

INNOVATING IT SOLUTIONS THROUGH HUMAN CENTERED DESIGN

Advances in information technology (IT) are supposed to make life easier for the people who use it, but this isn't always the case. In too many cases, the human element is ignored when designing an IT solution. The software's interface is confusing, and users cannot easily find basic, frequently used features. A new system is lightning fast until too many people attempt to log in during normal business hours, and it crashes because capacity planning was ignored. Even worse are situations when an upgrade that was never needed is made to an IT solution that makes things even worse for the end user by removing popular features or implementing enhancements that break core functionality. The result is an end product that disappoints the user community. How could these important factors be overlooked?

Background

Too often, organizations invest major resources (e.g. millions of dollars, hundreds of hours of time) on IT solutions that are based on "functional and non-functional requirements" developed with little or no actual engagement with the intended users. These requirements are likely based on features identified in initial project documentation or in passing conversation (i.e., "Wouldn't it be great if..."). Another common source is the feedback from testing during the development cycle. Most of the time it's just a small group that is making suggestions that have not been validated with the end user community in any real way.

Projects begin with a decision to invest in the development of a solution based on some variation of a business case for the investment, likely based on PMBOK related planning considerations, so it will include a description of the IT solution being proposed and the alternatives considered, risks and issues, defined costs, and a timeline or project schedule to implement. These details are important, but gaining customer buy-in early and often is not typically part of this process. "Key stakeholders" are identified in these business cases, but never truly consulted. Even more frustrating, the stakeholders identified are frequently not the intended users, but a senior leadership official that acts as a point of contact for an organization that might use the solution or an executive sponsor for the project. While the "key stakeholders" may represent their organization's best interests, they are not close enough to the end users to know what they need or how they want to work. The real users must be identified earlier on and engaged throughout the project.

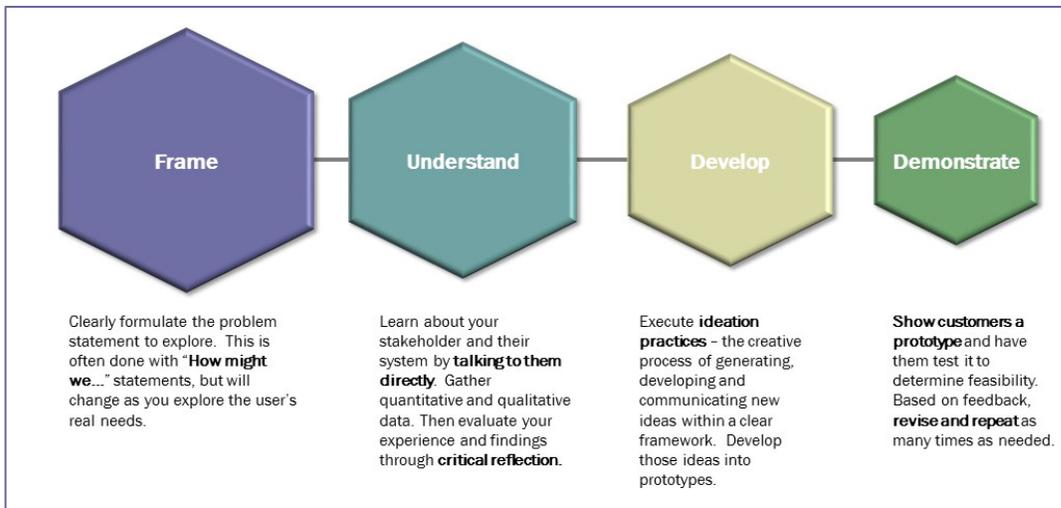
The missing step is the IT project's decision maker (e.g. the sponsor or investor) taking a step back before the project has been initiated and asking: "have you spoken to any humans about this?". This is the question that gets to the heart of the real "job to be done" (JTBD)ⁱ. The JTBD is the real purpose that people buy products, services, or solutions, which is learned by understanding the customer's behaviors and motivations. While each organization brings its own best practices to its IT projects, organizations that apply Human-Centered Design (HCD) techniques during IT project planning will become wiser at investing their limited resources because they will be pursuing smarter, more direct ways to design their solutions. Perhaps the greatest opportunities to see tangible results from this approach is the federal government. Given their public facing responsibilities, federal agencies will become better positioned to provide much richer services to the American people by leveraging human-centered design.ⁱⁱ

What is Human Centered Design?

Human-centered design (HCD) is not a new concept. It has been around for years under different names and has been applied mostly to exploring innovations for social needs.ⁱⁱⁱ It is a creative problem solving approach that starts with people and ends with innovative solutions to fit their real needs. The International Organization for Standardization (ISO) defines HCD in the context of interactive systems development as “an approach...that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors/ergonomics, and usability knowledge and techniques”^{iv}.

As we all know, the traditional waterfall approach to IT projects involves gathering technical requirements and then spending months developing a solution in a silo. It is also different from agile or scrum approaches, which uses sprints to iteratively develop new enhancements to IT solutions. It is even different from user experience (UX) design, which focuses on the user’s interaction with the software. Comparatively, HCD is not a prescriptive process in that it focuses more broadly on the human’s core needs, instead of just being an interactive systems development technique. It compliments these development methodologies and enhances them by improving the likelihood of successful, highly adopted products being delivered.

The essence of HCD is its requirement for the practitioner to actually talk to humans and validate the assumptions being made about the proposed product. The practitioner finds and frame the root of a problem first based on the customer’s actual experiences, then designs solutions for those same humans with their continued involvement. The following visual is a high-level view of an HCD approach:



The objective of this approach is to increase your understanding of the human problem you are attempting to solve and to explore the possible solutions with the people that will use the resulting product before investing in product development. The HCD steps described in this paper can be done in any order or skipped in parts, depending on the project’s maturity. For instance, the solution’s problem could already be clearly framed with a well-defined JTBD. In that case, the project team may proceed directly into the Understand or Develop stage of the approach. Conversely, perhaps the project team has demonstrated a solution and needs to go back to the drawing board and re-frame the problem.

A Smarter Way to IT Planning

There are four primary stages of HCD: Frame, Understand, Develop, and Demonstrate.

Frame

Before spending a dime on any IT investment, extensive customer discovery should take place to understand the real JTBD. The IT project team should be considered a “design team” until an investment approval is made, and the first task for this design team is to clearly scope the problem they want to resolve through the proposed project. This exercise should rely heavily on divergent thinking to avoid rushing to a single conclusion, and only begin to converge on preferred ideas when information is presented by the proposed customers. The team can start by crafting a “How Might We” statement that articulates the challenge or opportunity people are currently experiencing. The underlying principles are that, in the world of IT, no problem is ever solved permanently and the problem itself will change over time. “How might we make (such and such) better for people to do (such and such)” is a useful template to follow.

The design team should then create a stakeholder map that identifies actual users to concentrate their efforts on. As referenced earlier, identifying the real users is vital, so the stakeholder map will help the design team think through who their customers really are and can be refined and expanded as the framing effort progresses. Before speaking with any proposed user, however, the team will need to create a clear interview or engagement plan. The plan does not have to be formal, but it contains as much detail as needed to serve as a guide to ensure the team is validating its assumptions during customer interviews.

Understand

Now that the stakeholders are identified, the problem is framed, and the discovery plan is in place, the design team can become more familiar with the users by getting out there and speaking with them. Interviewing people is a science within itself, so consider some of the following best practices^v:

- Be prepared by having several questions ready.
- Find a way to record the conversation as it can be difficult to focus on the customer if you are serving as both interviewer and recorder.
- Ask open ended questions to allow the customer to expand on thoughts.
- Listen instead of talking, as the customer will often surprise you with their insights if you are not trying to lead the conversation.
- Ask for introductions to others to expand your customer discovery scope.

Sometimes a simple interview is not enough and further immersion is needed. The design team may want to spend a day, or a week, following the proposed user around, experiencing the use of current tools/technology to understand what is working and what is not. The AEIOU Framework (see <http://help.ethnohub.com/guide/aeiou-framework>) is an excellent resource for help framing this type of exploration.

The result of this phase is enough quantitative and qualitative data to help the team truly understand the job to be done, but the data gathered is only valuable if it is used to improve the end product. That means turning data points of the customers’ behavior into information that can be used to design a solution that will excite them. This knowledge or insight must be generated through data synthesis and critical reflection. There are specific tools to help the team

with this approach. A popular example is a tool called the empathy head, which helps the team design an idea around the proposed customer's perspective.



Other synthesis approaches to increase understanding include:

- Affinity diagramming
- Journey mapping
- Create user personas

Sometimes simply organizing the data points on sticky notes to see if they fit into groups or categories on a wall is a good starting point. The design team should work closely together to analyze its fieldwork and data points to move towards some possible ideas collaboratively.

Develop

To work towards meaningful solutions, the project team (no longer just a design team) should select the idea that makes the most sense to develop and begin to converge on the right solution using the data points gathered from the customers interviewed. This phase is sometimes referred to as “ideation”, the creative process of generating, developing, and communicating new ideas within a clear framework.^{vi} This stage allows the design team to iteratively converge on a solution that is both feasible and meets the customers’ requirements. Tools like the Creative Matrix or the Importance/Difficulty Matrix can help determine which ideas to target.

From the collection of ideas identified, the project team can build prototypes to test with the users using low fidelity, low (or no) cost methods. The goal during this stage is to fail quickly without spending money and without spending weeks or months building a working product. A flip book out of paper, for example, can show the functionality and design of a tool in a simple, accessible manner. For a full IT system, a more detailed storyboard might be needed to show the customers how the product will work. The intent is to help the user understand what you have in mind without spending major resources to build it.

A hypothetical example will help make this point. A major car company was exploring a completely new dashboard layout for new car models. Instead of waiting months to develop design and blueprints and spending millions of dollars to build the new dashboard in the factories, the company created cardboard cut-outs of the proposed design to simulate the

experience for the driver. They found through their customer testing that the placement of some of the key features on the dashboard were not only distracting, but possibly dangerous to the drivers, avoiding a potentially costly recall or even loss of life.

Demonstrate

When you are comfortable with the planned solution, the final stage is to validate the project team's assumptions and assess the solution's feasibility. This is accomplished by sharing the prototype or ideas with the customers to get their feedback and then by refining the prototype as many times as needed. These should be collaborative sessions during which the project team whiteboards concepts with the customers. Document their experiences while "testing" your prototype and make adjustments.

Once the project team and the customers are comfortable that the solution meets the core needs, the project will be ready to present its solution to the investment board, and decision makers will have a high level of confidence that the resulting product will satisfy the customer community.

Conclusion

While there's a general consensus that empathy is crucial to being a good person, it is also useful when designing worthwhile IT solutions. HCD does not cost anything but time, and the project team will develop a richer understanding of its customer's core needs. This can only result in a better end product that will be designed for easy adoption of the user. By starting small and working iteratively to build the customer into the project planning phase, the human need will become central to your solutions, and the rewards will be evident.

ⁱ The "job to be done" (JTBD) concept was first articulated by Harvard Business School Professor Clayton Christensen, and further described in the Innovator's Toolkit, Second Edition, by David Silverstein, Philip Samuel, Neil DeCarlo, 2012.

ⁱⁱ Federal agencies have already begun using HCD as a key way to innovate their offerings with great success, such as the revamping of the USAJobs website and interface, through the support of the OPM's Innovation Lab: lab@OPM.

ⁱⁱⁱ The organization IDEO (www.IDEO.org) notes it has been using HCD for decades. There is a seven-year-old ISO standard for Human-centered design: ISO 9241-210:2010, that notes "the principles of human-centred design and the related activities have not changed substantially since ISO 13407 was produced and have been validated by ten years of application".

^{iv} ISO 9241-210:2010, Ergonomics of human-system interaction – Part 210: Human-centred design for interactive systems, Introduction section.

^v Visit Giff Constable's blog, author of "Talking to Humans", for more insight on interviews:
<http://giffconstable.com/2010/07/12-tips-for-early-customer-development-interviews/>