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# The DEVICE Project: Increasing Focus on Vulnerable Generations in Design Teaching

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**Abstract**

The DEVICE project concerns designing for vulnerable generations, here defined as children and elderly; user groups with increased importance for technological products and applications. The project aims at increasing focus on vulnerable generations in design teaching not suggesting new and different methods but making existing methods more appropriate and adapted to vulnerable generations. The contributions of the paper are identified training needs, derived from professionals in academia and industry, as well as a set of suggested teaching modules to address them.

**Author Keywords**

Participatory Design; Interaction Design; Teaching; Design Methods; Children; Elderly; Vulnerable Generations

**ACM Classification Keywords**

H.5.2. Information Interfaces and Presentation: User Interfaces - Theory and Methods, User-Centered Design

**Introduction**

In an inclusive society, the needs of all the society's members should be taken into account. Today we can see some clear trends around us: first, technology

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continues to permeate all parts of our lives more and more; second, the elderly population is growing fast, and will within a few years be more than one third of the population; third, children is a group of the population with growing importance as parents spend more and more time and money on them. Even if the technological development empowers elderly people and children, and they gain influence, they can still in a broad sense be considered as vulnerable. They might have less control of their lives than other groups and are in some cases more dependent on the help of others in various types of situations. In addition to this, the vulnerability also lies in that they may also have some level of cognitive or physical restrictions. For these reasons, the term vulnerable generations will be used here to denote the group of both children and elderly as a whole. Nevertheless there is a growing awareness of the needs of vulnerable generations, but more work is needed in order to investigate how to best educate designers to consider the needs of these groups during the design process. Thus, to contribute to building inclusive social innovation, one key area should be investigation of methods and techniques for design of information technologies for children and elderly. This work addresses how designers of the future can be trained to contribute to building social innovation for vulnerable generations.

### **The DEVICE project**

The DEVICE project was initiated in October 2011 and aims to contribute to modernizing the design curriculum with a specific focus on the needs of vulnerable generations, including both children and elderly [2]. The basis for the project idea was the observation that while a lot of attention has been given to universal design, most of the work has been focused

on impaired people, but less so on other groups such as children and elderly. Accordingly, the overall goal of the DEVICE project ([www.deviceproject.eu](http://www.deviceproject.eu)) is to combine knowledge from traditional design education with ergonomics, usability, user-centred and participatory design etc. with a specific focus on vulnerable generations- children and elderly. The expected outcomes of the project include a set of recommendations and teaching modules that can be used to improve education in the area of design for vulnerable generations. To fulfill these goals the main phases of the project are (i) survey of existing 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. By now the DEVICE project has undertaken different activities briefly described below. For more details see [4, 5]

### **State of the Art**

In order to lay out an overview of the situation concerning education and research regarding design for vulnerable generations a desktop survey has been conducted by project partners as a first step. The survey identified around 100 cases, mostly from Northern and Western Europe, but also from Australia and the USA. The cases represent different kinds of work focused on vulnerable generations, where the largest category, 38%, are R&D projects followed by the category of various kinds of educational programs and modules, which represent 29% of the cases. While the survey collected a number of interesting cases, the overall impression is that there are fewer educational initiatives than expected targeted specifically towards design for children and elderly, indicating that more work should be done in this field. All the collected cases are available on the project website.

### **Competences Portfolio**

Following the investigation of the state of the art, a training needs analysis was performed with the aim of identifying educational priorities in the field of design for vulnerable generations and defining a competences portfolio [5]. The first step of this analysis has been carried out by interviewing academics and professionals in design and related fields (in total 27 interviews). Several information needs have been identified such as cognitive issues, physical strength, cultural context and environment, end-user's habits and the need to build empathy with end-users. Literature reviews were also conducted to determine the training needs that were deemed as being required for design professionals to be able to consider the needs of vulnerable groups.

### **Training Needs Analysis**

To further complement the results from interviews and literature studies, all project partners were requested to define training needs based on their findings [2]. Training needs were described by completing a template containing details about the identified training need, its importance, relevant sources of information and so on. In total, 43 completed templates were collected. By analyzing them and joining the existing overlapping or very similar training needs a list of identified needs has been developed. The training needs identified included: legal issues, empathy, end-user abilities and capabilities, ethics, methods, context of use (physical and social environment), literature and theory, translation and tools, inspiration and information, constraints, evaluation, awareness raising, engagement, cost of usability, creativity, working in a multidisciplinary team, risks and opportunities of the materials used, accidents and near-miss analysis in order to learn from errors, anthropometric library.

### **Design education modules for vulnerable generations**

To achieve the aim of the DEVICE project a modular approach is used: based on the findings presented above, the various training needs identified have been categorized and joined into a number of suggested educational modules. These will be developed in detail and be freely available online. The idea is then that educational institutions, as well as design firms, with a need for learning more about design for vulnerable generations, can combine the different modules according to their needs to create complete courses. The project consortium will also use the modules to perform at least 6 pilot courses within the frame of the DEVICE project. The suggested 9 educational modules are: Module 1. Introduction to Design and HCI (initial overview of the topics and concepts); Module 2. Market Analysis and Legislation (about societal issues and business principles); Module 3. Context (tools to understand and analyze the context ); Module 4. User Capabilities (specific capabilities and limitations of vulnerable generations); Module 5. User Involvement (how to involve users in the design process); Module 6. Design (improve designers' skills in managing a design process); Module 7. Evaluation (evaluation methods to test and validate with users); Module 8. Creativity (train creative thinking and design ) and Module 9. Empathy (tools for an empathic approach). For each module a set of design methods has been suggested.

### **Discussion**

The modules presented above have been designed based on the needs identified in the early phases of the DEVICE project. One question worth discussing is to what extent the modules for training design for vulnerable generations are unique and to what extent

they simply constitute general design knowledge and knowledge from the fields of universal and inclusive design. While some modules list very generic skills in interaction design/HCI, other modules such as the User capabilities module or the Context module are more specifically targeted towards vulnerable generations. The different methods and skills will also be presented in a manner that makes it clear how each method can be adapted and used when working with vulnerable generations. Within the modules there are also methods specifically designed for working with children or elderly like Mission from Mars [3] or Everyday communities of practice [1]. The modular construction of the described curriculum is intended to make it easy to use select parts of it only. The teaching modules from the DEVICE project can be seen as a complement to other resources that can be useful like the Inclusive design toolkit [6].

### **Conclusion**

In this paper the results obtained so far within the DEVICE project aiming at improving education of designers for working with vulnerable generations have been presented. Based on a survey of the state of art, a training needs analysis and the development of a competences portfolio, a number of teaching modules have been developed. The modules are based on the identified training needs and intended to be used as building blocks in courses aimed at training students and professionals in the area of design for vulnerable generations. The next steps within the DEVICE project will be to work out the details of the different modules and then try them out in a number of pilot educational activities. The activities will be carried out by different members of the project at different sites and in different contexts, which will serve as a test of the

flexibility and usefulness of the modules in different settings.

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