

# The UPC model: Teaching IDC Through Evaluation of Children's Technology

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## ABSTRACT

This paper presents a curriculum for teaching Interaction Design and Children (IDC) to non-designer students, in academic settings. The course uses the UPC model as an instructional scaffold, and combines multidisciplinary literature with hands-on activities.

## Categories and Subject Descriptors

K.3.2 [Computer and Information Science Education]: Curriculum

## General Terms

Human factors, Education.

## Keywords

Teaching, education, children's HCI, interaction design, psychology, curriculum, disciplines, child computer interaction, UPC.

## 1. INTRODUCTION

Academic instruction of Human-Computer Interaction (HCI) has been a challenge ever since the creation of the field, due to both interdisciplinary content and audiences. These have been addressed by workshops [1, 2], and publications, aiming at gathering and consolidating, content and methods, to teach HCI.

The Interaction Design and Children (IDC) community had been organized officially in 2000 [3], and has made several attempts since to think about formal instruction curricula [4], and tools [5]. These efforts presented great variety in approaches, both in interdisciplinary content, and in the audiences being addressed, and their different needs. Differences were found between faculties and departments (engineering, design, psychology, education, information studies, etc.), due to different orientation and literature base of the instructors, but also due to the different goals students' had for taking these classes.

This paper focuses on teaching students who want to learn about IDC to inform their practices and decision making, but are not necessarily designers and/or developers of children's technology.

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*IDC 2014*, June 17-20, 2014 Aarhus, Denmark.

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These students may be educators, policy makers, managers, and humanities' scholars. They have little technical and/or design knowledge, and may have some background in social sciences, and can be found in departments such as education, psychology, sociology, communications, culture studies, etc. They are curious and motivated to learn about a current phenomenon they see all around them in a more deep and scholarly fashion, to inform their other practices.

This paper will present a curriculum design for this audience. The goals of the course will be presented first, followed by the introduction of the UPC model, built to scaffold the learner's understanding of children's digital interfaces design. The content of the course will be presented afterwards, as well as the hands-on experiences and course projects. This curriculum is based on courses the author has developed and taught to these audiences, in both BA and MA degrees, and various academic institutions [8, 9, 10].

## 2. CURRICULUM DESIGN

### 2.1 Course Goal

This curriculum aims to give students an understanding of all the factors that influence the design, experience, and assessment of technology for children. After graduation, students should be able to examine in a scholarly manner a digital interface designed for children, comprehending the various factors that make this a "good" design, or at minimum what they need to ask in order to find that out. Student will make the transition from laymen's perspective about children's HCI, to being familiar with the theories, terms, and a repertoire of examples in the field. Whether they will be a teacher contemplating incorporating educational technology in their class, a policy maker considering legislation about children's use of digital interfaces, or researchers of current cultural phenomena, these students will have the tools to make informed decisions about IDC, and an impact on the lives of children in their community.

### 2.2 The UPC model

In order to facilitate students' understanding of the interdisciplinary nature of IDC, the User-Product-Context (UPC) model was created (see Figure 1). This model aims to simplify the multiple elements affecting the design of interfaces for children, and act as a theoretical scaffold throughout the course. The model consists of three main parts: user, product, and context. Each of these has three sub-sections, teasing out elements of the main category, which should be taken into consideration when designing, analyzing, or testing, digital interfaces for children.

The students use the model as a guiding principle when addressing an interface for children, by prompting them to ask questions such as: Who is this designed for, and does this take into consideration this group's needs? Is the content presented in this interaction appropriate, and is the design well suited for this group? Which interaction design theory and/or learning theory were applied here, and were they done well? Is this the best use of the medium/technologies affordances? In which setting is this interface to be used, and what are the trade-offs to current alternatives? Does this interface comply with the social and cultural context of its audience?



Figure 1. The User-Product-Context (UPC) model

### 2.2.1 User

Understanding the users of the technology, the people who will be interacting with the interfaces designed, is critical to designing, analyzing and testing, digital interfaces. This notion of user-centered design (UCD), is at the base of the UPC model. Students will learn about core human-computer interaction principles and theories, understanding people's perceptions, biases, and behavior, with digital interfaces. They will then learn more in depth about the children as users of interfaces, and the factors affecting their perceptions, biases and behavior, such as age, gender, and technology experience. For example: playing Minecraft may be inappropriate for toddlers both due to lack of fine motor skills and abstract navigation, but a wonderful experience for 8 year old children.

### 2.2.2 Product

The design and development of the digital interface itself, is the second part of the UPC model. Students will learn of different learning design approaches and their application in digital interfaces, and the tradeoffs of each approach. They will be introduced to interaction design styles, and affordances of media and technologies, which could affect children's user experience. For example mobile devices afford digital interaction wherever

children go, which can have a negative affect if they disconnect from their outdoor environment and focus only on their screen. However, this same affordance could have a positive effect if the mobile interface is used to investigate and learn about the outdoor environment, using cameras, GPS, and connectivity.

### 2.2.3 Context

The third and final part of the model raises the importance of the context of use of the interface investigated. The same interface could be a positive experience for one group of children, while a negative one for another group of the same age, but of a different setting. This depends on the alternatives those children have for these experiences, and on the social and cultural norms they live in. For example: playing 3 hours daily of MMOG instead of playing physically outdoors, may have a negative effect on the social lives of suburban children. However the same play pattern could be a safe, creative, and empowering environment for urban children who live in neighborhoods where it is dangerous to play outside.

## 2.3 Course Content

The course is divided into two main sections, in terms of content: (A) Disciplinary introductions, and (B) Intersections: child-computer interaction topics. In the first section students are introduced to the various contributing disciplines, each in a separate introductory lesson. These include introductions to main concepts in: current state of children's use of technology, child development, HCI, media studies, design methods, educational approaches, and interaction concepts. In the second section, the class starts looking deeper into types of children's interfaces, and analyzing them according to the concepts they have learned from the various disciplines (according to the UPC model). These topics may include: video games, tech-toys, social networks and cyber culture, educational technology, exergames, transmedia, and mobile applications.

## 2.4 Hands-on experiences

Despite the fact that these students aren't trained to be designers and/or developers, hands-on experiences are an important part of the learning throughout the course. "Learning by doing" has been proven to give students better understanding for phenomena, as well as more memorable experiences [7]. There are two types of hands-on experiences during the course: weekly small tasks and two projects. The weekly tasks focus on the topic that is to be discussed in the upcoming class. The task incorporate reflection on the articles assigned for that topic, in relation to an activity the students must do, such as: play video games from two different genres, find examples of "bad" interfaces according to Don Norman's concepts, and interview both a novice and an expert user about what "copy" and "paste" mean. Students are not required to write up and submit these assignments, but rather just post a picture on the course website, and be prepared to discuss it in class. This way the assignments' focus is on the task itself, and not the academic presentation, while still promoting a participatory discussion in class.

The two projects are: a midterm project and a final project. The midterm project takes place at the end of the first part of the course, the disciplinary introductions, and summarizes it. In this project students observe children playing with a digital interface, in their natural environment. They then interview both the children and their parents about this experience. The students are asked to analyze their observation and interviews according to the theories discussed and the UPC model, focusing on similarities

and discrepancies between theory and what they observed. The projects are presented in class.

In the final project students work in pairs, and they can either write an in depth assessment of an interface for children, or create a re-design (mock-up) of an interface for children. In both cases they must both present literature about the interface, and conduct testing with the appropriate audience. The main analysis of the project focuses on the similarities and differences between the literature and their findings in their testing, according to the UPC model.

### 3. Summary

The UPC model was introduced as an instructional scaffold to teaching interaction design and children academic classes. The course includes both multi-disciplinary and inter-disciplinary content, giving the learning a broad background that will allow them to evaluate digital interfaces for children, in a short amount of time, and with little background experiences.

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