

Experiential Prototypes to Elicit Dialogue

with Umeå Police Command and Communication Centre

Shelagh McLellan
Umeå Institute of Design
Umeå University
SE-901 87 Umeå, Sweden
+46-704 671 370

shmc0002@student.umu.se

ABSTRACT

This paper focuses on how low-fidelity and medium-fidelity prototypes create a dialogue between users, clients and designers. This dialogue is essential for creating designs that resonate emotionally and create alignment between clients and users at the different stages of the design process. It raises a discussion about how the level and type of fidelity of the prototype can be linked to the consequent dialogue with stakeholders.

Keywords

Design, Methods, Dialogue, Stakeholders, Prototypes, Fidelity

1. INTRODUCTION

This project was carried out over five weeks in cooperation with the Umeå Police, with the aim of redesigning the graphical user interface for dispatchers at the Command and Communication Center (LKC). The current interface and system consists of approximately 20 different windows from 5 different software applications displayed across three monitors.

The client in this project was a team comprised of a superintendent, duty officers, and civilian staff working towards developing a new LKC in Umeå. A dialogue between the dispatchers (users), superintendent and duty officers (client) and designers was essential for creating designs that resonated emotionally and created alignment between the stakeholders. This design method provided a user-client centered approach, in contrast to being solely user centered or client centered. Client-user involvement can strengthen the design by providing more perspectives in the dialogue.

In the initial briefing, the client emphasized the use of a large projection wall and explained how the police system works. The focus was then shifted to analyzing, observing, and interviewing the dispatchers at the LKC. Dispatchers interact with the system eight hours a day and are highly efficient at using the system. Therefore, it was difficult for them to envision how the system and interface could be improved upon beyond adding functions. After spending time with both parties, it was apparent that the client's understanding of the users' needs did not align with either the expressed needs of users nor the insights revealed by designers. This led to thoughts about using prototypes as aids in enhancing the dialogue between stakeholders.

The literature referenced in this paper use the term prototypes, even when sketches and mock-ups would be a more accurate term. For consistency reasons, the term prototype will be used throughout this paper. The focus of this paper is on how low and medium-fidelity prototypes aided in creating the desired dialogue with users, client and designers, and how this dialogue was essential for taking the project further.

2. EXPERIENTIAL VS. TECHNICAL FIDELITY

Fidelity is a synonym for faithfulness, ultimately coming from the Latin verb *fidere*, to trust. Today, the term is often used to describe the accuracy of technology in emulating something else. Typically, it expresses the degree to which an audio recording faithfully reproduces a live orchestral concert. In this paper the term fidelity refers to the degree of accuracy in which a simulation, in the form of a prototype, can mimic the user experience to be found in the proposed final product.

Ambiguity invites dialogue

In interaction design, unlike computer science, a lower fidelity prototype which promotes discussion can be more important than one using higher fidelity software, that fails to ignite discussion. A medium-fidelity prototype for the purposes like this case study can be created using computer graphics instead of programming. A working model, which offers a higher level of fidelity, mirrors a higher level of operational reality while less advanced technology implies greater ambiguity. The advantage of using lower fidelity with its inherent ambiguity, is that it opens up a broader dialogue [3]. When a more specific dialogue is desired, it can be appropriate to prototype using higher fidelity. The table below has been developed by the author to compare the types of fidelities in prototypes mentioned by Buxton, Coyette, Ehn & Kyng, Erickson, Hartman and Rudd [1,2,3,4,6,7]. Coyette et al argue that a medium-fidelity prototype is one which is developed using software tools, but is not a visual representation of the final design [2].

Choosing the appropriate fidelity

The table suggests that in the initial design stages, it is most valuable to use low fidelity prototypes to provoke with, in order to create an open but broad ranged dialogue. Further along in the design process it is more suitable to use medium-fidelity prototypes to

evaluate with, as they provide a higher level of experiential fidelity and an open, focused dialogue between stakeholders. Software

Fidelity	Low-Fidelity	Med-Fidelity	High-Fidelity
Medium	paper & pen	computer graphics	programming
Technology	low	medium	high
Experience	medium	high	medium
Ambiguity	high	medium	low
Dialog Openness	high	medium	low
Time	low	medium	high

Table 1: Comparing the qualities of low-fidelity, medium-fidelity and high-fidelity prototypes.

prototyping should be used to validate near the end of the design process, as it can limit the vision or experiential qualities, unless considerable amount of time and money is invested in both programming and graphics [3,7]. The method and outcome of using such prototypes in the design process will now be explained.

3. PROVOKING WITH LOW-FIDELITY PROTOTYPES

Stories are a natural way to begin a dialogue and a vague story line leaves openings for discussion of the design [4]. By combining a low-fidelity prototype with a roughly sketched scenario it was possible to create a space that encouraged users and clients to provide feedback and react to the concept.

3.1 Creating an environment for dialogue

The goal of the workshop was to provoke both users and clients and, consequently, to develop a dialogue about the design concept direction. The three hour workshop was hosted at Umeå Institute

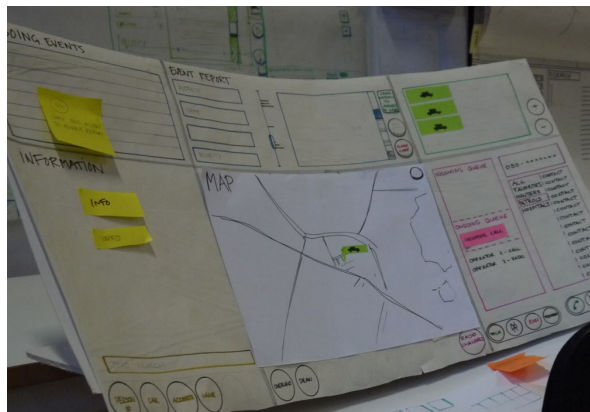


Figure 1: Low-fidelity paper prototype.

of Design and two rough paper prototypes were produced and presented to the participants along with a room arrangement activity. Six people attended the first workshop, four dispatchers (users) and two duty officers (clients), who were paired up in groups of two. Each pair rotated between stations of the different class projects. Each step was approximately 15 minutes and overall 45 minutes were spent with each pair. The first step of the workshop was the designers acting out a scenario of how one would interact with one of the paper prototypes. One designer told the story of the workflow while the other interacted with the prototype. After the demonstration the stakeholders were encouraged to try it out to see how the work environment felt. This triggered a discussion, before the next prototype was demonstrated, followed by a conversation about their reactions and work flows.



Figure 2: Room arrangement activity with stakeholders.

The last part of the workshop involved discussing the LKC room arrangements. Pieces of colored paper designated the different elements in the room and the participants were asked to reconfigure the room by rearranging the pieces of paper. Afterwards, a large board was placed on the wall, representing shared projection information. It was used to collect thoughts on what the space could be used for. The client brief mentioned that a wall projection would be an important part of the design. During initial observations it was not established how a shared wall projection could be useful for the users. Following the strategy used by Ehn & Kyng, the prototypes were very rough to ensure feedback and discussion was not hindered by minute interface details, but to focus on the hands-on experience and that the concept was understandable [3].

3.2 Dialogue influences design direction

With users testing the various work stations and from the discussion around the two paper prototypes, the preferred working method and design direction became clear. In addition, the duty officers were very keen to observe and listen to the comments of the dispatchers, and also contributed by asking questions. The room arrangements professed by the dispatchers and the duty officers differed because their needs were different. By listening to what was important to the dispatchers and the duty officers, the direction of room layout became clear. When asked initially what the shared projection screen could be used for, the dispatchers found it difficult to answer, while the duty officers suggested it could be used during special events.

The project lead team did not think about the actual application of the screen, but rather felt it was necessary because they are present in other communication centers. Low-fidelity prototypes provoked a good dialogue about the work environment at the LKC, and resulted in new insights about how the designers should move forward with the project. Decision making for the design team was enhanced when members were able to refer back to their dialogue with stakeholders.

3.3 Dialogue improves stakeholder alignment

The early client-user interaction sparked effective communication. The risk of misalignment between the two would be minimized in the later phases in the project, as the clients were able to see how the users reacted to the concepts first hand. Rather than clients making suggestions with just the designer, a much more efficient conversation occurred over a shorter time span because of the direct feedback between the user and the client. This dialogue between designers, the users, and the clients provided new perspectives that might not have arisen using typical methodologies. It ensured that the client, in particular, understood the specific users' needs.

4. EVALUATING WITH MEDIUM-FIDELITY PROTOTYPE

Medium-fidelity prototypes provide more detail-oriented feedback, and for this phase it was important to test how users and clients would experience the interface and for designers to see their reaction.

4.1 Storytelling to elicit user experience

One week after the first workshop, another workshop was hosted to get more specific feedback on the developed design concept in order to evaluate the design. This workshop was three hours long and also hosted at Umeå Institute of Design. The attendees consisted of two duty officers, three dispatchers and two LKC project team members, four of whom attended the previous workshop. A medium-fidelity prototype was presented, utilizing a curved plastic panel to simulate a touch screen using rear projection. The interface was presented as an interactive pdf file which was navigated



Figure 3: User testing with medium-fidelity prototype.

through as slides by one of the designers while a scenario was narrated by another designer with step by step instructions. The dispatchers and the duty officers followed the oral instructions and interacted with the screen. To evaluate the intuitiveness of the design, a scenario was used which depicted the current work flow. Only the functions that were to be performed were explained, without stating how to do them. After having experienced the prototype a discussion naturally emerged in which more specific questions about interaction methods and interface details were raised.

4.2 Storytelling triggers dialogue

Stories provide not only a rich user experience [4], but also provide a basis for starting the dialogue, as a way for the designers to dive deeper into the dispatchers workflow. During the user testing with the medium-fidelity prototype, the users interacted with the touch screen interface with ease, despite the prototypes lack of ability to provide realistic touch feedback. It was important to have all three perspectives as it provided a holistic and broader view of the project. This revealed, for instance, that dispatchers rarely call cars, but rather regions. The change was applied immediately, to both the interface and the way the story was told. The story behind the operation of the interface is a large part of the user experience, and also influences the dialogue. Those who were unfamiliar with the project asked "Is that a touchscreen?" meaning the prototype created the desired experience of being a touchscreen, although it lacked the technical scope of being a high fidelity prototype. As referred to in Table 1. the medium-fidelity prototype has a high experiential quality due to the nature of narratives [4].

5. DISCUSSION

The breadth and broadness of feedback and dialogue regarding design concepts often mimics the ambiguity of the stage in the design process. Something perceived as finalized will attain more detail-oriented feedback, while at the initial stages of the design process the focus should be on a dialogue about the overall concept. Changes to any high-fidelity prototype typically require considerable time and money, and may discourage stakeholders from an open dialogue [3,4]. According to Table 1. the high-fidelity prototype should be used to validate, and not to conceptualize, design concepts. Low fidelity-prototypes are intended to be quick, cheap and iterative, and changes and new ideas are encouraged [1,3]. Conversely to Buxton and Ehn & Kyng, Horst writes that "it is possible to develop high-fidelity integrated prototypes that convey a convincing use experience, and the dynamic details of a product interface, while still being very much open to change and continuous improvements, through a collaborative prototyping process with different stakeholders." [6]

The prototyping method described by Horst has become cheaper and more accessible over the past 10 years with programs such as Processing and Arduino. This is only helpful if the designers are fluent in programming and if the experience can be mocked up using existing technology. However, it is not always appropriate, nor necessary, to create high-fidelity prototypes to provide a convincing user experience. This case study included the use of lower-fidelity integrated prototypes that could be produced and modified

quickly, and were focused on the visualization and experience as opposed to technicalities. As there are no curved touchscreens on the market today, using a higher-fidelity prototype would not create the right user experience and desired dialogue needed within the short time frame available. Neither client nor user commented negatively about the disparity between a real-life interface, and the pseudo interface created. In addition, a working high-fidelity prototype would require a programmer, while a medium-fidelity prototype can be made by designers that are not advanced coders. This also ensures that the graphical interface is not limited by the software, but rather limited by the designers creativity, and the value of the design is focused on the user experience rather than the technical possibilities. The transparency in regards to how the prototypes were made and how easy they were to change encouraged stakeholders to not feel limited by time or money constraints when providing feedback.

By having the designers implement many of the suggestions between the two workshops, stakeholders were given a feeling that their voices were heard and that their comments actually contributed to the design. This sense of contribution is important when creating a dialogue with stakeholders. More research is needed on how users feel, act and respond in the presence of clients, along with other methods to elicit comments from, and encourage dialogue between, various stakeholder.

6. CONCLUSIONS

A designer's role is not merely to engage in a process focused on the creation of a product, but to participate in, and often lead, a social process between stakeholders where communication plays a crucial role. The low-fidelity and medium-fidelity prototypes of the LKC project helped create a platform for dialogue between the users, clients and designers. The low-fidelity prototype provided a dialogue focused on the overall interaction and which provided a big picture of the project. The medium-fidelity prototype focused closer on the details of the interaction. This dialogue allowed designers to make design decisions quickly, without a need to meet with the two parties separately. Instead the sessions provided valu-

able feedback, and a common understanding of each other's roles. This, in turn, reduces the likelihood of misalignment between stakeholders. Incorporating stakeholders' feedback enhances their esteem, by acknowledging their contribution to the project.

7. ACKNOWLEDGMENTS

Special thanks to my team members Ayse Gokce Bor, Kilian Kreiser and Siri Johansson. To our project advisor Niklas Andersson, and tutor Nils-Erik Gustafsson for great advice along the way and thank you to the LKC in Umeå for the friendly collaboration.

8. REFERENCES

- [1] Buxton, B., 2007. Sketching User Experiences. Focal Press, London.
- [2] Coyette, A., Kieffer, S. & Vanderdonckt, J., 2007. Multi-fidelity prototyping of user interfaces. *Human Computer Interaction - Interactions*, 4662
- [3] Ehn, P., Kyng M., 1992 In *Design at work: cooperative design of computer systems*. Lawrence Erlbaim Associates, Inc. New Jersey. 169-196
- [4] Erickson, T., 1995. Notes on design practice: stories and prototypes as catalysts for communication. In New York, NY, USA: John Wiley & Sons, Inc.
- [5] Hartmann, B., 2009. Gaining design insight through interaction prototyping tools. *Stanford University*. 19-22
- [6] Horst, Willem., 2011. Prototypes as platform for participation. *University of Southern Denmark*. 31-33
- [7] Rudd, J., Stern, K. & Isensee, S., 1996. Low vs. high-fidelity prototyping debate. *interactions*, 3(1)