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# *"IT IS REALLY HARD TO UNDERSTAND PEOPLE THAT ARE THAT DIFFERENT FROM ME"*- EVALUATING AN IDC CURRICULUM

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**ABSTRACT**

*In this paper, we present an evaluation of a curriculum in Interaction Design and Children (IDC), based on a case study of developing and teaching a master level IDC course. The course embodies a series of issues that arise when teaching IDC. At the same time, it highlights the issues that challenge the initiation of such a course, namely topics, learning outcomes, content, forms of teaching, competence of the instructors, etc. By extension, the case offers examples of how these challenges can be explored and addressed. We shortly present a range of such activities carried out in related work and in the course, and present the main lessons from the course on the basis of evaluation and final results. These lessons focus on language barriers, establish contacts with schools, children with special needs, pedagogic perspectives, novelty and quality, adaptation, materials and technology, and forced encounters with children. The contribution of this paper is to support anyone who intends to start teaching in this area, and contribute to an emerging curriculum for Interaction Design and Children.*

*Keywords: Interaction design and children, teaching, curriculum, evaluation*

## 1 INTRODUCTION

IDC - Interaction Design and Children (or CCI - Child Computer Interaction) is a fast growing area in both research and design (Read et al, 2011). Despite this extensive growth, there is very little discussion on how to teach CCI, as there is still no settled curriculum in the field (e.g. Ferrarini, 2013, Gilutz et al, 2011; Read, 2003). There exists different types of courses related to the field around the world, all with different approaches (e.g Bekker, 2008; Druin, 2008; Markopopoulis & Bekker, 2010; Read, 2011; GU, 2014), but the conversation around ways of forming harmonized content is still lacking in the community. To improve the design practice in the IDC area, we believe that it is necessary to not only study and improve methodology in a research context, but also how to transfer the gained knowledge to new generations of designers, to ensure its use in design. In the recent DEVICE project (2014), a combination of current best practices, design explorations and teaching experiments are used to investigate this topic, and suggest an approach to teach design for and with children and elderly people.

The course presented in this paper is a result of the work in the DEVICE project. The project started with international surveys and interviews in both academia and practice to map out existing practices, skills and needs, and based on this formulated training needs and developed teaching materials, and has finally piloted a project course on master level in Interaction Design and Children. The paper will shortly introduce DEVICE, present the structure and content of the

course, results and evaluations, and further discuss reflections and lessons learnt. It is the hope of the authors that this can serve as an inspiration to others interested in teaching IDC.

## 2 BACKGROUND

IDC is a relatively young field based on a variety of disciplines. Still, while the field is wide, there are fundamental guiding principles, theories, research methods and applied processes that should be covered regardless of the orientation of a given course (Gilutz et al, 2011). These fundamentals must be tailored to fit the disciplinary focus of different schools and educations, to different levels of students, resources, different orientations of both teachers and students, and especially to the length of the course (Gilutz et al, 2011).

### 2.1 THE DEVICE PROJECT

This section presents the DEVICE, project which aims to develop educational design programs with a specific focus on vulnerable generations - children and elderly. The project consortium consists of seven partners in five countries. The main phases of the project are (i) survey of existing educational curricula, projects and best practices (ii) training needs analysis to identify what is needed in design education (iii) development and testing of at least 6 pilot educational programs.

The survey activity collected around 100 examples of educational programs, courses or projects related to design for children and elderly. The training needs analysis included interviewing 27 academics and professionals around the world in design and related fields. This was complemented by literature reviews, in order to determine the training needs.
To further complement the results from interviews and literature studies, all project partners were requested to define training needs based on their findings. Training needs were described by completing a template containing details about the identified training need, its importance, relevant sources of information etc. In total, 43 completed templates were collected. When the collected templates were analyzed and compared a list of identified needs was developed. The training needs identified were: *legal issues, empathy, end-user abilities and capabilities, ethics, methods, context of use, literature and theory, translation and tools, inspiration and information, constraints, evaluation, awareness raising, engagement, cost of usability, creativity, working in a multidisciplinary team, materials, accidents and near-miss analysis, anthropometric library.*

The identified training needs were then categorized and joined into nine teaching modules. These have been developed and reviewed in detail, so that professionals and educational institutions can combine the different modules according to their needs to create complete courses. The nine developed educational modules are: *Introduction to design and HCI, Market analysis and legislation, Context, User capabilities, User involvement, Design, Evaluation, Creativity,* and *Empathy*. The nine teaching modules are freely available online from the DEVICE website, http://www.deviceproject.eu/ (2014).

The project consortium has used the modules to perform 6 pilot courses within the frame of DEVICE. The content and evaluation of a course in IDC will be further described in this paper.

### 2.2 IDC RELATED COURSE CONTENT

Gilutz et al suggest eight topics as critical to teaching IDC in a multidisciplinary context (Gilutz et al, 2011): *Communication* (facilitating various forms of interpersonal communication, children's media use and literacy), *Psychology* (Human development, learning theories, motivation), *HCI* (general), *Children's HCI* (History and current trends), *Pedagogies*, *Technologies*, *Experiences* (Designing for play, education, development, health, and communication), and *Design* (Methods and adaptation). Read suggests two different curricula, one for undergraduate students titled *Designing cool stuff for children working, learning and playing*, and one for postgraduate students titled *Child Computer Interaction* (Read, 2011). In our approach, we have chosen to merge topics, as we both introduce the students to children capabilities and to design interactive technology for and with children, but we also force the students to observe, co-design and evaluate in the wild, while being reflective and critical towards both their own work and to the literature.

## 3 COURSE DESIGN

The course was given within the Interaction design master's program at Chalmers University of Technology located in Gothenburg, Sweden. The program belongs to an IT department but is characterized by a very heterogeneous student base where the students' come from many different countries and educational backgrounds. All courses belonging to the program are based on Human Centered Design (Maguire, 2001) and research through design (Zimmerman et al, 2007), so the students all have some knowledge in this when applying for this course. The program is based on four pedagogical ideas that have been considered when designing the course. Firstly, a mix of theory and practice, applied in constructively aligned courses. Secondly, a mix of given and open problems; the former to practice application of certain skills, the latter to practice problem solving and innovation. Thirdly, a large amount of project work where students work in mixed groups in a studio environment. Fourthly, students are trained to present their work to the public, as exhibitions, or taking part in conferences and contests. These principles are based on current pedagogical research (e.g. Lundgren, 2010).

### 3.1 INTENDED LEARNING OUTCOMES

The course was designed along the principles of constructive alignment, where the teaching system should align activities and methods to the learning objectives, or intended learning outcomes, to facilitate for students to construct meaning and knowledge (Biggs, 2003). The intended learning outcomes make it clear to students what they are expected to know after the course and the teaching should then be designed to facilitate for students to reach them. The intended learning outcomes became the natural starting point for course development.

The learning outcomes for the course are written using active verbs and are divided into 3 categories, *Knowledge and understanding*, *Skills and abilities* and *Judgment and approach* according to praxis at Chalmers, and they are:

*Knowledge and Understanding*

— K1 Describe stages of child development relevant for design
— K2 Describe methods for working with interaction design and children
— K3 Describe the similarities and differences of children and other intended user groups

— K4 Describe considerations for involving children in the design process

*Skills and abilities*

— S1 Create designs specifically adopted for children
— S2 Design with regards to both children and caretakers
— S3 Modify design methods to fit the context and needs of children
— S4 Identify needs and requirements for children and caretakers

*Judgment and approach*

— J1 Evaluate designs taking into account the needs of children
— J2 Make an informed evaluation of the ethical and societal impacts of a design
— J3 Criticize designs and design processes with respect to the needs of children

When defining criteria for *knowledge and understanding* the focus was the most central theoretical knowledge for a design process namely knowledge of theories of development, knowledge of design methods suitable for working with children and involving them in the process. The criteria for *skills and abilities* focus on the skills of the designer in a design process; to identify requirements and create designs specifically targeted towards children and adapt methods accordingly. The criteria for *judgment and approach* aim to capture that students should be able to make critical analysis of design, taking the needs and perspectives of children into account as well as performing evaluation.

### **3.2** LECTURES AND EXERCISES

The course was scheduled with one weekly full day in class during eight weeks. In addition to the scheduled time students were expected to work by their own with some additional supervision. Each scheduled day typically contained a two hour lecture, followed by a 3-4 hour exercise on the same topic, to enforce learning and to mix theory with practice.

The topics of the lectures related to the core material of the course were:

- Child Development
- Ethics and Regulations
- Pedagogical perspectives
- Design for and with Children
- Design for Children with Disabilities
- Evaluation with children
- Design for Formal vs Informal Learning Contexts
- Principles of Screen and Web Design for Children
- Case studies

In the lecture on child development, the instructor was supported by a psychiatrist. The lecture on pedagogical perspectives on learning and education was held by an invited guest lecturer from the department of pedagogics. The lecture on children with disabilities was accompanied by a guest lecture from a special education school, held by the principal of the school and one pedagogue. The guest lecture included a live music performance with children from the

special school, where the digital music instruments were specially designed for the children and their disabilities.

The course also contained 3 mandatory literature seminars, which lasted for about 2 hours each. Several different methods were used to approach the literature in the seminars, e.g., students presenting papers to each other or coming up with questions to discuss.

### **3.3** DESIGN PROJECT

A major part of the course was a design project, aiming to get practical hands-on experience from planning and executing design for and with children. The project was done in groups and the task given to the students was open-ended: Design something for and with children related to the themes Playful interaction and Sustainability. During the project students had to have at least three encounters with children for observation, co-design and evaluation. The purpose of the first session was to learn more about the target group, while the second encounter was to practice co-design with children and get input for design. For the final evaluation session the students evaluated a prototype with the children. This could, but did not have to, be a working prototype.

*Figure 1: Students co-designing with children in the wild*

The project groups had weekly supervision to follow up progress and discuss problems and ideas. The focus of the meetings mostly concerned how to plan and structure activities with the children, and how to inform the parents. The students seemed confident in the design and technology parts, but lacked experience in what was possible to do with the children and how to carry out various methods in practice.

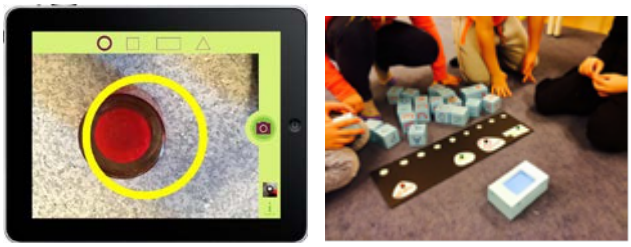

*Figure 2: a) Interface of CamQuest b) Evaluation of Blocks*

The course was graded pass/no pass based on the group project, and attendance to seminars and exercises. More information about the course design can be found in Eriksson and Torgersson (2014). All the material from the course is available on-line at http://ixdcth.se/courses/2013/ciu235/

## 4 OUTCOME

In the end, 19 students took the course. Of these, 18 were master's students in interaction design and one a student of product design engineering. The course was evaluated through a meeting once in the middle of the course, and again when the course was completed, using a questionnaire. All students were given a copy of the questionnaire at the final presentation of the course and were asked to hand it in before they left the room. The questionnaire consisted of 9 multiple-choice questions and 3 open-ended questions where the students were asked to leave comments and suggestions for improvements to the course. 17 students completed the evaluation form.

The multiple-choice questions asked about the students general impressions of the course and teaching, if it was a useful learning experience and so on. The results were overall positive, why we here focus on the open ended questions.

Some re-occurring themes could be found in the answers to the open questions. Most notably students really appreciated the direct involvement working with the children and the knowledge and understanding gained from this. Some comments about what they liked were *"Focus on field studies", "direct contact with children", "hands-on approach, out in the wild", "practical experience with children", "meeting actual users", "making with children", "comparison between theory (in specific papers) and practice (actual work with children)".*

Regarding what they learned, many commented about that they had gained an understanding of children, but also generally the need for understanding users: *"working with children is very different than working with adults", "I have learned that it is really hard to understand people that are that different from me, e.g. children age 5.", "I know that the children do not understand the world the adults do, but I did not know how much different and on which level it was", "co-design might not give concrete feedback from kids, but you get a lot of knowledge about the user and their world (something that is very easy for adults to forget) how they behave, and how they perceive the world", "All design should be adapted to target group. Even adults are different".*

Related to some of the above is also that many students appreciated that the course covered material on child development theories: *"child development according to age both mentally and physically", "The developmental psychology aspect of thing - Theories from Piaget, Druin - writings from Resnick…", "general knowledge about child development ex Piaget.", "I also much enjoyed the lecture on psychological view, especially Vygotsky."*

Students also liked the theory covered in the literature and the literature seminars: *"gained good insights from assigned literature and discussions with other students", "the papers were good - the lecture seminars further cemented what was previously read (great approach)", "sharing experience and knowledge through seminar", "literature seminars were interesting, good way to learn more about texts", "comprehensive literature".* The seminars provided a deeper understanding of the material. Literature that had not seen meaningful when reading alone became meaningful in the seminars and group discussions

Other things appreciated by the students were also the exercises connected to the lectures, the project and design methods: *"lecture + related assignment = good experience", "very stimulating lectures, good theoretical foundation", "project: possibility to try out theories and hypothesis", "knowledge about methods used when designing for children", "evaluation methods adapted to children".*

Of course there were also some suggestions for improvements: *"I think the course was lacking regarding gender issues", "It could be more focus on the design process itself rather than creating the best project for children", "we could start encounters with children earlier in the course, so we plan the project knowing them better", "more room for analyzing and discussing the different project in the class.", "The guest lecture on special needs was a good example for how to transfer the knowledge to other areas, could be complemented with for instance how to design for older people".*

## 5 **DISCUSSION AND KEY LESSONS**

This section will focus on a discussion around the key lessons and the experiences from the recently piloted project course in IDC. The lessons focus on *establish contacts with schools, language barriers, children with special needs, pedagogic perspectives, novelty and quality, materials and technology, forced encounters with children, adaptation* and *suggestions for improvements*.

### **5.1** ESTABLISHING CONTACT WITH SCHOOLS

One of the major concerns before the course started was to establish good contacts with schools and kindergartens, as we had three mandatory encounters with children throughout the course. What we did was to properly inform the schools and teachers what the purpose was and who we were, so that there would be no misunderstandings along the way. The schools were also properly informed of what the data should be used for beforehand, and the students were informed about how to inform parents, and we provided supervision about how to write consent forms, so that all ethical considerations were cleared from start.

### **5.2** LANGUAGE PROBLEMS

From start, we were concerned about the foreign students that took the course, how would they communicate with the children? To help them cope with this, our only demand when the project groups were established was that there should be at least one native speaking student in each group. In the end, it turned out that what we had thought of as a weakness was actually turned into strength instead. Especially when performing methods like co-designing with the children, there was a lot of creativity around this issue. In one group, the native student explained that she had brought some nice guests from a foreign country that did not speak the language, but that she could translate. Inspired from both the Mission from Mars method (Dindler et al, 2005) and Designing for Mr Hippo (Read et al, 2009), the children were told that the two foreigners were on a mission to learn how children in this country play with smartphones in order to create applications so the children in their countries could also play in a similar way. The task was then for the children to try to sketch and make the foreign guest sketch, so that they could understand each other. In this way, the children were the experts and were instructing the activity, which turned out to be very positive.

### **5.3** INCLUDE CHILDREN WITH SPECIAL NEEDS

One approach that we have not seen as part of any of the related courses is that we have included children with special needs as a natural part of the user group. We are of course aware of that designing for children with special needs is a very large area, and that we cannot cover that in a day. The students were told that for this course they should avoid designing for this user group, and practice on design for typically developed children, but also encouraged to work in this area in future projects and courses. The subject was very inspiring for them, as they could see how much you could do with small means in order to make a positive change to someone. Also, everything becomes in a way more extreme with this user group, as the methods have to be adopted even more, considerations regarding GUI become more difficult, interaction needs to be extra intuitive etc, which seem to inspire the students a lot and make them think even more about how they have to adapt to any user they will design for.

### **5.4** PEDAGOGICAL PERSPECTIVES AND LEARNING

In contrast to Read (2011), topics such as pedagogical perspectives and learning have been taught to the students, but they have been able to choose if this was something they wanted to include in their project or not. Some theories of learning, especially in combination with child psychology and child development, can be useful for a better understanding of the children as users, but these are large subjects that are hard to get a deep understanding for in a lecture or two. For teaching pedagogical perspectives, we had an invited guest lecturer, and for the lecture on child psychology there was a psychiatrist supporting the lecturer.

### **5.5** NOVELTY AND QUALITY

In a sense, the projects did not end up with much novelty or high quality, compared to what results the students achieve in other courses. Still, all groups produced solutions clearly designed for the target group and several groups submitted papers about their work to the Student Interaction Design Research Conference SIDeR 2014, and to the Interaction design and Children Conference (IDC'14).

However, the quality of the design and prototypes developed has not been the major factor for evaluating and grading the projects. What we have focused on is rather what has been learnt and how much the students have developed their knowledge within the area. The course only runs for eight weeks, which is quite limited time to get insight into what has been done in this, for them completely new, field. So instead of judging the novelty and quality of the designs, we suggest to evaluate the students' understanding for children as users, their methodology and explorative approach.

### **5.6** MATERIALS AND TECHNOLOGY

One thing we should have informed about much more clearly from the start is that there was technical assistance available for the students. The lack of information resulted in that many of the groups could have implemented more advanced prototypes, and several groups hesitated on doing physical prototypes due to that they were not sure if they could handle the prototyping. In particular, this was the case for the first year students, who were not yet used to our practice with technical assistance in project courses. Many of the groups had concepts for physical prototypes in their ideation phase, but still chose to make for instance an app. What can be learned from this is that the type of materials and tutoring provided to the students will have an effect on what type of projects will be developed. Perhaps a couple of hours could be spent quite early in the course on a practical exercise with different materials, technologies available and examples of previous prototypes for children, together with the technical assistants.

### **5.7** FORCED ENCOUNTERS WITH CHILDREN

One of the factors that had a great effect on the learning impact of the course was that the students were forced to have at least three encounters with children. It can be discussed if this is feasible to suggest for a curriculum for interaction design and children, as this is dependent on many of the national laws around ethics, accessibility to children etc. Though, from our perspective and from the evaluation with the students, this seemed to be the activities they learned most from, and where they could apply all the theory and exercises in the real world. Even if some of the students have children of their own, they still experienced many new types of challenges when working with design activities with and for children. The possibility to work with children in the wild is also of course a question of time, i.e. the courses suggested by Read have a limited possibility to do this (Read, 2011), as they are mostly short courses or modules of other courses.

### **5.8** ADAPTATION

By learning how to design for and with a specific user group, the students have had an eye opener to user-centered design regarding all types of users. Facing a field where the users are very different from themselves and understanding how much each method has to be modified for the intended user group deepens the students understanding of the need of adapting the design process to the involved users. Working with children provides a very hands-on demonstration of the importance of understanding the capabilities of the user and the need for

modifying the design methods the particular situation at hand. Further, they have gained a better understanding of how to handle ethics etc.
The students also requested transferability to other user groups, e.g. older people, in order to understand the need for modification methods and techniques even more in depth.

**5.9** SUGGESTIONS FOR IMPROVEMENTS

Something that had an impact on the course and the students' motivation was that the course was only graded with pass/ fail. While this gave the students the opportunity to practice new skills with less pressure, several students mentioned that they would have been more motivated for taking their design and implementation even further with varied grades. .

## 6 CONCLUSION

We have described the development and evaluation of a master's level course on Interaction design and Children. The course was based on research performed by the DEVICE project on development of design teaching for children (and elderly) as well as on current pedagogical research on how to teach interaction design. Despite the fact that the field of interaction design and children has been around for at least ten years, rather little work has been done on development of teaching curricula for the field. The case presented in this paper can serve as a guide for others developing courses in the same area, why all the material used in the course is freely available online for anyone to use and develop further. It is the hope of the authors that the paper can serve as a starting point for discussions on further development of curricula for teaching in interaction design for children.

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*"It is really hard to understand people that are that different from me"- Evaluating an IDC Curriculum*

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