KING'S College LONDON

6CCS3HCI Human-Computer Interaction 21/22

Individual Coursework: Human-Fitness Interaction

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January 2022

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1 Users' need & Problem Statement

To have a good start to the design, the team has conducted 21 interviews for the sake of understanding the users' needs in the context of the activities and goals they have, which can mainly be classified as three categories: "manage study time efficiently based on the dynamic nature of university life", "redirect focus away from student responsibilities when engaging in non-academic activities", as well as "provide motivation to focus on studies and at the same time ensuring a good balance between study and fitness."

After generating separate problem statements as three clusters, everyone in the team has tried to explore similar patterns in between and come up with a final problem statement, entitled "Students struggle to strike a balance between study and fitness, and lack the motivation to focus on either one or both, causing anxiety and stress. Our solution should include an app that allows students to schedule their studies and physical activities while also keeping track of their progress toward their goals."

A concrete prototype the team has made so far can be found within Figma:
`https://www.figma.com/file/dWNPBiY5cmy4Wt9nt5TlGV/Human-Fitness-Interaction?node-id=0%3A1`

2 General Design Overview

2.1 Testable hypothesis

Looking back at the Demographics (see 4 Appendix), it is not counter-intuitive that all interviewees the team have selected lie between 18-25 years old, so does the participants involved during the testing phase. Since this is the age at which the majority of university students are, it is time to start considering some outliers, what if selecting a mature student impacts the testing result? Here is where a testable hypothesis has come into play.

Mature students are able to spend their time more wisely compared to young students.

2.2 Target population

In the UK, people who start undergraduate after the age of 21 or 25 at the beginning of postgraduate studies are being considered mature students[2]. Under the context of this experiment, the age range included in testing will be expanded up to 60, with someone who is above 25 years old being treated as a mature student.

In general, a majority of mature students tend to work alongside their studies[2], due to the fact that they have all taken a definite period of study leaves. However, the problem statement addressed in the earlier section seems does not take into account students' work, it may still be the case that mature students also have some difficulties balancing their study, work and their fitness as a result of restarting their studying journey. That's why a shift of the targeting age group involved in testing starts becoming important.

2.3 Independent variable & Dependent variable

Participants can be found by informing the student union of universities and requesting them for sending an email pubic to all current students as a poster, followed by a random selection of those students replying back to the research group.

The experiment starts by dividing people into two groups of 50 based on their age range, one for people who are aged between 18-25, and everyone else who's outside this age range is being put within another group. Two separate versions of the app will be provided at this time, one stays exactly the same as the prototype shown in the above link and an additional field will be added to the users' activity pie for the variant.

At the beginning of the testing phase, a one-hour in-person tutorial session will be separately run for each group of participants, consisting of two sub-sessions as a 30-minute video watching plus a 30-minute Q&A to ensure that everyone in the group has a good understanding of the app's core functionalities. After that, two groups of people will be asked to use their own version of the app to carry out their daily routine for a month. The time management score for each user will be initialised to zero on the first day of each week, it may go down to negative scores if users stay being counter-productive. As the scores are counted weekly, all participants will be asked to write down their own score at the end of each week and work out their average time management score by the time the testing period ends. Some specific analysis will then be done by the research group, via summing all users' average time management scores, computing a final mean value of each group's score and then making a comparison.

To summarise, the main goal of the research team is to investigate whether students at an elder age are likely to have a high time management score than youngsters, which therefore makes the independent variable and dependent variable of the experiment explicit, as **"students' age"** and **"time management score"**. Linking back to the testable hypothesis made earlier, "spend time more wisely" indeed infers "a high time management score" under the experiment's context.

2.4 Experiment design

With the purpose of increasing participants' satisfaction, a **between-subjects design** is adopted due to zero training effects[1]. Within-subjects design, on the other hand, is very likely to have training effects as users are required to see both interfaces (i.e. both app versions) throughout the testing period, which in turn piles up everyone's workload and therefore may cause the experiment leaves a bitter aftertaste for the vast majority. Even though a larger population is needed for a more accurate testing result, it still outweighs the cons of "creating users' dissatisfaction" for within-subjects design.

3 Threats to validity

3.1 Threats to internal validity

Threats to internal validity typically involve ordering effects, selection effects, as well as experimenter bias[1]. All ordering effects are addressed within the test as the experiment itself is not a within-subjects design. For selection effects, however, as the group itself is not an independent variable and participants are all randomly selected from a set of the mailing lists, the research team not using pre-existing groups can be considered as a limitation, in addition to the difference in the level of enthusiasm about two separate app versions being one of the experimenter bias.

3.2 Threats to external validity

Although examples of the threats to external validity can be population, ecological, training and so on[1], the only one which is relevant to this experiment will be population. It is undeniable that a total of 100 participants involved in testing is indeed less representative of a much larger students' population, due to the fact that a between-subjects design is expected to have more participants compared to a within-subjects design.

3.3 Threats to reliability

When carrying out an experiment, there is always something that the research group do not know beforehand and happen completely out of their control, referred to as threats to reliability, consisting of previous experience, user differences, task design and measurement error[1]. Except for task design, the other three threats are still likely to come up under this experiment's context. For the first two, consider a scenario of most of the mature students being selected are being unorganised to everything in their life and at the same time at least three-quarters of young students involved are all in their top 5% of their year group regarding their grades and are already expert in managing time, which is intuitive that the results produced will be skewed towards the opposite. On the other hand, every participant can make errors either during the average computation, or miscopy the score from their own app, and thus potentially leads to data bias.

4 Appendix

Demographics:
https://emckclac-my.sharepoint.com/:x:/g/personal/k1923101_kcl_ac_uk/EcD0ZU0y67RKmJbK2sPrclcBBgC-6z3pm_Nc-EU989ZBzQ?e=DGY774

Bibliography

[1] Petr Slovak, 2021, Lecture 8: Test: Experiments, lecture slides, Human-Computer Interaction 6CCS3HCI, King's College London, delivered November 2021.

[2] UCAS. Mature undergraduate students, 2022. [Online]. Available at: `https://www.ucas.com/undergraduate/applying-university/mature-undergraduate-students`.