Supporting Industry in the Development of Design for All Curriculum

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Abstract. There are very few sources of information about industry needs in regard to the required Design for All knowledge and skills for designers and engineers. A common finding of many studies, besides technical feasibility and commercial viability, is the lack of awareness among suppliers and users on DfA. In this paper, some of the results of a series of workshops organized by Fraunhofer FIT under the scope of some EU-financed projects will be presented. We claim the need to create common guidelines on teaching DfA, which should not be limited to curriculum at universities but also for training employees within the companies. The guidelines should contain topics like: what to teach, whom to teach, how to teach and where to teach.

1 Introduction

We will present in this paper recommendations regarding the creation of Design for All Curriculum. The results come mainly from workshops organized by Fraunhofer FIT under the scope of two EU-funded projects. Two workshops were part of the IDCnet[1] project. IDCnet was a Thematic Network funded under the IST Thematic Priority of the 5th Framework Programme from the European Commission. Another workshop was organized within the activities of the DfA@eInclusion[2] Coordination Action. DfA@eInclusion aims to contribute towards the advancement of eInclusion in Europe through fostering Design for All. The activities of IDCnet and DfA@eInclusion are aimed at supporting the objectives of eEurope and the European Design for All e-Accessibility Network (EDeAN[3]) in regard to the development of curriculum recommendations in the area of Design for All (DfA) in ICT.

The strategic goals of the workshops were to integrate information and identify core knowledge sets and skills in design for all for model curricula at universities and training modules for employees at industry. We situate our activities in the multidisciplinary area of design, especially design for, and supported by, information and communication technologies.

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[1] http://idcnet.info/

[2] http://dfaei.org/

[3] http://edean.org/

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2 Why Design for All in ICT?

There are many terms in this area used more or less as synonyms for the same topic: accessible design, barrier-free design, inclusive design, Universal Design, etc. We want to stress that we are using the term Design for All as a synonym for all of them.

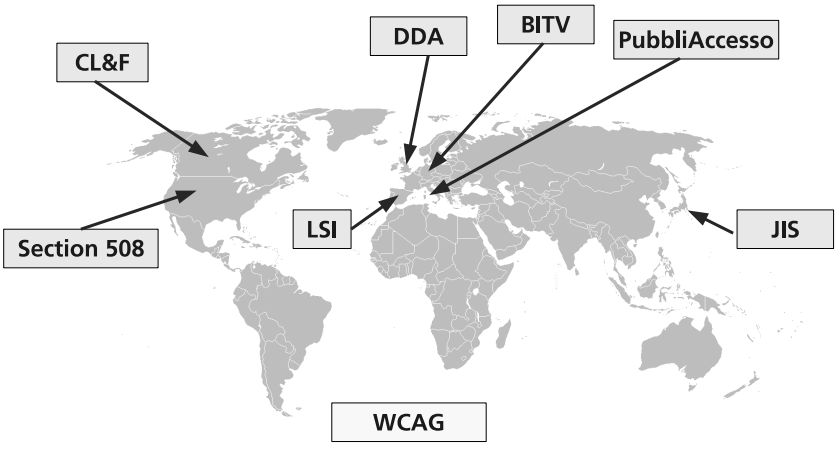

Fig. 1. Examples of accessibility policy environments worldwide

The drive to Design for All in ICT consists of many aspects:

- Legislation: worldwide policy environments regulating accessibility, like those presented in Figure 1 for the USA, Canada, Japan, Germany, United Kingdom, Italy, Spain, etc.
- International guidelines and recommendations, like:
  - W3C Web Content Accessibility Guidelines, in their versions 1.0 & 2.0.
  - W3C Authoring Tool Accessibility Guidelines.
  - W3C User Agent Accessibility Guidelines.
- Demographics and market potential due to the ageing of the population and increasing proportion of elderly persons worldwide. This leads to a diversity of users and their needs, e.g., disabled persons (we refer in this context to disabilities as a situative attribute and not as an attribute of a person).
- New interaction paradigms due to:
  - Rapid changes in technology.
  - New mobile devices with a variety of user agents and operating systems.
  - New interfaces arising from the Web 2.0 and the Semantic Web.

3 Requirements on Curriculum for Design for All in ICT

It is a known fact that a high percentage of European universities' curricula do not reflect the needs of industry. Therefore, we tried to focus our work in a

context that could identify first those needs, and then introduce recommendations dealing with Universal Access [1]. There are several technological landscapes in the area of ICT that can be affected by the incorporation of DfA:

- Accessibility guidelines and APIs
- Device independence
- User and device profiling
- Semantic Web and metadata
- Multi-modality
- Web 2.0 and other Web Services technologies
- Distributed and ubiquitous computing

According to the participants in our workshops, a number of big industry players are already working on DfA or accessibility, but they face a number of barriers. Software engineers are usually not taught about accessibility at the university, so they need to be retrained. For Web developers, the situation is even worse, because they have often no formal training. It became also clear that the drive for DfA is usually top-down, not driven by the knowledge or training of the developer. Accessible products are developed by companies where senior management understands the value of accessibility. Similarly, large accessibility initiatives in the Open Source community are usually supported by big industry players.

Many companies have misconceptions about DfA, and think that it is only design for the elderly and disabled, or that it means 'one size fits all.' Many also consider anything that costs more than the able-bodied version as an 'undue burden.' Existing guidelines, for example the Web Content Accessibility Guidelines, are sometimes seen as too complex or too detailed. There have been surveys on what would be good incentives to incorporate accessibility: profits or increase in Web site traffic always come out on top, while legislation and policy are the least popular incentives.

Industry also wants closer ties with organisations that perform research on DfA, easier access to research results and exemplars of good design as sources of inspiration. They also would like more support from the outside. Companies who start in this area want to know how to implement DfA in their organisation.

There are few sources on the ideal graduate profile for designers and engineers with regard to DfA, thus it was necessary to extrapolate from recommendations from related fields (HCI and ergonomics). Some examples gathered from the HCI area state that:

- There is a greater need for HCI experts than for methods and tools.
- The industry prefers pragmatic knowledge and hands-on advice on guidelines to perfectionism.
- People should be trained to become sensitive to good and bad design.
- Learning on the job and using your skills and expertise in projects is one of the best ways of learning.
- Inviting guest lecturers from companies can increase credibility.

– There is a need for HCI education for people who end up in supervisory or decision-making positions. There might be a greater need for soft skills than knowledge.

4 Taxonomy of Knowledge and Skills in DfA

In order to work towards curricula recommendations, it is also necessary to understand what constitutes the knowledge and skill sets that form the body of knowledge about DfA [1,2]. Defining and understanding this body of knowledge or 'discipline area' forms a basic task of most curriculum studies.[4] It may be argued that DfA is more of a philosophy than a discipline in its own right. This argument is taken up and refuted in [3], and a taxonomy of knowledge and skill sets that can be said to be distinct to DfA has been proposed:

– Design for All Awareness
– Why Design for All? Ethical, legal and commercial considerations
– Guidelines and Recommendations
– Interpersonal Skills for Teamwork
– Accessible interaction: input and output
– New paradigms of interaction
– User-centered design

5 Recommendations for Higher Education and Industry Training Courses

In the following we will show the main points, which resulted from discussions regarding the creation of training materials for employees in the industry. The main recommendations are:

– Computer-based training packages for all identified role's should be created.
– The duration of the modules should be of about 30 minutes for every package.
– The approach to this training packages could be like some popular online sites for training.
– The packages shall allow the addition of functionalities that can be adapted to user needs. This approach will account for future technologies that will not have devices anymore but "interaction" with the user.
– The curriculum recommendations should consider future technology development.
– The training should happen in interdisciplinary teams, not in single role employees (unless deep knowledge is conveyed, e.g., for developers).
– The packages must deliver information in different modalities: texts, images, videos.

[4] See, e.g., ACM Curricula Recommendations at:
`http://www.acm.org/education/curricula.html`

Table 1. Overview of training depth for different employee categories in DfA topics

	manager	software development	designer	QA	HR	marketing
(Graphical) User Interfaces						
O	X				No	X
M						
D		X	X	X		
Web Applications						
O	X				No	X
M						
D		X	X	X		
User Centered Development						
O					X	
M						
D	X	X		X	X	X
Evaluation Issues						
O	X				No	X
M						
D		X	X	X		
Assistive Technology						
O	X				X	X
M		X				
D			X	X		
New Paradigms of Interaction						
O	X	X		X	No	X
M			X			
D						
Best Practices in DfA						
O					No	
M	X					
D		X	X	X		X
Standardization						
O	X				No	X
M						
D		X	X	X		
Business Cases						
O	X				No	X
M						
D		X	X	X		
Privacy and Ethics						
O		X			X	
M			X			
D	X		X			X
Legal Issues						
O		X	X	X		
M	X				X	
D						X

– The packages must not focus on disability but on activity/participation.
– The training must stress user involvement in the development cycle.

We identified different roles of employees, e.g., software developer, designer, human resources (HR), quality assurance (QA), manager, etc. (see Table 1). In addition to the roles, several topics were identified: (Graphical) User Interfaces, Web Applications, etc. (see Table 1). Table 1 is part of an ongoing work and it will evolve more in the next months. Out of it, we will be able to derive checklists or guidelines that can be matched to the different roles and topics. Additionally, for every topic there are three granular levels of knowledge: overview (O), when only a superficial knowledge is necessary; middle (M), when some topics need a broader scope; and detailed (D), when a quite deep understanding is necessary. An *X* in a cell means that for the given topic and role, the selected knowledge level is required, so training courses should be created appropriately.

6 Conclusions and Future Work

It is obvious that the impact of our recommendations still depends greatly on national and international policies, and to a greater extent, in the pressure received by the higher education institutions from industry to satisfy its demands for future designers and engineers. When there is a sizeable body of recognizable DfA knowledge fuelled by lively research in the area, it will be easier for industry and policy makers to understand the importance of including DfA in their agenda. There are as well still many problems which need attention:

– Incompatible definitions and terms,
– Different and conflicting regulations,
– Inconsistent standards and contradictory guidelines, and
– Unnecessary certifications in the field of IT compliance especially of web resources and web applications.

References

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