Tools for Collaboratively Designing and Evaluating Personalized Assistive Technologies

Sabrina Lakhdhir[1], Hélène Fournier[2], Irina Kondratova[2], Fraser Anderson[3], Sowmya Somanath[1]

[1]University of Victoria, [2]National Research Council Canada, [3]Autodesk Research

In collaboration with Digital Health and Aging-in-Place researchers from the National Research Council of Canada (NRC), this research project will study and design novel technologies that enable diverse people to build and evaluate personally meaningful and useful assistive technologies (AT) alongside clinicians, caregivers, and professional designers. Through our design, development, and evaluation of a system that supports customization of healthcare products, we want to help the millions of individuals who rely on ATs to have devices that are functional, such as the glucometer shown in figure 1, but also meet their personal needs and preferences.

PROJECT AIMS

1. Understand how end-users, health professionals, and product designers can collaboratively design and evaluate personalized interactive glucose monitors.

2. Develop a novel software system that will facilitate collaborative prototyping and iterative evaluation of personalized glucose monitors.

3. Evaluate the developed system to understand how it meets user-identified usability concerns.

4. Generalize and share knowledge gained (through research papers, accessible blogs, and more).

Figure 1: Example of an existing glucometer [1].

MOTIVATION

The customization and personalization of ATs can help increase the lifespan of devices by integrating their user's personal and social needs into already functional devices. Figure 2 presents a series of functional 3D-printed glucose monitors that also adhere to user's personal needs and preferences such as portability.

However, as seen in figure 3, designing custom products is a complex and multi-step process that involves constant collaboration between the three involved parties. We want to understand and develop solutions to tackle this challenge in order to design interfaces that allow end-users to directly integrate their functional needs into the AT design process, supporting the personalization and customization of ATs, and lengthening the lifespans of ATs.

Figure 2: Examples of do-it-yourself (DIY) 3D-printed glucose monitors [2].

RESEARCH METHODOLOGY

Our research methodology employs methods from Human-Computer Interaction. We will work with the relevant groups (end-users, health care professionals, and product designers) to identify how such tools should be designed, and when they might be useful.

Formative studies will inform the design of the software system to facilitate collaborative AT design, and group workshops will employ co-design activities such as producing low-fidelity sketches of ideas or using pre-defined templates to begin prototyping collaboratively.
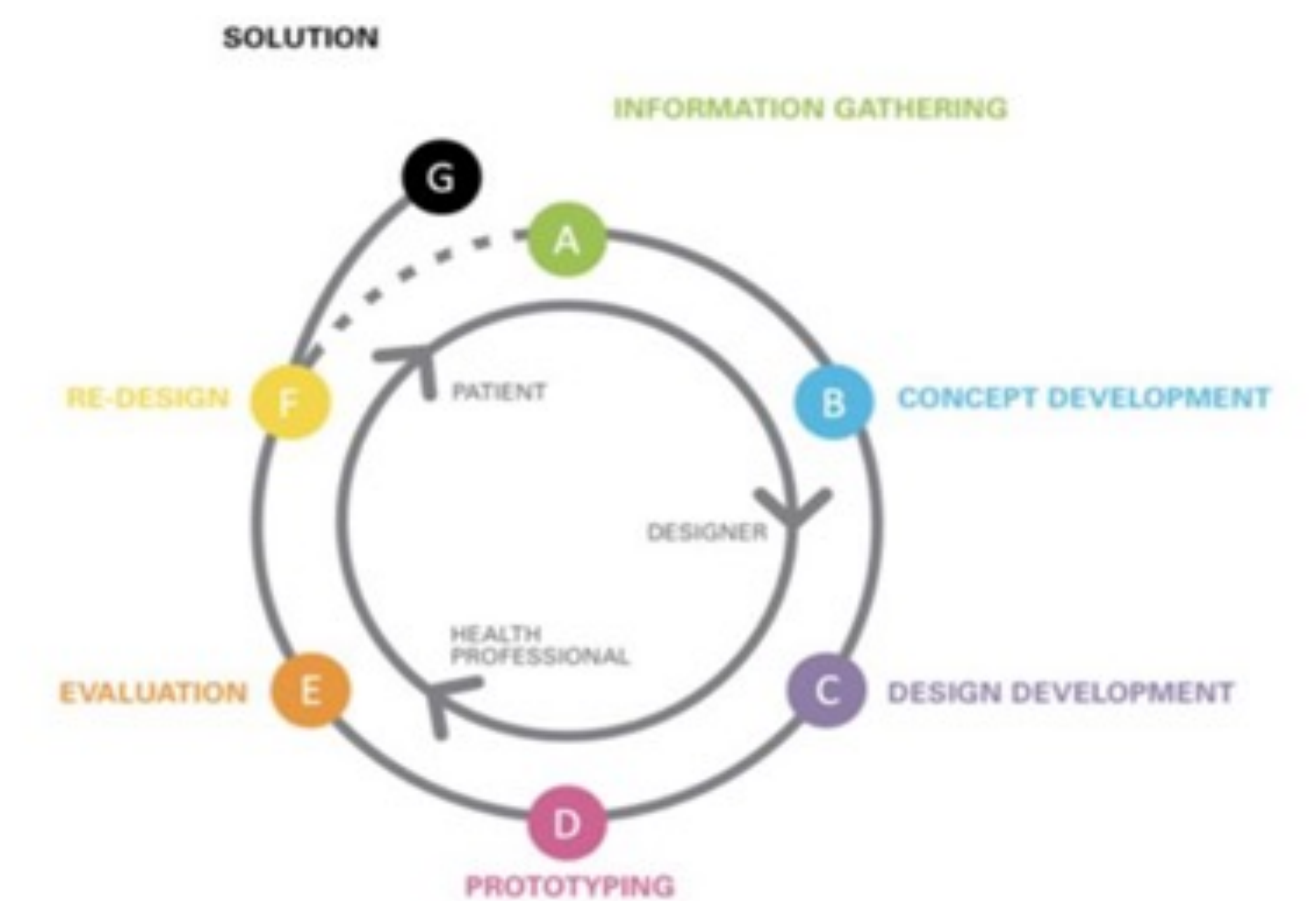

Figure 3: The 3-Corner Collaborative Design Model proposed by Belinda Paulovich [2].

EXPECTED CONTRIBUTIONS

1. Identify the needs of end-users, health care professionals, and product designers regarding tools for collaborative AT design.

2. Design and develop interfaces that allow end-users to directly incorporate their personal and social needs into their AT designs.

3. Evaluate the designed interfaces to understand how they address user-identified usability concerns.

REFERENCES

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