BRIDGING THE GAP BETWEEN YOUNG DESIGNERS AND OLDER USERS IN AN INCLUSIVE SOCIETY

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Abstract

The ageing of the European population and the increasing reliance on the use of electronic technology for communication, employment and leisure has resulted in the need for ICT products and services delivered by broadband to be designed to be useable by older and disabled people. The principles of equal rights and inclusion are encapsulated in the world of design through Design for All, Universal Design and Inclusive Design. These have a strong focus on issues of accessibility and acceptability of products and services by older and disabled people. The more recent more political and economically motivated world of Digital Inclusion also introduces a social element which draws attention to a combination of factors such as low educational attainment, poverty, culture and geography that are correlated with low take-up of digital technology.

This growing challenge of user diversity is placing new demands on our future young designers of broadband systems, information systems and services. Within this paper we discuss proposals and guidelines to support a European 'Design for All in ICT' curriculum which will enable an interdisciplinary mix of young designers, engineers and computer scientists to develop the skills and knowledge necessary to bridge the gap between them and older people, and other user groups and to design for an inclusive society.

Keywords

Education and Training, Design for All, eInclusion

1 INTRODUCTION

"…an old person is a young person who has just lived longer" (Pirkl 1994, p5)

The population of the European Union is currently just under 500m and the recent European population projections (Europa 2008) forecast significant changes in the population profile. The proportion of the population who are aged 65 or over is predicted to rise from 17% in 2008 to 30% in 2060. Nationally, however, there are some variations in these figures between United Kingdom and Denmark increasing to around 25% and Poland, Slovakia and Romania which have predicted rises to 35%.

These figures are the result of low birth rates and increased longevity. The proportion of those aged 80 is predicted to rise from over 4% to 12% over the same period from 2008 to 2060. It should be a cause for celebration that more people are living longer than was the case in previous generations. Potentially they offer industry a new market opportunity that has not previously been explored, while the youth market is shrinking as a consequence of the low birth rate. In encouraging us to each embrace our own ageing Coleman (1998) suggested that we should think of the positive side of ageing: **ability**, **activity** and **autonomy** and how designers can build on the **adaptability** of older people. He offered these 'A' options as an alternative to the pervasive negative views of ageing that focus on **deficit, decline** and **dependency** and the association of age with **disability**.

The assertion that "an old person is a young person who has just lived longer" is a reminder that an old person is not just the sum of their acquired impairments but that they will have had a different set of past experiences, and will continue to have different experiences to younger people. This is not a new problem, Pirkl (1994) sought to identify both similarities and differences when he set out his proposals for transgenerational design – to design products that benefit *both* older and younger users. This is reflected in the motto reported by Nayak (1998: p423):

"Design for the young and you exclude the old; design for the old and you include the young"

Age is one of a number of factors affecting the take-up of information technologies, systems and services. Current EU statistics (Eurostat 2008), published 2008 indicate that age and education significantly affect use of the internet. The experiences of our students is likely to match with the finding that 96% of people aged 16-24 with higher education use the internet at least once a week. The statistics show that for older adults aged 55-74 this was as low as 13% for those with little or no formal education, 34% for those with medium formal education and 65% for those with high level formal education.

Young designers may find it difficult to fully understand the experiences of older people and others who are not as engaged in the information society as they are. Keates (2002) argued that the typical researcher or developer finds it easier to design for 'someone like themselves'. However there are indications of the benefits of introducing the challenges of inclusive design into the student curriculum, Hewer (2006) reports on over twenty years of experience at the RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce, UK) where they have run a series of very successful student competitions on themes of ageing and inclusion:

> "the incorporation of inclusive design in a curriculum, whether as a discrete module in itself or as part of the methodology applied within other projects, has a powerful influence on the future practice of students beyond graduation."

If young graduates are to contribute successfully in the creation of an inclusive information society it is essential that they develop the necessary knowledge and skills to bridge the gap in experiences in relation to age and to the other social factors that are contribute to the broader risks of digital exclusion – including low educational attainment, culture, geography, disability, and poverty that are correlated with low take-up of digital technology

One of the objectives of COST 298 calls for a new conceptualisation of the role of users (COST 298 2009):

> To suggest new approaches and methodologies for constructing a more user-driven model of innovation in order to overcome the limitations of current models of 'user-centred' development. This entails providing an analysis of the various conceptualisations of the role of users held by those developing new applications within different parts of the ICT industry.

The scope of this social diversity will further challenge existing models and processes of user centred design. These new approaches and methodologies need to be introduced into the student curriculum. In particular, our future developers and designers will need to take on new challenges and new approaches that account for this diversity of user experiences and requirements, as well as the processes, methodologies and tools used to develop an ever widening range of digital devices and services. The aim of this paper is to describe the work of the DFA@eInclusion FP6 coordination action to facilitate Design for All ICT training in higher education establishments across Europe and to ensure that all students in information technologies are made aware of the issues and opportunities in creating an inclusive society.

2 BACKGROUND

EInclusion is recognised as central to the development of an information society:

> Information and communication technologies (ICT) will play a major role in creating a more inclusive society. ICT products and services with measurable benefits will enrich lives – especially for people at risk of social, economic or digital exclusion. (European Commission 2006)

Over the years there have been a number of European initiatives to bring awareness of the principles of Design for All into education and the Design for All @ eInclusion (DFAEI) is the most recent of these. It involves partners from 22 countries who are members of European Design for All in eAccessibility Network (EDeAN, www.edean.org). The DFAEI project has a number of key objectives which include education and training, the development of resources and the relationship with industry (http://www.dfaei.org/objectives.html). The education and training work package set out to examine current provision and identify best practice and to use this to create curriculum guidelines to facilitate extending existing courses and developing new ones. This work builds on other work in the area on curriculum development especially the IDCnet project (Velasco 2004) which published taxonomy of the core knowledge and skills to raise awareness of the need for the Design for All approach. This taxonomy identified generic aspects of Design for All such as awareness, legislation and design guidelines and ICT specific topics included accessible interaction, accessible content, user centred design and provision for e-learning, new paradigms and new technologies.

3 EUROPEAN SURVEY

The first requirement of our study was to determine whether the work of IDCnet had been adopted and whether these might be used as examples of best practice. All the project partners and associated members of EDeAN were emailed with a request to seek out appropriate training facilities within their own universities and other teaching centres where DFA content might be included, for example within computing science, web design or multimedia programmes.

There was very little evidence of whole programmes having Design for All or related titles in Universal or Inclusive design which lead to some difficulties in identifying appropriate courses. However, some of the early responses revealed instances of small elements within courses on computing, human computer interaction, web applications and information systems, or within programmes on disability and rehabilitation. The partners were advised to seek out further examples of similar small elements of DFA content embedded within mainstream teaching

This resulted in a final pool of 50 courses having some DFA relevant content. The analysis that follows offers a snap-shot of current practices in teaching DFA in ICT and an indication of the diversity of teaching practice across Europe. In particular, differences occur between study programmes where the student follows a pre-defined curriculum or where the student chooses modules and seminars which are offered to both undergraduate and postgraduate courses. This diversity of practice revealed by the initial survey (Keith, Whitney 2008) was used to inform the selection of case studies on best practice.

3.1 The results of the survey

Responses were received from thirty-five course providers in 18 countries of the 22 partner countries. These included courses in UK, Germany, Austria, Finland, Greece, Norway, Belgium, Hungary, Portugal, Czech Republic, Ireland, Slovakia, Denmark, Italy, Slovenia, Spain, Malta and Sweden. We did not receive any submissions from The Netherlands, Estonia, Lithuania or France. Most of the courses were offered either at masters or bachelor level and we also identified 5 vocational courses.

The IDCnet deliverable (Velasco 2004) was used to create a list of core topics in DFA content and respondents were asked to indicate which of these topics were included in their course. Some of the course providers offered a number of courses and we received data on course content from 44 courses. Almost all of these (over 80%) reported that courses delivered general information on design for all awareness, recommendations and principles.

Specialist ICT topics such accessible interaction and user centred design were also offered by almost all courses (over 80%). Accessible content or and new paradigms of interaction were offered by more than half the courses and this probably reflects a difference in specialisation between internet applications and other ICT technologies.

4 BEST PRACTICE IN TEACHING AND TRAINING

The spread of courses with respect to content and level revealed some of the diversity of current practice and a set of case studies was chosen for further analysis. The selected case studies represented differences in national educational practices around Europe and differences in the scope and focus of teaching activity. We consider here some of the key themes that address student centred learning and strategies for engaging the students. (For more details see Keith, Whitney, 2008)

4.1 Practical applications

Engaging students in practical applications was reported as having a significant impact on the student. In Spain, students studying for a degree in Computing or a Masters in Information Technology had to develop an accessible website that conformed to guidelines on accessibility.

Other popular teaching techniques included the use of videos, U-tube clips or talks by people with disabilities to demonstrate the use of ICT to facilitate everyday activities or game playing and which helped to engage the students and stimulate discussion.

4.2 Hidden gems

In many instances design for all issues were addressed as a small element within a mainstream course. For example students at the Czech Technical University following a compulsory module in Computer Graphics had just 4 lectures and seminars which focused on accessible interaction and user centred design. In a university in Norway it was reported that Design for All was an integrated theme for students in Engineering and that awareness of social responsibility was introduced in the first year.

4.3 Student centred learning

A number of the case study respondents reported on actions to meet the Bologna agreement to harmonise higher level education, in particular to distinguish three cycles equivalent to bachelor, masters and doctorate levels. The publication of the European Qualifications Framework (EQF, 2008) further helped to define what is expected of the students at different levels of higher education. The EQF encourages countries to relate their qualifications systems or frameworks to the EQF by 2010 and to ensure that all new qualifications issued from 2012 carry a reference to the appropriate EQF level. The framework uses eight levels starting from basic level post-compulsory education age to doctorate level. The completion of the first cycle or bachelor level is equivalent to level 6, and completion of the second cycle, Masters level is equivalent to level 7.

The EQF makes use of student centred learning outcomes to support comparison of student achievements and learning. Learning outcomes are "statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence"

The case studies were asked to describe their teaching activities in more detail including defining student centred learning outcomes; however we found that the use of learning outcomes was not common practice outside of the UK. We have conducted two workshops in which we have been able to examine how student centred learning outcomes can help to define what the student should achieve on completion of the course and how this differs from a topic listing of what should be included in the teaching. This has been applied together with the results from the case studies to help define modules and programmes at bachelor (1st cycle) and masters level (2nd cycle).

5 DEVELOPING THE CURRICULUM GUIDELINES

We have proposed and are evaluating curriculum guidelines which make use of learning outcome to describe the student centred learning. As shown in the examples of Box1 and Box2 we have set out a common template for structuring the aims of the course and learning outcomes. The learning outcomes are used to determine the evaluation strategy and the teaching techniques. This also allows scope for alternative methods of delivery, for example eLearning and to accommodate needs for accessible eLearning.

5.1 Bachelor level (1st cycle)

The solutions for an inclusive broadband future will call on an interdisciplinary approach to address social and political issues, and new ways of identifying user needs as well as a good understanding of technological change. We have chosen to set out a small module which is intended for first year bachelor level students from a wide range of disciplinary backgrounds. This module could be delivered alone or form part of a larger integrated module that perhaps sets out the broader context of our changing information society.

As shown in the example (Box 1), the student centred aim is that:

- *By taking this module the student will understand:* the role of design for all as an enabler of accessibility and participation in the information society

For the purposes of this first year course we have referred to EQF levels 4 rather than level 6 at completion of three years of study. Level 4 calls for factual and theoretical knowledge in broad contexts within a field of work or study whereas level 6 calls for an advanced knowledge of a field of work or study, involving a critical understanding of theories and principles. The example shown in Box1 expects that the student will be able to explain and demonstrate understanding of core principles and develop key skills of working with others and communication effectively. By way of teaching technique this offers the lecturer the opportunity to engage students through practical mini-projects and to apply assessment techniques such as presentations of practical work.

Module Title: Basic Concepts in Design for All in ICT

Student centred learning outcomes

- *The aim of this module is to provide the student with:* basic design for all principles and practices with respect to ICT products and services
- *By taking this module the student will understand:* the role of design for all as an enabler of accessibility and participation in the information society
- *This module consists of*: theoretical concept building, basic recommendations and guidelines, and practical activities
- *On successful completion of the module the student will be able to*:

Knowledge:

- To know and explain the established basic principles of design for all - and reflect on how they can be applied to real examples of ICT products and services
- To demonstrate their knowledge on the need for design for all in ICT and its impact on the information society
- To demonstrate a common understanding of the implications of the national, European and international regulatory framework on the design of ICT products and services
- To reflect on the needs of different user groups with respect to ICT products and services

Skill/Competence:

- To be able to recognise the need for design for all solutions in specific circumstances
- To know how to access the relevant information (technical, legal and ethical) to formulate solutions to design for all problems.
- To be able to work with others in order to share and enhance mutual understanding
- To write effectively and outline design for all requirements according to established principles of design for all.

Box 1: Learning Outcomes for Bachelor Level Module

5.2 Masters level (2nd cycle)

At EQF level 7, or Masters level the student is expected to have "highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research". Furthermore they are expected to develop the kind of problem solving skills that will be essential to innovation in creating an inclusive information society.

The challenge in developing the curriculum at this level is to determine whether this should be a highly technical course with pre-requisite learning in computing and information sciences or whether it should facilitate an interdisciplinary approach - and encourage participation by students from the arts and humanities. There is a further debate as to whether the knowledge and skills should be integrated within a mainstream technology course or whether it is better to have a recognisable and widely acknowledged specialist programme. To address these challenges we have defined a set of modules that could form a complete programme, or could be used individually as supplements to a mainstream ICT course, or additionally could be offered individually as a life learning professional development option.

Module Title: Research Project

Student centred learning outcomes

- *The aim of this module is to* provide the students with the experience of utilising Design for All principles to understand and solve a real world problem.
- *By taking this module the students will understand* how to undertake an individual research project within the area of Design for All. In addition, the module will develop the student's communication skills to enable them to communicate their findings in written and oral form. This module is where the interdisciplinary nature of this programme is experienced by the student.
- *This module consists of* a supervised research project.
- *On successful completion of the module the student will be able to*:

Knowledge:

- Identify potential projects and opportunities
- Select a suitable research problem for investigation and solution
- Apply appropriate theoretical and practical methods to the analysis and solution of computer communications solutions
- Conduct appropriate research, and undertake design and development of computer communications solutions and critically place your problem and its solution within the context of the body of knowledge within your topic area
- Implement design solutions and evaluate their effectiveness
- Plan, organise, direct and control tasks and resources so as to accomplish projects set goals effectively within the allotted time
- Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment

Skill/Competence:

- Apply suitable problem solving techniques, critically evaluate the perceived needs of the problem and make recommendations for future action.
- Apply appropriate theoretical and practical methods to the analysis and solution of Design for All in ICT problems.
- Critically evaluate your own work and work published by others in the context of current research.
- Compose and present your work in written form in a scientific report and in oral form to a scientific audience.
- Plan for effective project implementation, specify and use milestones in project

Box 2: Learning outcomes for Masters level project

The duration of the level 7 programme of study is subject to national variation, for example in the UK it is typically taken over 4 terms and given a credit value of 90 ECTS (180 UK credits), however more typically across Europe it is taken over two years and has a credit value of 120 ECTS. The modules descriptions developed to date include an introductory module and specialist modules on user experience design, accessible gaming, web accessibility, assistive technologies and standards, guidelines and regulations. The Masters level students are usually expected to complete a significant piece of research as a project or thesis (depending on local or national practice) which provides an opportunity to apply the processes which they have learned to solving complex problems. The example in Box2 sets out the learning outcomes for the research project. This provides an important opportunity to engage with industry or user organisations in order to undertake projects in a real-life setting. The student centred aim is:

> *By taking this module the students will understand* how to undertake an individual research project within the area of Design for All.

Students are also expected to develop transferable skills in project management, report writing, critical thinking and problem solving which will be of benefit whatever career path they subsequently choose.

6 CONCLUSIONS

We are increasingly being asked to consider the social, economic and political contexts in which information technologies are used. The successful promotion of the ideals and benefits of eInclusion depends on students throughout Europe developing knowledge and skills to create, design and evaluate accessible and inclusive systems. The 'greying of Europe' is a key driver to concerns about participation: we will have an older workforce and an increased number of very elderly people. Through the development of the curriculum guidelines we seek to bridge the gaps in experiences and requirements between young designers and older users as a vital step in creating an inclusive society. In these uncertain economic times we will need to attract students onto these courses and show that there are good subsequent career prospects.

The DFAEI project will continue its work on content, teaching technique and student centred learning outcomes in order to develop curriculum guidelines that can be used to initiate new programmes, modules or integrated elements according to local requirements and opportunities, and to provide the next generation of students with the knowledge and skills that they and our society will need.

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