Assignment 6: User studies

General comments: Again, you will be doing a scientific user study, so the comments from the preceding assignments on carefulness should be remembered. Likewise, make a good time planning, which is always important for research, but absolutely essential when you depend on others, i.e., the participants of your study. **Important note:** This assignment is quite similar to the one from last week, so again make sure to read the whole assignment carefully before starting it.

General rules: Email your results in a PDF to Wolfgang (huerst@uu.nl).
Include all group members in the cc of this email (students not included in the email will get
NO grade!) and consider the usual formalities:

- For the email: Use the subject [INFOMSCIP] Assignment $< i >$ group $< j >$

- For the PDF file: Use the name INFOMSCIP-X-Y.pdf where X is the number of the assignment and Y is your group number. Put all group members' names and student IDs at the begin of the PDF.

Deadline for this assignment: Send the email to Wolfgang before **Thu, Oct 24, 2019, 11am**.
Deadlines are strict. Each additional day after the deadline will result in a grade deduction of 1.0.

General remarks: This assignment is again about user studies and quite similar to the one last week. There, the goal was to do an empirical user study, that is, you had to decide on evaluating a quantitative value related to on-screen typing, such as typing time or accuracy. Such things can be measured objectively with a good study design. This time, we want to look into more subjective aspects, such as usability, experience, etc.

> **To deliver:** Similar to last week, the result of this assignment should be delivered as a PDF file. Start this file with a list of your team members. Before handing it in, add a rough estimate of hours spent on this assignment for each team member plus a short description of special tasks that he or she has done (unless you split all tasks equally or did all work together). One sentence is enough for this; no details required unless you deem them necessary for your grading.

First step: *Specification of the research.* Again, start by defining your research goal and specifying it formally. This assignment is very similar to the one last week, because again, you will be doing a user study. It is important though to make yourself aware of the differences. First, the goal is to evaluate a "softer" characteristic, such as "game play experience" or "usability", which are both rather vague terms. Also, these are a more qualitative and subjective characteristics. Yet, they might relate to quantitative measures, too.

Likewise, we want to look at the evaluation of a more complex system. Even if you look at just one parameter (e.g., when you want to test two different interaction modes for a game), there will be more influences that you cannot control and that impact your experiment (e.g., game aesthetics, genre) and it is more challenging to get meaningful results that allow you to draw general conclusions.

Because of the game-related examples above, you probably already guessed it: the goal is to evaluate some kind of game with respect to some characteristic. There are no concrete rules other than that your research should make sense, be relevant, and contribute to science (i.e., not just play two game versions and compare their high scores) and that the characteristic that you are looking at should have a subjective or qualitative character (because the goal of this assignment is that you demonstrate how to design and execute an experiment for such a case). Because you have to test with members from other groups again, I recommend to use a mobile game on your smartphone. Other options could be a game that can be played on your laptop or devices like the Nintendo Switch^{TM}, if you have one.

As said, the characteristic that you will be studying with the game(s) that you pick should not be a pure performance indicator but a more "complex" one, such as game play experience. It is up to

you if you compare, e.g., two game characteristics (e.g., input mode) or if you test a single game with respect to certain aspects. Likewise, you can compare two different games, compare two different aspects of one game, or just look at a single implementation of a game, as long as your evaluation makes sense and makes a contribution to science. Here some examples for inspiration (from mobile games): There are games that allow you to switch between interaction via tilting (e.g., the orientation of the phone is mapped to motions of a character in the game) and touch interaction (e.g., an on-screen joystick used to navigate the game character). Likewise, you could test the impact of screen size or screen orientation on game play experience (if the differences in screens make sense for the gaming app that you are using).

The single steps of the assignment are pretty much the same as last time. Thus, once you decided on a problem to study (i.e., your research goal or general aim), specify it concretely. Again, it is important to keep the difference in mind when designing your experiment and doing your research. For example, a formal hypothesis might not be needed this time. Likewise, your research question might not have the form that is typical for empirical research (but it could well be; it all depends on your goals and context).

To deliver: After listing all your team members at the begin of the PDF, address the things mentioned above. Be precise and to the point. No lengthy explanations with issues of minor relevance.

Use the following structure (but slight deviations are acceptable if they make sense and server your purposes):

- Research aim / general goal / research problem: ...

  Write one sentence or phrase to introduce it. Then add some text to shortly explain it; 1-2 sentences could be enough if you phrase it nicely.

- Research question: ...

  Phrase your question. If necessary, you can add a short text to explain it.

- Hypothesis: ...

  Only add this if it is needed and makes sense for your research. It might well be that a more "informal" phrasing is more appropriate this time.

Feel free to add any other text that you deem relevant, but avoid adding unnecessary information or issues of minor relevance (again, be precise and to the point). It is totally okay, and might even be better, not to use full text but phrasings and a bullet point structure.

Some related comments and grading criteria: You may have noticed that the text in the box above is almost a 1:1 copy from last week's text. Thus, the same comments and grading criteria apply here as well, even if I did not bother copying them again :)

Second step: *Experiment design.* And again, this is similar to last week, but of course, the different focus and goal of the project will result in a different experiment design. An obvious way to test for more "softer goals" such as usability, workload, engagement, game play experience, and so on is to use a standard questionnaire that evaluates this particular aspect (if such a standardized questionnaire exists). We discussed several of them in the lecture and you are welcome to chose one of them. But you are also free to look for different ones. In any case, make sure though that you explain and justify your choice. That is, shortly state why this questionnaire is good for your research. For example, you can shortly illustrate certain characteristics of it and why these make this questionnaire well suited for your goals. Don't just say something like "it's the only one that we found".

Also think about if this single questionnaire is sufficient to answer your research question or if other means are helpful to make a stronger conclusion. For example, even if the focus is on subjective experience, it might make sense to also track performance-related aspects, such as game play performance. Likewise, you could consider complementing your questionnaire with some qualitative statements gathered via an interview.

All other aspects are pretty much the same as with last week's assignment, so they are not listed here again, but you can look them up there yourself if you do not remember them anymore.

To deliver: Add the study design to your PDF document. There is no template, but make very sure that all information is there and clearly and nicely represented. I recommend using the layout to structure it in a way that key issues are easy to spot (e.g., don't write full text but use bullet lists, font style, etc.).

Some related comments and grading criteria: And again, the box above is almost a 1:1 copy from last time, so the same comments and criteria apply here as well. I am well aware that the comment above about measuring other things in addition to the questionnaire can easily make this assignment get out of hand. Yet, the important point here is not that you do as much as possible, but that what you are doing makes sense. If your conclusions are strong and convincing, it might well be that just using one questionnaire and nothing else is totally sufficient and will result in a high grade. Likewise, randomly mea-

suring additional things and reporting them will not result in a better grade if it does not help making your result stronger or if this data is not related to your research question.

Third step: *The actual experiment.* Not much to say here, since again, this is pretty similar to last time. Again, see this as a pre-test or pilot study, so write down some short comments on the limitations or compromises that you made, and then run your experiment with 2-3 members from another group, using the same group matches as last time: 1&2, 3&4, 5&6, 7&8, 9&10&11 (notice the "triple match" for groups 9-11).

To deliver: Complete the study design in your PDF by a paragraph or subsection entitled **Limitations** that introduces the above decisions and compromises that you made. Shortly describe their relevance and how they might impact the result.

Some related comments and grading criteria: You guessed it: the same text as last time applies here as well.

Fourth and final step: *Analyzing the results.* And again, same procedure as last time. Notice that you are not expected to do a significance analysis of your measured data, since we have not discussed any particular tests in the lecture and it would be too much for a one week assignment – apart from the fact that you will likely not have enough data to do this well anyhow.

To deliver: Add the results and analysis to your PDF. Structure it in the following way (minor changes are okay if you think they allow you to represent your results and conclusions in a better way):

- Results (*the actual data*)

- Discussion (*the analysis*)

- Conclusion (*this could include comments on how to change the actual experiment because of the conclusions drawn from your pilot study*)

Some related comments and grading criteria: As above: same criteria as last time.