A SWOT Analysis of Pilot Implementation

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Insights

- Pilot implementation is a method for evaluating the fit between a system and its real-world environment prior to release
- The strengths of pilot implementation revolve around its realness and the weaknesses around its partialness
- A pilot implementation reveals the consequences of a system for those involved and affected

Over the preceding decades, usability testing has become widely used for revealing design problems in information systems, while they are still at the prototype stage. Normally, these tests involve removing users from their work for an hour or two to have them solve pre-set tasks with a system prototype in a lab-like setting. As a result, usability testing is insensitive to many of the organizational and contextual issues that determine the fit between a system and its real-world environment. Methods such as work domain analysis and scenario-based design aim to address this limitation but from an analysis-and-design perspective. In contrast, pilot implementation is an evaluation method. It involves evaluating a system in the field and is, thereby, an important supplement to usability testing.

Evaluation in the field allows for identifying subtle organizational and contextual issues that are critical to the adoption of a system and to its consequences for those affected by it. This makes pilot implementation valuable to the interaction designer. However, pilot implementations are challenging to conduct, the identified issues may be muddled, and the possibilities for resolving them may be limited. In deciding whether and when to apply the method of pilot implementation, interaction designers need to be aware of its strengths, weaknesses, opportunities, and threats (SWOT). In this article, we offer a critical perspective on the adoption of pilot implementation in interaction design, supported by the results of a SWOT analysis.

Pilot Implementation

A pilot implementation is "*a field test of a properly engineered, yet unfinished system in its intended environment, using real data, and aiming – through real-use experience – to explore the value of the system, improve or assess its design, and reduce implementation risk*" [1]. This definition, illustrated in Figure 1, points to four ways in which pilot implementation goes beyond usability testing:

First, pilot implementations are conducted in the field, not the lab. This difference in setting means that the pilot system is exposed to the users' technical infrastructure, organizational processes, incentive structures, power relations, and so forth.

Second, pilot implementations involve using the pilot system for real work. That is, pre-set tasks are replaced with the users' real work, which has genuine interdependencies, deadlines, and consequences.

Third, pilot implementations are conducted toward the end of the systems development process. This is necessary because pilot systems must be properly engineered; they are not merely mockups or prototypes.

Fourth, pilot implementations last for days, weeks, or even months. Therefore, data about what is learned must be collected in ways other than by listening in on the users while they think out loud.

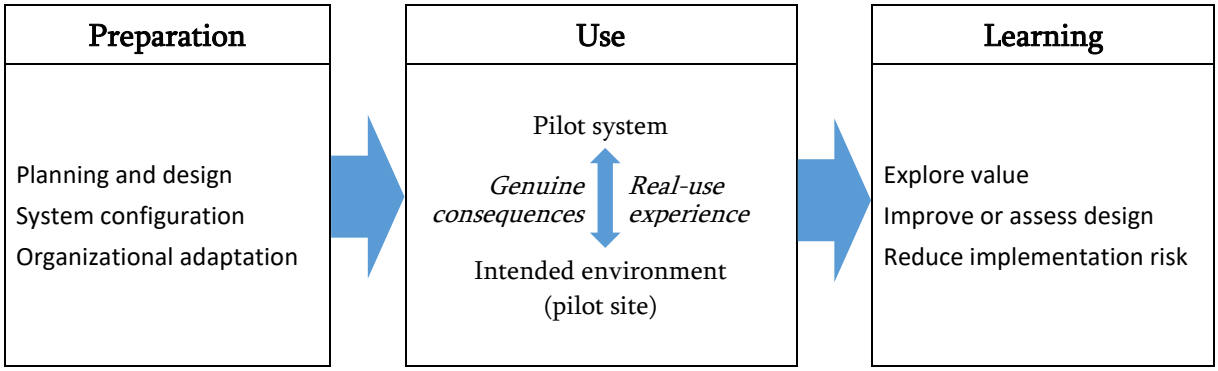

Figure 1. The elements of a pilot implementation

Just as pilot implementation differs from usability testing, it also differs from the early stages of full-scale implementation. While full-scale implementation is conducted to realize benefit from the new system through continued use, pilot implementation is a test conducted to learn through temporary use. The learning objective means that pilot implementation must strike a balance between integrating the system in day-to-day processes and maintaining a focus on the system as an object under evaluation.

As an example of a pilot implementation, Pereira et al. [2] describe the creation and pilot use of a blog for attracting more students to a university master program. The blog posts for example contained videos about the contents of the master program and summaries of theses written by its students. New blog posts were added several times a week throughout two periods of pilot use: July-August 2020 and January-August 2021. The data collected to learn from the pilot implementation showed that most visitors arrived at the blog from Facebook, thereby making links on this platform particularly important. The blog posts attracting most visitors concerned contemporary issues, such as smart cities, and suggested the importance of varied content. In terms of enrollment, 27 students were enrolled in 2020, compared to 18 the year before. In 2021, 50 students applied, thereby exceeding the maximum intake of 35 students. By documenting this increase, the pilot implementation provided a strong

argument for making the blog permanent. The main challenge is the resources required to post new blog content on a continual basis.

Informing Interaction Design through Pilot Implementation

This article is the outcome of a workshop held at the INTERACT2021 conference by the IFIP Working Group 13.6 – Human Work Interaction Design. At the workshop, eleven studies of pilot implementation were presented and discussed. In the months after the workshop, nine of its participants – the authors of this article – continued discussions and made a SWOT analysis of pilot implementation. We chose a SWOT analysis because it explicitly looks for both pros and cons and because it could be conducted in a consensus-building manner that identified the pilot-implementation features we agreed about, see the sidebar.

The SWOT analysis identified nine strengths, three weaknesses, ten opportunities, and four threats. We hope that our analysis will stimulate discussion about pilot implementation and inform decisions about when and how to apply this method. The strengths accord with the positive experiences from the abovementioned master-program blog and indicate that pilot implementation has a lot to offer. However, the uneven distribution of strengths and opportunities versus weaknesses and threats also reveals a need for further research on the features that weaken and threaten pilot implementation.

Sidebar: How We Made the SWOT Analysis

The SWOT analysis proceeded in three steps inspired by the Delphi method [3]:

First, the authors made a SWOT analysis of the pilot implementation they had presented at the workshop. This step resulted in SWOT analyses of six of the eleven studies presented at the workshop (because some of the authors had worked together on studies).

Second, the first author of the present article compiled a list of ten strengths, ten weaknesses, ten opportunities, and ten threats related to pilot implementation. This list was based on the SWOT analyses from the first step, a reading of the other studies presented at the workshop, and the pilot-implementation literature.

Third, the nine authors individually rated the 40 SWOT items on a seven-point scale from “Strongly disagree” (1) to “Strongly agree” (7).

We retained the 26 items that received a median rating of 6 or 7, indicating that the majority of the authors agreed or strongly agreed that these items captured pilot-implementation features. The other 14 items were excluded because only a minority of the authors agreed more than weakly to them.

Strengths

We contend that pilot implementation has nine strengths, see Table 1. The strengths revolve around the realness that is achieved by trying out a system in its intended environment. Pilot implementations share this realness with methods such as beta tests and living labs. The aims of these methods overlap, but beta tests tend to be more about the technical quality of a system than about the social and organizational issues included in pilot implementation. Living labs span labs that resemble a living environment as well as living environments that are instrumented for data collection; pilot implementation is restricted to the latter.

The use of a system for real work makes its consequences salient to its users, who may experience that their daily work becomes easier, that their workload increases, or that workarounds become necessary. Usually, this salience is associated with the post-implementation stage after a system has

gone live [4]. Pilot implementation makes the consequences of using a system salient to those involved and affected while the design of the system has not yet been finalized, that is, prior to go-live. Thereby, it provides possibilities for instigating increased accountability for these consequences and for remedying negative consequences before the system is released for full-scale use.

Table 1. The agreed-upon strengths, weaknesses, opportunities, and threats of pilot implementation.

Strengths
1. Pilot implementation provides realism (in terms of technical infrastructure, physical conditions, user workload, genuine consequences, etc.) 2. Pilot implementation helps discover social, organizational, and contextual issues (beyond those that can be discovered in lab-based usability tests) 3. The learning from a pilot implementation is informed by the implicit information and tacit knowledge that are inherent in real-life practices 4. Pilot implementation makes the consequences of the system salient to users and, thereby, engages them in providing feedback 5. Pilot implementation helps create alignment among the stakeholders on whom system adoption is dependent 6. Pilot implementation identifies discrepancies in how different user groups perceive the system 7. Pilot implementation creates contact with project stakeholders to manage their expectations and enable them to contribute 8. Pilot implementation, including its preparation phase, provides an understanding – and a shared vocabulary – of the user needs, system affordances, and change process 9. Pilot implementation smoothens the transition from the old system to the new, for example by revealing local conditions that require system configuration
Weaknesses
1. Pilot implementation informs, but does not put an end to, discussion about what using the system will be like 2. The subtle and long-term consequences of using the system may be overlooked because the duration of a pilot implementation is limited 3. Because the system has not yet been finalized, some aspects of its use cannot be included in the pilot implementation and conveyed to users
Opportunities
1. For emergent technologies in particular, pilot implementation provides for trying out new technological possibilities before deciding whether to adopt them 2. Pilot implementation helps the pilot site realize special needs that require local customization of the organization-wide system configuration 3. Pilot implementation fits well with design approaches that emphasize user-centeredness and user participation 4. For sensitive changes in particular, pilot implementation provides for assessing and refining implementation procedures prior to full-scale implementation 5. Pilot implementation provides for verifying whether revisions made in response to usability tests have been effective 6. Pilot implementation creates room for innovative experimentation 7. Pilot implementation is a means of providing developers and managers with early insights about the sociotechnical consequences of the system

8. Facilities for managing the data about what is learned from the pilot implementation may strengthen the feedback loop and speed up development
9. Pilot implementation creates a decision point for discontinuing system initiatives that face too many obstacles
10. Pilot implementation can be extended with methods and tools for end-user development to involve (selected) users more thoroughly

Threats

1. The feedback from a pilot implementation may be neglected by developers and managers (e.g., to meet pre-set schedules or avoid extra costs)
2. Pilot implementation involves a risk of overly optimistic expectations among stakeholders about what benefits the system will deliver, and when
3. Underestimating the extent of the preparation phase of pilot implementation (e.g., not involving the right participants, not providing sufficient training, etc.)
4. External events may make the period of pilot use unrepresentative of the users' work practices (e.g., working from home during the COVID-19 pandemic)

Weaknesses

The identified weaknesses (Table 1) revolve around the partialness of pilot implementation. While partialness is inevitable in any activity that attempts to stage real use prior to go-live, pilot implementation can go a long way to reduce the weaknesses, for example by prolonging the pilot implementation or involving multiple pilot sites. However, the reduction must be weighed against the cost of extra time and sites. Rather than seeking to minimize the weaknesses (at high cost), it appears advisable to factor them into the interpretation of the learning from the pilot implementation. In doing so, the first weakness almost becomes a recommendation for how to handle the partialness: by letting the pilot implementation inform discussions rather than expecting it to put an end to them.

Opportunities

The essence of the identified opportunities for deriving additional benefit from pilot implementation is that pilot implementation creates a room for experiencing and experimenting with a future system and the associated ways of working. Because pilot implementations have limited organizational and temporal scope, the cost of failure is restricted. Thus, it becomes feasible to run somewhat larger risks and learn from the outcome. Several of the opportunities (Table 1) point to ways of extending this learning through the incorporation of, for example, user-centered approaches, facilities for managing the feedback data, or tools for end-user development. These examples emphasize that pilot implementations are not merely tests but also opportunities for innovation. New possibilities may emerge as a result of the pilot implementation and be seized by its participants to pursue additional goals with the system.

Threats

The identified threats (Table 1) emphasize that pilot implementations may fail. Diverse issues must be handled to avoid failure, thereby requiring that those in charge of a pilot implementation maintain a wide spread of attention. The threats show that the issues in need of attention include, among others, schedule pressure, expectation management, and sufficient preparations. The preparation phase may last as much as twelve times longer than the period of pilot use if the users first need to reach alignment and external events interfere with the basis for reaching this alignment [5].

It should be noted that the identified threats focus on why a conducted pilot implementation may fail to generate benefit. They do not explain the issues that may lead to deciding against conducting a pilot implementation in the first place.

Outlook

We do not mean to imply that the 26 items in our SWOT analysis are a complete list. Rather, we sought to err on the side of caution by only including items to which we agreed or strongly agreed. Researchers and practitioners with backgrounds different from ours may be aware of additional items or rate items differently. In particular, our backgrounds are in research and mainly in systems for use at work. Complementary input is, for example, needed from design practitioners, system users, and people with a managerial outlook. These groups experience systems from different perspectives. Future work should attend to these differences, which bring out that pilot implementation may uncover contentious and political issues [5]. Thus, a consensus-building approach, such as the one taken in this article, will not be adequate. Studies must also make room for dissensus among groups with different perspectives on pilot implementation. In our own future work, we will continue to conduct case studies and action research to investigate the pros and cons of pilot implementation for all involved and affected.

One SWOT analysis cannot settle the qualities of pilot implementation. That said, we contend that there is untapped potential in recognizing pilot implementation as a method for evaluating the consequences of systems prior to their release. Currently, pilot implementation is often confounded with the early stages of full-scale implementation. The human-computer interaction (HCI) community could play a key role in the discussion of the qualities of pilot implementation and in positioning it as a method for evaluating the fit between a system and its real-world environment, thereby complementing lab-based usability tests.

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