

Design For Delight applied to Software Process Improvement

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Abstract

New product designers use a variety of techniques, blending art and science, to design the latest gadgets. Laptops, cell phones, kitchen utensils, and automobile dashboards are examples of products that have benefitted from the design process. My company uses a methodology, called Design for Delight, to create new services and offerings for our customers.

These creative methods also work for software process improvement. This paper shows how our team applied Design for Delight (D4D) for software process improvement. The paper will provide an overview of Design for Delight, tell the story how we applied it to improve a key software process, and describe the benefits and limitations of using Design for Delight for process improvement.

Our experience shows that D4D works well to identify customers of a process, work with them to learn the pain points, and identify improvements that focus on solving these pain points. The team is engaged and brings lots of creativity to problem solving.

On the other hand, we experienced several limitations of using this methodology for Software Process Improvement; for example, the results were highly dependent on the individuals selected as representative customers.

With these limitations in mind, our experience is that using product design techniques to improve software processes is a useful practice for applying creativity and innovation in software process improvement.

Biography

John Ruberto has been developing software in a variety of roles for 25 years. Currently, he is the Quality Leader for QuickBooks Online, a web application that helps small business owners manage their finances. John has a B.S. in Computer and Electrical Engineering from Purdue University, an M.S. in Computer Science from Washington University, and an MBA from San Jose State University.

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1. Introduction

Intuit developed Design for Delight (Shortened to D4D) to design easy to use products that delight our customers, and it is cited as the reason for many of our recent product innovations (Martin 2011). D4D is a methodology for understanding customer problems, and finding creative solutions to those problems.

Our quality team was evaluating several process improvement methodologies, when the thought came to apply D4D to software process improvement. This paper describes D4D, and our experience using D4D for process improvement.

2. Continuous Improvement and Delivering Quality

Excellent organizations, the market leaders, largely get that way by constantly learning and improving. They quickly and relentlessly solve problems that impede progress, and move past their competitors in the process (Spear 2009).

Organizations use many process improvement frameworks to drive continuous improvement; among these are Lean, Agile, Six-Sigma, Total Quality Management, Reengineering, and the Toyota Production System. But, each of these frameworks essentially boil down to 3 main elements (Spear 2011):

- Define the process to capture the best-known approach
- Measure and monitor the process
- Solve observed problems with discipline

Spear implies that it matters less which process improvement framework is applied, as long as it's applied relentlessly. With that in mind, our team decided to use a set of improvement tools created from another discipline: product design.

This principle of excellence through continuous improvement applies to quality and software development organizations as well. Continuous improvement is an explicit component for agile process like Scrum – with the focus on retrospectives and learning (Schwaber 2004).

3. The Creative Process

Product design and creativity is a business now, with defined processes and schools that teach the art of design. Creative designers follow a methodology to manage the creative process. These designers are not necessarily experts in the field in which they are innovating, but are experts in the process of innovation. The creative process is a blend of art and science (ABC Nightline 1999).

The creative process essentially follows this framework:

- Study the problem – decomposing the problem into components
- Brainstorm many solutions, using people with different backgrounds.
- Evaluate those solutions, and chose a few to test
- Test solutions with prototypes and storyboards.
- Iterate and Refine until satisfied with results.

The appendix provides several references to specific design techniques.

Our team decided to try to apply this creative process to software process improvement. We used the Design for Delight process, developed for and by product designers for Intuit, Inc. (Martin 2011).

4. Design for Delight

4.1 Introduction to Design for Delight

Design for Delight is the product design methodology created and in use at Intuit, inc. (Martin 2011). The D4D process has three main components:

- Deep Customer Empathy
- Go Broad to Go Narrow
- Rapid Experimentation with Customers

The following sections provide a brief overview of the D4D process. The section after that describes in more detail how we applied D4D to process improvement in our organization.

4.2 D4D Roles

4.2.1 Customers

One tenet of D4D is to interact directly with customers, actual customers who have the problem. This allows the designers to hear raw, unedited and unfiltered, descriptions of the pain points. The sessions are interactive and are meant to have continuity between the problem and a potential solution.

In the case study provided later in this paper, we decided to improve a process called “Level 3 Escalation Process”, where the customer support team escalates a problem to the development staff. For the customer role, in this case, the customers were the support agents that initiate an escalation.

4.2.2 Innovation Catalysts

Innovation Catalysts are people who are trained in D4D facilitation, and help the team with the process. An Innovation Catalyst may or may not be part of the team. They

typically plan the session with the team leader, make sure the room logistics are prepared, and conduct the session with the team.

The Innovation Catalyst will train the team about the methodology, keep time, and generally guide the team through the day. People trained in the art and science of innovation are very important to the success of the program (Tenant Snyder 2008).

4.2.3 The Team

The team is typically sized at 4-5 people, small enough to stay fully engaged while large enough to generate a diversity of ideas. The Innovation Catalysts like to quote the “2 pizza” rule, where the team has to be small enough to be fed with two large pizzas.

The team for a typically D4D product session might consist of Product Managers, Experience Designers, and Software Engineers. In our process improvement sessions, we included Project Managers, Software Engineers, and Software Quality Analysts.

4.3 Deep Customer Empathy

The goal for Deep Customer Empathy is to know the customer and their pain points better than they know themselves. This involves direct observation, interviews, process mapping, affinity diagrams, and other techniques to learn about the opportunities to help improve the customer’s experiences.

As mentioned in the roles section, it’s important to involve actual customers in these sessions. In a typical product-oriented D4D session, four to five customers would be included.

IDEO is one of the pre-eminent design firms and they have published a set of cards that summarizes many of their customer empathy techniques (IDEO 2003). These techniques include:

- A day in the life
- Affinity Diagrams
- Body Storming
- Camera Journal
- Card Sorting (and building mental models)
- Long Range Scenarios
- Role Playing
- Shadowing

The Stanford Design School has published a set of descriptions for their design techniques, with some overlap with the IDEO set. The Bootcamp Bootleg can be downloaded from their web site (<http://dschool.stanford.edu/>) (Stanford 2010).

The Pacific Northwest Software Quality Conference proceedings from the 2010 conference has a paper about Customer-Driven Quality, which describes many tools and techniques for incorporating customer insights in a software development life-cycle. Many of these techniques are applicable to gain customer insights for improvement activities. Among these are “Follow Me Home” and “Voice of the Customer” (Ruberto 2010).

4.4 Go Broad to Go Narrow

The “Go Broad to Go Narrow” stage is where creativity happens. One tenet is that to come up with a great idea, you first need many ideas to choose from. The Innovation Catalysts like to see 50 to 80 ideas generated.

Brainstorming and idea generation is encouraged to be as crazy and creative as possible. Often a crazy idea will spur a new line of thought. For example, an idea of giving away the product for free may sound crazy to business people, but may lead to new ideas in business models, such as a free trial.

Once there are a sufficient number of ideas, they are combined and evaluated for a few to be tested through Rapid Experimentation with Customers. The Innovation Catalysts help select the criteria to evaluate the solution ideas, with speed of implementation typically being part of the criteria.

4.5 Rapid Experimentation with Customers

Having a few ideas in hand, the team tests those ideas with the customers. To make the test more accurate, the idea is fleshed out into a prototype or at least a storyboard. A storyboard can be drawn in a few minutes. It’s a few minutes by definition, because the Innovation Catalysts allocate only a few minutes to creating the storyboard. This gives the team time to complete several iterations with the customers.

5. Design for Delight Applied to Process Improvement

Our team applied the D4D process to improve our processes. This section illustrates how we did that with an example.

5.1 Choosing a Process to Improve

Any discussion of process improvement should start with a discussion of processes. Books have been written on process standards and frameworks (Persse 2006). For our purposes, we will consider a simple framework as shown in figure 1.

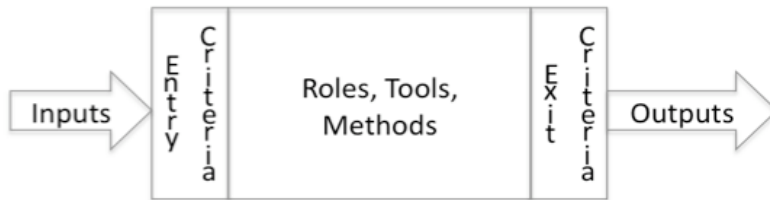


Figure 1: A simple process framework

We used the D4D process to improve the “Level 3 escalation process”. This is the process where the customer support team escalates problems to the Product Development organization, for analysis and potential correction. Our support team fields calls from our customers, and occasionally a single problem affects several customers. When this happens, the support team escalates the problem to the development team. In the past, this escalation process has been error prone, and communications between the support and development teams had a high noise ratio.

We used D4D to bring in support agents (the customers of this process), to understand their side of the process, their pain points and constraints. Then, followed the D4D process to generate a lot of ideas, evaluate those ideas, and narrow down to the few improvements that would make the most impact. Finally, we prototyped the improvements and tested those with the support agents before investing a lot of resources, so we could choose the most effective corrections.

5.2 D4D logistics

The Design for delight process works best with all of the participants together in a room, with tables, whiteboards, flip charts, plenty of post-it notes, and markers. We spent about 6 hours for the first session, which included an orientation on the overall process, a debrief afterwards, and lunch in the middle. Four hours should work well for a second session, where there may be less time required for training and debrief afterwards.

5.3 Process Mapping (Deep Customer Empathy)

The first step of D4D is “deep customer empathy”, which means that we should understand the customer’s emotions about the process that we are improving. But before we can understand the emotions involved, we need to gain a common understanding of the existing process steps. We did this in collaboration with the support team. The support manager used a whiteboard and post-it notes to lay out the process.

He wrote down each step on a Post-it(tm), and placed it on the board and used a marker to draw the process flow, branches, and loops. The QA team participated as well, asking clarifying questions, adding their own observations, and filling in details.

The emphasis is strongly on capturing the process as it exists in practice, not as we think it should or wish it to be.

5.4 Pain point identification (Deep Customer Empathy)

Once the process was laid out, we asked the support manager to evaluate the process steps in terms of pain and pleasure. Assigning an emotion to each step of the process involves both sides of the brain, left (logical) and right (emotional). Delight is right in the name of “Design for Delight”, and it’s an emotion. We want our solutions to be built on addressing the emotional aspects of process improvement.

Steps that caused pain for the support team were moved to the bottom of the board, while steps that appeared to be working well were moved toward the top.

We made sure that everyone understood the pain points, and then chose one of the pain points to address in the problem-solving phase.

The QA team already participates in the level 3 escalation process, so they were somewhat familiar with the pain points raised by the support manager, but this discussion allowed them to see the pain in a new light, from the support manager’s perspective.

5.5 Brainstorming (Go Broad to Go Narrow)

Brainstorming solutions is where the delight in D4D is born.

Remembering the “two pizza” rule, a good team size for this stage is four to five people. We spent about 15 minutes brainstorming ideas, suggesting people to come up with the most outlandish solutions possible. The extreme ideas are not usually fruitful in themselves, but often lead to new thinking when shared with the team.

5.6 Evaluating, grouping, selecting (Go Broad to Go Narrow)

Before we started to “go narrow”, we had to go a little broader. Each person took their ideas and one by one posted them to the board. As they posted them, they read each idea out loud. The other participants actively listened, asking clarifying questions, and made connections to their ideas, or even created new ideas on the fly. They are not judging the other persons’ ideas, but to building upon them.

As people posted their ideas, they were grouped with similar ideas as themes came out. Once everyone had posted his or her ideas, then the group took another round of brainstorming.

During this phase, the innovation catalyst asks several questions to spur thought:

- What about this idea would make of the experience great?
- How can I improve on this idea?
- What would we never even think about doing?

This stage takes another 20 minutes, combining ideas and feeding off each-other's ideas. After that, it's time to start to evaluate and narrow down from many ideas to a few that will be tested.

We used a 2x2 grid to start to narrow down the ideas. We drew the grid, depicted in figure 2, and placed each post-it note with an idea into the grid. This evaluates each idea in two dimensions, speed of implementation and impact to the solution.

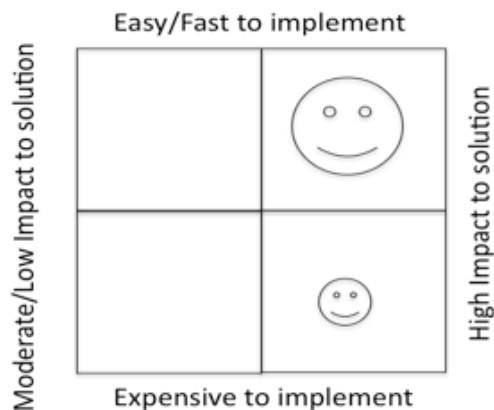


Figure 2: Grid to assist in idea selection.

This evaluation method helps to identify ideas that are both likely to solve the problem, and allow for rapid experimentation (ease or speed of implementation).

If there are many ideas in the upper right quadrant (fast to implement, with high impact for the solution), the innovation catalyst leads the team in a prioritization exercise, forcing the team to list each idea in priority order. This is frequently done by expanding the quadrant and re-judging each idea relative to each other. The top 2 – 3 ideas are fed into the next stage of D4D, rapid experimentation with customers.

5.7 Storyboarding (Rapid Experimentation with Customers)

Storyboarding is another technique from the design world. Storyboarding depicts the newly improved process as a sequence of drawings that tell a story, like a comic strip. Telling the story of how the new process will work will put the customer in a mindset of visualizing how the new process works, and allowing him/her to better judge the effectiveness of the solution. This provides the opportunity for more realistic feedback than a verbal description alone.

Figure 3 shows an example story board, which coupled with narration describes the new process for the customer to evaluate.

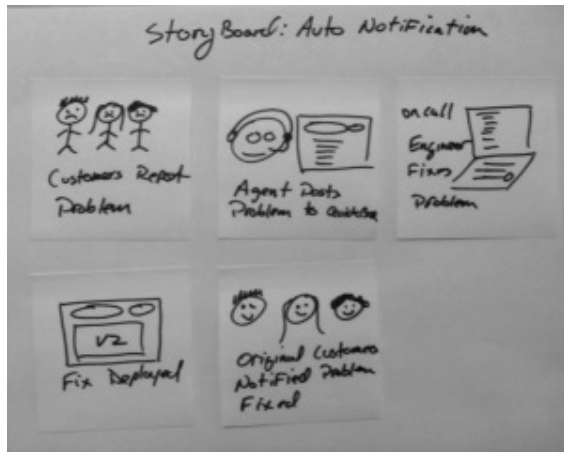


Figure 3 - An example story board

After generating a lot of ideas for improving the Level 3 escalation process, and selecting a few to prototype, we created storyboards to describe the change. We brought the customers back into the session and presented each storyboard – taking care to describe the scenario.

The customers asked a few clarifying questions and made comments. One story was completely off mark, while another was pretty close. We were able to get customer feedback and refine the solution with about 40 minutes of time spent.

5.8 How Did D4D Work for Process Improvement

The teams participating generally supported using this process for process improvement. A survey conducted a few days afterwards resulted in 8 of 9 participants indicating they would recommend D4D as a choice for process improvement. Some of the reasons cited for this recommendation were:

- A comprehensive set of ideas were generated, resulting in creative solutions
- The nature of the process was very collaborative
- Several “ah-ha” moments in realizing the customer’s pain, from his/her perspective.

Some of the areas for improvement expressed in using D4D:

- The results of using D4D are highly dependent on which customer(s) you include. These may or may not be the most important pain points to solve, but may reflect what was foremost in their mind that day.

- The results tended towards minor and incremental improvements – not the dramatic “reimagining” of the underlying process. This is largely determined by the selection criteria used, especially the factor where we evaluated those ideas that were quick to implement. Care should be taken to choose the selection criteria, or after the rapid experimentation phase to follow up and evaluate those ideas that would take longer to test.
- Evaluation and selection of ideas to pursue tended to be based on group consensus. There is great power in having relatively uninformed people participate in the brainstorming sessions to generate fresh thinking, but it didn’t seem as accretive in the selection process.

6 Summary

D4D provided a framework to engage with process owners and generate some creative solutions. It certainly engaged the team with process owners in a fun and energetic session. The results are highly dependent on the customers that are engaged, the pain points they list, and the selection criteria used to evaluate ideas.

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