

# CS6750 HCI – Assignment P5

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## 1 QUESTION 1 – COMPUTER SCIENCE PROMPT

The OMSCS program offered by Georgia Tech is just one example of where technology and society intersect. The fact that this OMSCS program is being offered by a top tier university, and offered for a comparably far lower tuition, makes the program appealing to many individuals. However, the effect on society is a double-edge sword and brings with it both negative and positive consequences. The leading benefit of this program is in its inherent flexibility, but, because of its online medium, there is a gap in human interaction and student-to-student communication.

### 1.1 OMSCS Positive Effect

There are numerous positive effects that come from offering an online program by a top tier university like Georgia Tech. One specific effect, as mentioned above, is the flexibility resulting from the asynchronous format in which it is delivered. When compared to the programs in-person counterpart, this program offers its students a remarkable amount of flexibility. Each course allows students to work at their own pace at a time that is convenient to them. Personally speaking, because of work and family responsibilities, I take advantage of the hours after my daughter is asleep to complete majority of the assignments. The ability to adapt the OMSCS programs requirements to a time that works with my schedule was the driving force in selecting this program. Moreover, for other student spread across the globe, the asynchronous structure affords flexibility of the program and enables courses to be completed regardless of geography.

### 1.2 OMSCS Negative Repercussion

Conversely, because of the inherent flexibility with this program, student-to-student interactions are reduced. In a class with 500+ students, the chances of working with students in the same time zone, let alone the same city, are very small. This results in a reduced number of networking and student-to-student communication opportunities for individuals. Unlike traditional on-campus programs,

the asynchronous structure, and resulting flexibility, of the OMSCS program is not conducive of student-to-student interaction.

### **1.3 Restructuring the Program**

To limit the negative consequences resulting from the positive effects of flexibility, an environment where flexibility is preserved but student-to-student interaction is encouraged would have to be established. To accomplish this, the OMSCS program could ask the student population if they are willing to volunteer their location provided on their application. Those who are willing would have their information shared in a location accessible to other students. Armed with this information, students could see who is close by and use them as resources to meet in person, for networking, course work, and possibly build a relationship that could carry them through the duration of the program. In another example, but on a smaller scale, each course could ask its current students to provide a similar level of information regarding their location. Again, students would be able to reach out directly to other students in their area, schedule times to meet, and ideally build lasting relationships. Both examples would replicate the student-to-student interaction experienced in an on-campus program but would maintain the asynchronous format supported by the online quality of this program.

## **2 QUESTION 2 – COMPUTER SCIENCE PROMPT**

### **2.1 Political Motivation Meets Technology**

On almost every street I drive on in my city, there is something new being built. New schools, shopping centers, and new neighborhoods are being built on every undeveloped piece of land. If it isn't already being developed, there is a sign notifying the public of an upcoming rezoning hearing so that it can be developed. Within a 5 mile radius of my home, I feel like I could throw a stone and hit something being constructed. With all this new development comes the need for improved infrastructure. The increase in vehicle traffic brings with it a need for expanded infrastructure. Improvements to existing streets and bridges are needed along with new streets and traffic signals to support the already crowded

roads. All this development, including the need to improve the cities infrastructure, is controlled by the stakeholders.

## **2.2 Stakeholders and Their Motivation**

The main stakeholders, or persons interested in the city's planning and growth, would be the residents of the city, the business located within the city, and the city's government officials.

### ***2.2.1 Stakeholder 1, Motivation, and Impact on Tech Design- Residents***

The residents of the city are stakeholders in motivated primality by the level of safety, the quality of education, access to jobs, and conveniences of shopping and restaurants. For the residents, motivation affecting design is put into action is accomplished by spending money within the city, and at local retailers and restaurants. Additionally, to make their voices heard, the residents come together and vote. Whether it be on the local government officials, school hearings, or new development, the residents can voice their concerns. Because a big part of the city's success rests on the residents who reside there spending money, it is in the government officials' interest to consider the residents motivation when planning new construction. This is also true with local businesses. If the residents of the city do not shop and/or eat at an establishment, it is unlikely that it will succeed. As a result, business too should be invested in the residents' motivations.

### ***2.2.2 Stakeholder 2, Motivation, and Impact on Tech Design - Business***

Businesses are stakeholders in creating/improving infrastructure because they cannot succeed if people don't visit nor if it doesn't make money. As a result, business must have quality employees and a service which the residents are willing to pay for to attract business. The result is a motivation to to grow. As such, actions that come from their motivations are rooted in the need to maintain and attract new business. To do this, businesses keep their tax dollars close to home, help build the cities identity, create job opportunities, and be involved in community events. All of these play an important role in city planning and development. In some cases, it could be possible that a business is developed in an area unfavorable to the resident. Having insufficient infrastructure leads to increases in traffic, and this is often in contrast of what residents want.

### ***2.2.3 Stakeholder 3, Motivation, and Impact on Tech Design - Local Government***

Local government officials are stakeholders in a cities infrastructure because they are the ones to allocate funds to pay for maintenance and improvements. In action, this looks like implementation and enforcement of policy that raises tax money that can used for infrastructure. Because the local government officials must consider the cause and effect of certain policies, they must act in a way that appeals to both the business and residents of the city. In some cases, local government motivation can conflict with the residents when building permits or rezoning is given but not wanted. Alternatively, local government can conflict with business motivations when infrastructure is not kept up with causing traffic and/or road closures that affect the business profit or ability to remain open.

## **3 QUESTION 3 – ACM CHI PAPERS**

### **3.1 1<sup>st</sup> Reading Choice - Title and Authors**

Title: Guidelines for Human-AI Interaction

Authors: Saleema Amershi, Dan Weld, Mihaela Vorvoreanu, Adam Fourney, Besmira Nushi, Penny Collisson, Jina Suh, Shamsi Iqbal, Paul N. Bennett, Kori Inkpen, Jaime Teevan, Ruth Kikin-Gil, Eric Horvitz

### **3.2 1<sup>st</sup> Reading Choice - Summary**

The authors of this paper examine the current state of AI, how it relates to HCI due to advancements in AI technology, and how there exists a need to redesign AI interaction with users. Based on a four-phrase process, the authors outline each principle and give an example application. The first category is “Initially” where the authors state users should utilize the first two principles which state (1) make clear what the system can do and (2) Make clear how well the system can do what it can. The next category is “During Interaction” where the principles 3-6 are deployed. These are (3) Time services based on context, (4) Show contextually relevant information, (5) Match relevant social norms, and (6) Mitigate social biases. The third category is “When wrong” where principles 7-11 are as follows. (7) Support efficient invocation, (8) G8 Support efficient dismissal, (9) G8 Support efficient correction, (10) Scope services when in doubt, and

(11) Make clear why the system did what it did. Finally, the last category is “Over time” where principles 12-18 are explained as (12) Remember recent interactions, (13) Learn from user behavior, (14) Update and adapt cautiously, (15) Encourage granular feedback, (16) Convey the consequences of user actions, (17) Provide global controls, and lastly (18) Notify users about changes. The authors go on to summarize the design lifecycle of their guidelines and the results. The first phase of this exercise was consolidating guidelines, where AI guidelines from multiple sources were reviewing and combined. The second phase was a heuristic evaluation of what the authors considered the top 20 guiding principles. Thirdly, the authors conducted a user study consisting of 49 HCO users to determine user understanding and the guiding principles clarity. The last phase of the design lifecycle was expert evaluation of the revisions produced in the previous phase. The motivation here was to make sure the revisions proposed would improve the guidelines.

Besides the fact that AI technology is an ever growing part of technology, what interests me about this article is how relevant it is to the fact that AI is a growing part of society. Because of the increasing presence of AI, guidelines are needed to set a baseline for human computer interaction. Also of interest is the design lifecycle the authors went through to improve their guidelines using the same design lifecycle and needfinding exercises we have used in this course.

### **3.3 2nd Reading Choice - Title and Authors**

Title: User Authentication via Electrical Muscle Stimulation

Authors: Yuxin Chen, Zhuolin Yang, Ruben Abbou, Pedro Lopes, Ben Y. Zhao, Haitao Zheng

### **3.4 2nd Reading Choice – Summary**

The authors of this article address a need for improved biometric screening. First, the authors describe what biometric authentication is and its greatest flaw; once it has been compromised, there is nothing that can be done to reuse it by the user. To address this, the authors propose a solution of using electronic muscle stimulation (EMS) to produce a unique response in the subject which can then be used as a form of authentication. The author detail how it can be implemented using an EMS device, a motion sensor, and a trained machine learning model to classify the users’ movements. These three components are used to send a

sequence of electrical impulses into a user's forearm. The motion sensors pick up the movement and feed it to the ML mode. Because every person's physiology is different, varying movements would be expected in everyone this is used on. As such, the response from EMS could be used as a form a biometric authentication enabling users to forgo the need of memorizing passwords and PINs.

This is a very interesting article because of the technology it implements to address a common issue. I work with very sensitive data in my day job and can relate to the problem space these authors have identified. My job, without a doubt, would be simplified if I was able to authenticate myself without memorizing different passwords that need to be reset every 60 days.

#### **4 QUESTION 4 – ADDITIONAL ACM, IEEE, APA CONFERENCE PAPERS**

##### **4.1 1<sup>st</sup> Reading Choice – Title and Authors**

Title: Cognitive Mechanisms Underlying the Creative Process

Author: Liane M. Gabora

##### **4.2 1<sup>st</sup> Reading Choice – Summary**

The author of this article looks at the cognitive mechanisms to explain what happens in the mind during the creative process. From the perspective of the authors, they agree with the widespread idea that there are two stages of the creative process: associative and analytic. The first, or associative more, is suggestive and reveals remote connections between items. The second, or analytic mode, is conducive of analyzing cause and effect relationships and is much more focused than the first. Moreover, the author of this article explains how each of these creative processes are rooted in memory and how memory plays a role in the creative process. Essentially, an initially unfocused idea turns into one that can solve a problem, account for inconsistency, or convey desired relations or emotions.

The way the author explains the creative process is very interesting to me, hence why I chose this article. I have always believed myself to be a creative person, but never thought about how creativity is associated with cognitive mechanisms like memory. The idea that there is a cognitive change that occurs as an idea

transforms from inspiration to a finished product really makes me look at creativity through a different pair of glasses. What's more is how creativity in my 2 and half year old daughter is created under the same cognitive process when compared to my own creativeness.

## 5 ASSIGNMENT SUBMISSION

I was only able to complete one reading for question 4. My wife and I welcomed our second baby on 3/18 (photo below because I can't not share) and my priorities have had to stitch. We have been back and forth from the hospital to the house to continue taking care of our 2 year old. Please consider this assignment as complete as possible given the circumstances, and that I have a grasp on the material.

*Figure 1* — Madison Lukacsko. Source: Mother

