

Aide's Aide: Assistance to Home Health Aides

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1 Prototyping Strategy

Even though HCI research community shows broad support for prototyping, there is no unambiguous preference or empirical research results that favor low fidelity prototyping over high fidelity or vice versa (Farnum, 2002; Lim et al., 2008; Liu and Khooshabeh, 2003; Kussmaul and Jack, 2006; Rudd et al., 1996; Virzi et al., 1996; Yasar, 2007). Lim et al. (2006) try to reconcile the two approaches by suggesting that using high and low-fidelity prototypes results in different types of usability problems being identified. The user needs and designer objectives should be the deciding factor in selecting prototyping techniques and tools. In other words, the prototype should facilitate the creation of a relevant environment where a user's experience with the system as well as the prototype itself can be effectively observed and evaluated by the designer (Hennipman et al., 2008).

In order to evaluate the overall concept of the *Aide's Aide* website i.e. to see whether the users are comfortable with the fundamentals of its design (e.g. layout, composition, naming scheme, etc.) the low-fidelity prototype is the best fit (Rudd et al., 1996). For the development of a low-fidelity prototype, I prefer paper and crayons. I decided to avoid automated sketching tools so as not to tie myself to graphical design choices at early stages and because a paper prototype is the fastest and most economical way to check if a designer is on the right track (Yasar, 2007).

However, the paper prototype does not fully suit my goals for usability testing. The paper prototype lacks autonomy, so it is harder for testing participants to turn into evaluators (Rudd et al., 1996). In other words, in prototype testing, the users are actors who must place themselves into the given circumstances¹, and with paper prototyping they have to share stage with another person who plays the role of a machine (despite the fact that users asked to communicate with paper it is not possible to discard involvement of another human and the relationship they share) so this human-to-human play has too many unknown variables that makes predictions of the validity of user evaluation of the system less

¹I use the term “given circumstances” as defined by K.S. Stanislavsky.

controlled. Electronic prototyping significantly reduces the number of unknown variables associated with participation of the designer and puts things in order in a sense that props are real (e.g., a computer is a computer), so it is easier for users to imagine themselves in the given circumstances of the evaluators.

Since my users are mostly novices and know me personally, I anticipate that with the paper prototyping they would not be immersed enough and mostly rely on me to show them how to “do things” (which is good since this would reveal potential usability problems). I should definitely get a lot of useful explorative results (Hennipman et al., 2008) from the rapid low-fidelity paper prototyping regarding layout, terminology, overall website presentation, and even user satisfaction, but my concern is that it will not be enough. In addition, I need an experimental prototype (Hennipman et al., 2008) that will put user one on one with a machine to eliminate the atmosphere of a make-believe play, so the users would be bound to pay more attention to tasks. Therefore, I made a choice of developing a second prototype, this time a digital and medium-fidelity (Farnum, 2002) or mixed-fidelity (Hennipman et al., 2008) prototype. This decision of choosing a mixed-fidelity over high-fidelity prototype is dictated mostly by the lack of time and the breadth and depth of skills necessary to develop a fully functional and graphically professionally looking product. The following list describes my strategy and the results for the second, mixed-fidelity, prototype based on the five dimensions suggested by McCurdy et al. (2006).

Level of Visual Refinement: High. Probably realized more in breadth than in depth but I would still consider it as high-fidelity. Even though McCurdy et al. (2006) suggested implementation of lower level of “aesthetic refinement” for the early prototypes I felt that for the *Aide’s Aide* system visual elements play a very important role (e.g. color coding), so a prototype with enhanced graphics would help me in observing user experience with the system.

Breadth of Functionality: Realized as much as I physically could. High-fidelity prototyping for the breadth of functionality should help users better understand the system capabilities (McCurdy et al., 2006), enhance their experience (Hennipman et al., 2008) and therefore reveal a broader set of usability issues.

Depth of Functionality: Not fully realized for all tasks but some major functions are fully implemented (e.g. adding or deleting news). I do not think that at this point of the system development the level of details for completion of the task is very important for observing user experience.

Richness of Interactivity: Also realized as much as possible considering the severe time constraints. Level of interactivity of a prototype defines a level of “reality” for the users and, thus, should be realized as much as possible (Hennipman et al., 2008).

Richness of Data Model: Not realized. Even though *Aide’s Aide* website is a knowledge based system and users probably would expect to see some real data during testing, I made a calculated decision to spend more time for developing interactive and graphical dimensions of the website and let users suspend their disbelief on this dimension.

2 Prototype Description

As I mentioned above, I have built two prototypes. One is a low-fidelity paper prototype and another is a mixed-fidelity digital prototype.

2.1 Paper Prototype

This prototype faithfully depicts navigation system of the website and supports main tasks such as (1) login, (2) add news, (3) add carpool info, and (4) upload new document. It does not support completion of the “task sheets” task because the paper prototype would be a close resemblance of the actual task sheets so I thought it would be confusing for users if I gave them something they complete every week anyway. This prototype supports only the first layer of the system since it was designed more for the concept proofing than for task analysis. Here are the pictures of the paper prototype (they are also were enclosed in the Appendix of the Milestone 3 document).

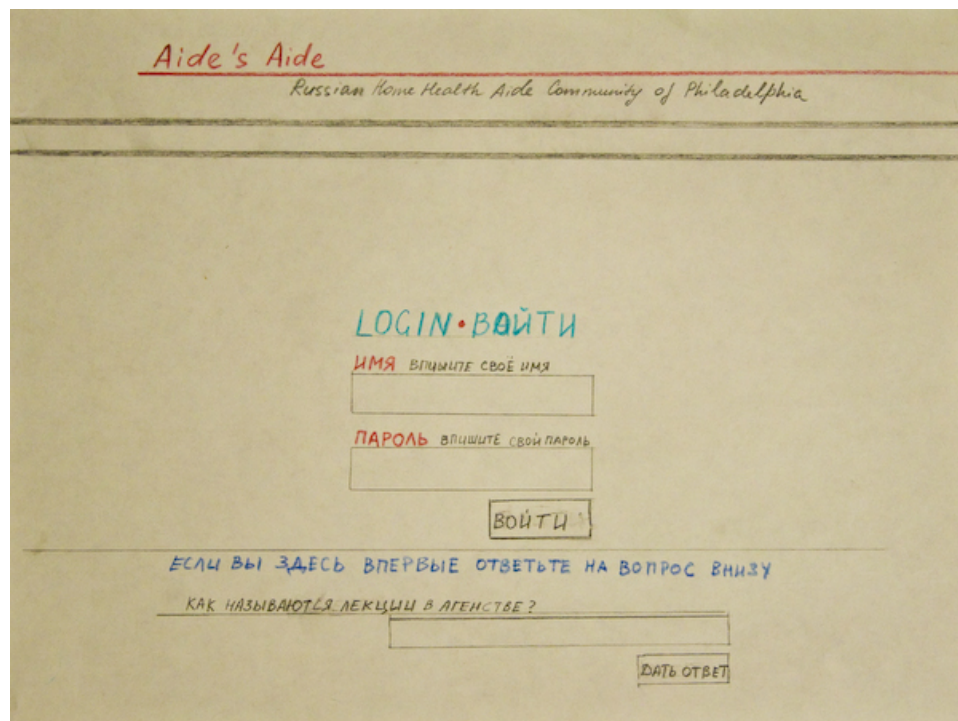


Figure 1: First Paper Prototype: Login Page

It is hard to explain in words how this prototype works so there is a video that shows how it worked with users.

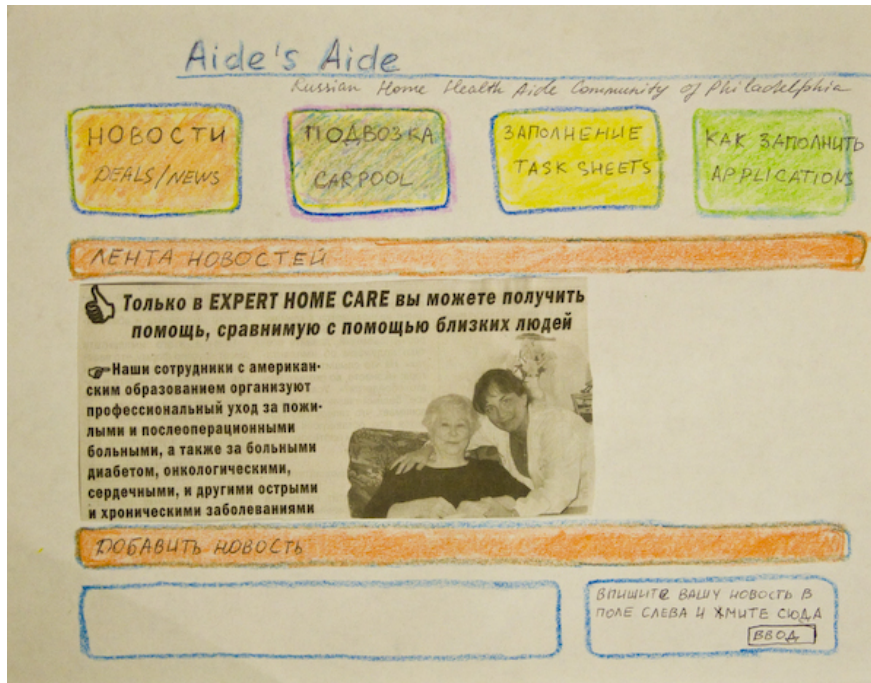


Figure 2: First Paper Prototype: News Page

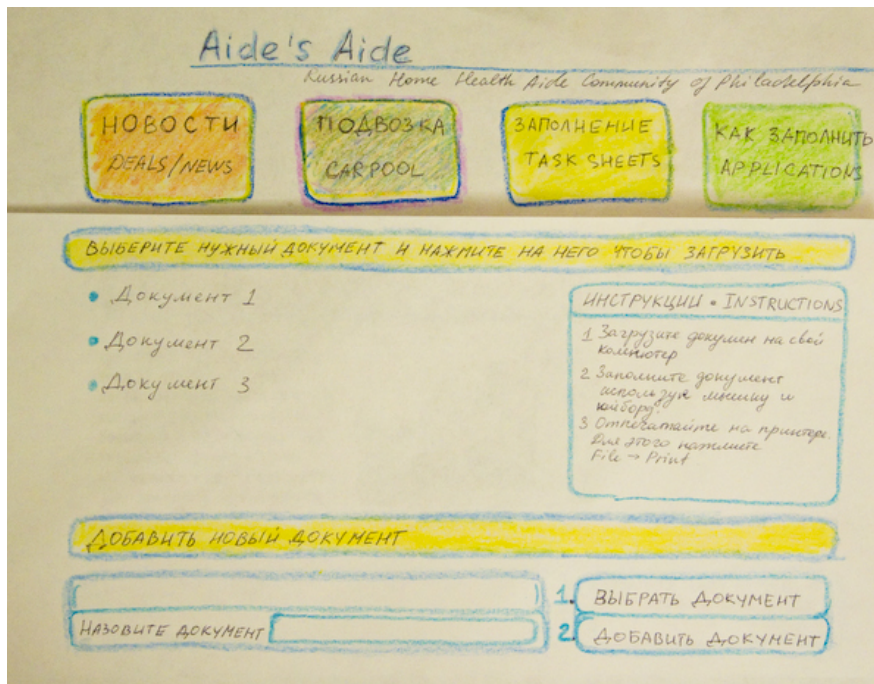


Figure 3: First Paper Prototype: Task Sheet Page

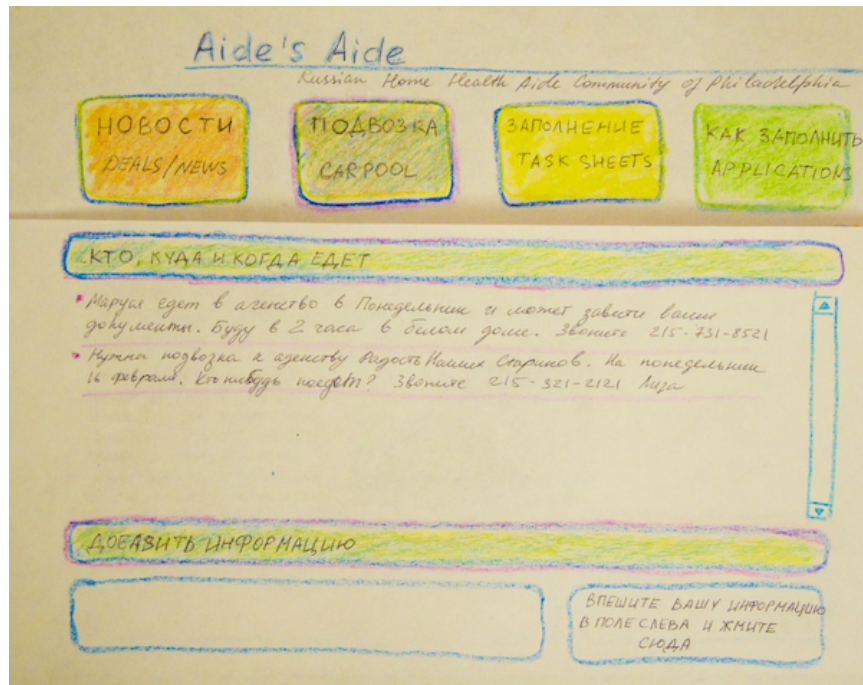


Figure 4: First Paper Prototype: Carpool Page

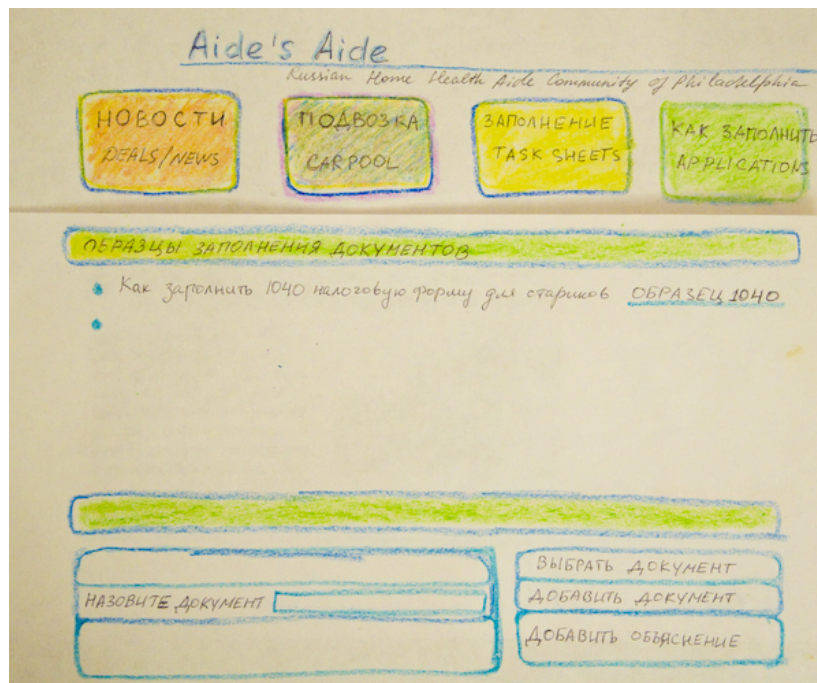


Figure 5: First Paper Prototype: Applications Page

2.2 Digital Prototype

For the digital, mixed-fidelity prototype, I created a website in ASP.NET using C# and SQL server and Access databases. It supports all major tasks described in the Design document

(see Milestone 3) except for uploading images and SMS's. Due to time limitations and since vast majority of my users do not use SMS anyway and this feature was intended only for advanced users while users I am going to test prototype with, are not very proficient, so I decided to leave it out.

Also, for some of the tasks only the first layer of functionality is realized. Specifically, for the application and task sheet sections I did not develop a functional prototype for the second and the third layers. I think that users should have enough functionality on the first layer (it does everything they asked for), so at least for some time their needs must be satisfied.

Here are some of the screen shots of the digital prototype. I need to make some minor tuneups so I am not including everything.

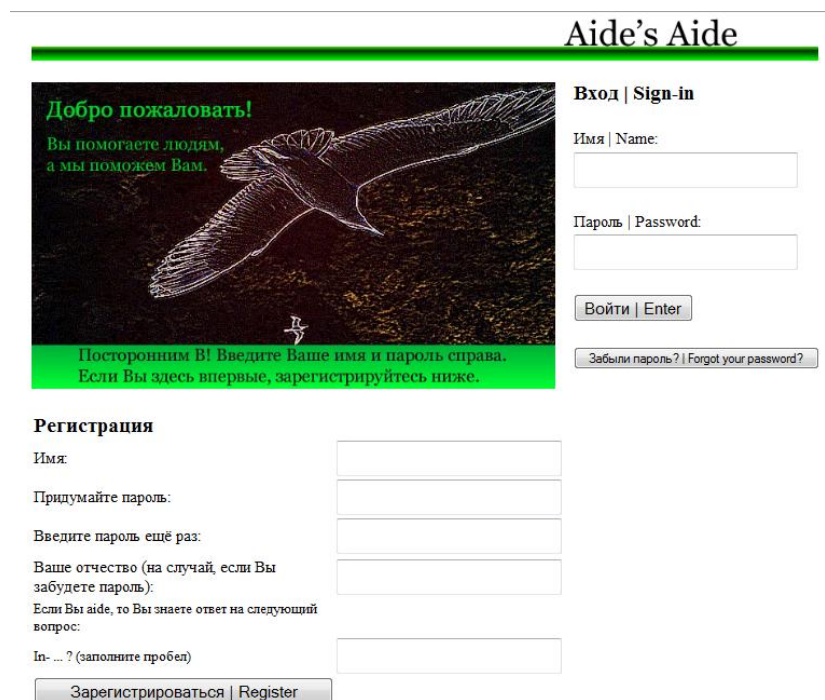


Figure 6: Digital Prototype: Login Page

3 Reflection

It was real fun and not a very time consuming process to draw a paper prototype and, even though it is a low-fidelity prototype that supports only basic functionality, it turned

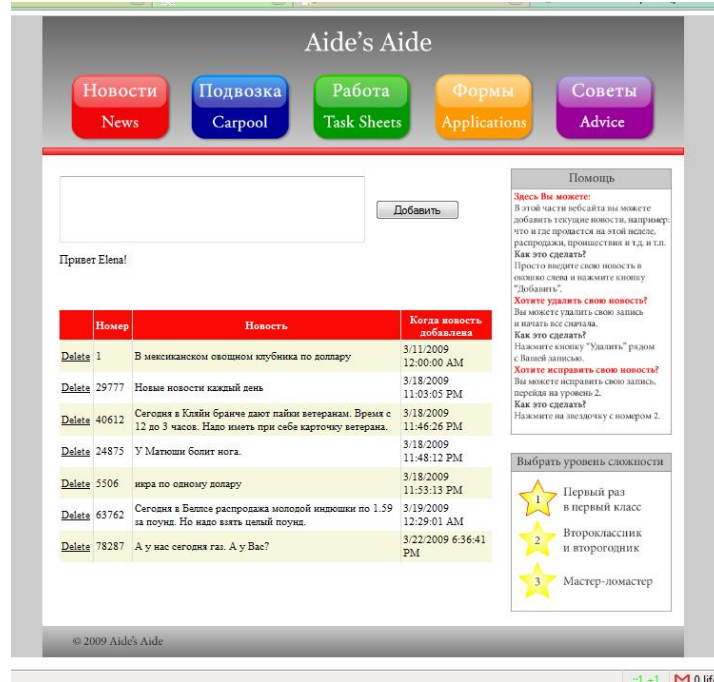


Figure 7: Digital Prototype: News Page

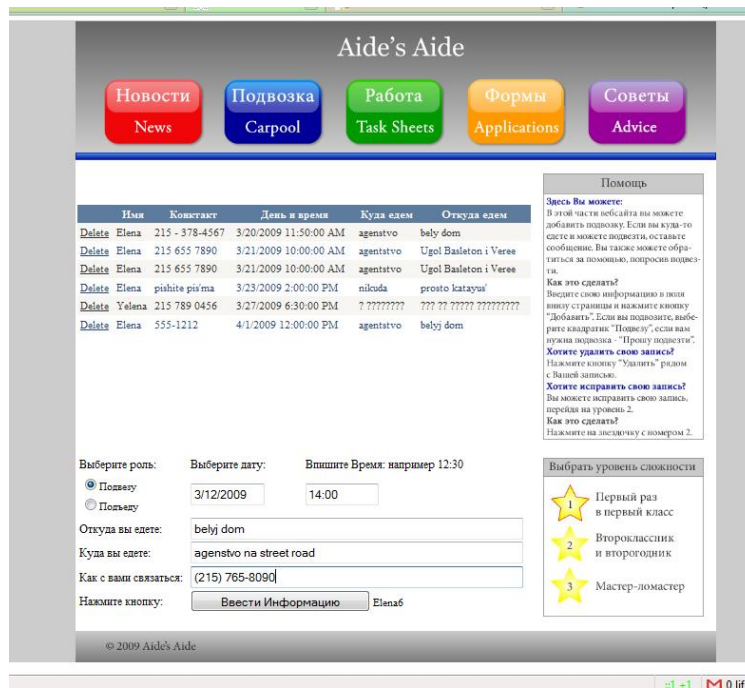


Figure 8: Digital Prototype: Carpool Page

out to be a very useful and effective tool for discovering several usability problems and



Paper Prototype Video

Digital Prototype Video

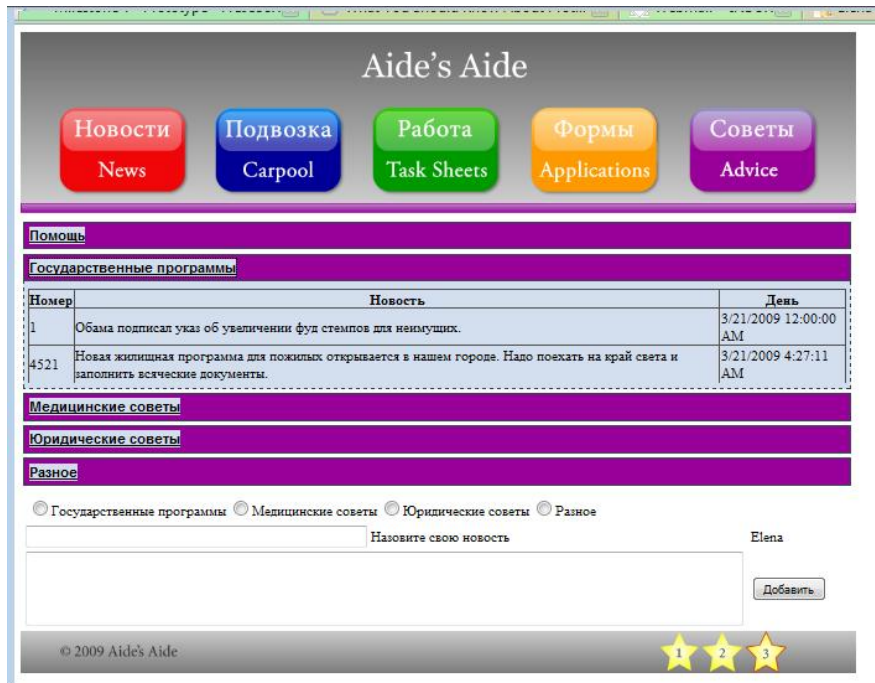


Figure 9: Digital Prototype: Advice Page

getting an overall conceptual feedback on the system. For example, I found that my naming scheme is confusing for users. Unexpectedly, I found that the users are very enthusiastic toward “unreal” paper prototype and understand its concept perfectly and with ease, so the suspension of disbelief is not really an issue in this case.

Naturally, I found that digital higher-fidelity prototype is much more time consuming and is much harder to implement. But that is what I was expecting from the beginning. I did not expect my design ideas to be so bound to a particular technology (.NET in my case) and my experience in it. That made prototyping process much less flexible and creative.

In the future I would prolong testing with paper prototypes starting with low-fidelity prototypes and refining my design ideas gradually bringing paper prototypes to higher fidelity level. After that I would build a digital high-fidelity prototype.

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