



PToolkit Prototype: Mixed Fidelity for Design Idea Transformation

Aeni Zuhana Saidin, Nassiriah Shaari & Asmidah Alwi

School of Multimedia Technology and Communication, Universiti Utara Malaysia, Malaysia

Abstract

This paper describes about the design and development of PToolkit prototype. We used both low and high fidelity prototype techniques for development of PToolkit prototype interactive application with expert user collaboration in the design iterative phases. Low fidelity prototype enables exploration for the general layout and information contents, whereas high fidelity prototype allows experimentation in providing experience for intended context and target user group. Both techniques has proved provide experiences in design context, thus allows an early reflection and design transformation.

Keywords: Persuasive technology, low fidelity prototype, high fidelity prototype, design iterations

1. Introduction

The early history of persuasion is linked to the work of rhetoric. Classical rhetoric was usually worked in producing effective arguments aimed to be used in courtrooms and before public assemblies. On the other hand, modern rhetoric started when Aristotle extended the definition of rhetoric to ethos, logos and pathos [1] which makes it applicable to various domains such as fine arts, journalism, media and many more [2]. Since then, rhetoric or persuasion knowledge is debated by scholars academically and well-practiced in domains such as health behavior, communications, public relations, lobbying, law, marketing, professional, and technical writing, and advertising.

Latterly, persuasion has been introduced in the computing field. In early 90's BJ Fogg has introduced a new domain in human computer interaction (HCI) and named it as persuasive technology (PT). According to him, PT is the used of interactive application to change people's attitude and behavior [3]. During the early years of the computing era, the idea that a computer system could be designed to impact people's beliefs or behaviors would have been unfamiliar, and possibly unwelcomed. However, as technology evolved and increasingly dominated people's lives, the idea that applications could be used for persuasion gradually become an important and even acceptable prospect. There is some degree of concern over the drawbacks that

persuasion technology might cause, especially in the issue of ethics that was being debated [4] [5]. However, this field continue blooming and the design has extended towards more universal and everyday product. A recent study also used theoretic approach to investigate the psychological constructs in influencing behavior through technology [6]. Nowadays, it is common for users to be

reminded by their mobile phones regarding their personalized exercise regime, brought groceries through websites and offer support through social networking to people during difficult times [7]. This situation is still continuing thus requires design of persuasion to be long term [8] and robust.

The situation has made that academic conquers of persuasion knowledge need to be passed to the commercial designers. Therefore, making the rich body of knowledge about persuasion to be accessible and appropriate for people involved in designing persuasive applications is necessary. Consequently, we are currently designing Persuasion Knowledge Toolkit (PToolkit) prototype that aims to transfer the persuasion knowledge to the designers' community.

2. Scenario & Persona

To understand the designers (user of PToolkit) we were conducting interview sessions with them and ran a series of design workshop. As a result persona and scenario were created in assisting the design and development of PToolkit.

They provided the concept and context of what and how the prototype (an application) during the beginning of the design process, and evaluation tools to verify on the functionality at the end of the design process. This exercised, conducted has revealed three types of designers that plotted into a persona. Each persona and scenario were given a specific name, character, working preferences to make it as real as human as possible.

This persona then was given story that relates to their working context (refer table 1). The story covers two important aspects in terms of attitudes and tasks.

Table 1: Type of Designers

Type of designers	Summarized of Persona and Scenario
Type 1 designer	They would like to do lots of research before starts the design work. Both online and offline materials were used to gather knowledge to help him design effectively.
Type 2 designer	Type 2 designer would like to surf the Internet for information and at the same time observing how people solve the problem. He argues that the solving mechanism would trigger the design ideas and inspiration.
Type 3 designer	Type 3 designer would like to make an observation and searching on the Internet about similar product/application assigned to him. He believes observing the existing artifacts would inspire the design ideas in a more practical and effective way. He values more practicality (observing object / visual observation) and does not prefer the complex theory.

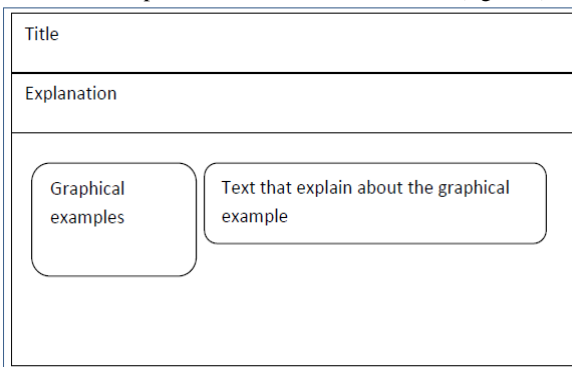
3. Prototyping

This section explain the prototyping process of PToolkit. The prototyping process is important to ensure that wider aspects of transferring a specialized knowledge from the academic community to designers community (practitioners) can be done successfully. PToolkit prototype is taking a huge challenge in providing constructive views and appropriate process of how the knowledge that resides in a theoretical and philosophical domain should be accessible to the designers that might not be aware and/or even interested in the knowledge.

3.1 Low Fidelity Prototype

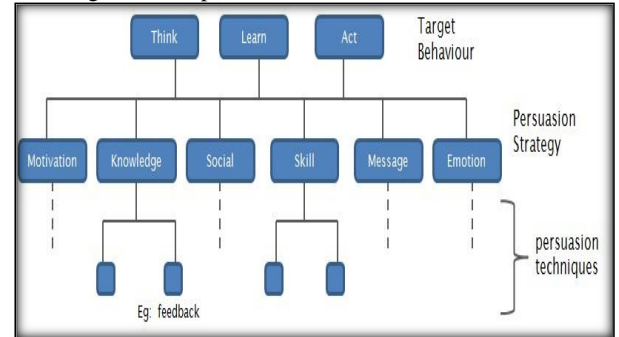
The low fidelity prototype has several purposes; as a tool for providing exploration [9], communication medium and design decision between experts (researchers). PToolkit prototype was in paper-based form. It has a few important elements regarding 3 aspects of general layout, navigation structure and information layout.

- i. General Layout – Placement of elements in PToolkit. Generally, information about persuasion knowledge is the most important elements contain in the application. Its contain title, explanation both in visual and text (figure 1).

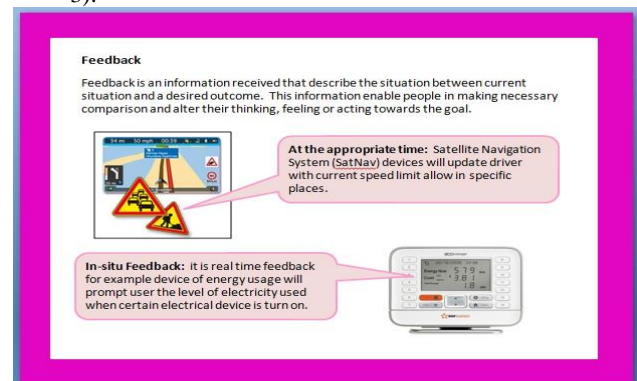
**Figure 1:** Example of paper based low fidelity prototype

- ii. Navigation Structure. Based on the early classification work on persuasion knowledge [7], PToolkits' information organization was created (figure 2). Persuasion knowledge has a complex structure of the target behavior, strategy, and

techniques that currently is not obvious to the designer. The main PToolkit's information architecture consists of the target behavior, which arranged in a hierarchy and contains sub information on related strategies and techniques. This view provides a general framework of how persuasion knowledge should be grasped by the designers before starting any PT design. Therefore, we were structuring the navigation structure based on this information architecture in order to make the PToolkit able to inspire the designer during the design ideation phase.

**Figure 2:** PToolkit's Navigation Structure

- iii. Information Layout. The general layout showed the important information contain in the application. The design mainly focusing on providing designer examples of how persuasion knowledge was being implemented in various designs and artefacts. Additionally, some information related to the theory of persuasion was also provided (figure 3).

**Figure 3:** Example of paper based low fidelity prototype

3.2 High Fidelity Prototype

As soon as the design and requirements of the artefact becomes more mature, the high fidelity techniques that offer more detailed overview and functionality can be introduced [10] in the design phase. High fidelity prototype acts as experimental tool [11] for supporting user- center design activity. It can provides feedback [6] and reflection for design iterations at later stage [12]. At this stage, we were working on the following important aspects on making any design decisions.

3.3 Persuasion Knowledge Elements

Persuasion knowledge elements are the core components that intend to be given to the user. Therefore it needs to be carefully identified, obviously seen and understand (when using this prototype). We have identified those persuasion knowledge elements that required designer's grasp during persuasive design;

Target behavior, which aims to change the user behavior. Persuasion strategies that is the overall planning of the persuasion attempts such as social, motivation, skill, emotion, knowledge and ability to retrieved message. Designers are able to choose one or combination of this strategy respectively. Lastly is the persuasion techniques as the as the process to influence people’s attitude and behavior.

The information is designed as such in fulfilling the different persona types of designers as stated in the previous section. After design iteration cycles, the information was iterated through several changes, which aim to make it more understandable. The information can be categorized into four criteria of direct textual explanation, graphical example, extended information and extended information with a link to a specific location in web or example of usage. As much as the persona was used as the basis in designing the information, comments provided by the evaluator during the design iteration phases is also very helpful to improve the design.

This information is among the basis in transferring the persuasion knowledge to the designer as well as the knowledge structure and elements. Design and development of PToolkit is based on a series of criteria data of the personas. This method is an adaptation of [13]. Matching with the user preferences, artefacts should be built to match with the user preferences that reflect the user’s attitudes and behaviours [14] (refer table 2). Similarly, PToolkit was designed by matching the knowledge characteristics with the designer’s information seeking behaviour.

Table 2. Types of Information

Types Of Information	Example	Persona
Direct explanation:	Text based information that explains about either strategy or technique. It was made as simple as possible to allow easy understanding.	Type 1, Type 2, type 3
Visual information / example	The graphical information to provide a visual example on how strategy and technique was used in various situation.	Type 1, Type 2, type 3
Extended information	Some of the techniques will be supported with the extended information. It is an additional information that allow a designer to understand further.	Type 1
Extended explanation that allows navigation to other sites.	There is also additional information that provides links to other examples on website. This link will allow designers to further explore about the subject matters.	Type 1 and Type 2

3.4 Design Iteration

Design iteration is important to ensure that the artefact is right and achieve the objectives. Therefore, it has gone through several design iterations using the walkthrough and think aloud approach. The evaluator (expert) will explore the PToolkit, and talk about their opinion out loud. The walkthrough approach provides clear context on how a user deals with the application’s core task [15] and allows evaluation to be done in the early stage of the design cycle [16]. Whereas, the think aloud methods allow the evaluator to use the prototype and spontaneously verbalize their thinking. This approach enables to provide feedback

it easily to be addressed (table 4). Then the design on the actual use of the interface and content during the exercise [17].

The comments then were noted and then documented to change the design in later stage. In this phase, we have conducted three design iteration cycles. The first cycle was done after the high-fidelity prototype is completely design (figure 4). The first cycle served as a pilot test of the iteration cycles. During the first cycle, one expert was chosen and walkthrough the application. The expert used the think aloud during the walkthrough. The documentations of the comments from the first walkthrough cycles were quite difficult. The evaluator seems freely comments on any aspects, as we did not provide any specific guidance to do the task (table 3).

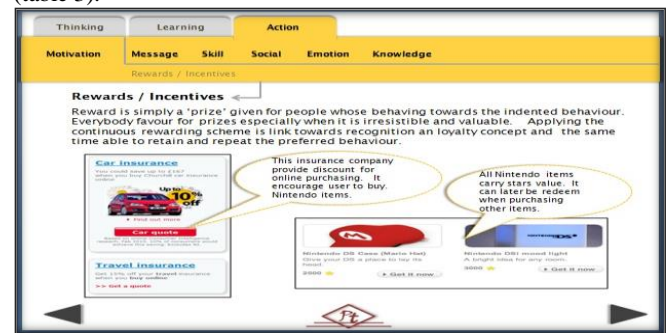


Figure 4: Initial design of PToolkit

Table 3

Comments	Evaluator#1
1	Confusing of pages visited Unable to locate where I am
2	Not sure the effective use of colour Or why the colour is different for certain part
3	Unclear use of button / link (hot texts) No back button
4	Navigation is not smooth Information structure is not obvious, I am not sure where I am now, or why I am here.
5	The explanation is too simple Unable to understand the following concept: Target, behaviour, Strategy, Techniques Are those important, why?
6	Is the graphic credible? Can I navigate the graphics or example? Need more explanation for the example given, why this can persuade people Search facility could be better (or filters), makes searching easier
7	Need to check on English usage (grammar, punctuation etc)
8	The persuasion knowledge is not obvious, and how can be used in design.

Our further analysis has classified the comments were revolved around the issues of the interface, navigation and contents. Then the comment were tabled to make was changed according to the suggestion. Figure 5, shows the first changes made after the first cycle of design iteration. Other two design iteration activities were continued using two evaluators in each cycles. As the template for redesign task has been constructed, addressing the evaluators comments were much more easier.

Table 4. Redesign Task

Comments	Redesign Task – Addressing The Comments
1 – 2	<p>① - Each page is given a title name to know the page location.</p> <p>② - Each strategy is given a different color coding to make it obvious and know the specific location is visited.</p>
3 – 4	<p>③ - Buttons were replaced with hypertext to navigate to another persuasion elements and home location.</p> <p>-To ensure that the navigation is smooth and easy</p>
5,7	<p>④ - Explanation need improvement must remain simple and avoid jargon words. Check on grammatical error, and language.</p>
6	<p>⑤ - Used other graphic that suitable to the explanation, however the task is not as difficult as many available resources are exits, therefore some graphic is remaining.</p> <p>- Modify some explanation in the callout, to make it obvious on how persuasion was applied by using such graphic.</p>
8	<p>Design of ①, ②, ④ and ⑤ is hope to make the persuasion knowledge obvious in terms of its structure and function.</p>

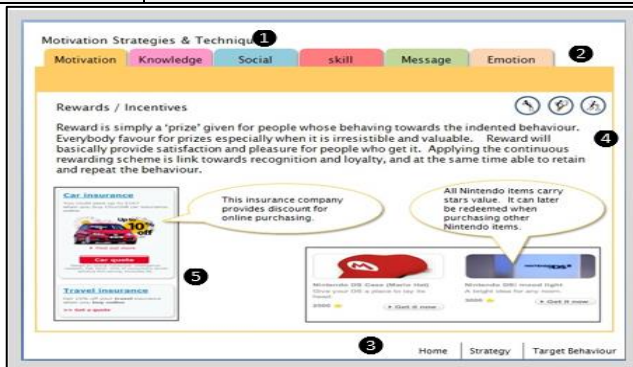


Figure 5: Redesign of Ptoolkit after the first comments

3.5 Iteration for Better Experience Design

User experience is very important for acquiring user understanding and engagement. Ptoolkit aims to provide experience for designer on variety of persuasion elements that could be useful and appropriately use during design ideation. Navigation and interface design are among design aspects that important in designing experience and interaction. Ptoolkit enables designers to navigate at every target behaviors and persuasion strategies. However, only few persuasion techniques were able to be explored (at the moment). On the other hand, design of interface is focusing in providing designer's understanding on different types of target behavior, classification of persuasion strategy and techniques.

Design iteration was used as an early evaluation in the design and development of Ptoolkit. There were significant changes were made in each cycle to allow easier navigation and understood the persuasion knowledge in order to spark design ideation. The iteration designs have speed up the design process before it is ready to be used in the real setting. As a results Ptoolkit has been

designed in six months with some limited functionality and navigation (figure 6).

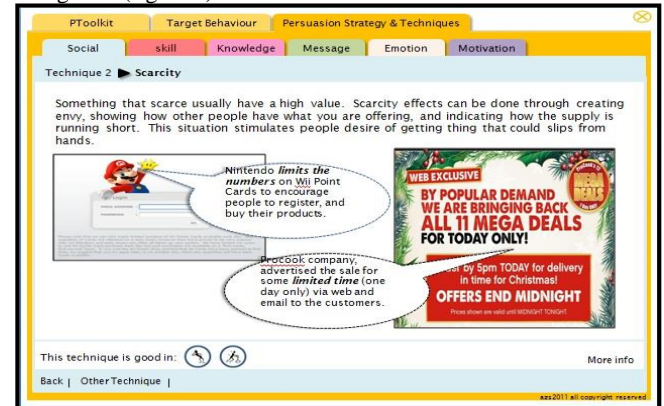


Figure 6: Final Ptoolkit Prototype

4. Conclusion

The objective of the design and development of Ptoolkit is to transfer the specialized design knowledge to the PT designers. We used persona and scenario to help us in understanding of how the knowledge is appropriately being transferred. Then we were utilizing prototyping methods to gather the early experience and feedback from the user. Clearly, both low fidelity and high fidelity prototype has proved very beneficial in our works. Noticeably, the most important consideration is any particular chosen techniques should allow the evaluation in relevant contexts (environments) in order to gain insight into the actual experiences that user get when they are dealing with the artefacts.

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