) The paper focuses on the "social interaction on the road" That is the drivers, the cars autopilots, and other vehicles on the road and how they behave socially. The authors believe that cars and drivers are continuously communicating to one another to enable effective and safe driving. And that these communication signals are not simply turning on a blinker or slowing down to let another car into a lane. The communication is often more subtle and nuanced yet is easily understood by a human driver and can be missed by autonomous vehicles. An example is provided describing, how human drivers "nudge" their way through a 4-way intersection. Currently, autonomous vehicle wait for the intersection to clear before proceeding because they don't understand and are not able to provide the appropriate signals to other drivers. This lack of social understanding of the road has led to a number of accidents where human driver rear end autonomous vehicles (and the humans are blamed for the accident) but the root problem is that the autonomous vehicle is acting in a way that is not appropriate for the social road. The paper also covers numerous mistakes that the autopilot makes and how the driver recovers from these mistakes. The paper comments on the word usage in the videos. Where a driver would say the car is "thinking" about this or the "rudeness" of the autopilot, if it cut-off another car. It is important to note that the paper is not a review of what is wrong with the current generation of autonomous vehicles. Instead, it is a look at how HCI design can help improve existing technology and how the nature of driving is changing with the introduction of these co-piloted systems and fully autonomous vehicles.

Why I selected it for this assignment: In searching the provided conference archives I was looking for a paper that appealed to my personal interests as well as appeared to be covering topics easily accessible to what we have been learning in this course. When I saw the title that included the term “Social Road” I found the term immediately interesting although I did not specifically know what it meant. But after a short review of the content, it was clear that these researchers were taking the participants view of autonomous driving which was a perspective that I personally have not seen much work done on and I found the article fascinating.

References

- Brook, C. (2018). What is a Health Information System? Retrieved from <https://digitalguardian.com/blog/what-health-information-system>
- GA-Tech. (2019). The Numbers. Retrieved from <https://www.omscs.gatech.edu/prospective-students/numbers>
- Joyner, D. (2017). Human-Computer Interaction. Retrieved from <https://www.udacity.com/course/human-computer-interaction--ud400>
- Vu, S. (2017). Cracking the code: Why aren't more women majoring in computer science? *Newsroom UCLA*. Retrieved from <http://newsroom.ucla.edu/stories/cracking-the-code:-why-aren-t-more-women-majoring-in-computer-science>