

CIRP 25th Design Conference Innovative Product Creation

## User-Based Approach to Teaching and Learning Product Design

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### Abstract

This paper reports on a senior-level multidisciplinary course titled Innovative Product Design at Florida Atlantic University aimed at teaching and learning one aspect of innovative thinking: Design of products or services from the user viewpoint, i.e., focusing on benefits and ease of use, rather than on product features.

Specific objectives of the course are:

- To study well-known principles in design interaction, i.e., basic rules that allow design from the user point of view.
- To enhance innovative problem solving skills.
- To explore creative and innovative processes in product design.
- To practice methodologies for design of products and services.
- To engage student teams in the design of assistive technologies.

This course introduces students from engineering, computer science and business majors to methodologies in design of products and services. Lectures, discussions, and problem solving exercises are used to explore the creative/innovative process in product design. Student teams design assistive technology products based on their knowledge and enhanced innovative skills. For a project to be approved, each team had to interview at least five potential users.

The paper focuses mainly on engaging activities, some of which are new. It describes hands-on interactive class exercises, teaming activities, homework assignments, presentations, and projects, most of which relate to the user's point of view. The paper shares some available formal and informal preliminary feedback/evaluation of class topics, material and activities.

In order to engage students in more real-life experiences, design experts and specialists in assistive technologies visited the class to teach and mentor students. Among the visitors were the chief product designer of Motorola, and the director of Stand Among Friends, a non-profit organization that helps people with disabilities.

The paper shares students' feedback. They liked the fact that the course teaches design from a totally different perspective, i.e., the user – an unfamiliar aspect to most of them. For some, the concept of design with the user in mind was an “eye opening” experience. They enjoyed prototyping activities (and asked for more) and hands-on experiences that led to prototyping. Open environment and openness to new, simple and absurd ideas were highly appreciated. They have asked for smaller scale projects and for more class time to work on them.

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## 1. Introduction

This paper details engaging activities in an introductory multidisciplinary course titled *Innovative Product Design* at Florida Atlantic University. The main goal of this course is to enhance the student's mindset and awareness as it relates to product design, from a user's point of view.

In this course, students learn principles and methodologies in design interaction, and explore and practice relevant innovative processes. The course is interactive: students are engaged in many hands-on activities, discussions, lecturing and sharing information. They share with others specific design books that they have read, and work in teams on assistive technology projects. The course targets several skills, in particular, those that are related to innovative problem solving and entrepreneurial thinking, understanding the "big picture," as well as personal and social skills.

The paper focuses mainly on engaging activities. It describes hands-on interactive class exercises, homework assignments, projects, book and project presentations, and teaming activities. Projects deal with the whole process of user based design, from observation to advanced prototyping. Course grading is based on attendance and participation in class activities, homework assignments, off-class activities, and projects.

The course attracted experts in the design and assistive technologies areas. Franco Lodato, chief product designer of Motorola has led several design sessions, Shawn Friedkin, the president and CEO of Stand Among Friends, a non-profit organization, mentored students and gave them very helpful feedback, regarding designing products that can help people with disabilities.

At the end of the course, students commented that they liked prototyping (and would like to have more) and hands-on experiences that led to prototyping. They liked the fact that the course teaches design from a totally different perspective, i.e., the user – an unfamiliar aspect to most of them. Open environment and openness to new, simple and absurd ideas were highly appreciated. They have asked for smaller scale projects and for more class time to work on them. Most students were engineering and computer science students, and only few from other colleges. This paper shares some of the specific comments (please see Appendix D).

Special thanks to the National Collegiate Inventors and Innovators Alliance (NCIIA), now VentureWell for supporting activities and projects.

## 2. Details of Activities

This section details activities that have been used to enhance the understanding of, and engagement with, user-based design. The underlying goal of the activities is to change the traditional point of view of students when designing products or services, i.e., always keep the user in mind. The activities are grouped in a way that they are easy to explain and rationalize.

Before each activity or assignment, the type of design is introduced to be either a general discussion, or by showing a few visual examples. The different activities are meant to lead to useful (or useless), ornamental, artistic, expressive, etc.

designs, in an attempt to increase awareness of the importance of user-based design, to change students point of view and mind-set, to make them more observant, not to take things for granted, and to experience principles in user-based design.

The section starts with a story to elucidate the meaning of "user-based design."

The activities are divided as follows:

- 2.1. Warm-up and mind-set activities
- 2.2. You are the user: observing experiences
- 2.3. You are the user: mapping experiences
- 2.4. Activities to experience the meaning of simplicity
- 2.5. Resourcefulness-based design: Making something from (almost) nothing
- 2.6. Blue Collar designs
- 2.7. "What's in it for me" designs
- 2.8. "Be there:" Empathy-based designs
- 2.9. Designs that solve or re-solve existing problems
- 2.10. Design Quickies
- 2.11. Use-based design
- 2.12. Rethinking existing designs ("do not get used to...")

### *The meaning of user-based design*

The following story epitomizes one of many that are being shared with the students. It is about designing a solution to an "unsolvable" problem. The story emphasizes the need to look at problems and solutions from the customer's point of view [1].

The plot deals with young gang members. The disobedient teenagers regularly damage private and public property. Initial police response was to arrest them for a short period of time. However, the unintended and unexpected response was that the number of offences increased.

Following some brief undercover investigation it appeared that the reason for the increase in offences was the gang's perception of a 'macho image'. Those who were jailed actually were highly respected among their peers.

The police chief came out with a totally ingenious solution: by observing the customers (i.e., the gang members) he treated the jailed offenders like babies. They were fed baby food, given drink in baby milk bottles. In a short period of time news of this "baby food treatment" spread out, and the offences disappeared.

By being able to think like the "consumer/customer" a simple solution was designed and successfully implemented.

### *2.1 Warm-up and mind-set activities*

The following activities are meant to encourage sketching and prototyping, and engage students in fun, team-based activities.

Activity: Re-invent the name tag

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