Human-Centred Design Studies and Explorations with Bridging Design Prototypes

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Background and aim

The bridging design prototype (BDP) approach was developed to enable individual designers to gain entry into real setting for undertaking human-centred design (HCD) studies with difficult to access and technologically disinclined communities. During my PhD studies, I was an individual designer wanting to undertake HCD studies in preschools on the use of a new learning tool. This approach evolved from exploring ways to address three challenges I encountered in the application of some HCD principles.

First challenge: I had no way to "watch [prospective] users as they perform[ed] the activities the new product [was] intended to assist...". For the reason that the product idea was completely novel to this community. They did not perform product-related activities in their work setting.

- **Second challenge:** I couldn't meet the HCD principle of "start[ing] with a multidisciplinary team that includes representatives from marketing, technology, and user experience". I was an individual designer researching this issue independently without a particular institutional or company affiliation.

- **Third challenge:** I was an outsider to the Australian and New Zealand communities I was designing for. They did not see the relevance and benefits of the novel product I was proposing to them.

THE SIX PRINCIPLES OF THE BRIDGING DESIGN PROTOTYPE APPROACH	UNDERPINNING CONCEPTS DRAWN FROM THREE DESIGN METHODS AND A LEARNING THEORY
Principle "Develop a human-centred design study that brings a **multidisciplinary thinking team approach to research the user community and the market"**	The human-centered product development process including rapid ethnography (Norman, 1998)
Principle "Becoming more empathic through the designer, R&D team and the user community achieving **similar mental models**"	Ideally the user's model and the designer's model of a system image should be equivalent (Norman, 1999)
Principle "Deep understanding of the **prior knowledge and familiar** technological, behavioural, and social **interactions** of the user community.	The learner must have prior knowledge and the learning must be prepared with familiar languages - conditions for meaningful learning (Ausubel, 1968
Principle "Development of features that **make activities simpler**"	The seven principles for transforming difficult tasks into simple ones (Norman, 2002)
Principle "Development of features that **broaden participation**"	The inclusive design approach concepts of countering exclusion and accessibility (Keates and Clarkson 2003)
Principle "Implementation of a prototype for early adoption enabling the user community to **participate**, contribute, improve features **in** the **design** process.	Users become participants and play a critical role in a design process (Suchman in Schuler & Namioka, 1993; Spinuzzi, 2002). Users' participation early in the front-end is needed to drive truly human-centred product development (Sanders & Williams, 2001)

Top left: user community interacting with tangible BDP. **Top right:** users become designers by creating an educational technology. **Bottom left:** author interacting with users in their real context. **Bottom right:** BDP of a software technology for postgraduate medical education.

Method

Bridging design prototypes are fully functional rapid prototypes that user communities adopt into real activities, while designers employ them for learning about their context/practice. It capitalises on a user communitiy's prior knowledge and recognises their context realities. (i.e. the knowledge users already have about a situation or an activity).

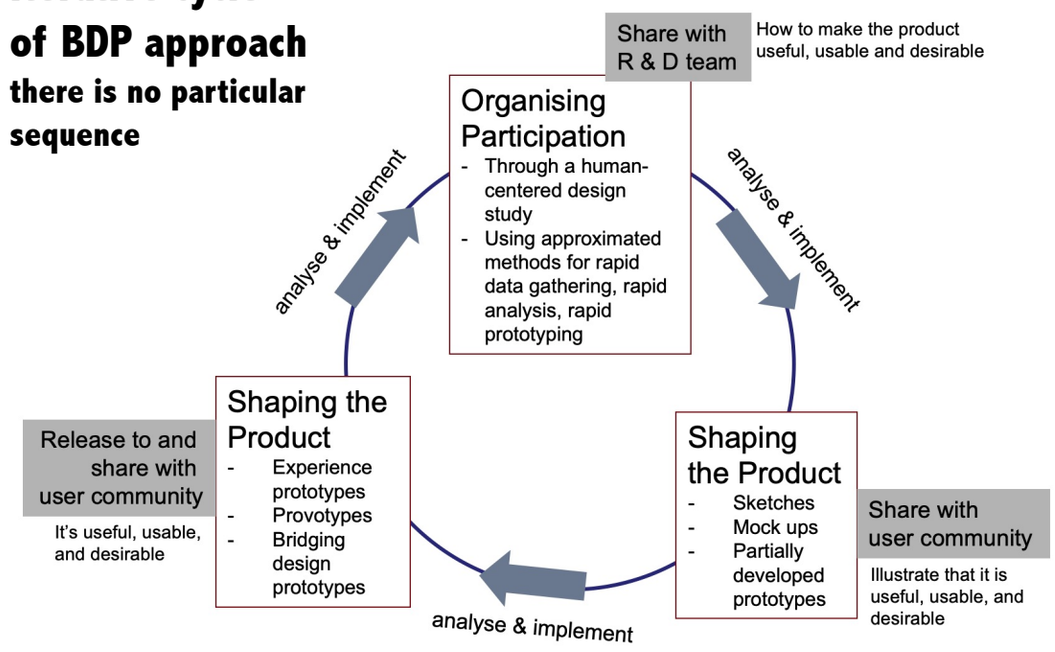
These characteristics bring users into the development process early because they accept to incorporate it into their real activities. At the same time, individual designers or R&D teams use it for learning about the community, the context, and the practice.

Cases in educational technology

BDPs in early childhood and medical postgraduate communities **Publications at www.gloriagomez.com/bdp.html**

Iterative cycle of BDP approach

there is no particular sequence



Adapted from "Enhancing the online study experience in medical education" (Gomez & Tamblyn, 2012)

Results and Conclusions

Case studies in educational, service, health technologies illustrate the six principles used to build them and how their early adoption may lead to socially inclusive technologies and users becoming designers.

PROJECT NAME AND AUTHOR	TYPE AND TIME INVESTMENT	FIELD
CASES ON BDPS MADE WITH TANGIBLE MATERIALS		
BDP for preschool concept mapping by Gloria Gomez	Thesis project, PhD in Design, investment 1 year	Early childhood education
BDP for investigating the use of an educational game for learning the timetables in elementary school by Claudia Marín Ortíz	Thesis project, *Maestría en Diseño y Creación*, unknown	Early childhood education
BPD of an in-plant sensor unit to enhance the management of a greenhouse production system by Mathias Halkjær Petersen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Internet of things, greenhouse production system
BDP for investigating a student food delivery service by Kasper Andersen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Healthy eating and food delivery service
BDP for building healthy habits in children by Evka Hudakova	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Healthy eating and children games
BDP for climbers and athletes to train unilateral movement by Robert Hoppe	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Preventing injury and sports medicine
BDP for teenage children and parents to talk about sexually transmitted diseases by Bjørn Clemensen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Youth education and family games
CASES ON BDPS MADE WITH PENCIL AND PAPER		
BDP for measuring and evaluating own food waste by Katrine Riber Hansen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Food waste awareness in households
BDP for investigating the relevance of implementing and app for collaborative games by Rafael Moreno Aranda	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Outdoors collaborative and leisure games
CASES ON BDPS MADE WITH PROGRAMMING SOFTWARE		
BDP for online academic study by Gloria Gomez	Early product research for technology start up, 1 year approx.	Educational Technology
CASES ON USING BDP PRINCIPLES TO EVALUATE EXISTING TECHNOLOGIES OR FRAMEWORKS		
Evaluating a welfare technology (game) called Touch and Play for elderly with dementia by Maigen Wilki Thygesen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Cognitive training, interactive games, welfare technology
Creating a user research framework within the existing product development model of Blue Ocean Robotics by Enikő Rozsnyói	Thesis project for MSc in Engineering degree (Product development and Innovation), 1000h	Health robotics, welfare technology
BDP approach used for career development skills by Magnus Vestergaard Laursen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	Human resources technology
CASES ON BDPS BUILT ON TOP OF EXISTING TECHNOLOGIES		
BDP for international students to navigate the Danish Society by Alexandra Marie Rasmussen	Class project, MSc in Engineering degree (Product development and Innovation), 60h	International student services, and welfare technologies