Design Thinking Helps Drive the Value of Digital Innovation Beyond Business Propositions Nurturing Digital Innovation

DIGITAL HEALTH LEARNING NETWORK,

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Emma Lawton is a graphic designer with a love for drawing. At the young age of 29 years old, she was diagnosed with early onset Parkinson's disease (PD). PD is a long-term degenerative disorder of the central nervous system that causes uncontrollable tremors, limb rigidity, slowness of movement, and imbalance. Currently, there is no cure for PD and the drug development process has not resulted in strong treatment options. Understandably, Emma's life was turned upside down and she stopped writing and drawing as her tremors worsened over the past three years.

Traditional technology innovation, particularly from the Computer Science and Engineering disciplines, adopt techno-centric approaches, where design is practiced in the "lab" setting. Technology is assumed to be predictable and to operate seamlessly, as planned across time and place (Orlikowski, 2007).

More recently, new design approaches have become necessary to better fit the shift to digital technologies as increasingly embedded in everyday life. Contemporary technology development is increasingly being seen as situated in socio-cultural and history contexts. Such a statement may be commonplace in the liberal arts disciplines, but it is an uncomfortable turn for engineers who, until recently, approached product design as a science (Buchanan, 1992). Design thinking is an approach that takes the product development process out of the hands of the engineers and distributes it amongst the ecosystem of users, technologists, and business leaders. It is a human-centric problem-solving practice that relies on our deeply human ability to intuitively recognize patterns and construct ideas that have emotion meaning, in addition to being functional (Brown and Wyatt, 2010).

This is the approach that one Microsoft researcher took to give Emma Lawton a piece of her life back. Haiyan Zhang is an Innovation Director at Microsoft Research in Cambridge. Her vision was to accelerate the technology development process by working closely with one individual to understand her unique situation and needs. Haiyan spent six-months "studying" Emma in her home environment, through what academics would consider ethnographic research. She learned that what Emma *wanted* was to reduce her tremors so she could pursue her passion for drawing and writing.

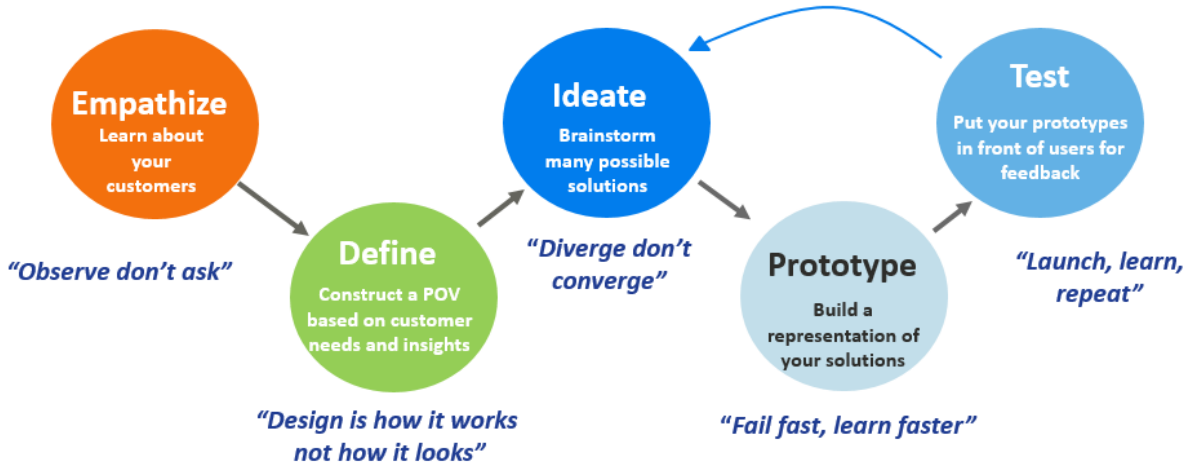
Arguably, these insights would not be evident through traditional development methods that would have abstracted Emma's *wants* from its embeddedness in her everyday life and what she valued to what the engineers would assume an individual with PD may *need.* Haiyan now had the scope (and challenge) for her prototype. Upon investigation, she learned about a vibrating spoon that helped reduce tremors for one individual with PD. She used this principle

and experimented with several rough prototypes with a small cohort of people with PD. She hypothesized that the vibrations counteracted the tremors by short-circuiting the feedback loop between the hand and the brain. In 6-months, she had a wearable prototype that she was ready to try out with Emma. It worked! Emma's tremors reduced to the point where she could more comfortably write and draw.

Inspired by the impact the Emma watch made on Emma's life, Haiyan wanted to figure out a way to commercialize the wearable device. Today, an early study with 16 individuals on PD medication is underway. Outcomes are tracked based on performance on a star tracing task, a spiral tracing task, and a 9-hole peg task. Each study participant performs these tasks three times in at least three conditions, including no vibrations, vibration with 20 BPM modulating, and vibration with 60 BPM modulation. Through the broader study, the researchers realized that the intensity of the vibrations needed to be tailored to the individual. Today, the Microsoft team is collaborating with the UCL Neurology Department to gauge the applicability of the device to other conditions with tremors. They are also developing software can capture drawings to analyze the data.

The Emma watch project is the perfect example of design thinking in practice and the impact of qualitative user research on digital innovation. By working one-on-one with Emma, Haiyan was able to connect with and empathize with Emma through direct and participatory observation. As a result, she was able to define a point-of-view (POV), which served as the core requirements for the wearable device. She didn't just stop there, she spoke to her colleagues, PD researchers and experts, and investigated existing products for novel ideas (when she discovered the vibrating spoon). Through rapid prototyping, she explored several options and tested them in order to develop a working wearable version, which she tested with Emma. The success legitimized a broader research study in partnership with the UCL Neurology Department and investments in data and analytics capabilities

Emma Watch Design Thinking Process



The design thinking principles applied during the Emma watch development process include:

- Develop *insights* by observing people (users) in their "natural" environment
- Design the *experience,* not the device or the product
- Consider a *divergent* array of potential solutions through broad *collaborations*
- Create solutions that *balance* user needs, business needs, and technical capabilities

Microsoft Research was able to qualify the right ideas to accelerate innovation, which has the potential to not only drive business value but to improve the lives of the 10 million people worldwide with PD.

References

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