# Assignment P5

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## 1 QUESTION 1 – COMPUTER SCIENCE PROMPT

Having been a student of OMSCS program for nearly two semesters now, there are multiple aspects that can be highlighted as to how the program is positively affecting the society as a whole. For the scope of this exercise, I shall be taking up the positive effect of *making international education feasible* and the negative effect being *lack of actual classroom interaction and lesser network building*.

### 1.1 Positive Effect – Feasibility of Education

Education while is quoted as a fundamental right in multiple countries, the quality often comes at a cost which not a lot of us are able to bear given hectic circumstances in life. Developing countries where people's incomes aren't that substantial, continue to struggle hard in affording good courses or educational degrees which would be a necessary step in their emancipation. And those who are okay to afford the tuition costs, despite the recognition and future benefits at times struggle going for international education due to the incurred additional expenses of staying away from home.

Given the setup and structure of the OMSCS program, it **makes quality education feasible** where it positively benefits that huge section of the global population who suffer from the above two rationales by providing education at scale at a *low cost* and *using an asynchronous, online channel*. And amidst the health crisis that we are all facing for the last two years where physical contact is as good as banned, on-campus educational institutions took a huge hit and had to send students back home. An unanticipated positive effect occurs in this context as the program was already equipped to tackle such a case in the modern world.

### 1.2 Negative Effect – Lack of Actual Classroom Interaction

Since the courses are designed to be taken in an asynchronous manner, the total focus of learning gets shifted towards the material and the consistent individual effort. In such cases, we fail to utilize the overall potential of the human beings both attending the classes as well as taking the classes. The videos inhibit the learners from gaining all the knowledge that the lecturer might hold on the

subject and would have to offer as well as the learners aren't able to have healthy, in-the-moment discussions with their fellow classmates to know their opinions and subject matter experiences.

Though the same is often tried to be bridged with platforms like Piazza and EdStem, virtual platforms only could go to some lengths today in mimicking the interactions that happens physically - where one can read body language, interpret hidden meanings behind simpler words, garner more value in lesser time and so on. As a result of this limited interaction, networking suffers where virtual contacts that are built aren't that solid due to limited interactions on forums in an enormous class size.

### 1.3 Mitigating Negatives and Retaining Positives

While the program benefits by being an asynchronously run, online classroom program, it also has negative repercussions on the learning aspects from people and building good contacts that international students often look forward to. To mitigate the negatives while keeping the class program online, there are a couple of ideas that could be worked upon.

1. *Breaking down class size into groups* – My undergraduate classes consisted of huge batches which were broken down into smaller groups (of say 70 or so) for evaluations or labs due to lack of staff and other resources. Similar concepts of virtual groupings can be done where the massive classes can be broken down into groups and these groups now can benefit from smaller interactions that can happen within these groups. Smaller groups are also better managed where office hours can be conducted and students can have actual face-time with instructor team.

2. *Assessment tools to induce personal interaction* – Courses like HCI benefit from assessment tools like Peer Reviews and Interviews in Design Lifecycle which are just few examples of what can be extended to other courses within the program. Having more opportunities for face-time with other students and learning from their work by design would be a good way to mitigate these challenges.

## 2 QUESTION 2 – COMPUTER SCIENCE PROMPT

Healthcare is one crucial area where politics plays a major role in determining the design of a given technology. Sanctions or subsidies are given on the creation and even research of some selective technology in this domain. Research and development of targeted drugs, automated surgery technology, rapid response vaccines, etc. are all good examples where though the technology proposes common good, yet sanctions and pushback is common from governments and industrial companies globally.

### 2.1 Stakeholders

Due to the industry spanning across multitude of people all across a geographical region, there are ample number of stakeholders that can be produced. For the scope of this question, I would discuss the three major ones – government of a country, private companies regulated in the domain and the people who are beneficiaries in the service.

1. *Government* – Targeting welfare of the people along with maintaining a good relationship with other industries to facilitate financial revenue streams, the government is often the primary stakeholder in any technology related to healthcare with said motivations. For people's safety and security, channels and protocols are setup by them which govern whether a technology is good overall for the country or not. Tweaks are recommended, even at times the research is thwarted if it might lead to malicious use.

2. *Private companies within domain* – These are usually the creators behind the new cutting edge technologies that come into the market or enter the research circle for further progress on development. Firms like these might have bigger intangible goals but usually are in the business of making profits by monetizing the sale of new technology or drugs to establishments like hospitals, infirmaries, pharmaceutical organizations, etc.

3. *Common People* – People are usually the beneficiaries or in some cases, victims of the technological advancement that occurs as a result of companies bringing products to the market after passing through the government regulations. Drugs, surgeries or any new medical procedure, common people would be the ones who these technologies are eventually built for while their

own motivations would just be to aid themselves from various health issues.

## 2.2 Affects on Technology

1. *Government* – Although newer technologies like Automated Surgical Robots are seeing good strides in research and may pose good advantages in future towards the common good of citizens, many governments pushed back the idea of automation due to the pertinent risk which is greater than the good. In cases where specific vaccines or targeted drug research has a potential to be weaponized, the regulation authorities completely shut down the programs themselves which shapes the design of technology in the opposite way.

2. *Private companies within domain* – Targeting a wider market in due course of time, some companies throughout the ages have fell short on the testing and development regulations of their products, be it vaccines or surgical gear to prioritize an early release as well as a steady profit. This conflicts with the usual common good and safety motivations which these technologies are supposed to maintain.

3. *Common People* – Due to a rampant demand of specific drugs and procedures, for example, ventilators in COVID19 cases or braces in dental deformation cases, a lot of equipments see functional improvements from their developers and suppliers which eventually eases out both the quality and the quantities of such devices. This leads to a positive change towards common good and protecting self-welfare.

## 3 ACM CHI SUMMARIES

Given are the two papers I studied from the ACM CHI Conferences from 2018 and 2019 which provide interesting insights in the fields of AI and Healthcare with their roots within HCI.

### 3.1 Paper 1 – Guidelines for Human-AI Interaction (2019)

*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*

### 3.1.1 *Summary*

In today's world, artificial intelligence capabilities are integrated in a variety of interfaces which give way to abilities like pattern recognition, speech recognition, face recognition and so on. The advent of such capabilities however changes the way we conventionally used to interact with interfaces for our desired tasks, as both the way we execute them and our eventual goals have changed in this setup. For example, typing a message using Google Keyboard for the first time might lend a different experience as compared to usage overtime where the keyboard would have learnt substantial knowledge regarding the user's patterns and frequently used words. The task of typing after a given learning phase would provide a much lesser gulf of execution as compared to the first time.

In the lectures we came across a set of design principles and heuristics that make way for a thoughtful and usable design process for new interfaces. The same are interpreted by the users while they use any interface. But with AI making its way in systems, the interface may demonstrate unpredictable behaviours for the users that can be disruptive, confusing and at times offensive. This in turn renders the established usability guidelines of traditional design moot. The paper then presents a new set of 18 design guidelines highlighting when they are likely to be applied during the interaction phase (listed in the appendix section)

### 3.1.2 *Choice of Paper and Pertinent Interest*

The applications of Artificial intelligence today are endless where each and every piece of machinery is trying to utilize some aspect of AI. Being personally fascinated by the wide ranging applications of the field, this paper provided an interesting extension to the aspects of HCI and touched upon how this changing world will now have to adapt to newer standards of developing interfaces as well as what are the conditions that interfaces have to make users aware about while the interaction is underway.

### 3.2 Paper 2 – Designing Peer Support Chats for Mental Health (2018)

*Title* – "Suddenly, we got to become therapists for each other": Designing Peer Support Chats for Mental Health
*Authors* – *Katie O'Leary, Stephen M. Schueller, Jacob O. Wobbrock, Wanda Pratt*

### 3.2.1 *Summary*

The rise of mental illnesses today is frightening where the paper informs that more than a quarter of US population is already affected. Face-to-Face talk therapy is the most common and effective methods in battling such conditions. Yet be it due to social stigma or lack of support, majority of people don't get access to this kind of care. While a lot of people (peers) end up signing up for learning more about talk therapy and eventually help others, the practice isn't scalable enough. The paper delves into the design of an online, peer supported guided chat system which provides guidance to peers based on psychotherapy prompts to increase the efficacy and quality of help rendered to mental health patients.

The design of the chat system entailed the use of psychotherapy and cognitive behaviour therapy prompts provided to the peers at every step of the way, guiding them through the process of helping patients. A prominent use of HCI principles like simplicity, consistency and ease of use were highlighted in building the system. The incremental study was tested out against an unguided control chat where the guided system generated valuable solutions to problems, promoting awareness of issues where as the control just provided a pleasant distraction from actual issues.

### 3.2.2 *Choice of Paper and Pertinent Interest*

Having encountered multiple cases of Depression and Anxiety in my personal circle of friends and family, the title of the paper itself was quite intriguing for me due to the context in which HCI was being applied. Moreover being related to mental well-being, I thought it would be interesting for everyone to see how nuanced decision-making could become when we design interfaces for such a sensitive context.

### 4 OTHER CONFERENCE SUMMARIES

Given are the two papers I studied from the ACM Creativity and Cognition Conference from 2019 and MobileHCI Conference from 2020 which provide a view of positive change design brings as well as interesting insights on human abilities when looked at from the lens of HCI.

## 4.1 Paper 1 – Designing Hearing Aids Beyond Functionality

*Conference* – ACM Creativity and Cognition (2019)
*Title* – Is Deafness A Disability? Designing Hearing Aids Beyond Functionality
***Authors*** – *Patrizia Marti, Annamaria Recupero*

### 4.1.1 *Summary*

Estimating a 5% deafness rate in global population as per WHO, the paper begins to by distinguishing between the deaf - who overtime lose their ability to hear and Deaf (with capital D) - who are born with the disability. In either case, due to multiple aspects like cost, discomfort, social rejection, stigmatization, etc., these individuals refuse to use the existing hearing aids available in the market. Hence, the task of the design process in this case was how to balance the functionality of hearing aids with other aspects of user experience, like self expression and social acceptance.

The paper goes over a full design lifecycle process which begins with needfinding interviews and surveys with impaired individuals and coming up with design alternatives like smart broaches, smart necklaces, etc. for the female and smart armbands or rings for the male to detect sonic vibrations and actuation to pass it onto a mobile app which them interprets the caught frequencies. Fashionable gear and smart jewels were final prototypes which were gauged in evaluation cycles against parameters like aesthetics and identity, gender appropriateness, etc. in post-event protocols and in-depth interviews.

### 4.1.2 *Choice of Paper and Pertinent Interest*

The paper brings out positive change by design by means of producing interfaces which not only assist in functionality (providing hearing aid) but also the other dimensions of user experience, like self expression and social contexts which might help users in adopting the technology for a much longer period of time. The interesting fact this paper brings out in this sensitive context is that often functionality isn't all that matters and overall user experience might entail trivial yet crucial things.

## 4.2 Paper 2 – Extracting Daytime-Dependent Alertness Patterns

*Conference* – MobileHCI (2020)
*Title* – Extracting Daytime-Dependent Alertness Patterns from Mobile Game

Data

*Authors* – *Tilman Dingler, Ken Singer, Niels Henze, Tonja-Katrin Machulla*

### 4.2.1 *Summary*

Cognition-aware systems are gaining traction as a research topic in the community which defines them as systems which operate under the knowledge of their user's cognitive states in real time. Human bodies go through a circadian pattern as a result of which cognitive functions, including alertness, attentiveness and vigilance systematically differ all through the day. This leads to an impact in perception, memory, and subsequently our productivity which might usually be hard to figure out individual to individual.

The paper in that light proposes a method to extract this circadian rhythm pattern from the user by using a mobile game. The game entails 3 different stimuli tests, namely PVT (random time stimulus), CNG (go/no-go choice stimulus) and MOT (sustained attention stimulus) which gauged a total of 30 participants in an in-the-wild test to collect and evaluate the response times and thus, calculate an effective range of maximum alertness in each of the subjects.

### 4.2.2 *Choice of Paper and Pertinent Interest*

In my own knowledge, I had never come across the concept of cognition aware systems which made this paper a really interesting choice to share insights upon. Generating a model of human cognitive cycles is always a challenge due to the sheer subjectivity of individuals which made the paper describing a clean and efficient method to derive a successful alertness model even more incredible.

## 5 REFERENCES

1. Amershi S. et al (2019). Guidelines for Human-AI Interaction. ACM CHI 2019. Published.
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3. Marti, P.,  Recupero, A. (2019). Is Deafness A Disability? Designing Hearing Aids Beyond Functionality. ACM MobileHCI 2019. Published.
4. Dingler, T., Henze, N., Singer K., Machulla T. (2019). Extracting Daytime-Dependent Alertness Patterns from Mobile Game Data. ACM Creativity  Cog-

nition 2020. Published.

## 6 APPENDIX

*Table 1*—Design Guidelines and When are they applied

| SNO | Design Guideline | Application |
|-----|------------------|-------------|
| G1 | Make clear what the system can do | Initially |
| G2 | Make clear how well the system can do what it can do | During Interaction |
| G3 | Time when to act or interrupt based on user action | During Interaction |
| G4 | Show contextually relevant information | During Interaction |
| G5 | Match relevant social norms | During Interaction |
| G6 | Mitigate social biases | During Interaction |
| G7 | Make it easy to invoke or request the AI system's services when needed | When Wrong |
| G8 | Make it easy to dismiss or ignore undesired AI system services | When Wrong |
| G9 | Make it easy to edit, refine, or recover when the AI system is wrong | When Wrong |
| G10 | Engage in disambiguation or gracefully degrade the AI system's services when uncertain about a user's goals | When Wrong |
| G11 | Make clear why the system did what it did | When Wrong |
| G12 | Remember recent interactions | Over Time |
| G13 | Learn from user behavior | Over Time |
| G14 | Update and adapt cautiously | Over Time |
| G15 | Encourage granular feedback | Over Time |
| G16 | Convey the consequences of user actions | Over Time |
| G17 | Allow the user to globally customize what the AI system monitors and how it behaves | Over Time |
| G18 | Notify users about changes | Over Time |