At what stage in the user-centred design cycle is it appropriate to use low and high-fidelity prototypes?

In a user-centred design cycle, prototyping is usually an iterative process that comes after gathering requirements from potential users. Prototypes are artefacts produced in user-centred design that allows communication between the users and designers as well as between designers. Prototypes are also used to explore design options as they can take various representations of a system. The two main types of prototypes are low-fidelity and high-fidelity prototypes. In the following paragraphs, the two kinds of prototypes will be compared, followed by the different purposes of these prototypes and when they should be used in a user-centred design cycle.

The commonality between low and high-fidelity prototypes is that they both help to generate design alternatives and be used as a communication tool (Rogers, Sharp and Preece, 2011). Using the group coursework as an example, the participants of the two evaluation sessions were able to raise issues they have with HealthyMind using the prototypes presented to them. They added requirements which were previously not thought of by the designers and gave feedback on how effective the system would be.

Between the two types of prototypes, the main differences lie in the interactivity, visuals, and content of these prototypes (Pernice, 2016). A low-fidelity has limited interactions with the presenter having to be agile towards the users' actions and respond. In terms of visuals, a low-fidelity prototype is not fully represented and would appear as a schematic representation in which visual aesthetics are not prioritized. The content of a low-fidelity prototype would only have a summary or substitution that are short or abstract. In contrast, a high-fidelity prototype would work like a real system, in which immediate change can be observed in response to the users' actions. It usually looks like the real system itself with concrete graphics and clear content.

To distinguish the stages of when two types of prototypes are used, examples will be drawn from the group coursework that presented the app of HealthyMind. Although our first low-fidelity prototype was very limited in which users cannot interact with them and presented to them by word-of-mouth, we were able to gather further requirements from the users. However, this meant that the establishment of requirements before prototyping were not complete. This is probably because interviews were not conducted with potential users to gain a deeper understanding of how they currently cope with stress, anxiety and depression. This hinders an understanding of how the system can be tailored to their current needs and how the system designed can benefit them. If interviews were conducted, the designers would be able to know the source of stress students are facing and to know what motivates them and incorporate functionalities targeted at those challenges and drives to promote students in a positive behaviour. The decision of requirements was relied on the assumption that the system designers would know user requirements based on previous work and designers being part of the targeted audience themselves. However, the group managed it by incorporating those requirements into the next iteration of prototyping. Through the first participatory design session, the team was able to benefit from using a low-fidelity prototype as the prototype could be easily disposed of. Also, users were able to create their own low-fidelity prototypes to communicate the design alternatives with the designers. The different approach in which the team decided to let the users create their own low-fidelity prototype before evaluating designs by the designers helped to avoid bias and to boost creativity. Through this approach, the team was able to show that low-fidelity

prototype can be used at the start of a design stage to gather requirements through user-created prototypes compared to the traditional cycle of having design alternatives before prototyping.

Besides gathering requirements, a low-fidelity prototype can also invoke design alternatives. A participant in the first participatory design session suggested a background using a flower instead of a tree that could integrate game elements such as achievements. This was a helpful input to the future implementations of the design, but it was not integrated in the high-fidelity prototype as the designers felt that a tree brings a metaphorical element of an individual being strong compared to a flower that is more culturally seen as fragile. After explaining the symbolic meaning of the tree to the participant, the participant took a positive note and agreed a tree was more meaningful than the initial intention of a flower. Nonetheless, the participant had suggested graphical alternatives that implicated their ability to provide their own insights to how the app would look like.

Furthermore, low-fidelity and high-fidelity prototypes can be distinguished by answering different usability issues of a system. Although Virzi, Sokolov, and Karis (1996) suggested that a low prototype would uncover the same issues as a high-fidelity prototype, there are conditions to meet in which a think-aloud protocol is used. From the evaluation sessions conducted, the team was able to find differences due to the interactivity of prototypes. While the first participatory design session presented a low-fidelity prototype that consisted of static images, one of the participants in the second participatory design session using high-fidelity prototype was able to report the ease of using swipe motions to interact on the device. This difference was able to help determine at which stage the different fidelity of prototypes are to be used. If the focus of the stage was on the visual aesthetics such as the ease of interaction with the screen or the speed of animation, a high-fidelity prototype can be used. This is because participants had to imagine the interaction taking place in a low-fidelity prototype, but could it come to live in a high-fidelity prototype. This suggests that when a low-fidelity prototype has undergone a few iterations for usability feedback in terms of functionality, a high-fidelity prototype can be presented for feedback on visual elements or animations and a clear description of what needs to be changed. For instance, further qualitative questionnaires with high-fidelity prototypes conducted regarding the app design observed positive feedback with most of the requirements of potential users being met but one of the participants suggested a change for "snooze" time during workouts to be customizable. The fact that the issue addressed was on the specific amount of "snooze" time that was supposed to be a placeholder for the actual system proved that indeed, high fidelity prototypes should only be presented after all requirements are fulfilled because they are more likely to focus on the content than on the functionalities as suggested (Rogers, Preece and Sharp, 2016). Thus, high-fidelity prototypes are recommended to be produced after low-fidelity prototypes are iterated.

In conclusion, the different cost and effort in producing low and high-fidelity prototypes provide different insights to a system. For a low-fidelity prototype can be used at the start of a design stage to not only gather functionalities, but also allow imagination of interactions and content. As the two prototypes may provide insights with different focus, it is recommended that low fidelity prototypes are produced when requirements are not yet finalized and high-fidelity prototypes for visualization elements before development takes place. As high-fidelity prototypes take a longer time to build, it can be conducted before the system implementation stage as it can also be taken as an estimate of how long a real system will take to develop and provide developers a clear idea on how the system should behave.

References

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