CS6750 – Assignment M1

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***Abstract*—**For multitasking individuals that engage in physical activities while listening to MOOC lectures the iPhone Udacity application demands constant, physical user interaction. To bridge this Gulf of Execution while maximizing user safety, attention and information retention, this project shall explore supplemental interface features for effective studying while multitasking.

1 PROBLEM SPACE

The user, in this context is assumed to be engaged in a physically demanding activity, while also immersed in Udacity's lecture material. The physical activity could range from running on a treadmill, biking, driving a car, or any other task which requires both visual and tactile attention of the user. Due to this limitation, any interaction with Udacity application such as selecting the lecture, pressing play, speed increase, maximizing window, answering quiz questions or recording notes require the user to context switch both their visual and tactile attention to the phone touch screen. In the case of biking or driving, taking both the eyes off the road and a hand off of the wheel produces an enormous safety hazard, while an activity like running may suffice without visual attention but navigating a touch screen during the activity may become quite challenging. In order to separate interaction with the Udacity application away from the iPhone screen, the user requires another mode of screen navigation and data entry currently not available from the iPhone or the Udactiy application.

2 USER TYPE

The user type includes the entire population across multiple continents, countries and languages. The Udactiy platform is available for free to audit certain lectures and inspires new generations of people of all ages to seek continuing education. Making education material freely available to the masses is an enormous task in and of itself. However, making the material available to the user in any environment, during any task or activity that he or she may be engaged in is

a step not yet accomplished. The user is active; working, exercising, jogging, biking, or even driving. Their mental capacity is not overwhelmed and can be split between their main activity and absorbing lecture material. However, context switching their visuospatial attention between active task and lecture material is strenuous and would most likely lead to stopping one activity or the other altogether. User engagement with the application is always one-on-one and although the Udacity content is available to all, the nature of the Problem Space limits the useful age group to adults over the age of 18, due to underage children not being able to multitask or engage in certain activities for as long of a time as adults to give reasonable feedback on their experience.

3 NEEDFINDING PLAN 1 – SURVEY

3.1 Plan

The survey needfinding plan would involve surveying Georgia Tech OMSCS students for their experience using the Udacity application. The Georgia Tech OMSCS population is perfect for this effort since the population body is globally diverse. The survey method is best to probe this population for information since people on different time zones or locations may be difficult to observe, interview, or participate with, but instead can take a survey at any time of their convenience. Users will be questioned about their tasks, subtasks and the context in which the task is performed. Since the Problem Space is in effect a multitasking problem, then multiple tasks or subtasks are inherently intertwined in any context, since that situation is what is being designed for.

3.2 Biases

Additionally, the OMSCS population removes biases of gender, race, religion, age, or occupation since the student body varies across all these factors. Conversely, Udacity is the only platform delivering content to the OMSCS student body, so their evaluation may be skewed to favor the current design since it may be the only one they are familiar with. As such, the question should be fairly broad, and focus solely on minimizing interactions while multi-tasking, rather than directly discussing Udacity's interface. As such, the survey text may include a preliminary set of questions such as those in Appendix 1.

Confirmation bias will be reduced by asking the users about their needs, rather than evaluating potential designs. This way the opinions of the interviewer are eliminated and potential solution ideas are not presented. If the prototype solutions do not conform to the user needs, the interviewer will know that the designs have to change. Additionally, a broad range of interviewee population will be sampled in order to have a large sampling pool. Observer bias will be minimized by having survey questions reviewed prior to any interviews. Social Desirability bias will be reduced by surveying only objective elements without revealing to the user any potential design implementations of the product. Voluntary response bias will be minimized by comparing the survey results with those received form the other needfinding plans. Recall bias will be minimized by avoiding any questions that ask the user to evaluate past experiences. Only the opinions on current usability will be asked in the survey.

4 NEEDFINDING PLAN 2 – INTERVIEW

4.1 Plan

The interview needfinding plan will focus on determining the needs of the users and the tasks which the user requires. This plan will be conducted with both OMSCS students through Skype or Google Hangouts, and with coworkers or local OMSCS students and coworkers or local students which also take MOOC classes in order to expand their knowledge. Since the interview is conducted one on one, more intimate question may be asked of the user. Details about the context and the variant multitude of subtasks and task mixtures can be probed from the user base. It is possible that there are certain contexts or tasks that users perform while listening to lectures that the interviewer never thought about. Additionally there may be certain limitations to possible solutions that the interviewer also did not consider. Direct interviews allow a conversation between interviewer and interviewee to explore that kind of things that the user may need, rather than what the research thinks they may need. It is important to pay attention specifically to users of different genders and occupations since usually the tasks performed during the day can vary wildly between gender roles and occupational tasks, during which lecture material is absorbed by the user. Some interview questions that may be asked include those in Appendix B.

4.2 Biases

Potential biases of the interview needfinding plan are assuming that online lecture video/audio is a universally well accepted method of delivering educational information to people interested. It is feasible to consider that there may be even better delivery technologies that no one has thought up of yet. Since the interview will be focused on this delivery technology and improving its usability, it is assumed that this delivery vehicle is the only acceptable one.

Confirmation bias will be reduced by interacting with the interviewee on a personal basis to get to know their needs and use context. Avoiding mentioning anything about potential designs or even the true nature of the interview should minimize any idea the user may have as to the purpose of the potential product. Observer bias will be minimized by having the interview questions reviewed and the interview process heavily scripted. Apart from small ice-breaker questions, the interview should flow in order to obtain the proper data needed. Social Desirability bias will be minimized as part of interview questions review and scripting, making sure that no hints about the potential product are inadvertently hinted to by the questions being asked. Voluntary response bias will be minimized by seeking out and asking a varied pool of people to interview, rather than asking a broad pool to volunteer to interview. In this way, both strongly willed and weakly willed interviewees should be evaluated evenly. Recall bias will be minimized by avoiding asking any question which requires the interviewee to recall and evaluate past events.

5 NEEDFINDING PLAN 3 – ANALYSIS OF EXISTING UI

5.1 Plan

This needfinding plan will focus on analyzing existing User Interfaces used in this context. Automotive User Interface includes controls on the steering wheel and the central entertainment console. This UI can range wildly depending on the automotive vehicle. Semi-hands-free User Interfaces are assumed to be those with minimal user interaction, containing only tactile interactions such as the Apple ear buds which allow VolUp, VolDown, Answer Call and End Call, all capable without visually interacting with the interface. Finally Minimal User Interfaces will be evaluated such as Bluetooth audio headphones and personal assistants which require no audio or visual interactions at all. For each user in-

terface, the researcher will determine who are most common users, What is each user interface most commonly used for and in what context? And also, for which tasks do these User Interfaces commonly solve? Exploring these questions for each User Interface will help the researcher understand and drive their design to either of these possibilities, or even a bland of more than one possible User Interface presented.

5.2 Biases

The bias present in this needfinding plan is the limitation of the researcher's creativity in finding a variety of currently available user interfaces to evaluate. This needfinding plan is also least interactive with users and receives absolutely zero feedback on either the ideas or the evaluations presented by the researcher, in terms of needs or capabilities of the UIs. Conversely, without involvement by other people, the biases of population variety are eliminated, since concerns for a broad population range are not necessary.

Confirmation bias, observer bias and social desirability bias can only be minimized by the researcher himself, since there are no people to interview or survey. The researcher himself must maintain some integrity in attempting to distance opinions, beliefs and prior knowledge from the process of determining possible candidates to evaluate. Voluntary response bias and recall bias are also not applicable to this needfinding plan since no users are interviewed or surveyed.

6 CONCLUSION

In order to solve the task of multitasking while absorbing Udacity lecture material, several needfinding plans will be implemented. The variety of the needfinding plans will be spread over a broad population range and variety of possible existing UI types in order to determine the lacking feature which shall be developed in later assignments. The user types and problem space span multiple populations and user contexts, thus questions are broad enough to cover a variety of working environments but specific enough to narrow down the features needed by the users. In the end, the goal of this exercise is to provide the students of MOOC delivery platforms a way to study in any environment, while doing any activity, and in any available context, with minimal interaction with the actual application.

7 APPENDICES

7.1 Appendix A

• How often do you perform a physical activity while also listening to audio material (music, audiobooks, lectures, etc.)?

1: 0-2 times/week

2: 3-5 times/week

3: 6-10 times/week

4: 10-20 times/week

5: 20+ times/week

• How satisfied are you with touch being the main interface on your phone?

1: Very dissatisfied (Still carry around my flip-phone)

2: Dissatisfied (Have a smart-phone but would love some tactile accessories)

3: Neutral (No hard opinion on touch screens)

4: Satisfied (Do not know what people are complaining about)

5: Very satisfied (Sometimes I wish my significant other was made of touch screens)

7.2 Appendix B

• Are there any daily tasks during which you would like to listen to some form of study material, but cannot due to some lack of technological capability?

• Does any part of the current technology block you from better retaining or keeping focused on the lecture materials?