IDCnet

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D3.3 – Teaching DfA Core Knowledge and Skill Sets: Experiences in including inclusive design

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Abstract:

The purpose of this document is twofold. Firstly it is to present the teaching pilots that were undertaken by members of the network, and

Abstract:

describes the pilot setting and the material taught, as related to the taxonomy of Design for All knowledge and skill sets developed in previous deliverables. Each pilot indicates topics taught and to which categories of the taxonomy they belong. Furthermore, student expectations and reactions to the DfA teaching pilots are described by means of the information gained from questionnaires. In this way the taxonomy is evaluated by the teaching pilot experiences for robustness in completeness and usefulness.
The second purpose of this exercise is to highlight best practices in, and possible obstacles and other challenges to implementing and maintaining of Design for All courses and modules in a range of higher education schemes, so that education policies and strategies may be informed accordingly.
Both of these objectives help to further the work on recommendations for curriculum work on Design for All, in terms of content and in terms of sustainability.

Deliverable D3.3

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DELIVERABLE REVIEW			
Version	*Review date*	*Reviewed by*	*Conclusion**

∗ e.g. Accept, Develop, Modify, Rework, Update

Table of Contents

1 Executive Summary

This deliverable describes the teaching pilots phase of IDCnet. This represents the third and final phase of workpackage 3 that was concerned with Design for All knowledge sets and skills. The previous phases were:

- Investigating and assessing relevant work and new results and information coming from a wide range of sources and interests that contribute to the body of knowledge on Design for All. This phase resulted in an interim description available to the workshop participants as baseline material (Deliverable 3.1).

- Identifying core knowledge sets and skills by eliciting information from experts who were asked to comment on the baseline documents, in order to create a taxonomy of knowledge sets based upon current and emerging work, The results of this work formed deliverable 3.2. Identifying Core Knowledge Sets and Skills, a living document that has had a major revision.

The third task is to report on the activities of network members efforts to pilot DfA teaching. The purpose of this document is to trial the taxonomy for robustness, and also, to use the experiences of teaching to highlight best practices in teaching and possible obstacles and challenges to the implementation of Design for All course modules and topics into a range of higher education schemes.

2 Introduction

This document presents the teaching pilots that were undertaken by members of the network, and describes the pilot setting and the material taught, as related to the taxonomy of Design for All core knowledge and skill sets developed in previous deliverables. Following the maxim, "practise what you preach", a primary objective was to validate the theoretical taxonomy of Design for All core knowledge and skill sets, and test it for robustness within actual teaching settings. This is even more important when the settings cover a diversity of student backgrounds, geographical locations, and higher education contexts. Each pilot indicates topics taught and to which categories of the taxonomy they belong. Student expectations of, and reactions to, the DfA teaching pilots are described using the results of questionnaires. In this way the taxonomy is evaluated by the teaching pilot experiences for robustness in completeness and usefulness.

Looking to the future, the taxonomy can help to align teaching on the subject, while the taxonomy itself provides a framework of reference for further course content development as well as exchange of experiences between teaching staff in terms of both teaching methods and methodologies and topics within subcategories of the taxonomy. All these exercises can help to establish consensus on curriculum content, facilitate staff exchanges of material and contribute to a repository of knowledge. This work therefore helps to further the work on recommendations for Design for All curriculum in terms of content. Defining and validating the core knowledge sets and skills is a fundamental step in curriculum design as has been explained in previous work (Deliverables 3.1 & 3.2) and the taxonomy is here evaluated for its usefulness as a guide, its completeness, and its validity as a basis for building curricula.

A secondary outcome of the teaching pilot exercise is to highlight best practices in, and possible obstacles and challenges to implementing and maintaining Design for All courses and modules a range of higher education schemes. For this, the IDCnet teaching pilot experiences are compared with the results and recommendations from a similar project for teaching Universal Design for the built environment. These recommendations are less to do with the content of Design for All, and more to do with the internal strategies for introducing and keeping within their institutions.

The next section (Section 3) describes each teaching pilot according to a template. The term "teaching pilots" is taken very broadly and refers to both new teaching that was undertaken as part of the project; existing and ongoing courses that members were involved with, as well as future planned courses. Also included with a brief description are courses that can be said to have some connection to IDCnet, either because there are links between their organisers and IDCnet members, and/or they have

made use of the IDCnet taxonomy, etc. The use of the word "pilot" was to indicate the "trialling" nature of the teaching, in relation to the taxonomy.

As can be seen, the complete list of the teaching pilots using this broad definition covers a wide range of disciplines, levels of students, and areas of Europe that subscribe to different educational systems in higher level educational institutions. In some cases the pilot may describe an activity with a relatively short duration, such as a one off lecture, or a module within a course, while at the other it may describe a whole degree course. This variety was essential to test the robustness of the taxonomy, as it is to be the basis for recommendations for content for European curricula for designers and engineers.

This general overview is supplemented by 3 in depth accounts of teaching. (Section 4). The narration of the experiences from the different institutions provides material for instructors in terms of student responses, alternative methods of approaching certain categories or topics within categories, as well as a useful exchange of information relating to trialled teaching methods and methodologies. This helps to maintain alignment with teaching of categories and topics within the taxonomy as well as providing a good sample of current European practice.

Section 5 describes the results gained from the use of student surveys. Their expectations and reactions to the DfA teaching they followed in 5 cases are summarized.

Section 6 discusses the validation of the taxonomy using the criteria of completeness and usefulness.

In section 7, the focus shifts from the teaching pilots and curriculum content, to report on some of the other aspects of the valuable experience that the teaching pilots offered about the situation of Design for All within institutions, highlight best practices and identifying obstacles and other challenges to implementing and maintaining Design for All courses and modules. The conclusions from the UDEP[1] project are also examined in the light of the experience of the IDCnet pilots.

Finally, the conclusions section 8 sums up with some suggestions for the ways forward for educators, as to how the curriculum effort might proceed.

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[1] http://www.uoregon.edu/~sij/udep/

3   Teaching Pilots

In this section, firstly a brief overview of all the Design for All teaching activities/institutions participating in this phase is given. The criteria for including courses/modules, was simply that they were involved somehow in IDCnet, for instance, members of IDCnet or that the taxonomy had some influence on the design of the content of the course.

Throwing the net so wide enabled us to acquire an overview of what is happening. The information is presented in Table 1 under the following headings

1. Country?

2. Name of Institution?

3. Student level? (undergraduate, postgraduate)

4. Student background? (computer science, human computer interaction, and ergonomists, designers, etc)

5. Title of degree course being followed? (undergraduate degree, masters, etc)

6. Title of Design for All teaching? (e.g. course, module, seminar, etc.)

7. Duration? (e.g.1 semester, 1 week)

8. Obligatory or Optional?

9. Student numbers?

10. Taxonomy: Categories and Subcategories taught?

In the subsections that follow, each of the entries in the table is briefly described, with further useful information such as an indication of the teaching strategies used (lectures, practical work, team work, projects, dissertation, etc).

Participants were also asked to answer the following questions:

* Will the teaching continue? (in its present format; with changes - more/less hours, more/less students, different levels, etc-; uncertain; other)
* How did colleagues view this work? (with interest; with indifference (not enough time to understand what it is about), with hostility; other)
* Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (the way the course is structured, coverage of topics, etc.)

And of course, participants were free to offer any other material that they thought might be of interest, such as the structure of the course, etc.

Table of Pilots

Country	Institution	Level and/or title of degree course	Background of students	Title of course / module	Duration	Obligatory/Option al	Student numbers	Taxonomy categories used
Austria	Universität Linz, Institut integriert studieren	Undergraduate and postgraduate	Computer Science	Special Topics on Information Systems: Designing Accessible Web sites	1 semester (4 months)	Optional	13	**Awareness** **Recommnedations** **Accessible Content,** **Accessible interaction input and outp**
	Universität Linz, Institut integriert studieren	Vocational Undergraduate/postgraduate		Postgraduate Course on Assistive Technologies	3 semesters 1.5 years	Optional	Max 15	**Awareness of Design for All** **Why design for All** **Recommendations** **Interpersonal Skills** **Accessible content** **Accessible interaction: input and outp** **New paradigms of Interaction, Appli Research** **Application Domains and Research**
	Universität Linz, Institut integriert studieren	Vocational Undergraduate/postgraduate		Postgraduate Course on Accessible Web Design	4 semesters 2 years	Optional	Max15	**Awareness of Design for All** **Why Design for All** **Recommendations** **Accessible content** **Accessible interaction: input and outp** **User Centred Design** **Application Domains and Research**
Belgium Also see	Limburgs Universitair							**Awareness**

section 3.2	Centrum							**Accessible Content**
Finland See section 3.3	Helsinki Polytechnic, STADIA							
	Jyväskylä Polytechnic							
	University of Art and Design							
	Tampere University of Technology							
France	L'Ecole de Design Nantes Atlantique	Master of Arts in Design.	Design, with hypermedia & interaction	Project-based long term workshop with industrial partnership	12 weeks (56 hours)	Design option or Industrial Design option.	27 (12 from Hypermedia option and 15 from Product Design option)	**Awareness of Design for All** **Why Design for All?** **Interpersonal Skills for Teamwork** **Accessible interaction: input and outp** **New paradigms of interaction** **User centred design**
Germany	Multimedia Campus, Kiel University,	Postgraduate (masters) Multimedia Management	Very diverse, bachelor degree	Within Computer Graphics course, module on accessibility v usability	8 hours	Optional	11	**Awareness of Design for All**, **User centred design** **Accessible input and output** **New paradigms of Interaction**
	Institute for Informatics and Mathematics, Kiel University,	Diploma in Informatics	Programing in Java, XML,	Within course in interactive systems	48 hours	Optional	10	**Awareness of Design for All**, **User centred design** **Accessible input and output** **New paradigms of Interaction** **Recommendations**

	Bonn-Aachen International Center for Information Technology http://www.b-it-center.de/	Masters in Media Informatics: http://mi.b-it-center.de/	Computer Scientists, with Bachelor Degree	Building Advanced Internet Services and Applications using Web Standards. Accessible Interfaces and New Devices	1 semester 24 hours in 12 classes	Optional	14	**Why Design for All: ethical considerat compliance with legislation, commerc potential** **Recommendations: Principles, Guideli Standards, Best Practice, etc.** **Accessible content** **Accessible input and output** **New paradigms of Interaction, Applic Research**
	University of the Aegean, Greece Dept of Product and Systems Design Engineering	Design students (Products and Systems for Information Society)	Undergraduate Degree (5 years, BSc+MSc level) in Product and Systems Design Engineering	Design for All)	56 hours 14 weeks (1 semester)	(Optional module within the Interaction Design 4th Year optional direction		**Awareness,** **Why Design for All** **Recommendations** **Interpersonal skills for team working communication** **Accessible content,** **Accessible interaction: input and outp** **New Paradigms of Interaction** **User centred design methods** **Applications**
	University of the Aegean, Greece Dept of Information and Communicatio n Systems		Undergraduate, postgraduate	Design for All and ICT	One off Seminars	Optional		**Awareness,** **Why Design for All,** **Recommendations** **Accessible content,** **Accessible interaction: input and outp**
	University of the Aegean, Greece, Dept of Cultural		Undergraduate, postgraduate	Culture for all by Design	One off seminars	Optional		**Awareness,** **Why Design for All** **Recommendations**

	Technology							**Accessible content**
	University of Crete, Department of Computer Science	Undergraduate and postgraduate	Computer science	DfA modules in two courses: -Introduction to HCI -Advanced topics in HCI	-3 weeks in the context of "Introduction to HCI" (1 semester) -5 weeks in the context of "Advanced topics in HCI" (1 semester)	Modules obligatory within the courses	Approximately 90 students for the "Introduction to HCI" course and approximately 30 students for the "Advanced topics in HCI" course.	Introduction to HCI **Awareness:** **Why Design For All** **User Centred Design:** **Recommendations:** Advanced topics in HCI **User Centred Design:** **Recommendations:** **Accessible Interaction: Input/Output** **Accessible Content:** **New Paradigms Of Interaction:** **Applications And Research:**
	University of Cyprus, Dept of Computer Science				Invited Lecture	Optional		**Awareness,** **Why Design for All** **Recommendations**
Ireland	CRC/ Adult Education Department, University College, Dublin	Undergraduate Diploma	Professional Development Course for practitioners involved in Service Delivery in the Disability Sector	DACA – Diploma in Assistive Computer Applications	1 year	Contains two mandatory Modules	Approximately 25 students	**Why Design for All: ethical considerat compliance with legislation, commerc potential** **Recommendations: Principles, Guideli Standards, Best Practice, etc.** **Accessible content** **Accessible input and output**
	Dublin Institute of Technology	Final year Undergraduate Computer Science Students BSc in Computer Science	Computer Science	Design for All and Assistive Technology	18hrs	Optional	42	**Why Design for All: ethical considerat compliance with legislation, commerc potential** **Recommendations: Principles, Guideli Standards, Best Practice, etc.** **User centred design.**
Spain	Polytechnic	Undergradua	Computer	Design for	4 months	Optional	25	Awareness

	University of Madrid. Computer Science School	te	Science	All. Accessible Web Design	(45 hours)			Why Design for All Recommendations Interpersonal skills Accessible content Accessible Input and Output User centred Design
	Polytechnic University of Madrid. Telecommunications School	Undergraduate	Telecommunications	Introduction to Design for All in Information and Communication Technologies	4 months (45 hours)	Optional	58	Awareness Why Design for All Recommendations Accessible content Accessible Input and Output User centred Design
	Universitat de València Estudi General	Undergraduate	Technical careers (computer science, biology, maths)	Design for All and Accessible Technology	4 months (60 hours)	Optional	18	Awareness Why Design for All Recommendations Interpersonal Skills Accessible content Accessible input and output
	Board of European Students of Technology (BEST) Polytechnic University of Madrid	Independent from degree (2004)	Technical careers (Engineering)	Design for All. Accessible Web Design	2 weeks	Optional	Not known yet	Awareness Why Design for All Recommendations Accessible content Accessible Input and Output User centred Design
	University of Cadiz	Summer course (2004)	Technical careers	Design for All. Accessible Web Design	3 days	Optional	Not known yet	Awareness Why Design for All Recommendations Accessible content Accessible Input and Output
Sweden	KTH Department of Numerical Analysis and Computer Science, Royal Institute of Technology	Undergraduate and postgraduate Mainly master students in their own subject,	From KTH: engineering: (computer science, electrical engineering, media technology and	User Centred Interaction design	1 semester	Optional (see section 3.9.1 for details)	50 about 30 from KTH and 20 from other institutions	User Centred Design

	(KTH), Stockholm	often specializing in human-computer interaction or similar subjects.	industrial economics). From Stockholm University: (psychology, anthropology, sociology, pedagogy and graphic design). From University College of Arts Crafts and Design (Konstfack): industrial design.					
	KTH	Undergraduate	all engineering students at KTH (2004), 2005 onward hopefully also for social science and design students	IT Design for Disabled People	0.5 semester (1 period)	Optional	2004 – 13 2005 -30?	Awareness of design for all, Why Design for All (ethical considerations Recommendations Accessible content Accessible interaction: input and output User centered design Application domains and research
UK	Centre for Computer Human Interaction Design, City University							
	CCHID, City University	Postgrad MSC degree						
	Loughborough University, Dept. of	Undergrad (BSc) Final year, and	Mainly ergonomics, but	Module: Ergonomics of Disability	One semester module, 3	Optional	25-30	Introduction to all categories, but mainly Awareness Why Design for all

	Human Sciences	post-grad (MSc) degree	some psychology	and Ageing	hours each of 11 weeks			Recommendations User-centred design Interpersonal Skills for teamwork (inclusive design workshop – see report)
	Loughborough University, IPTME	Undergrad (BSc) 1st year	Materials/engineering, textiles, and design and technology	Module: Applied Design Ergonomics	One semester module, 3 hours each of 11 weeks	Obligatory	15	Awareness Why Design for all Recommendations Accessible Content
	Loughborough University, Dept. of Human Sciences	Secondary school	Recruitment exercise to present features of ergonomics degree programme	One-off seminar	45 minutes	Optional	15	Awareness Why Design for all Interpersonal Skills for Teamwork Accessible content New paradigms of interaction User centred design

Table 1 Table of Pilots

3.1 Austria:

3.1.1 Universität Linz, Institut integriert studieren

Number of students

13

Student level

Undergraduate / Postgraduate

Student background

11   Computer Science

2   Postgraduate studies

Title of Design for All teaching

German title:

Spezielle Kapitel aus Informationssysteme: Barrierefreies Webdesign

English title:

Special Topics on Information Systems: Designing Accessible Websites

Duration

1 semester (= 4 months)

<u>Lecture:</u>

1 semester hour - 1,5 credits (European Credit Transfer System)

We do 7 sessions of 2 units each (1 unit = 45 minutes).

<u>Practical work:</u>

2 semester hours - 3 credits (European Credit Transfer System)

We do 4 sessions of 2 units each (1 unit = 45 minutes) where students have to be present. The rest of the work has to be done by the students at home.

Obligatory or optional

Optional

Taxonomy

1. Introduction: Design for all, Accessibility (Awareness)

2. Cognitive disabilities (Simple language etc.) (Awareness and Accessible Content)

3. Visual impairment, blindness (Braille, Screen Readers, Speech Output etc.) (Awareness, Accessible Content, Accessible Input and output)

4. Hearing impairment, deafness (Awareness, Accessible content, Accessible Input and Output)

5. Mobility impairment (Awareness, Accessible content, Accessible Input and Output)

6. Web Content Accessibility Guidelines 1.0 (Recommendations)

7. HTML

8. Cascading Stylesheets (Recommendations, Accessible content)

9. Evaluation and repair tools (Recommendations, Accessible content)

Teaching strategies used

<u>Lecture:</u>

Presentations by 5 different lecturers. The e-Learning-System Module is used for providing the materials (slides, scripts).

<u>Practical work:</u>

The students have to do a small project where they can apply what they learned in the lecture. Most of the work has to be done at home, but we do 2 sessions of 2 units each for answering questions regarding the project and 2 sessions of 2 units each for presenting and discussing the results.

The e-Learning-System Module is used for discussions and for providing interesting resources (documents, links, etc.)

Any other information

- We plan to offer this teaching in its present form also in the next semester. Some changes are possible as we try to keep up to date and to integrate our experiences from this year's lecture and also from projects we are working in.
- No involvement from other colleagues and hence no reaction.

3.1.2   Universität Linz, Institut integriert studieren- Postgraduate Course on Assistive Technologes

Number of students

Max. 15

Student level

Undergraduate with vocational experience / Postgraduate

Student background

Not yet known

Title of degree course being followed

Not yet known

Title of Design for All teaching

German title:

Universitätslehrgang "Assistierende Technologien"

English translation:

Postgraduate Course on Assistive Technologies

Duration

3 semester (= 1,5 years)

Obligatory or optional

Optional

Taxonomy

Taxonomy categories used in the basic module:

Awareness of Design for All, Why Design for All, Recommendations, Accessible content, Accessible interaction: input and output

Taxonomy categories used in the specialisation module:

Accessible interaction: input and output, Recommendations

Taxonomy of categories used in the practical module:

Interpersonal Skills, Application Domains and Research, New paradigms of Interaction, Applications and Research

Teaching strategies used

The course will be offered as an online e-Learning application with a minimum of mandatory attendance hours.

The course will be built of three modules, each of them containing several seminars:

1. Basic module
2. Specialization module
3. Practical experience

Any other information

We have handed in a project proposal for developing this course. The course will only be developed if the project will be approved. Approval/Disapproval will be done in June 2004.

3.1.3   Universität Linz, Institut integriert studieren: Postgraduate Course on Accessible Web Design

Number of students

Max. 15

Student level

Undergraduate with vocational experience / Postgraduate

Student background

Not yet known

Title of degree course being followed

Not yet known

Title of Design for All teaching

German title:

Universitätslehrgang "Barrierefreies Webdesign"

English translation:

Postgraduate Course on Accessible Web Design

Duration

4 semester (= 2 years)

Obligatory or optional

Optional

Taxonomy

The course will be split into six modules:

1. Web Accessibility (Accessible content, Accessible interaction: input and output, Application Domains and Research)

2. Assistive Technologies (Awareness of Design for All, Accessible interaction: input and output)

3. Software Accessibility (Accessible Content and Accessible Input and Output)

4. Usability (Awareness, User centred design)

5. Legal Requirements (Why Design for All, Recommendations)

6. Preparation of materials for print disabled people (Accessible Content, Accessible interaction: input and output)

Each of the modules contains several lectures belonging to the specific field.

Teaching strategies used

The course will be offered as an online e-Learning application with a minimum of mandatory attendance hours.

Any other information

The course is currently under development.

The first course will start in summer semester 2005.

3.2   Belgium:

The Research group on Document Architectures at Katholieke Universiteit Leuven has been asked to take responsibility for promoting DfA items in the field of ICT accessibility within the framework of the newly established Belgian branch of eDeAN [Belgian Design for All Network, BDfAN,

http://www.bdfan.be]. The 2004 workshop will try to group persons who have a responsible position in the Belgian Educational system. Further collaboration with Jan Graafmans in the framework of EDeAN is also scheduled.

The Research group on Document Architectures at Katholieke Universiteit Leuven has been promoting the inclusion of ICT related items in the DfA courses taught at LUC (Limburgs Universitair Centrum) by Prof. Froyen. The ICT-related subjects in these courses fit mainly in the categories "Recommendations" and "Accessible Content".

3.3   Finland

On the Finnish DfA Edu Project:

The Finnish Design for All Network, the Finnish national network in the EDeAN, has ten higher education institutions as members (seven universities and three polytechnics). The Finnish Design for All Education Development Project was initiated at the end of 2003 by all these insitutions and with the support of STAKES, the coordinator of the network. The primary objective of the project is to develop a cross-disciplinary set of Design for All course modules to serve students in all ten higher education insitutions. Course modules will be developed as accessible, digital learning material in the Finnish virtual university structure. Students can either select a limited set of courses in their study programme or complete them all and add a minor in their degree. The production of course material will be coordinated by the University of Art and Design UIAH Helsinki, Virtual University Department, but produced as a joint effort between the ten universities. Funding for the first part of the project has been received from the Ministry of Education in Finland.

On the taxonomy

The Finnish Design for All Education Project group discussed the IDCnet DfA taxonomy in its March 2004 project meeting. The taxonomy was welcomed by many of the participants, but the challenge related to the use of taxonomy was also recognised. In design fields especially, teaching and learning is often both project and problem based, and it was felt that a rigid taxonomy might not sufficiently support the problem based learning method. On the other hand, it was also recognised, that in the context of teaching DfA, "what" and "how" are two separate issues.

The Finnish EDeAN network has been instrumental in supporting the development of DfA education in Finnish higher level education institutions. In November 2003, it launched a three year DfA education development project with its member higher level education institutions, which aims to develop a multi- as well as a cross-disciplinary set of Design for All courses in the virtual university context.

Although the use of terms surrounding concepts such as inclusion, socially sustainable development or indeed Design for All is varied and thus makes

the collation of information somewhat difficult, a study conducted by the Finnish DfA network on the network's member universities and polytechnics shows a wide range of DfA related activities in Finnish higher level education institutions. In the polytechnics courses incorporating the DfA approach range from occupational therapy and rehabilitation to teacher training and health and social care. Jyväskylä Polytechnic has also developed a degree course in Wellbeing Technologies (engineering) that now also offers post graduate studies mentioning DfA methods specifically as one of its approaches.

University of Art and Design in Helsinki (UIAH) has a long history in design education and DfA is part of the School of Design's curricula content on both BA and MA level - the university has set up an internal network across department lines to support the coordination and development of DfA education. UIAH is also the home of the Future Home Institute - a research concept largely based on the DfA idea. In Tampere University of Technology (TUT) Design for All thinking is incorporated in the study of built environment and architecture, especially in the Institute of Urban Planning and Design. Studies leading to MSc in the institutes of Electronics, Machine Design, Software Systems and Signal Processing all feature some elements of usability, accessibility and design for all.

In the fields of information society technologies and communications both UIAH and TUT have been active. UIAH's Medialaboratory has incorporated the DfA approach to areas as wide as film studies in sign language and the accessibility of museums' internet sites and online services. TUT hosts the Digital Media Institute/ Hypermedia Laboratory, which is committed to the research and development of online and networked publishing and its validation methods and tools from e.g. usability and accessibility aspects.

Although there has been no comprehensive mapping to date, Finnish DfA network's research shows that DfA education is carried out on several levels and in various disciplines, (see Table 2 below).

Finish Higher education institution	Department/Course/Module/Project
Helsinki Polytechnic, STADIA http://www.stadia.fi/english/	DfA elements in all professional studies, e.g. user centred planning and design. DfA education included in the following courses: occupational therapy and rehabilitation.
Jyväskylä Polytechnic http://web1.jypoly.fi/English/	DfA related education included in the following courses: • Wellbeing Technologies • Teacher training • Social studies and health care • Occupational therapy
University of Art and Design http://www.uiah.fi	DfA is part of the School of Design's curricula content on both BA and MA level - the university has set up an internal network across department lines to support the coordination and development of DfA education. MUMMI-project: Multimodal Museum Interface and Design for All in Museums Usability School in co-operation with Helsinki University of Technology and University of Helsinki. UIAH is hosts the Future Home Institute.
Tampere University of Technology http://www.tut.fi	Hypermedia Laboratory is committed to the research and development of online and networked publishing and its validation methods and tools from e.g. usability and accessibility aspects. DfA related education in • Institute of Urban Planning and Design. • Institute of Electronics • Institute of Machine Design • Institute of Software Systems • Institute of Signal Processing

Table 2 Finnish DfA education various levels and disciplines

3.4   France

3.4.1   L'Ecole de Design Nantes Atlantique:

Student background (computer science, human computer interaction, and ergonomists, designers, etc)
Design, with hypermedia/interaction design option or industrial design option.

Student level (undergraduate, postgraduate)?
Undergraduate (2nd year in a 5-year curriculum)

Number of Students?
27 students, (12 from Hypermedia option and 15 from Product Design option)

Title of degree course being followed (undergraduate degree, masters, etc)?
Master of Arts in Design. There is no undergraduate degree for the time being.

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)?
Project-based long term workshop, with industrial partnership.

Duration (e.g.1semester, 1 week)?
12 weeks within one semester.

Obligatory or Optional?
Obligatory.

Taxonomy:Categories and Subcategories taught?
Awareness of Design for All
Why Design for All? Ethical, legal and commercial considerations
Interpersonal Skills for Teamwork
Accessible interaction: input and output
New paradigms of interaction
User centred design

Teaching strategies used (lectures, practical work, team work, projects,dissertation, etc) any other information?
Project focused teaching strategy.
A short theoretical work on DfA is requested.
Meetings and focus groups with disabled people of various kinds are supposed to take place within a few weeks. Our partner EDF (French electricity company) is giving us a strong input from its own multidisplinary team (ergonomist, HCI designer, product designer). The project is fully multidisciplinary : teachers will be both from industrial and hypermedia design, as well as ergonomics and semiotics.

Will the teaching continue: in its present format; **with changes (more/less hours, more/less students, different levels, etc)**; **uncertain**; **other?**
The project will not be duplicated as such, but the teaching of DfA in 2nd year is now an important part of the regular course.

How did colleagues view this work (With interest;With indifference (not enough time to understand what it is about); **With hostility**; **Other**

With Interest. DfA is gaining attention in our organisation.

L'Ecole de Design Nantes Atlantique has introduced DfA concerns in a more general curriculum for three years now.

The interdisciplinary teaching team gathered for the pilot project here includes :

- Jean Patrick Péché, industrial designer with a strong background in medical devices design and coordinator for all the projects and workshops in our institution,

- Grégoire Cliquet, interaction designer (Msc in IT from the University of Amiens), currently specializing in 3D immersive environments,

- Titoun Pasquier, researcher and consultant in ergonomics and cognitive sciences (PhD in cognitive sciences from the University of Nancy),

- Alain Jacquemin, physician, psychologist and semoticis consultant for design projects.

Usually, our industrial partners give us a strong input from their own research and documentation. They're also involved in the teaching process during meetings and presentations.

3.5   Germany

3.5.1   Bonn IT centre, DfA teaching sourced by FIT

The Fraunhofer Institute for Applied Information Technology has included a DfA module in the Summer semester of the Master's Program in Media Informatics of the Bonn IT Center. Its details are:

Name of Institution
Bonn-Aachen International Center for Information Technology B-IT, Görresstraße 13, D53113 Bonn, Germany <http://www.b-it-center.de/>

B-IT offers highly selective International Master Programmes in Applied IT as well as summer/winter schools for qualified computer science students.

Student background (computer science, human computer interaction, and ergonomists, designers, etc):

Computer Scientists, with Bachelor Degree

Student level (undergraduate, postgraduate):

Undergraduate

Title of degree course being followed (undergraduate degree, masters, etc)

Masters in Media Informatics: http://mi.b-it-center.de/

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Building Advanced Internet Services and Applications using Web Standards. Accessible Interfaces and New Devices. (Not an accessibility class "per se", as it encompasses other topics.)

Duration 1 Semester (24 hours in 12 classes)

Obligatory or Optional

Optional

Taxonomy:

- Why Design for All: ethical considerations, compliance with legislation, commercial potential
- Recommendations: Principles, Guidelines, Standards, Best Practice, etc.
- Accessible content
- Accessible input and output
- User centred design

The course aims at providing the students with theoretical and practical knowledge about building up advanced Internet services and applications with Web Standards that consider usable and accessible interfaces for desktop and mobile platforms. The students will learn how to manage and develop complex on-line applications, obtaining an overview of workflow procedures from content creation to interface development and user testing, by using last generation Web Publishing Frameworks. These competences are key in the business world, where the ubiquitous presence of complex Web portals, e-commerce applications, Web Services, and mobile devices, both B2B and B2C demand professionals with the adequate knowledge in this area. This is linked also to widespread legal requirements for accessibility, combined with the needs of an aging population that represent a big market area.

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc): Lectures, exercises, videos, joint projects

Any other information

Course contents:

1. Introduction and course overview. Description of necessary tools and frameworks for the course (2 hours)

2. XML and XHTML. Advanced issues and new vocabularies (4 hours)

3. Processing XML (6 hours)

4. The Semantic Web. Search engines and metadata (2 hours)

5. The Integration: Web Publishing Frameworks (2 hours)

6. Accessibility I. An introduction (2 hours)

7. Accessibility II. User testing and evaluation methodologies (2 hours)

8. Accessibility III. Recommendations and implementation techniques. User and Device Profiling (4 hours)

Will the teaching continue in its present format?

The teaching will continue in its present format: every Summer Semester

How did colleagues view this work?

Mostly with indifference. It was not well understood the need for all other technical topics to teach an advanced class on accessibility

Number of students?

14

General comments:

The initial curricula was pretty ambitious and was aimed to give students a high level of understanding of new Web technologies, and how these could be influenced by Universal Access considerations, giving support to a wide range of users and devices. However, the lecturers met with a poor background of the Computer Science students in Web technologies, needed as a background to the course content, and had to rework the course content.

This fact is leading us to think that the application to the taxonomy in the European universities might become unrealistic until the rest of the curriculum in the CS area gets updated to the needs of the industry for Web technologies, because DfA is unavoidably linked to leading-edge technologies.

No results of questionnaires available yet, as the course is running when writing this deliverable.

3.5.2   Multimedia Campus, Kiel,

The chair of Human Centered Interfaces has the responsibility for lectures in the masters program "Multimedia Management" in the course on "Computer Graphics" a module on the comparison of usability with accessibility of user interfaces, especially web pages (given in February/March). This is based on presentations of student projects on software architecture of screen readers and screen magnifiers (addressing awareness of all students) in the previous course on "Operating Systems". The module evaluated for this report introduces user requirements and discusses basic and some advanced interaction techniques for different

user groups. As a result of this course the software architecture of graphical user interfaces is revised and students may improve accessibility of one of the own GUIs or they develop a 3D tactile model for the Phantom force feedback device.

A following module within the course on multimedia user interfaces addresses new multimodal interaction paradigms using mark-up languages for multimedia content and specific notations such as MathML.

As a result a lab for evaluation together with one colleague is being developed. Several companies are supported in developing accessible user interfaces, including accessible web sites. But: one regional research proposal together with a design colleague on accessible media technology was rejected. Master thesis projects have been developed in the past from this activity and will probably also be chosen by some students based on this year's modules.

Number of Students: 11 with bachelor degree

Degree: M.Sc. in Media Management, taught in English

Duration: covers several courses within 4 quarters of a 12 month program, this module: 2 weeks in February + student's project time in March

3.5.3   The Kiel University - Informatics course

Chair of Human Centered Interfaces, lectures in the diploma program "Informatics" in the course on "Interactive Systems" a module on the comparison of usability with accessibility of user interfaces, especially web pages. No specific awareness raising activity precedes this optional module, but the syllabus is published in advance.

The module evaluated for this report introduces user requirements and discusses basic and some advanced interaction techniques for different user groups. For example are formal specifications of "drag and drop" via Braille display discussed.

Unlike the MMC (see above 3.5.3) web content guidelines can be discussed in greater detail and practical assignments are required. This includes profiling techniques using XML/XSLT techniques for multimedia user interfaces.

Number of Students: 10

Degree: Diploma in Informatics

Duration: 4 weeks including student assignment time (May)

Other information:
It is important to cater for "training the trainers!". This activity is planned for the new lab in Kiel

Kiel strategy is to insert DfA related topics within mainstream courses.

It is important to get students interested in the subject, by including things that interest them (are current and "cool"), e.g., force feedback.

DfA has enabled students and lecturers from different disciplines interact an example is that media designers like e-Business colleagues are interested.

3.6   Greece and Cyprus

3.6.1   University of the Aegean, Department of Product and Systems Design Engineering

Student level

Undergraduate 4th year (of five year course (BSc+MSc))

Student background

Design of Products and Systems for the Information Society

Title of degree course being followed

BSc Degree in Product and Systems Design Engineering (five year course)

Title of Design for All teaching (e.g. course module, seminar etc)

Design for All

Duration

1 semester, 2x2 hours a week (56 hours)

Obligatory or Optional

Optional (, compulsory for fourth year direction (one direction from 3 to be chosen) Interaction Design)

Student numbers

66 enrolled, 48 completed the course

3.6.2   Other activities planned by University of the Aegean, DPSD

Other activities were planned for this geographical area. However, only one was completed in time for reporting for this deliverable. The activities and the reasons for the delay are noted below

- Department of Computer Science, University of Cyprus, 2 hour seminar on 'awareness', 'why Design for All' and some 'recommendations'

The contact in the University of Cyprus took up a position in another university, and without him there to act a as a champion, it was not possible to interest other members of the department, who are not personally aware of the area of Design for All. However, there is some hope that the contact will himself return to the University of Cyprus for invited lectures, in the academic year 2004-2005, and if that is the case

he has expressed willingness to give one of those lectures over to Design for All. The proposed activity was a 2 hour seminar within the Educational Technology module

- Department of information and Telecommunication Systems, University of the Aegean, 2 seminar hours on 'awareness', 'why Design for All' and 'recommendations'.

- Department of Cultural Technology, University of the Aegean, on 'awareness', 'why Design for All' 'recommendations' and 'accessible content': short course with practical exercises.

Due to problems with strike action by contracted University staff throughout the higher education sector in Greece, the students were very late in starting their academic year 2003-2004 (in some cases not starting until the 1st December). The resulting compression of courses made it impossible to include any programmes of invited speakers and extra curricular seminars and courses hence the planned activities with other Departments in the University of the Aegean (Department of information and Telecommunication Systems and Department of Cultural Technology) have been postponed, for the next academic year.

- Department of Computer Science, University of the Patras, chapter in student textbook on Interaction Design, devoted to Design for All

This activity is ongoing, and represents a more long term approach. It is to contribute a chapter on Design for All to a student textbook on Interaction Design, that is presently being prepared by a team affiliated to the Department of Computer Science, University of the Patras. The understanding is that if the finished textbook is adopted as the a student text, to be distributed free of charge to students, as is the habit in Greek state universities, in this way it is hoped it will put Design for All firmly on the syllabus in teaching of Interaction Design.

The chapter contents have been accepted by the editorial team, and work is now to go ahead when the page and word limits have been decided. The finished work will be in Greek. It will treat the whole of the taxonomy, but focusing mainly on the Awareness Why Design for All, Recommendations, Accessible content and Accessible input and output. For accessible content there will be some suggestions of exercises. For human centred interaction, new paradigms of interaction, research and applications, there will be links to other chapters in the book which deal with these more fully, drawing out the dimensions and perspectives offered by Design for all, with suggestions for further reading, sidebars, etc

3.6.3   University of Crete, Computer Science Department

Student level (undergraduate, postgraduate)

Undergraduate and postgraduate

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

Computer science

Title of degree course being followed (undergraduate degree, masters, etc)

BSc and MSc in Computer Science

Title of Design for All teaching? (e.g. course, module, seminar, etc.)

DfA modules in two courses:
    Introduction to HCI
    Advanced topics in HCI

Duration? (e.g.1 semester, 1 week)

> 3 weeks in the context of "Introduction to HCI" (1 semester)

> 5 weeks in the context of "Advanced topics in HCI" (1 semester)

Obligatory or Optional?

Modules obligatory within the above courses

Student numbers

Approximately 90 students for the "Introduction to HCI" course and approximately 30 students for the "Advanced topics in HCI" course.

Taxonomy: Categories and Subcategories taught?

Introduction to HCI

- Introduction to the Information Society and its dimensions of diversity (AWARENESS)
- Overview of different approaches to accessibility (WHY DESIGN FOR ALL)
- User-centred design (USER CENTRED DESIGN)
- Evaluation methods, techniques and tools (USER CENTRED DESIGN)
- Guidelines and Standards (RECOMMENDATIONS)
- Methods, techniques and tools for the accessibility of web applications and portals (RECOMMENDATIONS)

Advanced topics in HCI

- Methods and techniques for user requirements elicitation and analysis, including the requirements of users with various types of disabilities (**User Centred Design**)
- Design for All methods, techniques and tools (**Recommendations: Principles, Guidelines, Practice, etc; User Centred Design**)

- Unified User Interfaces development methodology, techniques and tools (Recommendations: Principles, Guidelines, Practice, Etc; User Centred Design)
- Non-visual interaction (**Accessible Interaction: Input and Output**, **Accessible Content**; **New Paradigms of Interaction, Applications And Research**)
- Switch-based interaction (**Accessible Interaction: Input and Output)**
- Input / output devices and interaction techniques for users with various types of disabilities (**Accessible Interaction: Input And Output**, **Accessible Content**; **New Paradigms Of Interaction, Applications And Research**)
- Case studies of universally accessible interactive applications and services. (**Recommendations: Practice**; **Accessible Interaction: Input And Output**; **Accessible Content**)

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)?

- Lectures
- practical work
- team work in small groups of 3-4 students
- project work carried out at ICS-FORTH under scholarship
- final year dissertation work
- MSc thesis
- Invited lectures by researchers around the world

Will the teaching continue? (in its present format; with changes (more/less hours, more/less students, different levels, etc); uncertain; other)

The teaching is on-going since the academic year 1993/94 and is updated/upgraded on a yearly basis. The number of students is gradually increasing.

How did colleagues view this work? (with interest; with indifference (not enough time to understand what it is about), with hostility; other)

With interest.

Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (onthe way the course is structured, coverage of topics, etc.)

Already addressed in section on taxonomy above

Any other material you think might be of interest, such as the structure of the course, etc.

Textbook used:

- Stephanidis, C. (Ed.). (2001). User Interfaces for All - Concepts, Methods, and Tools. Mahwah, NJ: Lawrence Erlbaum Associates (ISBN 0-8058-2967-9, 760 pages).

Research papers used:

- Stephanidis, C., & Savidis, A. (2001). Universal Access in the Information Society: Methods, Tools and Interaction Technologies. Universal Access in the Information Society, 1 (1), 40-55 (Managing Editor: Reinhard Oppermann, GMD, Germany).

- Stephanidis, C. (2001). Adaptive techniques for Universal Access. User Modelling and User Adapted Interaction International Journal, 11 (1/2), 159-179.

- Stephanidis, C., & Emiliani, P.L. (1999). Connecting to the Information Society: a European Perspective. Technology and Disability Journal, 10 (1), 21-44.

Starting from the academic year 2005-2006, the following additional material will be used:

- C. Stephanidis (Ed.) (2004, to appear). Universal Access Code of Practice in Health Telematics, LNCS 3041.

- On-line DfA Training course (http://is4all-tc.ics.forth.gr)

3.7   Ireland

3.7.1   Central Remedial Clinic: Diploma in Assistive Computer Applications

Student level

Professional Development

Student background

Students participating in this course have successfully completed the, one-year, Certificate programme in Assistive Technology Applications (CATA). Students have tended to be professionals working in the area of assistive technology or other disability service sectors. The course is considered as a broad overview of the area of Computers and Disabilities, with participants gaining new knowledge in relation to the use of computers by and for people with disabilities.

Title of course

Diploma in Assistive Computer Applications (D.A.C.A.)

Accredited by the National University of Ireland through University College Dublin

Run as a partnership between Adult Education Department, UCD and the CRC.

Title of Design for All teaching (e.g. course,module,seminar)

2 modules

"Human factors in Interaction" & "WWW Accessibility"

Built upon other courseware

Duration

22hours

Taxonomy categories and subcategories taught?

Human Factors in Interaction (User centred Design

WWW Accessibility (Accessble content, Accessible interaction input and output)

Teaching strategies used

(10 Hours Online; 2 x 3 hour workshops ; 6 x 1 hour lectures)

Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (the way the course is structured, coverage of topics, etc.)

The course content for both modules delivered as part of this course has been modified slightly to reflect the taxonomy developed by IDC-Net. The next course is due to run from September 2004, with both modules related to Design for All scheduled for delivery in November/December 2004.

Other information

Running since 2002,

Accredited by the National University of Ireland through University College Dublin

Run as a partnership between Adult Education Department, UCD and the CRC.

3.7.2   Computer Science, Dublin Institute of Technology,

Teaching by staff from Central Remedial Clinic.

Student level

Undergraduate Final year elective module

Student background

Computer Science

Title of degree course being followed

BSc. Computer Science from the Dublin Institute of Technology

Title of Design for All teaching (e.g. course module, seminar etc)

Assistive Technology and Universal Design

Duration

18 hours direct tuition

Obligatory or Optional

Optional (Final year elective module)

Student numbers

Although this module is optional – over the past four years, students' selecting this module has increased from 9 students in 1999/2000 to 42 in the academic year 2003/2004.

Taxonomy: Categories and Subcategories taught?

Human Factors in Interaction, identification of User Requirements: Activity Analysis, Occupational Performance – as related to computer use (**Awareness, User centred Design)**

WWW Accessibility: Guidelines and Standards, Website design and evaluation methodologies,methodologies for Design of accessible software applications and Websites. evaluation of existing media (**Recommendations, Accessible content, Accessible interaction input and output**)

Teaching strategies used (lectures, practical work, team work, project, dissertation, etc)

18 hours lectures

Previously 1 x 3 hour workshop

Students must complete final year exam

Other information

Future Course Delivery

Currently, staff involved in the delivery of this course are in the process of changing this module from an elective, final-year option, to a mandatory component of the first-year curriculum.

3.8   Spain

Three "DfA and ICT" courses have been organised by Spanish Universities for their undergraduate students in 2003, as free selection modules, with good acceptance both among students, teaching professionals who took part in them and experts colleagues who where aware of their existence.

Two out of these three courses will be repeated next year, the third being under revision because of infrastructure reasons.

It is foreseen that two new courses will be started in 2004. One of them is an initiative of the Board of European Students of Technology (BEST) and

the Polytechnic University of Madrid (UPM). BEST knew about the DfA activity of the UPM and decided to organise a similar course for 20 students coming from all over Europe, except Spain.

Relation between IDCnet project and Spanish University activities

There has been a bidirectional link between the IDCnet project and all the University courses that have been run in Spain, or those that are foreseen to be run.

The reasons for this relationship are:

- The awareness of project activities among teaching professionals, and the public availability of interesting material produced within its framework.

- The participation of one Spanish partner in the project, the University of Valencia (Universitat de València Estudi General), which is an active stakeholder of Spanish DfA and ICT movement.

In all these courses the work from IDCnet had influence on the teaching to some extent, including content and structure. The results from the IDCnet project, especially the taxonomy, are helpfin to shape up a new course to be taught in 2004 (BEST) see section 3.8.4.1 below

On the other hand, IDCnet is performing a watchdog task, where the main features of these courses are being collected following a template design within the project. This has enriched the final results of IDCnet.

3.8.1 Computer Science School, Polytechnich University of Madrid (Facultad de Informática, Universidad Politecnica de Madrid)

Name of Institution

Polytechnic University of Madrid. Computer Science School

Number of students?

25

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

Computer Science

Student level (undergraduate, postgraduate)

Undergraduate (5th year of a 5 year career)

Title of degree course being followed (undergraduate degree, masters, etc)

Computing Engineer (in Spanish: "Ingeniero en Informática"). It is

more or less a Master level (5 years).

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Design for All. Accessible Web Design

Duration (e.g.1 semester, 1 week)

1 semester (in Spain that is 4 months) 4.5 Spanish credits

(that is 45 hours)

Obligatory or Optional

Optional (it is a free selection module)

Taxonomy: Categories and Subcategories taught

1. Introduction to DFA and Assistive Technologies (3h) (**Why Design for All**, **Accessible Input and Output)**

2. Normalisation and Legislation (5h) (**Why Design for All**?)

- General context

- eEurope 2002 and 2005

- Spanish law on the Services of the Information Society

- Spanish standards on Accessible Hardware, Software and Web content

- US: 508 amendments

WAI (1h) (**Recommendations)**

- The World Wide Web Consortium

- The Web Accessibility Initiative

- Guidelines: content, authoring tools, user agents

4. WCAG 1.0 (9h) (**Recommendations**)

- Guidelines

- Checkpoints

- Techniques

- (All of this was taught using an example)

5. Accessibility Evaluation (3h) (**Accessible content, accessible input and output)**

- Manual vs. Automatic evaluation

- Automatic Tools: TAW

- Practical Evaluation Method

6. Implementing DFA in an organisation (1h) (**Why Design for All**, **Interpersonal skills, User centred Design)**

- The accessibility control group

- Accessible Web Design Process

- Usability

There was an invited lecture about "Independent Living" (2h) (Awareness)

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)

Lectures (22 hours) + Small project (designing a simple accessible web site 23 hours)

Any other information you believe interesting

It was the first year for this module, but we had previous experience from a Seminar on "Computing Technologies for People with Disabilities that was taught from 1995 to 2000 in the previous Curriculum in our school.

Will the teaching continue? (In its present format, with changes (more/less hours, more/less students, different levels, etc); uncertain other)

It will continue in the present format with a couple of changes:

- We will accept more students (this year we had a limit of 25)

- We will have more invited lectures from people with disabilities

- Maybe we will slightly change the contents (providing more about usability, for instance)

How did colleagues view this work? (With interest; with indifference (not enough time to understand what it is about); with hostility; other).

The proposal of this module required no evaluation from colleagues. Some of them found it interesting when we told them about it, but that's all.

Has the work from IDCnet had, or will it have in the future any influence on the teaching?

It had some influence about the contents and structure. IDCnet final results will be checked for input next year.

3.8.2 Telecommunications School, Polytechnic University of Madrid. (Escuela Técnica Superior de Ingenieros de Telecomunicación, Universidad Politecnica de Madrid)

Name of Institution

Polytechnic University of Madrid. Telecommunications School. Vodafone Chair

Number of students:

58

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

Telecommunications

Student level (undergraduate, postgraduate)

Undergraduate (5th year of a 5 year career). 10% postgraduate.

Title of degree course being followed (undergraduate degree, masters, etc)

Telecommunications Engineer (in Spanish: "Ingeniero en Telecomunicaciones"). It is more or less a Master level (5 years).

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Introduction to Design for All in Information and Communication Technologies

Duration (e.g.1 semester, 1 week)

1 semester (in Spain that is 4 months) 4 Spanish credits (that is 40 hours)

Obligatory or Optional

Optional (it is a free selection module)

Taxonomy: Categories and Subcategories taught

1. Introduction to Design for All. Relationship with ICT (2h) (**Awareness, Why Design for All, especially ethical reasons, accessible content, accessible input and output,)**

- Users: types and demographics of disabilities
- Evolution of disability: from paternalism to integration
- Definition of Design for All and Assistive Technologies.
- Application to ICT

2. Legislation and Standardisation. The role of Public Administration (2 h) (**Why Design for All, especially legal resons; Recommendations)**

- Legislation in the US. European Union Mandates. The situation in
- Spain
- Importance of Standards. Working groups in CEN, CENELEC, ETSI
- The role of the Public Administration

3. Accessible Web Design (14h) **(Recommendations, accessible content, accessible input and output)**

- The Web Accessibility Initiative of the World Wide Web Consortium
- Assistive technologies used for Web Access
- Accessibility Evaluation

4. User Centred Design (2h) (**User centred Design**)

- Userfit methodology: concepts and practical application in engineering projects

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc.)

The first two parts were given by invited lecturers Lectures (14 hours) + Laboratory classes (6 hours) + Small exercise

(evaluating the accessibility of a web site or designing a simple accessible web site 15 hours)

Any other information you believe interesting

This module was promoted by the Vodafone Chair/Vodafone Foundation

Results from an evaluation questionnaire:

- Before the course began, 86% of the students thought Accessibility was only related with access to the built environment. 70% had never heard before about the Design for All concept.

- After the course, 57% of the students thought they could never/seldom apply the concepts learnt in the course during their future jobs.

- After the course, 58% of the students believed that Design for All philosophy and criteria should be widely included within the School Study Plan.

- Students required more content related with hardware accessibility issues.

Will the teaching continue? (In its present format, with changes (more/less hours, more/less students, different levels, etc); uncertain other)

It will continue. Main structure and content will continue. Enhance of contents related with Telecommunication engineering.

How did colleagues view this work? (With interest; with indifference (not enough time to understand what it is about); with hostility; other).

They found it very interesting.

Has the work from IDCnet had, or will it have in the future any influence on the teaching?

It had some influence about the contents and structure. IDCnet final results will be checked for input next year.

3.8.3 University of Valencia (Universitat de València Estudi General)

Name of Institution

Universitat de València Estudi General (UVEG)

Department of Developmental and Evolutive Psychology of the University of Valencia Estudi General has offered an optional module on 'Design for

All and Accessible Technology' to students of technical courses (Computer Science, Electrical Engineering, Physics...

Number of students:

18 (20 enrolled, but two did not take the course)

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

- 7 from Computer Science (+1 who did not attend)

- 8 from Biology

- 2 from Mathematics

- 1 from Electronical Engineering

- 1 from Pharmacy (who did not attend)

Student level (undergraduate, postgraduate)

Undergraduate (between 1st and 5th year of 5 year careers)

Title of degree course being followed (undergraduate degree, masters, etc.)

Currently degree courses in Spain are 5 years long, something between Bachelor and Master degrees. This will change soon to harmonize with the rest of Europe. Students were registered in these courses:

- Computer Science

- Biology

- Mathematics

- Electronical Engineering

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Design for All and Accessible Technology

Duration (e.g.1 semester, 1 week)

1 semester (in Spain that is 4 months) 6 Spanish credits

This should have been 60 hours, but finally there were 24 sessions of 2 hours each.

Obligatory or Optional

Optional (it was a free selection module). Students chose this module freely from the available offer of modules. Every year they have to choose 2 or 3 of these from about 50 optional modules.

Taxonomy: Categories and Subcategories taught

1. Awareness of Design for All

2. Why Design for All? Ethical, legal and commercial considerations

3. Recommendations

4. Interpersonal Skills for Teamwork (slightly)

5. Accessible content: knowledge about documents and multimedia

6. Accessible interaction: input and output

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc.)

The course was given face to face but the eLearning platform WebCT was used for supporting the discussion forums, content presentation, course webmail and the submission of assignments. Also used practical assignments in groups, and visits from experts and users. See section 4.2 for a detailed account of

Will the teaching continue? (In its present format, with changes (more/less hours, more/less students, different levels, etc); uncertain other)

Uncertain. For the moment it will not continue.

How did colleagues view this work? (With interest; with indifference (not enough time to understand what it is about); with hostility; other).

No, involvement from other colleagues and hence no reaction. This is one of the reasons that the course has been stopped for the moment.

Has the work from IDCnet had, or will have in the future any influence on the teaching?

If the course is run again I will try to cover also the categories missing from the taxonomy in the first edition.

3.8.4   Foreseen "Design For All And ICT" Courses in Spain

3.8.4.1   Board of European Students of Technology (BEST) Polytechnic University of Madrid

Name of Institution

Board of European Students of Technology (BEST)

Polytechnic University of Madrid

Student background (computer science, human computer interaction, and ergonomists, designers, etc.)

Technical Students. Details not yet known.

Student level (undergraduate, postgraduate)

Undergraduate, but concrete level is not yet known.

Title of degree course being followed (undergraduate degree, masters, etc.)

It doesn't belong to any degree course

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Design for All. Accessible Web Design

Duration (e.g.1 semester, 1 week)

2 weeks in July 2004

Obligatory or Optional

It is an external event, not related with degree studies. In some

Universities students can get credits for their certificates.

Taxonomy: Categories and Subcategories taught

1. Introduction to DFA and Assistive Technologies (3h) (Awareness, Why Design for All, Accessible interaction: input and output)

2. Normalisation and Legislation (3h) (Why Design for All, Recommendations

- General context
- eEurope 2002 and 2005
- Spanish law on the Services of the Information Society
- Spanish standards on Accessible Hardware, Software and Web content
- US: 508 amendments

3. W3C and WAI (3h) (Recommendations)

- The World Wide Web Consortium
- The Web Accessibility Initiative
- Guidelines: content, authoring tools, user agents

4. WCAG 1.0 (9h) (Recommendations)

- Guidelines
- Checkpoints
- Techniques

5. Accessibility Evaluation (3h) (Recommendations)

  - Manual vs. Automatic evaluation

  - Automatic Tools: TAW

  - Practical Evaluation Method

6. User centred Design (3h) (User centred Design)

  - Accessible Web Design Process

  - Usability

- Application of the Userfit Methodology

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc.)

7 Lectures (21 hours) + 2 Laboratory sessions (6 hours) + 2 visits

to relevant places

Any other information you believe interesting

All the course will be in English.

The students come from all over Europe (except Spain). The estimated number of students is around 20.

Web page for BEST: http://www.best.eu.org/index.jsp

Web page for BEST-UPM: http://best.da.upm.es/

Web page for the course:
http://www.best.da.upm.es/events/sc04/index.html

Will the teaching continue? (In its present format, with changes (more/less hours, more/less students, different levels, etc); uncertain; other)

Initially this is a unique course but if successful it may be repeated.

How did colleagues view this work? (With interest; with indifference (not enough time to understand what it is about); with hostility; other).

This course was proposed by UPM students in relation with the European Year of People with Disabilities and after they saw there was some activity in the UPM (the free selection modules in Telecommunications and Computer Science Schools).

Has the work from IDCnet had, or will have in the future any influence on the teaching?

It had some influence about the contents and structure.

3.8.4.2 University of Cadiz (Universidad de Cadiz)

Name of Institution

University of Cadiz

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

Technical Students. Details not yet known.

Student level (undergraduate, postgraduate)

Undergraduate and postgraduate, but concrete level is not yet known.

Title of degree course being followed (undergraduate degree, masters, etc.)

It doesn't belong to any degree course. It is part of the Summer Courses of the University of Cadiz

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Design for All. Accessible Web Design

Duration (e.g., 1 semester, 1 week)

3 days in August 2004

Obligatory or Optional

Optional. It is part of the Summer Courses organised by the University of Cadiz.

Taxonomy: Categories and Subcategories taught

1. People with Disability and the Information Society (2h) (**Awareness, Why Design for All**)

2. The need for accessibility: Design for All (2h) (**Awareness, Why Design for All**)

3. Tools for evaluating web accessibility (1,5h) (**Accessible content, Accessible input and output**)

4. Methods to evaluate web accessibility (4h) (**Accessible content, Accessible input and output**)

5. Semantic web and web accessibility (3h) (**Accessible content, Accessible input and output**)

6. Design for all, Accessible web and DfA Curriculum (? Is this part of the course?)

Will the teaching continue? (In its present format, with changes (more/less hours, more/less students, different levels, etc); uncertain; other)

Initially this is a unique course but if successful it may be repeated.

Has the work from IDCnet WP3 had, or will have in the future any influence on the teaching (both pilot and beyond)? (the way the course is structured, coverage of topics, etc.)

It had some influence about the contents and structure and they will check the IDCnet final results for input next year.

3.9   Sweden

3.9.1   Department of Numerical Analysis and Computer Science, Royal Institute of Technology (KTH), Stockholm.

Student level (undergraduate, postgraduate)

Undergraduate and postgraduate

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

From KTH: engineering students such as computer science, electrical engineering, media technology and industrial economics.

From Stockholm University: students in for example psychology, anthropology, sociology, pedagogy and graphic design.

From University College of Arts Crafts and Design (Konstfack): industrial design.

Title of degree course being followed (undergraduate degree, masters, etc)

Mainly master students in their own subject, often specializing in human-computer interaction or similar subjects.

Title of Design for All teaching? (e.g. course, module, seminar, etc.)

> User Centred Interaction design (not really a DfA course, but during the years many of the student projects has been dealing with DfA issues)

Duration? (e.g.1 semester, 1 week)

1 semester

Obligatory or Optional?

Elective course for last years students, students specializing in HCI at KTH has to choose at least one out of three courses, where this course is included.

Student numbers

50 (about 30 from KTH, 20 from other universities)

Taxonomy: Categories and Subcategories taught?

User centred design

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)?

The course uses theory and practical exercises using the theory, as well as project based work.

Theoretical part:

The theoretical part of the course consists of two separate threads, a series of lectures and a number of practical exercises. The lectures are mainly based on invited speakers that give the students an insight into how different disciplines views participation of and works with users. Another reason for having these lectures is to give the students a common ground and a basic understanding of how work is perfomed in the different disciplines. The lecturers have a background in e.g. industrial design, psychology, anthropology, ethnology, human-computer interaction, computer science, and cinema studies.

The practical exercises give the students practical experience from using different user centered methods. During the years the methods used have varied a lot, from scenario based methods such as Observation & Invention and brainstorming methods such as Future Workshop (Kensing & Madsen, 1991), to the more ethnographically oriented Contextual Inquiry (Beyer & Holtzblatt, 1998) and Function analysis which is a common method used by industrial designers (Westerlund 2002). The focus has shifted from introducing the students to ways of working with and observing users in general, to a more cooperative design perspective using for example design workshops (Westerlund & al 2003) and probes (Gaver & al 1999).

Projects:

Projects (interdisciplinary, 5-7 per year with 6-8 participants

Taken form all areas, e.g. participatory design with users, ethnography, design workshops, giving different aspects and "triangulisation"

Cooperative design, working close together with the users.

A total of about 50 multidisciplinary projects, 5-7 per year with 6-8 participants, under themes such as

• Adaptability
• Portability
• Physical and digital
• Rooms in Stockholm
• Accessibility in public spaces

Will the teaching continue? (in its present format; with changes (more/less hours, more/less students, different levels, etc); uncertain; other)

It will continue, more or less in its present format

How did colleagues view this work? (with interest; with indifference (not enough time to understand what it is about), with hostility; other)

With great interest, the course has been around for about ten years now

Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (on the way the course is structured, coverage of topics, etc.)

Not on the things taught, but it might be used as inspiration when giving the students the project theme.

3.9.2   KTH (new course from 2004)

Student level (undergraduate, postgraduate)

Undergraduate

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

All engineering students at KTH (2004), 2005 onward hopefully also for social science and design students

Title of degree course being followed (undergraduate degree, masters, etc)

Mainly masters students

Title of Design for All teaching? (e.g. course, module, seminar, etc.)

   IT Design for Disabled People (a whole course dedicated to DfA)

Duration? (e.g.1 semester, 1 week)

one period, which amounts to about a half semester

Obligatory or Optional?

Optional

Student numbers

This year 13 students, the goal for next year is 30

Taxonomy: Categories and Subcategories taught?

Awareness of design for all, also elements of ethical considerations, recommendations, accessible content and interaction, user centered design and application domains and research (as outlined in the IDCnet deliverable D3.2),

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)?

Written exam and a paper about an issue brought up during the course

Will the teaching continue? (in its present format; with changes (more/less hours, more/less students, different levels, etc); uncertain; other)

Yes, it will continue, hopefully with more categories of students

How did colleagues view this work? (with interest; with indifference (not enough time to understand what it is about), with hostility; other)

Most people fall somewhere between interested and indifferent, as usual most people agree that the area of DfA is very important but the actual interest is often very small

Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (on the way the course is structured, coverage of topics, etc.)

The IDCnet taxonomy has been used as the basis for this course

Any other material you think might be of interest, such as the structure of the course, etc.

A lot of focus has been placed on the awareness raising, with many guest lecturers talking about specific disabilities (visually impairments, hearing impairments, mobility impairments and cognitive disabilities), how accessibility issues are dealt with in industry, and what are the policies and legislations that a university has to follow.

3.10　UK

3.10.1　Centre for HCI Design, City University, London

Name of Institution

Centre for Human Computer Interaction Design, City University

Student Level (undergraduate, postgraduate)

Undergraduate (Year 2 and 4 of 4 year courses) and postgraduate (MSc and PhD)

Student background

Computing, Engineering

Title of Degree Course being followed (BSc in … MSc in … etc.)

BSc Business Computing, Information Systems, Software Engineering

until Autumn 2004:

>   MSc in Business Systems Analysis and Design

>   MSc in Information Systems and Technology

From Autumn 2004:

>   Msc in Business Systems Analysis and Design

>   MSc in Information Systems and Technology

>   MSc in Human Centred Systems

Title of DfA teaching (ie course in , module on..)

Introductory course in HCI (2nd year students) in which DfA is taught as part of the course (course title: Principles of HCI, module within the course: "Designing for a diversity of users")

Duration (hours, weeks, semesters)

30 hour course - 20 hours of lectures and 10 hours of practical work

Obligatory or Optional

Obligatory

Student numbers

BSc students in Informatics - 220 per year

BEng students - 20 per year

Taxonomy: Categories and sub categories taught

The business case for DfA (as an example of developing a customer-oriented business case of any kind), particularly emphasising the ageing population (**Why Design for All**)

Physical/psychological capabilities of users - the bell curve, designing for a diversity of users, not a "typical" user, not oneself, temporary and permanent disabilities, the basic concept of DfA (**Awareness**)

Interaction devices: specialist input and output devices for people with disabilities and how they interface to standard environments and applications [and DON'T reinvent the wheel] (**Accessible input and output**)

User requirements elicitation and evaluation techniques - how to include a diversity of users, why that is useful for all design (yields good design) (**User centred design**)

Mini-project - paper prototyping a novel interface, one option is older users or users with particular disability (last year blindness, this year Sign Language users) (**Accessible input and output, +**)

Case study of the whole design lifecycle - embodying DfA approach (User centred design +)

Teaching strategies used

Lectures and practical classes, including exercises

N.B. A very similar module is given on the MSc IST and MSc BSAD courses

Student numbers:

MSc IST – approximately 20 students per year

MSc BSAD - approximately 20 students per year

Title of DfA teaching (ie course in , module on..)

Optional advanced course in HCI (3rd/4th year students) in which DfA is taught as part of the course (course: Advanced Principles of HCI)

Duration (hours, weeks, semesters) 30 hour course - 20 hours of lectures and 10 hours of practical work

Obligatory or Optional

Optional

Student numbers

BSc students in Informatics - 100 per year

BEng students - 10 per year

Taxonomy: Categories and sub categories taught

The business case for DfA (as an example of developing a customer-oriented business case of any kind), particularly emphasising the ageing population (**Why Design for All**) – builds on the material from the previous course

Web accessibility (as an example of guidelines based design & as useful information in its own right) (**Recommendations**, **Accessible content**, **Accessible input and output)**

Case study of the whole design lifecycle - embodying DfA approach (User centred design +)

Teaching strategies used

Lectures and practical classes, including exercises

From Autumn 2004:

Title of DfA teaching (ie course in , module on..)

Inclusive design

Duration (hours, weeks, semesters) 30 hour course - 20 hours of lectures and 10 hours of practical work

Obligatory or Optional

Optional

Student numbers

MSc in Human Centred Systems (it may also be available to the other MSc students, if there is interest)

Anticipated 10 – 15 students

Taxonomy: Categories and sub categories taught

The business case for DfA (as an example of developing a customer-oriented business case of any kind), particularly emphasising the ageing population (**Why Design for All**)

Physical/psychological capabilities of users - the bell curve, designing for a diversity of users, not a "typical" user, not oneself, temporary and permanent disabilities, the basic concept of DfA (**Awareness**)

Interaction devices: specialist input and output devices for people with disabilities and how they interface to standard environments and applications [and DON'T reinvent the wheel] (**Accessible input and output**)

User requirements elicitation and evaluation techniques - how to include a diversity of users, why that is useful for all design (yields good design) (**User centred design**)

Mini-project - paper prototyping a novel interface, one option is older users or users with particular disability (last year blindness, this year Sign Language users) (**Accessible input and output**, **+)**

Case study of the whole design lifecycle - embodying DfA approach (User centred design +)

The syllabus for the course is still being developed, it will cover all these areas and probably several others

Teaching strategies used

Lectures and practical classes, including exercises

Any other information that you think of might be of interest

City University states that it aspires to be a centre of excellence for students with disabilities in the London region. It has been pro-active in providing access to students with disabilities, having a very large disability support team for a UK university, has conducted an accessibility audit of the physical and learning environment in advance of the legal requirement, and is building a specialist centre for students with disabilities. The Centre for HCI Design wants to build upon this commitment to develop education in related topics - DfA and e-Accessibility.

The centre conducts disability-related research in a number of areas, and recently carried out a very large survey commissioned by the Disability Rights Commission to look into web site accessibility.

Will the teaching continue? (in its present format; with changes (more/less hours, more/less students, different levels, etc); uncertain;other)

Teaching will continue at an undergraduate level with the same hours and numbers of students; teaching at the MSc level will continue as before, but now with a whole course dedicated to Inclusive Design.

How did colleagues view this work? (with interest; with indifference (not enough time to understand what it is about), with hostility; other)

with interest, - although they accept it as an insert into their courses and do not get much involved in the subject

Has the work from IDCnet WP3 had, or do you expect it will have any influence on the teaching (both pilot and beyond)? (the way the course is structured, coverage of topics, etc.)

Very helpful in terms of thinking about the syllabus and what needs to be covered, ideas for materials, sources, exercises etc

Other information

Teaching organisation

At City University, the research centres provide teaching support in their areas of expertise to the School of Informatics, thus CHCID provides teaching expertise in HCI, including DfA and [e]accessibility

Masters level courses

The School of Informatics also runs a number of Masters courses

- MSc Electronic Publishing (Web and multimedia)
- MSc Object Oriented Software Systems (conversion for non-computer scientists)
- MSc Information Systems and Technology
- MSc Business Systems Analysis and Design

All these courses include an introductory HCI course, and about 100-130 students a year take them

Research projects in DfA/[e]Accessibility

All students undertake a research project, for BSc students - a one year project in their final year and one MSc students - three month project over the summer. A number of research projects related to DfA/eA are offered and these are proving very popular In last 12 months - approx. 6 BSc and 6 MSc projects in the area

3.10.1.1 City University, CHCID MSc in Human Centred Systems

From 2004 the Centre for Human Computer Interaction Design is offering a new MSc in Human-Centred Systems[2]. The programme comprises eight modules: Human-Computer Interaction Design

- Requirements Engineering
- Systems Specification
- Professional and Research Skills
- **Inclusive Design**
- Multimedia Design
- Advanced Human-Computer Interaction
- Evaluation of Systems

3.10.2 Loughborough University

3.10.2.1 Loughborough University, Department of Human Sciences

Name of Institution

Loughborough University, Department of Human Sciences.

Student level (undergraduate, postgraduate)

both undergraduate and postgraduate

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

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[2] http://www.city.ac.uk/pgrad/00000913.htm

Mainly Ergonomists, but some students in psychology. Sometimes we also have students in human biology, design and technology and mechanical engineering.

Title of degree course being followed (undergraduate degree, masters, etc)

BSc or MSc in Ergonomics

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

Optional Module in Ergonomics of Disability and Ageing

Entire Module runs for one semester, but the pilot described in detail in section 4.1 consisted of 2 lectures

Duration (e.g.1 semester, 1 week)

Total of 2 lectures (2 ½ hours each) over 2 weeks.

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)

Entire module uses lectures, practical work, and coursework which consists of either an essay focused on inclusive design, an assessment of need or an ergonomic audit of a building or technology. However, team work was the strategy used for this pilot workshop.

Taxonomy: Categories and Subcategories taught

All the categories in the taxonomy of core knowledge sets and skills (and especially awareness', 'why Design for All', 'recommendations', and user-centred design) are at least introduced over the course of the module, although a detailed coverage is not possible due to time constraints in a one-semester module (see full report). The Workshop pilot was intended to integrate the knowledge covered earlier in the module and to give the students more effective Interpersonal Skills for Teamwork and Communication by providing an opportunity to practise and consolidate behavioural skills, such as team work, communication skills, information representation, information retrieval, etc., in the context of Design for All. Given the nature of the workshop, however, all other elements of the taxonomy were also touched upon, the extent depending on the nature of the proposed design ideas and related discussions.

Other information:

The pilot Inclusive Design Workshop, which formed part of an existing module, has demonstrated the robustness of the knowledge sets and skills. It is expected that this module will continue in its present form. However, to introduce this workshop into the module in a permanent way will require the support and funding of the Institute, in order to pay for the expert user's time. This has proved to be a vital part of the interaction and learning process.

Colleagues have viewed this work as interesting and as an important part of this module.

3.10.2.2 Loughborough University, Institute of Polymer Technology and Materials Engineering (IPTME)

The Institute offers a range of programmes which are enhanced by its research activities and close contacts with industry. The philosophy of the IPTME is based on the engineering application and use of materials which when processed, are altered in structure and properties. This philosophy encompasses design considerations and business implications.

Student background (computer science, human computer interaction, and ergonomists, designers, etc)

The students in this pilot (15 in total) come from a range of different backgrounds, from materials/engineering, textiles, and design and technology. The latter group would have some basic, but limited, ergonomics background.

Student level (undergraduate, postgraduate)

Undergraduate, First year students.

Title of degree course being followed (undergraduate degree, masters, etc)

BSc (Hons) degree. The programme is either 3 years full time or 4 years o a sandwich course including a Diploma in Industrial Studies.

Title/type of Design for All teaching (e.g.course, module, seminar, etc.)

The teaching consisted of two sessions, as part of a new, one semester, module called Applied Design Ergonomics, provided for IPTME by the Ergonomics and Safety Research Institute (ESRI). The first session was held on 23 October, and the second on the following day. The aims of this module are to give students grounding in applied design ergonomics, together with the tools and techniques for the practical application of ergonomics into the design and selection of materials. This was the students' first formal exposure to the concept of design for all.

Teaching strategies used (lectures, practical work, team work, projects, dissertation, etc)

Session 1:

Session 1 consisted of a 50 minute simulation workshop (See Nicolle and Maguire, 2003) to encourage the students to think about how we take our senses and abilities for granted, as well as what coping strategies and adaptation techniques might be used by older and disabled people.

Using simulation glasses and sunglasses smeared with Vaseline, the following visual tasks were undertaken:

- Reading various newspapers, using different intensity light sources
- Completing application forms and other documents
- Identifying the contents of different tins and packets of food
- Trying to read the instructions for preparing the packets and tins of food
- Writing on paper, with different coloured papers and different sizes and colour of pens
- Counting a pile of money

The following Dexterity tasks were undertaken, after the students had taped buttons onto their knuckles and covered their hands with surgical gloves:

- Opening packets of various kinds
- Opening the plastic bags, putting objects into them and tying them up
- Untying plastic bags and removing objects
- Putting objects into jars and closing them
- Opening jars and taking objects out
- Drawing on paper with different sized pens and cutting out the drawings with scissors.

The session ended with a discussion about how the students' experiences and how these could affect the way they think in future.

Session 2:

Session 2 took place the following day as a two-hour lecture and discussion about inclusive design, covering the categories in the taxonomy as described below.

Duration (e.g., 1 semester, 1 week)

Total of 3 hours over 2 days.

Obligatory

Taxonomy: Categories and Subcategories taught

Awareness of Design for All

Students are made aware of problems faced by users in various contexts, successfully introduced through empathic modelling in first session (Nicolle and Maguire, 2003). [3]This is further emphasised the following day by presenting various perspectives on disability and ageing.

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[3] Nicolle, C. and Maguire, M. (2003). Empathic Modelling in Teaching Design for All.. Proceedings of HCI International, Crete, June 2003, Lawrence Erlbaum Associates.

Why Design for All

Students are made aware of the ethical, legal and commercial considerations for Design for All.

Recommendations

Students are made aware of the 7 Principles of Universal Design, the UK Disability Discrimination Act, and where to find them. Also web accessibility is provided as an example of the need for design for all, and the Web Content Accessibility Guidelines are briefly mentioned.

Accessible Content

A very brief introduction to accessible content in the context of recommendations above.

In addition, it was found that some of the overall instructional goals and learning outcomes, as proposed in IDCnet Deliverable 3.2, were evident when the students submitted their coursework. In particular these included 'understanding the importance of determining client needs' and 'knowing how to use various techniques and methods to capture user requirements ...'. taking into account age, body size, ability, etc. in the design process.

Other information:

It is expected that this module will continue to run next year, and the lecturer who invited the contribution plans to include these two sessions in its present format. Colleagues from Loughborough have viewed this work as interesting and as an important part of this module.

3.10.2.3 Loughborough University, Department of Human Sciences

A mini-pilot was undertaken as part of the recruitment process within the Department of Human Sciences to introduce the topic of Ergonomics to students planning to undertake a university degree.

One of the teaching assistants and research associates, who had in fact taken the module 'Ergonomics of disability and Ageing' some years before, was asked by the department to present some features of the Ergonomics Degree programme to (Advanced) A-level students.

This one-off talk about ergonomics to 15 secondary school students described what it is, what sort of jobs it would lead to, and where the degree can be taken. The research associate asked for advice on how to approach this in an innovative way, and I suggested the empathic modelling workshop, as described above.

The session was in the form of a seminar, with practical exercises, lasting 45 minutes. The students came from a variety of backgrounds, although all were generally interested in science. The presenter found that it was very easy to get the topic of Design for All on the agenda for the session. Only a subsection of the group undertook some empathic modelling, but

the whole group viewed slides to show how the world would look to individuals with different forms of visual impairment.

Taxonomy covered:

Following guidance in using the simulation tools, as well as the lecture notes and other materials, the presenter covered the following categories from the taxonomy, noting that she has never taught these topics before:

Awareness of Design for All

Why Design for All

Interpersonal Skills for Teamwork

Accessible content

New paradigms of interaction

User centred design

It is uncertain whether this recruitment session will continue in this form next year, as any number of university staff may be called upon to present it. However, it is planned that discussions will take place in the department in the hope that 'design for all' can be introduced as early as possible in a student's career, even at secondary school level.

4 Detailed Reports from the Universities of Loughborough, Valencia and the Aegean

4.1 Loughborough University, Department of Human Sciences IDCnet Pilot: Inclusive Design Workshop

4.1.1 Introduction

Ergonomics of Disability and Ageing is a one-semester module provided to the Department of Human Sciences by the Ergonomics and Safety Research Institute (ESRI), part of the Research School in Ergonomics and Human Factors. The aims of this module are for the student

- To develop an awareness of ageing and disability and explore how ergonomists can play a part in the design of products, services and the built environment for elderly people and people with disabilities,

- To explore the concepts of 'universal', 'inclusive' and 'barrier free' design, as applied to particular applications (low and high technology examples), and

- To examine the role of ergonomists in the development and evaluation of adaptations, generic or individual solutions

The majority of students are in their final year of a BSc Honours degree in Ergonomics, but there are also a few taking a one-year MSc degree in Ergonomics, not all of whom will have a background in Ergonomics. In addition, over the years there have been a number of students from the disciplines of Human Biology and Psychology, as well as from the Department of Design and Technology and Mechanical Engineering. This is an optional, as opposed to compulsory, module, and worth 10 credits towards the 120 credits the students need to take in one year. In order to cater for these different student learning styles, backgrounds and interests, there is a choice of coursework, which can be either an essay focused on inclusive design, an assessment of need, or an ergonomic audit of the built environment. Within these choices, however, there is a certain degree of flexibility, as long as the student discusses his or her suggestions with the course tutor. There is also a two-hour final examination, which consists of a selection from essay questions taken from the main concepts covered in the module, including:

- Introduction and empathic modelling, or experiential workshop Perspectives on disability and the process of ageing

- The built environment

- Design of everyday products

- Advanced technologies for ageing and disability

- Effects of disability and ageing on everyday life (The Third Age Suit)

- Access to computers

- Ergonomics tools, methods and techniques

- Requirements capture and evaluation in practice (the Inclusive Design workshop, held over two weeks and described below)

- Case studies, including for, example, smart homes and in-vehicle transport technologies (See Appendix 9.3 for a detailed description linking these topics to each category in the taxonomy).

Although the module has been running since 1998, it has evolved over the years and the concept of inclusive design has received more emphasis of late, especially with the introduction of the 'Inclusive Design Workshop' in weeks 9 and 10.

4.1.2   Categories from the Taxonomy

As can be seen from the contents of the module, it provides at least an introduction to all the categories from the taxonomy of core knowledge sets and skills, although no one topic can be covered in any great detail in only one semester of 11 lectures:

Awareness of Design for All

Students are made aware of problems faced by users in various contexts, successfully introduced through empathic modelling in the first lecture (Nicolle and Maguire, 2003).

Why Design for All

Students are made aware of the ethical, legal and commercial considerations for Design for All.

Recommendations

Students are made aware of a wide range of principles, guidelines, and legislation (especially the UK's Disability Discrimination Act) and where to find them.

Interpersonal Skills for Teamwork and Communication

It was felt that a specific activity was needed to practise and consolidate skills, such as team work, communication skills, information representation, information retrieval, etc., in the context of Design for All. Hence, the Inclusive Design Workshop was introduced, as described below.

Accessible Content

Students develop the ability to understand when content is inaccessible and what methods and techniques are available to produce accessible content. However, given the nature of the module, they do not develop the ability to create or convert the content for themselves.

Accessible Interaction: input and output

Students are introduced to a range of different input and output modalities, including a demonstration of JAWS screen reading software given by a first-year student who is blind.

New Paradigms of Interaction

Students are made aware of ongoing research in the area through case studies covering smart homes and in-vehicle telematic systems viewed through the 'lens' of Design for All.

User-Centred Design

Since most of the students come from an ergonomics background, they have a good understanding of user-centred design. However, the module views such methods and tools in the context of inclusive design.

Application Domains and Research

Students are made aware of the need to ensure that the higher education eLearning sector is accessible through the requirements of the University's 'Learn Server', where all course materials can be found on the University's intranet. The students understand that the new SENDA (Special Educational Needs and Disability Act, 2001) legislation requires that all schools, colleges of further and higher education and universities have a duty to make reasonable adjustments for disabled students.

In addition, it is intended that the overall instructional goals and learning outcomes, as proposed in IDCnet Deliverable 3.2, will be more evident in years to come when the students have entered their professions, hopefully built upon a foundation of inclusive design.

4.1.3   Inclusive Design Workshop, Loughborough University, UK

In December 2003, an inclusive design workshop formed part of the module at Loughborough University entitled Ergonomics of Ageing and Disability. The concept for this workshop had been developed during the GENIE project, which originally had taken place over the course of about 2½ days at the final GENIE project meeting in Helsinki[4]. The format was revised for use in this module with final year and post-graduate ergonomics students so that it could be completed over the course of 2 lectures of 2½ hours each. If necessary, however, the format could be condensed, as was attempted the previous year; however, this does not allow for much interaction, in particular with a guest facilitator. The interaction in this pilot proved to be an important element of the workshop, facilitated by Tony Verelst, from the Information Society DisAbilities Challenge International Organisation (ISdAC).

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[4]Dekker, M., Nicolle, C.,. and Molenbroek, J., (in print), GENIE workshop for curricula with user involvement and inclusive design. Gerontechnology Inernational Journal.

As can be seen from the previous section, all the categories in the taxonomy of core knowledge sets and skills are at least introduced over the course of the module, although a detailed coverage is not possible due to time constraints in a one-semester module. From previous lectures on the module, students already had a good awareness of Design for All, as well as Why Design for All and Recommendations. Since almost all the students had an ergonomics background, there was also a good understanding of user-centred design methods and techniques; and these were emphasised in the workshop through requirements capture and evaluation techniques. (However, a couple of the MSc students were Occupational Therapists, and felt disadvantaged because they did not feel confident with such previous knowledge). The Workshop was intended to integrate the knowledge covered earlier in the module and to give the students more effective Interpersonal Skills for Teamwork and Communication by providing an opportunity to practise and consolidate behavioural skills, such as team work, communication skills, information representation, information retrieval, etc., in the context of Design for All. Given the nature of the workshop, however, all other elements of the taxonomy were also touched upon, the extent depending on the nature of the proposed design ideas and related discussions.

4.1.3.1   Methodology

During the first week, the students followed Steps 1-3 (See format in the Appendix), that is:

The scene was set, whereby the students were told that they were taking part in a design team meeting, looking for new concepts for advanced technologies that follow the principles of inclusive design. The students divided up into groups of 5 students in each, and each group covering one of the following areas:

- Mobility
- Work
- Housing
- Information and Communication

One person in the group was asked to 'role play' as an older person or a younger person with a disability, whereby situations and daily activities could be explored from another point of view. With the help of a facilitator, these students were helped into their role by visualising someone they knew who is elderly or disabled, and also reflecting back on the Empathic Modelling session at the beginning of term.[5]

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[5] Nicolle C, Maguire M (2003). Empathic Modelling in Teaching Design for All. In: Stephanidis C (ed), Universal Access in HCI, Inclusive Design in the Information Society.

The objective of the workshop was to define a new or modified technology, designed to be as inclusive as possible, in the chosen topic area. The session began with the following general procedure:

- Starting from a higher abstract level (Step 1), defining threats and opportunities for the older or disabled population in society

- Identifying the requirements of the older or disabled person in that particular scenario (Step 2), and

- Creating a concept for a new technology to serve as a solution to the identified problem, and asking the older or disabled person to evaluate and discuss its utility, accessibility and usability (Step 3).

The ultimate aim of the workshop, however, was to arrive at a more practical solution or idea that would be accessible and usable not only by the older or disabled person, but also by a wider range of users, i.e., a more inclusive design rather than a form of assistive technology.

Step 4, Feedback to a Plenary session, took place the following week, when our visiting expert was able to participate. Tony Verelst, Chairman of the ISdAC International Association was first introduced to the class. Tony began the class by describing ISdAC and then presenting the *what*, *why* and *how* of inclusive design. After a short break, the students then presented their solutions and invited feedback from the plenary group.

A description of the proposed solutions, with comments, is provided below.

4.1.3.2   Mobility Group

This group developed a concept for special route planning software for a mobile phone to enable Shirley, aged 22 and with a learning disability, to learn and remember routes. It consisted of a simple map with landmarks, programmed to her level. For example, she could just select 'Find Job', press 'Go', and it would direct her accordingly. The advantage to this system was that it used existing technology but special adaptive software to meet anyone's specific needs.

Tony suggested that if everyone can use this system, then why not include the software in the original design, with the facility to adapt the user interface to particular needs. We can start with the needs of Shirley, and work outwards to the general population.

Tony also suggested that the students think about ethical issues with respect to such technology, e.g., how far can you go in controlling a person?

4.1.3.3   ICT

The user in role play during this scenario was Granny Smith, who has arthritis, with some visual problems, and unable to see or understand using a computer screen. She wishes, however, to use the Internet and to

continue writing to her family. The proposed solution would enable her to use a pen on a writing pad, whereby the writing would appear on the TV screen. Facilities, with easy input, would be available for email, shopping, Internet searching and calling for help in an emergency. It was expected that the text could be transferred as either handwritten or typed text, depending on preference of the user and also the recipient.

The shape of the pen, i.e., chunky and easy grip material was discussed, as well as the fact that the pen should stay with the unit and could turn 'on' and 'off'. It was noted that some PDA's have character recognition and the system could be trained to accept it. Tony noted, however, that it should not be Granny Smith who has to adapt to the system – it is the system that has to adapt to Granny Smith. After 10-20 characters of one type, the system would be able to tell the difference, and if not, it is a shortcoming of the system.

4.1.3.4   Work

The user in this scenario is a 32 year old man by the name of Phil. He is dependent on a wheelchair, and has problems when using his computer in accessing the cables at the back. The proposed solution is a new PC tower, with cables on the side, capable of being flipped to suit many different configurations in an office (See Figure 1). Such a new concept would not only help Phil to be more independent in managing his computer, but it would be helpful for everyone in different work situations. The design is also more aesthetically pleasing, as a flap covers over the cables.

Tony's response to this was 'Why do I have to come to Loughborough to see a design like this?' Even if Phil is not able to do it himself, he can still see what is going on more easily than before. Adding visible labels would also help identify each slot. Labels would, however, end up being upside down when the tower is flipped and it was decided that this feature would need to be discussed.
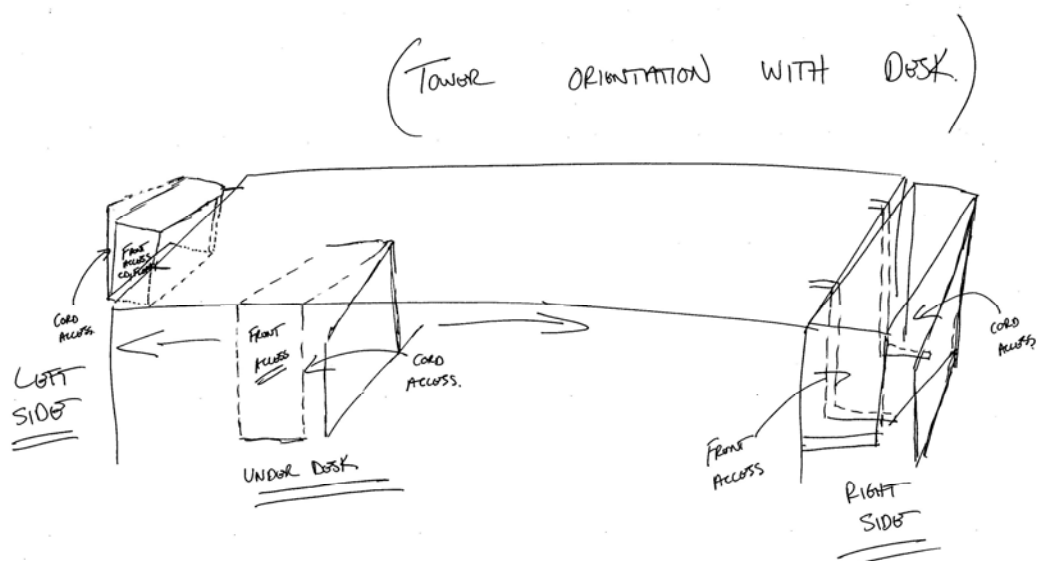
Figure 1: Students' sketch of new solution for PC tower

4.1.3.5 Housing

The user in the housing scenario is 87 with arthritis, needing help with a number of everyday living activities. One particular problem is filling a kettle with water. The proposed solution was a retractable hose from the kitchen sink which could be drawn to the pan or kettle to fill it in situ. The group were not aware that such a solution already exists and a lively discussion ensued; however, this is still a good example of inclusive design. Anyone filling a large utensil of water on the floor could benefit from using a hose extending from the tap. Care would be needed not to overfill, of course, and there would be a need for an electric siphon to empty the water later.

4.1.4 Discussion and Impact

The design solutions led to a further discussion about other examples and the benefits of inclusive design. For example, speech recognition was originally created for businessmen walking around whilst writing a letter. Now it is integrated into Windows XP. The housing scenario prompted questions regarding the usability and acceptability of smart home technology, and the students asked Tony a number of questions about access to his own technologies. For example, Tony described Lucy, his computer input device which works with a laser pointer attached to his eyeglasses. The students were so interested in how this would work that Tony sent photos, which were shown to the students the following week (see for example Figure 2).

Figure 2: LUCY with laser pointer

Two final comments from Tony demonstrated the essence and compatibility of inclusive design with user centred design:

"In ISdAC's view, there's only one good methodology: direct user involvement,"

and

"In the end, the user should have control."

4.1.5   Future of the Module and the Inclusive Design Workshop

The students have commented on the impact that this workshop has made on the overall success of the module. The module will certainly run again next year, and it is hoped that the Inclusive Design Workshop will also find the additional funding to ensure that Tony's visit to Loughborough will form an irreplaceable aspect of the module.

It is interesting to note that on the questionnaire completed by the students at the beginning of the module, all respondents thought that the Design for All knowledge and skills would be useful in the future, but on the post-questionnaire only 89.5% of them thought so (See Analysis of Pre- and Post- questionnaires in section 5.1). The reasons for this difference will need to be investigated, but perhaps the elements that the students disliked about the module can lead to improvements in the future, for example:

- Would have liked more practice in practical assessment techniques and design, and more examples of applications instead of summaries

Solution: More practical work

- Didn't like the part of the module about legislation, standards and guidelines
Solution: Investigate tactics for making this more interesting, as it is vital for inclusion in the module

Module doesn't really look at the company/designers' difficulties when approaching these issues. The ideas and tools etc. are great but it was a slightly biased view

Solution: Investigate/discuss these issues from the standpoint of the designer

There is also a problem when mixing undergraduate with post-graduate students because the background is very different. A couple of the MSc students were Occupational Therapists, and did not already possess adequate knowledge of user-centred design methods and tools, feeling disadvantaged in certain aspects of the module. However, their knowledge of the characteristics of older and disabled people was a valuable addition to class discussions, as well as to their own written work. Their assessment in the module did not suffer, although their concerns need to be taken on board.

Given the small numbers of MSc students, it has not proved possible to schedule a separate module for post-graduate students, although this could change in the near future. Based on the success of the existing module, a new post-graduate module 'Inclusive Design' has been recently proposed to the university. If accepted by the university, with sufficient student numbers registering for the course, this would mean 2 modules, which amongst other relevant modules within the Department of Human Sciences, would lead to a specialist MSc in Human Factors and Inclusive Design. The first module, Ergonomics of Disability and Ageing, would provide an overview of the specific needs of older and disabled people; and the second, Inclusive Design, would provide more specific detail and design advice to ensure that the student can put these principles into practice in a range of application areas, of which ICT will form a major part. In this second module, there would be more flexibility to take into account the suggestions made by the students in the IDCnet questionnaires.

In summary, the pilot Inclusive Design Workshop, which formed part of an existing module, has demonstrated the robustness of the knowledge sets and skills. To introduce this activity into the module in a permanent way will require the support and funding of the Institute. The will is there, but it requires more than just an enthusiastic 'champion' to make progress. As recommended in the FORTUNE project[6], participation of users in research needs to be appreciated and rewarded on the same basis as all other

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[6] Buhler, C. (2001), Guidelines for participation of Users with Disabilities in R&D Projects. In Proceedings of AAATE '01, Assistive Technology – Added Value to the Quality of Life, Slovenia. Č. Marinček, C. Bühler, H. Knops and R. Andrich (eds.). IOS Press: Amsterdam

partners—the same should be true of teaching activities. This includes inviting people with disabilities as presenters and not only as a reference group (see results of Helsinki Workshop on awareness raising, Darzentas, ed., 2003[7]). Organising a pilot workshop activity such as that at Loughborough University can demonstrate inclusive design practice, not just to the students but also to the administration, who are (or need to be) made aware of any accessibility issues in the built environment or teaching materials.

The authors welcome the use of this methodology (found in the Section 4.1.6 that follows) by other module or course organisers, as well as comments and suggestions to improve it.

4.1.5.1 Views and impressions on user participation in the Inclusive Design Workshop

The fact that as part of this teaching pilot, the direct user involvement is considered as very important for several reasons is an innovative approach to say the least.

Not only does it offer the chance for the potential end users to share their views on the why and how of an Inclusive Design Approach, but it also creates opportunities for discussing and demonstrating some good practices in this regard. From the students' point of view it is an opportunity to cross reference their thoughts and ideas on Inclusive Design with those of the users, and discuss some of the possible 'problem areas' in the specific design solution that they have come up with during this workshop. Furthermore, the impact of a 'real user defining real needs' is more powerful and accurate than any empathic modelling being carried out.

The fact that already during the presentation of their Inclusive Design solution the students were able to highlight some possible problems for specific target groups that they didn't consider earlier, as well as the fact that there was a huge interest on the specific technologies used by the disabled person taking part in the workshop, has proven that this is an important aspect of the curriculum and a way to generate their interest in the subject. It is also a more practical approach towards teaching Inclusive Design, which was indicated by the students as desirable in the questionnaires afterwards, rather than a pure theoretical one. Whereas both are undoubtedly vital components of any teaching on Inclusive Design, the right balance needs to be sought between theory and practice, which will take some time of trial and error before the optimal combination will be achieved.

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[7] Darzentas, J. (ed.), (2003), Identifying Core Knowledge and Skills Sets for Model Curricula, IDCnet Deliverable 3.2.

In order to facilitate and ensure a maximum effect of the user involvement in this teaching process, some views and points of attention might be considered:

- Since 'sharing the user's expertise' is considered an important part of the teaching, it is evident that some kind of reimbursement is foreseen, which is equal to that of other guest speakers. Therefore, when planning the curriculum and drawing up the teaching modules, this cost needs to be taken into account by the administration. A possible way to minimise costs can be to try and combine those modules where user involvement is required within a certain timeframe, e.g. by arranging several user feedback sessions on one day, rather than making the user come over several times.

- Arranging a user's visit to the teaching premises within the scope of this curriculum is also an opportunity to indicate some possible difficulties within the built environment. This way the Inclusive Design idea can also be put into practice towards the administration, so that they are aware of the issues involved.

- Whenever the user is to provide feedback on any Inclusive Design concept or product developed within the course of the curriculum, it is important to provide some 'positive suggestions in order to improve its functionality' rather than criticism. One should not forget that very often the students are not yet very familiar with the concept of Inclusive Design and the specific needs of different people with a disability. Therefore, giving a user's view on a specific product or idea must be done very carefully in order to prevent the students getting demotivated and losing interest in applying Inclusive Design.

- If possible, an interesting approach could be to involve several users with varying disabilities, in order to cover the full scope of needs for each specific target group. Bringing along some (assistive) devices as examples of good practice and demonstrate how they are used can be a real eye-opener as well.

- User needs and desires are very often determined by one's personal preferences, and therefore it is important to keep in mind that a certain user's needs and ideas might not always be those of the whole target group. A careful selection of the users to be involved in this regard is a critical factor for success.

In conclusion one might say that the need and impact of real user feedback with regard to teaching Inclusive Design has clearly been demonstrated in the Loughborough pilot. The success and effectiveness of such an approach is highly determined by a number of factors, and especially by the choice of the right user experts and their attitude towards the students.

Organising user involvement taking all these recommendations and requirements into account might be a heavy burden when drawing up an

Inclusive Design curriculum, and involving an intermediary disability organisation (e.g. ISdAC) in this regard can be of great help. Not only does such an organisation have contacts with disabled individuals and other organisations in order to find 'the right person for the job', it also brings together people with varying disabilities, and therefore possesses good knowledge about each disability category's specific needs, so that it can produce a global view on critical issues concerning Inclusive Design. This way the teaching organisation can fully focus on putting together the different modules for the curriculum, whereas the intermediary disability organisation can support this process by selecting and providing the best possible candidates for giving user feedback.

4.1.6   Workshop Methodology

HUC/HUP114

Ergonomics of Ageing and Disability

Inclusive Design Workshop

Setting the Scene (10.15-10.30)

You are taking part in a design team meeting, where we shall be looking for new concepts for advanced technologies that follow the principles of inclusive design. There is not much time for such ambitious goals (which is often normal practice), and so facilitators will help you decide when it is time to move on to the next activity.

There will be 4 different scenarios to work with, and you will divide up into groups, each covering one of the following areas:

- Mobility

- Work

- Housing

- Information and Communication

The groups will be organised in such a way that different disciplines will work together wherever possible. One person in the group will be asked to 'role play' as an older person or a younger person with a disability, whereby situations and daily activities can be explored from another point of view.

The objective of the workshop will be to define a new or modified technology, designed to be as inclusive as possible, in the chosen topic area. The discussion will start from a higher abstract level (defining threats and opportunities for the older or disabled population in society) and (hopefully!) ending up with a more practical solution or idea that will be accessible and usable by a wider range of users, including people who are older or disabled.

Step 1 – Opportunities and Threats (10.30-10.40)

For each older or disabled person:

While the rest of the group defines opportunities and threats (see below), the 'older or disabled persons' will spend time defining their particular needs and problems. With the help of a facilitator, it will be helpful to visualise someone you know who is elderly or disabled, and also to reflect back on the Empathic Modelling session at the beginning of term.

For the rest of each group:

Define the opportunities and threats to older and disabled people when considering their mobility, work, housing, or information/communication needs. For example in the field of mobility, some possibilities are:

Opportunities

- Wanting/needing to continue getting around.
- Maintaining independence.

Threats

- Walking:
- Difficulties or inability walking long distances
- Driving:
- Decline in motor performance, reaction times, vision, hearing and information processing.

Discuss these opportunities and threats. What requirements might they identify for new advanced technologies that can optimise the opportunities or reduce the threats?

Step 2 – User Requirements (10.40-11.10)

Develop your methodology for defining a new technology that would improve an older or disabled person's mobility, work, housing, or information/communication needs.

Discuss what methods or tools could be used to learn about older or disabled people's needs and preferences. Involve your older or disabled person in this discussion of their requirements.

Suggestions:

1. Develop a series of questions you want to ask the end-user, including e.g.whether to focus on walking, driving or public transport.

2. Identify tasks/activities that cause particular problems for that person.

3. Define the user's needs

Step 3 – Development and Evaluation (11.10-11.40)

Create a concept for this new technology:

1. Involving the older or disabled person as much as possible, identify possible solutions to the identified problems that can optimise their opportunities or reduce their threats to mobility, work, housing, or information/communication needs.

2. Choose one (or more) possible solution(s). Draw it or describe it.

3. Ask the older or disabled person to evaluate and discuss its utility, accessibility and usability.

Step 4 – Feedback (45 minutes the following week)

The design teams and the end users should be prepared to feed back their ideas and overall reactions at a plenary session the following week.

4.2   University of Valencia: A pilot experience teaching design for all in ICT-related courses

4.2.1   Introduction

The Department of Developmental and Educational Psychology of the University of Valencia Estudi General has offered during the 2002/2003 academic year an optional module of 60 hours on 'Design for All and Accessible Technology' to students of technical courses, (Computer Science, Electrical Engineering, Physics and so on)[8]. The module included material on 'awareness', 'why Design for All', 'recommendations', 'accessible interaction' and 'accessible content', this last one focused on accessible web design and video captioning using SMIL and RealText. Overall the module was very successful but it is still to see if this topic can be incorporated in the curriculum of ICT-related courses of the University of Valencia in a more permanent way once the IDCnet project finishes

The module contents were designed following the main knowledge and skill sets for Model Curricula proposed by IDCnet experts [3]. However some of the recommended items were not included in the program, namely 'New paradigms of interaction' and 'HCI and usability studies, user centred design and evaluation methods'.

4.2.2   Module content and methodology

The objectives of the module were:

- To know DfA philosophy applied to ICT products and services.

- To learn to defend DfA cases using legal, ethical and business arguments.

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[8] for fuller account see: paper in mICTE2003. you may link to the conference webpage: http://www.formatex.org/micte2003/micte2003.htm
and/or the online pdf on in that website:
http://www.todowebextremadura.com/papers/490.pdf

- To know the legislation in Spain, Europe and worldwide covering DfA
- To know real experiences of ICT access by people with disabilities.
- To know how to use the information sources about DfA in Internet.
- To know the implications of elderly and disability for ICT design
- To perform critical reviews of usability and accessibility of ICT products
- To know and apply the principles and techniques to create accessible multimedia presentations with SMIL (Synchronized Multimedia Integration Language).
- To know and apply the principles and techniques to review the accessibility of web sites.
- To acquire skills for presenting in public works related to the topic.

The module was structured following these thematic units:

1. DfA introduction
2. Related legislation and norms
3. Types of disabilities, functional aspects
4. Implications of elderly and disability for ICT design
5. Accessible multimedia (video captioning)
6. Accessible web design

The module comprised 24 sessions of 2 hours each and was taught always in a computer room with Internet access. Although the course was presential, the eLearning platform WebCT was used for supporting the discussion forums, content presentation, course webmail and the submission of assignments.

Figure 1. Web platform for students' discussion.

Between one third and one half of the session time on average was spent reviewing peer comments on the forum and web links suggested in class, commenting on the forum or working on the assignments. Six complete sessions were left for preparing and presenting these assignments in class by groups of two or three students. The assignments to do were:

1. Captioning in Spanish 5 minutes of different videos from Microsoft Enable video with SMIL and RealText.

Figure 2. Accessibility video captioning.

2. Comment on four problems of inaccessible web design and lack of usability found on different web sites.

Figure 3. Accessibility Test.

It was planned to do a third assignment about the DfA aspects of real ICT hardware devices for elderly and disabled people. For example, a mobile telephone, a TV set or an automatic cash machine. However, this could not be done due to lack of time.

There were also some visits from experts and users. This was the most valued aspect by students.

- A lawyer specialised in accessibility and Internet legislation.

- Two blind users (one was student) demonstrated the use of JAWS for browsing the web and commented on inaccessible websites. They also showed some Braille note-takers and commented on other technology for blind during two days.

- A motor impaired young person in wheelchair, demonstrated the use of speech dictate and alternative input methods (adapted roller-ball) to access the computer.

- A person with hearing impairment, also working at the Counselling Centre for Disabled Students at UVEG, presented us technical aids for the deaf, and commented on communication barriers.

- A teenage boy with Down syndrome came together with her older sister and they were commenting on his access to the TV, telephone, Internet and so on.

In order to pass the module, the students had to complete and present the two assignments and had to show also a minimum participation in the discussion forum, sending at least a message per each session where the lecturer posed a question to answer or discuss in the forum. Reading most of the messages sent by the other students was also a condition to pass the course. This was followed up using this available feature of WebCT.

4.2.3   Module results

The module was offered as an optional one (*asignatura de libre elección)* in the second term of the academic year. There were 20 students enrolled although only 18 did finally attend. There were 7 from Computer Science, 8 from Biology, 2 from Mathematics Science and 1 from Electronical Engineering.

All students passed the module as they all completed the two group assignments and had a satisfactory participation in the online forum, with a total of more than 300 messages sent.

The last day of the academic year the students had to fill in an evaluation questionnaire about the module. This questionnaire was based in the draft version of the one that will be passed to all students of different IDCnet pilots by the end of the project. The results of this questionnaire are presented in more detail in section 5.1

4.2.4   Conclusions

This experience shows that DfA can be taught correctly in ICT-related courses as an autonomous module and it fits naturally with the rest of contents of these careers and is accepted quite well by students. However, it is still to see if this topic can be incorporated in the curriculum of ICT-related courses in a more permanent way once the IDCnet project finishes. Different alternatives and proposals are already being put forward in the framework of IDCnet but these still have to be assumed by the University of València.

On the other hand, the optional nature of the course impeded to introduce a high level of demand into it as students tend to put more effort into compulsory subjects and do not expect to work too hard into these "free-option" modules. And in this kind of module it is difficult to motivate with the final mark as only "pass" or "not pass" marks are possible.

4.3   The University of the Aegean, Department of Product and Systems Engineering Design

The course on Design for All was given in the Autumn semester 2003, in the Department of comprising lectures on 'awareness', 'why Design for All' 'recommendations', and accessible input and output, and lectures and practical demonstrations on 'accessible content'; seminars on 'new

paradigms of interaction', and human centred design, and projects (to practice interpersonal skills as well) on new paradigms and applications,

4.3.1   Background

The Department of Product and Systems Design Engineering, University of the Aegean, is a new department that opened in Autumn of 2000. The mission of the Department is to offer education in design, bridging the gap between art and design and technology, and looking to the new products sytems and services that will be required in the Information Society. A very strong influence in the department is that of HCI.

Hence the students style themselves as "designers", and while during their five year studies, they follow similar courses to other design schools, such as form and styling, sketching and colour, and design studios, and courses in CAD, they also take courses in informatics, soft systems information architecture, communication theory and interaction design.

The Course on Design for All given for the first time in 2003/2004 to the first cohort was offered as an obligatory course, if students took the option Interaction Design, which is one of three 'directions' or options offered to students in the fourth year of their five year undergraduate course (UG+Master's combined).

78 students were eligible to take the direction-option Interaction Design, and 66 chose Interaction Design, and hence signed up for the Design for All course. Of these 66, 48 stayed the full course and sat the final exam. Student drop out was mostly due to failure of the 18 students to complete team projects which was an obligatory part of the course, counting for 50% of the final grade. The reasons cited for failure to complete by these students were:

- pressure of time due to participation in a national design competition whose deadline was only one week earlier that the deadline for the DfA projects,

- and time spent abroad on an educational visit to Italy, between the delayed start of the academic year, and the deadlines for the competition that put even further pressures on students when they returned

4.3.2   Course structure

The course was run over a complete 14 week semester, beginning in late October 2003 and finishing early January 2004, with the written projects being due in early December. Oral presentation of the projects by the groups took place between December and January using DfA class hours and supplementing them as needed. The final exam was held in February 2004. The students worked in groups of 3-5 persons. The written work was submitted to a common deadline, while the presentations were made to the audience of the class, with time for questions from their peers and

commentary from their peers and their instructor(s). The projects, counting for 50% of the final grade for the course, were marked 25% for the quality and presentation of the written work, and 25% for the quality of presentation and content of the oral work. In order to guarantee that all students work, students must obtain a minimum of 40% on both exam and project work.

The topics for the team projects were to be research based, as time constraints did not allow for a more practical approach. The students were asked to choose between various domains of applications. 11 projects were completed, the subjects were:

- e-Commerce

- e-games

- smart buildings/homes (5 projects)

- web design for all

- mobile phones

- sports (2 projects)

Each project had to look at the state of the art of the application, and identify problems for accessibility, and suggest ways to overcome problems.

The idea behind the projects was twofold: to practice both **interpersonal skills**, and to explore **domains of application and** the current state of **research**. In the event, since these were students in their fourth year, who have been making oral presentations of their work for other courses, they mostly demonstrated extremely good presentation skills, both in terms of time-keeping, dividing the presentation roles between the members of the team, as well as presentation materials that were well thought out. However, new challenges to the students were introduced; they were to explain graphics, to cope with low lighting, noisy conditions, and audience unfamiliar with the language of presentation. On the whole, the students responded well to these challenges, checking their presentation materials for non-essential graphics, and colour schemes that could cause problems, making an effort to speak slowly, clearly, and loudly enough to be heard over the noise, etc.

4.3.3   The relationship of the IDCnet taxonomy to the course.

The course outline was based upon the taxonomy. Broadly speaking each week was dedicated to a subcategory, except for the categories of interpersonal skills and domains of application that were referred to, but mainly treated by means of the team projects, as described above.

Some of the topics covered within each subcategory are briefly described below for illustrative purposes:

Awareness

Some of this took place in the taster class that was offered to all students in order for them to make informed choices about the direction option.

This session began with the instructor challenging the students to offer explanations for the term Design for All. This instructor was not the DfA course instructor but a "skeptic" aiming to provoke the students. "Is it possible to design for all" he asked, "How can we design a public phone at a height that is suitable for everyone". Much to our delight, a female student immediately fell into the trap of offering us the average height as the answer! This gave us the opportunity to launch into the bell curve argument, and also to suggest that a telephone need not necessarily be at a fixed height.

For the awareness lectures proper, the aims were

- To explore various definitions of design for all: e.g. Design for All as more than design for the disabled and elderly

- To try some simulation exercises. These were deliberately based upon handicapping situations, Doing parallel tasking (holding the baby and making a phone call on an unfamiliar cell phone) talking on the phone in a noisy environment, trying to read the instructions on a medicine bottle without glasses, etc.

- Hearing from experts: It was explained to the students that although we could also do exercises to simulate disabilities we would prefer to hear directly from people with disabilities about their experiences. Our plan was to a lady with MS who lives locally, who was willing to discuss the problems she and others experienced living with the disease and in particular with everyday ICT appliances and had agreed to answer questions the students would ask.

In the event, the visitor was unable to come so, as a stopgap, we made use of the experiences of 3 British students who were writing diaries for the BBC Ouch! Website[9]. These students had undertaken to keep a diary for the first four weeks of their first term at University. Because of the late start of term for the Greek students, (see section 3.6.2) there were already two weeks of journal entries for the students to read. They found this very enlightening, enjoying reading about an age group with whom they had a lot in common (going to concerts, skipping lectures, etc.) and in discussion, revealed their surprise at some of the problems the students had, not with their disability as such, but with their concern for acceptance by the student community and integration into student life.

From this it turned out that most of the students could more easily relate to the elderly, as the strong family culture in Greece means that many students are used to having close contact with elderly relatives, and well

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[9] http://www.bbc.co.uk/ouch/

aware of the problems they face, both practical and emotional but few students had any similar level of familiarity with people of their own age.

Assignments to students to find out about what organisations existed in Greece for the disabled, also led them to discover that a large proportion of the young people with disabilities in Greece have acquired their disabilities though accidents (mostly traffic accidents) rather than being born with them. Thus the students included in their awareness the sudden transition from able bodied to disabled, and that Design for All is not just about functionality but also about human dignity.

Why Design for All

In this part of the course, extensive use was made of material from the DASDA website[10], particularly for the commercial reasons.

For ethical reasons, the progression from the 1948 Declaration of Human Rights to the adoption of equal opportunities for all was presented.

For legal reasons, a brief overview of some of the legislation that is highlighting equal rights for all, and being used in the name of accessibility, and giving some examples of litigation. The difference between the push of ADA and the pull of Section 508 was explained. As an assignment, students were asked to try to find what legislation exists in Greece

Demographic statistics regarding the aging population and the changing composition of the population were also presented and discussed for their import to Design for All

Recommendations

An introduction to this large area dealt gave an explanation of what it covered and the understanding that these were repositories of knowledge and guidance that students should be aware of, and consult as appropriate when doing design in the future. Several items came up with regard to this area. For example: students had a very limited understanding of the use of standards, and so the relationship between standards and legislation was explained. The Universal Design principles were presented and discussed, and assignments challenged students for find examples of each of the seven principles and see if they could find an eighth principle. The possible uses of the WHO's ICF (International Classification on Functioning)[11] in their future design work was discussed, as well as noting in passing the change in abbreviation from "ICIDH" (International Classification of Functioning, Disability and Health) to on of "ICF." the significance being the emphasis on functioning rather than on disability.

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[10] http://www.design-for-all.info/

[11] http://www3.who.int/icf/icftemplate.cfm

Another example of recommendations were specifications and as an example, specifications from the IMS project[12] were examined.

The aim was to encourage students to look up such recommendations that would be appropriate for their design work in the future, at the same time it was explained that we would be looking at recommendations alongside the subject matter of accessible content in the form of the W3C WAI guidelines on accessible content.

Accessible content

Treatment of this category of the taxonomy, took the form of lectures and and some practical work, various tools for creation and checking of content were demonstrated and students asked to do an exercise where they used the tools themselves.

Amongst the topics treated here were: importance of content to the Information Society, digital and non-digital content, the view of content in terms of content, structure and presentation, the use of different types of media to convey different types of information, e.g. a text description of a task compared to a diagrams, a combination of two may be redundant but offers reinforcement and overall aids comprehension. (Students invited to find counter examples!). Moving to discussion of some ways examples of alternatives, like graphics, audio visual material, the importance of adding visual to audio material (i.e. captioning), the uses of various metadata schemes, etc. Also introduced were the WCAG 1.0 as well as 2.0 (reinforcing the message from previous classes about recommendations), showing the evolution of guidelines, and as a preparation for the work that students would do in the practical part of the class. The IRIS environment[13] was demonstrated, as was VIScheck[14], to show the students the usefulness and the limitations of the available tools.

As an example of the practical class, students making use of these tools, demonstrated that the Athens Olympic Website could cause problems for people with colour blindness, and that a lang tag was missing in the English version of the site.

Accessible interaction: input and output

The lectures from this week in the class introduced the students to various pieces of assistive technology. Care was taken to demonstrate wherever possible how some of this technology had been taken over by mainstream design; e.g. voice recognition systems, vibrating and flashing mobile phone alerts, etc. It was emphasised using screen readers as an example that the assistive technology can be a hardware device, or a software programme. (Students were reminded of the importance of structuring and presenting their content that had been demonstrated in the previous

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[12] http://www.imsglobal.org/

[13] http://www.iris-design4all.org/

[14] http://www.vischeck.com/vischeck

classes). In order to give an overview of some of the topics here, the material was roughly split into input devices and software aids, and output devices and media.

The students also enjoyed two short videos from WebAIM[15] which showed a blind student demonstrating the use of the screen reader and discussing some of the issues, and the perspective of non accessible output from a deaf person. Not being native English speakers, combined with the poor acoustics of the rooms, and the poor quality of the speakers on the computer, they needed to see the video, read the transcript, and then watch the videos again. They commented that WebAIM should caption these videos to make them accessible to a wider audience!

New paradigms of interaction

The objective underlying this set of lectures was to impress upon the students that new technologies and ways of interacting with them can raise new barriers for some users, if they are not designed inclusively. A series of innovative products were examined and analysed in terms of what they offered and whether they were usable and accessible.

Some of the technologies looked at were: Virtual realities: e.g. immersive environments, including avatars, (for instance applications like signing avatars); mixed realities, including haptics and force-feedback; Sensing and scanning technologies, for location awareness and context sensitiveness : e.g. RFID:(Radio Frequency Identification), GPS, sensors; Biometrics, sensors and implants; robotics: animatronics, teletronics and how amalgamations of some or all of these create new uses, new paradigms. Examples of such products were: cyborg type products: e.g the Fukumoto phone, robotic products (the robot that carried users up and down stairs, and over uneven ground); smart wearables: clothing and accessories with sensors, with internet, etc.

User Centred Design

As explained above, the DPSDE students have already taken many HCI courses, therefore, although they were introduced to USERfit as a means of gathering requirements from using different tools and methods, it was not not necessary to explain the use of many of these tools and methods. Some however, they had not come across, such as Kansei modeling. Instead, they explored what might be the most suitable methods to elicit information from groups for whom some of these methods might not be suitable. Had there been more time, a practical exercise was planned, involving the pupils, parents and teachers from a local special needs school.

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[15] http://www.webaim.org/

4.3.4   Communication channels

Athough most of the course was face to face, the use of online VLE e-class for lecture notes, for project written work, for announcements to the students about deadlines, guidance on project presentation, etc. as well as email communication with the students etc, meant that it was possible to interact with students frequently outside of lecture hours, on matters to do with the course, both on a one-to one basis as well as project and class wide.

4.3.5   Outcomes of the course in terms of continuity

One of the most important outcomes of the course, is that students are to be encouraged to take up DfA work in other courses. In the next academic year, this cohort of students will be taking Design Studio (no 7) where the design brief will include Design for All criteria.

It was also very useful that other staff members attended the first lectures on DfA awareness and Why Design for All.

As a result of both this DfA course, and the Design Studio, the plan is that students enter for the Inclusive Worlds competition next academic year, and actively seek to incorporate an inclusive design theme to their work in other competitions, even when not specifically called for by the competition.

Other changes to the course.

- DfA will be obligatory for all students: Interaction Design Direction is going to become obligatory, so that all students will be required to take this course.

- More practical work on e-accessibility: Instead of 2 x 2hour classes a week that are mostly theory, there will be 1x 2hrs lecture and 1x2hrs practical work every second week.

- Introduction to DfA earlier in the degree course: In the first and second years of the degree course, the module on HCI will contain some lectures on DfA, to make sure that students are introduced to the topic earlier on in their course.

For an account of the students' expectations from, and reactions to, the course, please see section 5.

5 Student expectations and reactions: Results from Questionnaires

Questionnaires were prepared to be completed by the students before and after each of the pilots (See the templates in Appendix 9.1). The purpose of the pre questionnaire was to identify the knowledge, skills and attitudes of students towards 'design for all' before the module, course or particular session began. The students were told that a similar questionnaire would then be administered later to see if and how their views may have changed.

In most cases, respondents were allowed to select more than one response to any question. For example, when asked to comment on their background or knowledge in each particular category of the taxonomy, it is possible that they not only have some knowledge, but they hope the module will give them further knowledge or skills in that area. This accounts for the different number of responses for each question. On reflection, it may have been better to allow only one reply for each question so that comparisons before and after could more easily be made. However, in some cases the responses were anonymous and not all students were present to answer both questionnaires. Therefore, the qualitative feedback was expected to be (and was indeed) the most useful result, and it was not essential that the pre and post questionnaires would be correlated for specific students.

5.1   Spain: Valencia

Results from experience (evaluation questionnaire) (post questionnaire)

Overall, the students value the module as an "eye-opening" experience and think that they have learned new things in an area that they completely ignored. However some of them opine that it will be difficult to apply this knowledge in their future jobs as there seems to be presently a lack of legal exigency in providing accessible products and services, especially in the area of accessible web design.

The sessions that students liked most were the sessions with real users, where they appreciated that some users were students like them, and to a lesser extent the topic of accessible web design and revision. What they disliked most was the session about legislation and the initial theoretical sessions about DfA and the different disabilities.

It can be highlighted that many students chose the module because they hoped it to be 'useful or interesting' but did not expect its contents to evolve around the needs of elderly and disabled people. However they were happy with it in the end. As an anecdote, one student thought initially that 'Design for All' meant making computer technology easy *for the students* and he registered in the module because he considered that he was very low computer-skilled.

Some interesting student comments extracted from the questionnaires are quoted next:

- "In my future job I do not know if I will really use the computer but this module has made me think about accessibility globally, not just for the computer, and that I do think it will be useful for me."

- "Given the current state of the world of telecommunications I will not use this knowledge in my future job unless I work for the public administration or other public institutions. Private firms focus more on latest technology and attractive pages to impress the client."

- "In general I think it has been a very interesting module, although at the beginning I did not know what it was about."

- "I would suggest more practise and less talking."

- "I would recommend this module to everyone, because you can learn about the problems of people with disabilities but also the many things that can be done to make life easier to them."

- "I did not have much knowledge about this. What I have learned can be very helpful in the future, not only for my course, but for my life in general, because when I design any device I will think much more in people with disabilities"

- "It made me see thinks that I really did not consider before".

- "I never imagined that the (inaccessible) web design could affect to so many people. With and without disabilities."

And one final comment by one student that shows that the objectives of the authors when designing the course have been accomplished, at least for this person:

"I think it is one of the most useful modules I have chosen in my four years course so far. It is important to possess knowledge, but it is even more important to think about helping the others and make life easier for those who encounter more barriers. Besides, I think it has made me grow as a person."

5.2   UK: Loughborough University

5.2.1 Loughborough University, Department of Human Sciences

A pre-questionnaire was completed by 24 students at the start of the module Ergonomics of Disability and Ageing in October 2003. The post questionnaire was completed by 19 students at the end of the entire module in January 2004.

23 out of 24 respondents (95.8%) chose this optional module, as opposed to other possibilities, because they said it looked interesting and useful.

The remaining respondent had previous experience of Inclusive Design in the past as an Occupational Therapist and wished to learn more about the subject.

Students said they liked the fact that a wide range of topics were covered, and that the topic was useful and applicable to other modules. They liked the general overview approach and also the flexibility of arranging a coursework topic, as well as all practical aspects of the module, including the 'inclusive design workshop'. (This module, and its associated coursework options, has frequently led to final year or Masters projects in the area of design for all).

As reported in Section 4.1, on the pre-questionnaire all respondents thought that the Design for All knowledge and skills would be useful in the future, but on the post-questionnaire only 89.5% of them thought so. The reasons for this difference will need to be investigated, but perhaps the elements that the students disliked about the module can lead to improvements in the future, for example:

- Would have liked more practice in practical assessment techniques and design, and more examples of applications instead of summaries

Solution: More practical work

- Didn't like the part of the module about legislation, standards and guidelines

Solution: Investigate tactics for making this more interesting, as it is vital for inclusion in the module

- Module doesn't really look at the company/designers' difficulties when approaching these issues. The ideas and tools etc. are great but it was a slightly biased view

Solution: Investigate/discuss these issues from the standpoint of the designer

The full results and specific comments from the students can be found in Appendix 9.2.1.

5.2.2   Loughborough University, Institute of Polymer Technology and Materials Engineering (IPTME)

The pre questionnaire was completed by 12 students in October 2003 before a 50-minute simulation workshop (See description in Section 3.9.2.2.) The post questionnaire was completed by 11 students on the next day, following a two-hour lecture and discussion about inclusive design (also see Section 3.9.2.2 for categories covered from the taxonomy).

This is a new IPTME module in Applied Design Ergonomics, taught by ergonomists at ESRI, and the lectures are compulsory for all first year

students. When asked if they thought the knowledge and skills from these 2 sessions would be useful in the future, all 12 respondents answered yes to this question. 10 out of the 11 students (90.9%) that completed the post session questionnaire thought the knowledge gained from the course would be useful to them in the future. The remaining student provided no response.

Students commented on the fact that they had limited previous knowledge of the issues raised in design for all. They enjoyed the way they were taught to think like the user, and hadn't realised the problems faced by people with disabilities. They said that this knowledge is important when working as a designer in order to be able to consider other people's everyday problems and difficulties.

One student commented that there were a bit too many statistics, but another suggested that longer could be spent on design for all as it is an important area for design. It was also noted that the list of addresses and references would be useful in the future, so also knowing where to look for more information was important. Given the limited nature of these 2 sessions, these comments need to be considered for future students. It will be recommended that this pilot be used as an early awareness raising exercise, but that design for all should then be 'infused' throughout not only this module, but also the entire degree course.

The full results can be found in Appendix 9.2.2.

5.3   Greece: University of the Aegean, Department of Product and Systems Design Engineering

Background

Pre questionnaires were filled out by 22 students, post questionnaires were filled out by 17 students, with 11 students filling out both pre and post questionnaires.

Completion of the questionnaires was not obligatory, and the students filled them in anonymously, (in fact, the students devised a system of ids that would be known to themselves, but not to each other, or the instructor of the course). In the final event, most students did not bother to mask their identity, although a few maintained that anonymity was a principle that should be adhered to, and stuck to the system that had been originally devised. The questionnaires were filled out online. The pre-questionaires were filled out after the students had attended a "taster" one hour class. The taster class is carried out for all optional classes in the department, so that students can make more informed choices. The students filled out the post questionnaire after the end of the course, and when the final grades were known, so that there was no possibility of them believing that filling out the questionnaire with favourable comments would help their grades. The questionnaires were given in their original language (English) and many students understanding that the

questionnaires would be subject to analysis by project members, made great efforts to write their comments in English. No attempt to correlate the pre and post questionnaires for specific students.

Results:

Overall in the prequestionnaires, the students answered that they hoped the module would give them more knowledge and skills in the area, while in the post questionnaires, the results consistently showed that they believed they had learned new concepts, confirmed previous knowledge and that the module had provided important knowledge and skills in the area.

More valuable and illuminating than the quantative resutls, a graphical display of which can be found in Annex 9.2.3, were the qualitative results coming from the students comments, both in terms of their expectations and their reactions to the course. Several comments from the students were very useful for the future instruction of the course. For instance, several students expressed the wish for more hands on practical elements in the course, for continuity in other areas of their degree, etc.

With regard to expectations, 12 students replied, while 10 left the question unanswered (54%). Their replies were all affirmative to the question **"Do you think that the knowledge and skill listed abov would be useful in the future"** and to the corollary **"Why or How?"** some students replied with practical concerns, hoping it would gain them added value in the job market, others that they would be able to use the knowledge and skills profitably in other areas of their degree course. Of those who answered, the majority seemed to think it was a logical step to design for "everyman" (evidence perhaps of the HCI pervasiveness within the department) while one student expressed idealistically that it would make the world a better place.

With regard to reactions, the students were on the whole very positive about the course, replying to the question "**What did you like about the course**" with comments to do with the new perspective, and the opening up of a new area of knowledge that was pertinent to their degree course. There were no really strong objections to parts of the course, (**What did you dislike about the course?)** although there were comments that referred to the difficulty of supporting the definition of design for all, and being overwhelmed by the responsibility it entailed. Finally to the question **What did you find most useful?,** some students replied by picking out modules, others referred to the way the course was run. There was no overall concensus, preferring one module over another, but there were several replies to the effect that everything was equally useful. The annexe 9.2.3 gives a fuller account of the questionnaire survey carried out in the Aegean.

5.4   Germany: Multimedia Center Kiel (MMC)

The pre-questionnaire was completed by 12 students on 8 March 2004 at the start of the module. The post questionnaire was completed by 12 students at the end of the entire module on 22 March 2004.

Students choose the course as an option out of two, but the module was obligatory within the whole course. Participants from developing countries were hearing for the first time about needs of disabled users.

The lecturing model is based on the short modules which appear in different courses and cover several aspects separately but in relationship to mainstream knowledge.

Students had confirmed their knowledge they gained in another previous course, where some assistive devices and interaction techniques were already discussed. Still, this knowledge was extended in the course. The post-questionnaire results confirm that students expect to apply their knowledge in other subjects as well. Another small module in a different course will discuss more advanced techniques to adapt user interfaces.

Future work should try to identify how Design for All knowledge can be made applicable in other subjects. In the case of Kiel the application in management courses would be a good source to link design experiences, technical solutions and business cases.

As the module was too short to cover web accessibility in detail, a future version will have to include also real users to challenge students in web design issues.

Graphs represented the questionnaire result can be found in Annexe 9.2.3

5.5   Central Remedial Clinic (CRC) , Delivery of Design for All and Assistive Technology, Elective Module, Final Year, BSc., Computer Science, Dublin Institute of Technology, Kevin Street.

Of the 42 students participating in this elective module, 39 completed the pre-questionnaire, following a short presentation of the course content and objectives.

On analysis of the completed questionnaires, the majority of students highlighted the fact that they had little or no prior knowledge of design for all or issues relating to design for people with disabilities. Many of those who completed questionnaires commented that they chose to do the module because it "looked interesting", or because it "might be useful" in their future careers.

The content and structure of this course was amended to reflect the taxonomy developed by the IDC-Net consortium.

Following completion of this course all participants were asked to complete the post questionnaire, following an end of module, in-class exam. In all, 35 students completed this questionnaire.

Analysis of the post-questionnaire, suggests that, overall, students found the course very interesting and useful (91%). The majority of students found that during this course their awareness of Design for All issues increased (83%), they learned new aspects relating to the ethical or legal imperatives for DfA (74%) and the guidelines provided to them during the course were of value (89%).

The delivery of the course was complimented as being interactive and encouraging debate as a mechanism for learning. The use of practical examples to illustrate various learning concepts or ideas was deemed of high value to participating students.

Many students on review of the course material reported that the new information received would be of value to them in the workplace. Some commented that the module should be delivered long before final year of their four year BSc., programme, so that it could be practically implemented into ongoing project work. The main criticism expressed by respondents was in relation to the timing of the course, with students highly critical of the fact that lectures were conducted so late in the evening.

Some students also criticised the fact that they did not get enough practical hands on experience, particularly in relation to the use of assistive technologies, in contrast, however, most students reported that the teaching of Web Accessibility standards and guidelines was replete with practical examples.

Some of the comments from student respondents are summarised below.

What did you find most useful?

"The Web Accessibility is most appropriate for course , but I think looking from every users point of view will always benefit me in future developments and projects"

"The various ergonomic services and the approaches taken to incorporate them with computers."

"The knowledge obtained about disabilities and the usefulness of computer for disabilities I feel that will. I will be more aware in the future."

What did you like about the topic?

"Different approach to computers than other subjects, i.e. More importance on the user rather than the application . It was an interesting and thought providing course."

"I found it very interesting to learn how other users use the internet and I became aware of the obstacles disabled users face on a day to day basis.

It broadened my outlook on design and made me aware of what I take for granted as regards internet /computer use."

"It gave me an insight into the problems that people with disabilities feel, that I would not have gathered elsewhere. Made me think differently about how people without disabilities help those with."

"Brings human element of computers in study of computer science."

"I liked the fact that we were shown how to look at assessing different aspects of computer technology from a disabled point of view."

"It had a different approach to other modules. You are made to think rather than just learn."

"The accessibility of websites classes was very interesting, and also the design for all."

"Gained extra insight into features which make good design for all principles."

Do you have any further comments or suggestions?

"This option in the FT228 Course should be mandatory. The design aspect of software is always left until the end. This course module teaches fundamentals and practices which is inherent or should be inherent in software design."

User centered design, including methods, tools and techniques to capture user requirements and evaluate designs with users. Further comments:

"Would like to have covered this in more detail- methods to capture user requirements."

5.6   Conclusions

The most salient conclusion to be made is that although these modules were optional, and in the case of Valencia, free modules, students who chose them and answered questionnaires were on the whole very happy with their choice. It may be argued that students who were not satisfied would not bother to fill out questionnaires, or indeed continue on the course. However, of the high numbers of students that filled out questionnaires, shows that, in terms of student acceptance, Design for All teaching is popular with students, and that the majority believe it will be useful in the future (Aegean, Loughborough, Kiel, Valencia, CRC), that they would like more practical work (CRC, Loughborough, Valencia and Aegean), and more or better hours (Kiel, CRC, Loughborough). An immediate result of these responses that they were very encouraging for DfA educators involved. On several of the questionnaires the students offered opinions about the importance of the topic, i.e. that it should be taught earlier on in the course, and to all students.

6 Taxonomy Validation

In this section, the taxonomy of core Design for All knowledge sets and skill is reviewed in the light of the experiences described in section 3, 4 and 5 above using two criteria: **completeness and usefulness**.

6.1   Completeness

With regard to the first, the present version represents the final version of the structure of the categories and subcategories. Within the subcategories it has been suggested that more indication of the topics that belong in each category could be made. In the short description of each of the teaching pilots in section 3, and in the more detailed narrative of the pilots in section 4, there are descriptions of the topics covered and the categories they belong to. We believe that these will be helpful to other DfA educators to better understand what is being taught, without mandating what topics should be taught, as these will vary with the background of students and institution, and also will vary over time. In the annexe 9.3, two examples are given. The first of a course plan given, where the taxonomy is shown, at the highest level, followed by lecture title (unit) and the topics covered. (Note that it is possible for a topic to belong more than one category). The second example is actually two for two modules inserted within HCI courses, the one into an introductory course in HCI, and the other, into an advanced HCI course. Again, the taxonomy categories are shown at the highest level and representative topics shown underneath.

6.2   Usefulness

With regard to the second criteria, there are views from different stakeholder groups: the DfA educators, the students, and other people involved less directly with the teaching of DfA, such as researchers, and librarians. It is also interesting in the context of the pilots, to compare experiences with the teaching of certain topics from the categories in the taxonomy, some of these are presented in this section. From the DfA educator point of view:

There were several positive comments:

- Some lecturers said they would like to include material from other categories in the taxonomy that they did not presently include (see sections 3.7.1. & 3.8.3).

- Several course organisers, said that they would check the taxonomy for structuring their course.(see sections 3.8.1, 3.8.2, 3.8.4.1, 3.8.4.2)

- Others claimed they would use the taxonomy as a basis.(see sections 3.9.2 & 3. 7.2)

Other comments are not so positive.

One comment was that it was too "rigid", (see section 3.3) not allowing for project and problem based learning. However, in fairness, the taxonomy does not prescribe any specific teaching methods. It is merely a classification system for taxonomising the types of knowledge and skills that are presently being taught to students of various disciplines, and are called Design for All. .

How this material (or selections of it) is passed to the students (face to face, online) and generally how it should be taught (lectures, projects) are all current concerns of educators with theories of how learners learn. This is a particular concern currently in view of the shift from teaching to learning and the increasingly prevalence of online delivery of materials as was discussed in Deliverable 3.2.

In contrast to this view, another member of the consortium, whose institution uses exclusively project based learning for DfA did not express any difficulty with the taxonomy nor perceive it as a rigid menu structure.(see section 3.4). It would be interesting to compile best practices for teaching certain aspects of the taxonomy, as long as these were taken only as suggestions and not prescriptions. The taxonomy should remain a knowledge classification system, and attempts to make it something else would invalidate its usefulness for curriculum design.

A further comment was that the application of the taxonomy was probably unrealistic unless students were more proficient in areas like web technologies (see section 3.5.1). Again, the taxonomy is what is presently taught to students, the depth of competence that can be achieved in for instance, the category of accessible content, will depend very much on the background of students. Thus if it is not possible to teach some of the areas of the taxonomy in depth because the student's background in web technologies is not sufficient, then this calls possibly for a revision in computer science curricula. Such efforts are under way presently, the ACM is revising Computer Science and in particular Software Engineering for both undergraduates and postgraduate (MSc level) courses, with the aim of including networking and other technologies[16]. Their results were due this year, 2004, but have been delayed. The sheer amount of curriculum effort in this area over the last decade is testament to the problem the rapid changes in technology and the difficulty of keeping education current.

Thus in conclusion, the majority of the teaching pilots described here, found the taxonomy useful in terms of guidance and as a checklist of areas they include in their courses, or might include in the future.

6.2.1   From student point of view

Overall, students seemed to find the taxonomy helpful.

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[16] http://www.acm.org/education/curricula.html

The post questionnaire answers seem to indicate that the students were able to distinguish the content categories even if their thematic modules cut across categories, or if the DfA knowledge was not actually part of the module where the questionnaires were handed out (see section 5.4).

This is also borne out by the experience of students from the Aegean who were given the Design for All course with the taxonomy acting as a table of contents to the thematic units. The students reported that when doing the research for their team projects, the taxonomy helped them to classify the wealth of material they came across when searching, and to keep focused on the material that was useful to them, and this was corroborated by research and library staff, especially since lately they have been receiving a wealth of material to do with accessibility, by and e-mail and traditional post.

6.2.2   From teaching pilot point of view

The taxonomy's sub categories are only broad thematic labels. As stated previously, under each subcategory there are to be a series of topics, and within topics, teaching material may be available, or at least descriptions of what was taught. These descriptions are often as useful as the actual material, since at this level of granularity, it becomes important to tailor the topic to the audience, and as every educator knows, it is rare that another person's material can just be picked up and used without some re-purposing and adaptation.

Two teaching pilot reports noted that their students disliked the topic to do with "**legislation**" part of the course (**Why Design for All**, **Recommendations**), (see sections 4.1.5., 5.1. and 5.2.1). However, all agree that this is an important component of Design for All teaching. At the Aegean the experience was different, one student actually commented he/she enjoyed that part of the course. One of the things that was popular was working on a case study of some actual litigation, (the well documented Maguire v SCOGOC)[17]. (This could of course be somewhat motivated by the fact that Athens is hosting the 2004 Olympic games this summer). Of course each lecturer is limited in terms of time constraints and students often like to work on a "need to know" basis as they are concerned to distil the knowledge needed to pass the course, so it is not always possible to "take the scenic route"!.

In previous deliverables, (3.1 and 3.2)[18] we have noted the category "**Interpersonal skills**." and the fact that it is more important to students of DfA than just the general "soft skills" that should be part of every graduate's accomplishments. Besides having to be aware of ways of

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[17] Worthington, T. Olympic Failure: A Case for Making the Web Accessible
http://www.tomw.net.au/2000/bat.html

[18] www.idcnet/info/documents

making presentations accessible, or how best to facilitate interacting in groups where there are people with disabilities, or in contexts where there a barriers to communication (noise, lighting, etc.) these students, will often have to act as 'evangelists' for Design for All, using all the arguments from the category **Why Design for All**.. Some teaching hints from Universal Design Education Project (UDEP)[19]:

> "Other tests for students who have learned about universal design in coursework or studios are to study with an instructor who does not support or condone universal design and to work in an office that is unfamiliar with universal design principles. In those settings, they must be able to articulate the value, incorporate it into technical decisions, and be able to support and, possibly defend, their belief persuasively."

Overall, it would appear the taxonomy has shown its robustness, as measured with its use for the teaching pilots and the associated questionnaires. It also serves other less apparent purposes, such as helping course designers to exchange information about various topics, by giving a framework of reference. These are important assets for building curricula and maintaining alignment with other curricula in other institutions and disciplines.

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[19] http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

7 Design for All: Best practices and Challenges

The previous section dealt with the relationship of the taxonomy to the teaching pilots, or the content of the curriculum. However, the teaching pilots also offered valuable experience about the situation of Design for All within institutions, highlight best practices in, and possible obstacles and other challenges to implementing and maintaining of Design for All courses and modules in a range of higher education schemes. The first subsection below describes an initiative from within universities to introduce DfA as a compulsory part of the Computer Science courses. Such a process could be followed by other countries, especially in the light of the re-organisation caused by the commitment to the Bologna declaration to have common higher education structure (3 years Undergraduate +2 years Masters)

7.1   The Spanish model: The Design for All Spanish Coordinating Association

In Spain there is a well organised response by higher education for introducing Design for All as an obligatory part of the curriculum of Computer Science courses, in the Curricula of Spanish Univerisities .

The Design for All Spanish Coordinating Association (Coordinadora del Diseño para Todas las Personas en España, http://www.dfa-coordinadora.org/, general@proasolutions.com) is working in the project "Inclusion of Design for All in the curricula of the educative programmes of the university studies related with **built environment and ICT**".

The project is supported through an agreement ONCE (Spanish National Organization for the Blind) –IMSERSO (Institute of Migrations and Social Services, Labour Ministry), referred to the Resolution RedAP (2001) passed by the Committee of Ministers of the European Council "Regarding the introduction of the principles of Universal Design in the curriculum of all the activities related with the **built environment**."

The project **objectives** are:

- To embody in a concrete and effective way the European Council Resolution extending it to all the curriculum of all the related Careers.

- To define the imperative curriculum content on Design for All so as to guarantee that professionals in the related careers can offer an efficient and effective answer to diversity that society demands.

- Define the curriculum content in such a way that each university can develop independently and in a more efficient way the methodology included in their training programmes .

All the Spanish Universities with Design for All and ICT courses are collaborating within the framework of this project.

The **structure** of the project includes:

- Project Coordinator.

- Editor team

    Project Scientific Director.

    University Rector.

    An expert in Design for All.

- Scientific committee

    University Rector.

    A Professor.

    A professor of each one of the subject matter content of the principles of Design for All.

    University teaching professionals.

    User representatives.

- Management Team

    A Co-ordinador.

    Scientific Management.

    Economic Management.

The **methodology** of the work consists of:

- Collection of background documents.

- Preparation of a framework document.

- Contributions from University teaching professionals.

- Compilation and edition of the Green book and the White book of DfA in the Universities.

- Presentation to the Spanish Universities Council.

-To monitor universities' activities.

Declaration of Intent:

During the "Interaccion 2004"Conference (V International conference Human-Computer Interaction) May, 3 - 7 2004 hosted and organised by the University of Lleida, a declaration was issued by the Coordinating Association, where 55 Spanish Universities ask the Spanish Ministry of Science and Education to include "Diseño para Todos" in several obligatory subjects of Computer Science University Studies.

The importance of this effort is that it has been adopted from within University community, rather than being an initiative from government or industry. It offers a model of how to coordinate curriculum efforts on a national level, and is run as a project.

The next section offers lesson learned from the US Universal Design Education project

7.2   The US model: Lessons learned From Universal Design Education Project

This subsection takes the experience of Universal Design Education Project, (UDEP) and compares it to that of the IDCnet pilots, in terms of lessons learned. Begun in 1989, UDEP is a national effort organized by Adaptive Environments Center in Boston, MA to challenge existing values in design education by supporting curriculum development and teaching interventions that incorporate the principles and values of universal design. During the 1993-4 academic year, twenty two design schools across the U.S. were funded to undertake innovative teaching in the areas of architecture, landscape architecture, interior design and industrial design. Support came from the National Endowment for the Arts, the Disability Rights Section of the US Department of Justice, and private foundations.

7.2.1   A common curriculum?

The first lesson is the conclusion that a common curriculum cannot be implemented uniformly, but instead, that curriculum recommendations need to be suited to the particular climate of the host universities and institutions.

> "Developing teaching materials and techniques that fit within the culture of his or her respective department and school. This perspective was supported by the findings of one of the earlier projects: "no structural formula for intervention was found to be more viable than any other. The intervention must be tailored to the specific strengths and weaknesses of students, faculty and curriculum."
> http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

The lesson for IDCNet is that it not possible to talk of a common European curriculum. Instead, within general guidelines or recommendations regarding the content, it is important to allow the development of teaching materials and techniques that are adapted to the environment in which they will be taught. The variety and range of the teaching pilots reported here shows that the IDCnet taxonomy is neutral with regard to background of students, level of students, etc. while at the same time, offering a framework for commonality of content.

7.2.2   Mainstreaming Design for All

The second conclusion was that the Universal Design material should not be given in standalone courses, but that it should be "infused" throughout the degree course.

> "…strategies infusing universal design principles throughout the curriculum had the greatest likelihood of changing students' attitudes and impacting their design decisions. An infusion approach

would reinforce the notion that universal design is a way of thinking about user accommodation that permeates all design decision-making. If universal design were to be taught as a standalone course, it risked being identified as a skill area and being marginalized as nonessential material."
http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

Our work with the teaching pilots shows that while this is a logical position in theory, it is still very difficult to achieve in practice, needing extensive support from within the institution. The experience from City University is relevant to quote here.

> "The policy at City for the last two and a half years has rapidly become that all students in the School of Informatics should receive at least an introduction to DfA. For some students this is only a three hour session (two hours of lectures and one hour of discussion/tutorial). For students who do the introductory course, it is a bit more, as it is woven into a number of lectures. One of the factors that seems to have influenced senior staff at City is how interested the students are in doing their final year research projects on topics related to DfA. (…) probably about 20 projects (about 17% of all projects) on DfA."

One of the reasons that this approach is more feasible at City, is that there are several staff members engaged in research and teaching in DfA, this is often not the case in other institutions, where it is a lone 'champion', or a small team of staff and research students. The importance of having a large group is important to ensure continuity and to change the perception of DfA as a "specialist" area, outside of the mainstream. As an example, at City University, the Centre for Human Computer Interaction Design, numbers 6 academics, 20 researchers, 15 PhD students, of whom 2 academics, 8 researchers, 2 PhDs are concerned with Design for All.

Perhaps the answer is to have a compromise between the pervasive and the specialist approach that is along a continuum of the depth of knowledge about the subject.

The view from City is expressed as follows

> "Every computing graduate should be aware of the concept of DfA and the rights [and a little of the requirements] of older/disabled users
>
> Every graduate who has specialized in HCI should understand the business case for DfA, basic requirements of the diversity of users, basic principles for involving the diversity of users in design process
>
> Only those who have specialized in DfA/eA should have a full understanding of all the issues and methodologies"

There is of course, the counter argument, that following a specialist design for all course will offer students a competitive edge when they reach the market place.

Within the UDEP, specifically at two institutions in Virginia, opinion was mixed over the "infusion" strategy:

> "Design students acquire fragmentary knowledge of barrier- free design through other classes but have not had systematic exposure to universal design."
> "Some faculty argue for keeping courses separate so that they are identifiable by students and employers. A course on barrier- free design has been a fairly unique offering for design and property management students and gives them a distinct advantage with employers." [20]

7.2.3   Multidisciplinary background of students

The previous question of "infusion" and infiltrating other courses with Design for All, has a corollary, that of coping with the multidisciplinary background of students. Many of the pilots reported here, notably at Loughborough and at KTH Sweden are given to students from varying backgrounds, not to mention levels of education. It seems quite common to find a mix of undergraduate/postgraduates following the same module. While this does cause some problems (see section 4.1.1) overall students seem to cope, and in the case of KTH it seems to offer very positive interaction in terms of projects (see section 3.9.1). The whole of the pilots reported here, although confined to ICT shows a wide range of disciplines involved, and this work will be input to EDeAN's SIG on Curricula which is currently exploring this question.

7.2.4   Consulting the users

The third conclusion from UDEP was the importance of using consultants, who are real users (not advocates). They point for example to the usefulness of users in bringing to life recommendations such as standards for the built environment, and the gap than can exist between compliance and true accessibility.

> "Consultants were singularly effective at moving students (and faculty) beyond the technical focus of codes and at illustrating the variability in how people actually use the environment. Students met consultants whose needs might not be accommodated by following minimum code requirements. This reinforced that working directly with users is more informative than relying on abstract

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[20] Julia Beamish, J., Marshall-Baker, A. Wiedegreen, E : Interior Design Program, Across the Lifespan and the Curriculum Virginia Polytechnic Institute and State University Blacksburg Virginia http://www.adaptiveenvironments.org/universal/pdf/strategies21.pdf

standards, especially when the designer makes judgments and sets priorities….”

The UDEP also emphasized

> “the importance of presenting consultants to students as experts rather than as human beings who have unmet needs.”

> http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

This experience was borne out by the pilots in Valencia and especially in Loughborough, although it brings with it the problem of funding for the consultants, as well as the careful use of consultants (see sections 4.2.2 & 4.1.5, and in particular section 4.1.5.1). One of the particular lessons learned here is the importance of using consultants such as those from ISdAC.

One might also stretch this to include the listening to the learners, the ‘users’ of our teaching, who can provide suggestions about how they would like improvements in the course/module. Evaluation questionnaire results can help to reinforce teaching staff’s position for putting more DfA into the curricula as was the case in the Aegean (see section 4.3).

7.2.5   The problem of continuity

While it is a challenge to introduce DfA into the curricula, it is just as much a challenge to maintain it. IDCnet members have expressed the worry that it is difficult to ensure continuity of courses, for a variety of reasons.

From the CRC, “what happens when the two members of staff doing the teaching leave?” This is also similar to the experience from the Aegean for the proposed course in Cyprus, where the champion supporting the invited lecture left.

In UVEG, the teaching, although successful is not on the curriculum for the academic year 2003-2004 because its champion is not a permanent member of staff.

In Loughborough, while the course is fixed, the opportunity to run again the very successful workshop within the course, is compromised by the need to find funding for the invited expert.

The problem of continuity was also faced by UDEP, who also identified as a key factor the culture prevalent in higher education, which does not support collaborative endeavours, and curriculum efforts

> “The biggest problem was tenure. Universities have traditionally rewarded individual work over collaborative work and questioned curriculum development as a form of scholarship. Other major issues on the minds of faculty included the power of tradition and inertia in design educators’ attitudes, inadequate time for course development, and the need for continuous reinforcement.”

UDEP was able to directly address the latter two issues because it used its funding to employ personnel to gather course materials and coordinate user consultants. It was able to fund advisor visits to higher education establishments, a reinforcement that teaching staff believed might help them promote and sustain their efforts, especially in departments that had exhibited little interest in the subject.

> "The advisors' role had been important in the original proposal, but as the project evolved, the value of their contribution was greater than anticipated. Among the most well-known and respected practitioners and educators in universal design, the advisors were lodestars (…) The most valuable contribution of the advisors was the site visit, envisioned as a way to demonstrate the significance of universal design. The visit from an outside expert, someone who is known to be an authority on the topic, was especially valuable for faculty who were in the minority within their department. The prestige of a nationally known person added to the credibility of the topic and provided additional avenues for discussion with colleagues, administrators, and students.
>
> The visits varied from school to school. Most had a public component in which the advisor made a presentation on universal design to a broad audience, visited classes and participated in studio reviews, and met with departmental leadership to discuss the ramifications of universal design education, an audience that was sometimes not possible for faculty on their own. The interchange with deans and department heads was especially helpful."
>
> http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

This might be a possible avenue for continuation of the European DfA curriculum work, but it will need the endorsement of an authority such as EU, and funding for visits and coordination.

The lessons learned in the UDEP project remain relevant for the Europe and Design for All in ICT. Both they and the Spanish model are concerned with "University culture". However, there is the other dimension, to do with knowledge. These are discussed in the context of the concluding section.

8 Conclusions: Ways forward

The previous section highlighted some best practices, lessons learned in the context of an analogous endeavour, and challenges to DfA educators.

By way of conclusion some recommendations for meeting these challenges from within the educational community and proceeding with the work on curriculum design are:

Creating a vibrant research community:

As discussed in our Workshop in St Augustin, Bonn in February 2004, (see Deliverable 4.2 for a report) a vibrant research community is a vital component. It serves three functions:

- helps to get subject accepted by peers. Colleagues are more amenable to accepting teaching must be done, when there is a substantial body of research.

- this in turn creates more champions and aids the "continuity" problem, by widening the circle of people competent to become educators.

- Keeps the teaching aligned with current research and up-to-date

Try to 'infiltrate' other (research) communities, for example:

- those working on Future and Emerging Technologies FET community (now known as NEST) within IST

- online learning

- design research: although this is a fairly new community, they are already committed to social responsibility role of design

- 'content' researchers: those affiliated to the publishing industry, and other e-content stakeholders

Making strategic alliance with other courses, modules – e.g. HCI, Ergonomics, etc.

This is closely allied to the taxonomy, and its content. For example, it can work both for the HCI educator, to see DfA as an extension of his work, as well as for the Disability researcher who is an expert in one particular area. For the latter, the taxonomy can provides a frame of reference, an aid to understand the larger picture and motivate wider approach to teaching.

Continuing Networking, for example

- using EDeAN, supported by D4ALLnet's SIG on Curricula, and its planned activities, for workshops, etc..

- leveraging Professional Associations and existing higher education networks: EIDD, Cumulus, AAATE etc

(Organised) Pooling of resources.

- EDeAN's Ariadne
- The RSA's Inclusive Design Resource,
- sharing lecture notes,
- collaboration on a text books for students.

In addition, we should accept this is a lengthy process. We may look to related areas, like HCI, or Ergonomics. As an example, the HETPEP [21] took at least 15 years, and this in an area where there was a professional association involved.

Strategies for speeding matters up, might be **change from without**, such as

- getting industy to realise it they need people trained in DfA, and that they cannot continue with piecemeal in-house training
- pressure from governments and legislation, education and research policy planners and strategists.

These issues are discussed at more length in Deliverables 2.2 and 4.2.

Finally it is also important to recognise that as well as transmitting knowledge, we are also trying to deal with a change in attitude,

> "Teaching universal design is a process of exploring how a politically mandated and socially desirable value can be embodied by the design disciplines." [22]

What the IDCnet pilots have shown is that there is already a substantial amount of teaching going on, transmitting both values and knowledge. This exercise yielded both information about teaching in relationship to the taxonomy of core knowledge sets and skills, as well as other useful information about practical aspects of teaching Design for All. Both of these objectives help to further the work on recommendations for curriculum work on Design for All, in terms of content and in terms of sustainability.

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[21] www.eurerg.org/HetPep.pdf

[22] http://www.adaptiveenvironments.org/universal/pdf/strategies23.pdf

9 Annexes

9.1   Student Questionnaires: the templates

The questionnaires are available online for download in our Web site, free to anybody for their use.

- Introduction page: http://www.idcnet.info/questionnaires
- Questionnaire for Lecturers:
  http://www.idcnet.info/html/IDCnet_pilot_lecturer.html
- Questionnaire for Students (before participating in the module):
  http://www.idcnet.info/html/IDCnet_pilot_pre.html
- Questionnaire for Students (after participating in the module):
  http://www.idcnet.info/html/IDCnet_pilot_post.html

9.2   Student questionnaires: data and analysis

9.2.1   UK: Loughborough University, Department of Human Sciences

Module Ergonomics of Disability and Ageing, including Inclusive Design Workshop

Pre and Post Questionnaires Background

The pre-questionnaire was completed by 24 students on 2 October 2003 at the start of Module Ergonomics of Disability and Ageing (HUC/HUP114). The post questionnaire was completed by 19 students at the end of the entire module in January 2004.

The code in brackets after the comments provided is a unique code for each respondent. This allows comments to be cross referenced across questions. However no matching of pre and post questionnaire responses is possible as the questionnaires were filled in anonymously. PR codes refer to comments recorded on the pre questionnaires. PO codes to comments made on the post questionnaires. Similar comments have been grouped to avoid repetition. When this occurs all the relevant respondent codes are included.

Respondents were allowed to select more than one response to any question. This accounts for the different number of responses for each question. 24 students completed the pre-questionnaire and 19 the post-questionnaire. The section headings numbers below refer to the actual numbers found in the questionnaire.

Question 2.1.1 Why did you choose this module?

23 out of 24 respondents (95.8%) chose the module because it looked interesting and useful. The remaining respondent (PR1) had previous experience of Inclusive Design in the past as an Occupational Therapist and wished to learn more about the subject.

Other comments

Considering a Masters Course in Ergonomics (PR2)

Question 2.1.2 General comments provided on background and previous knowledge

Occupational Therapist –worked with children & adults with profound retardation in Israel. Taken a course in Assistive Technology last year in Israel. (PR1)

Have previously completed a module in Anthropometry that touched on design for the older generation and disabled. (PR4)

Question 2.1.2.1 Awareness of Design for All, Inclusive Design, Universal Design etc.
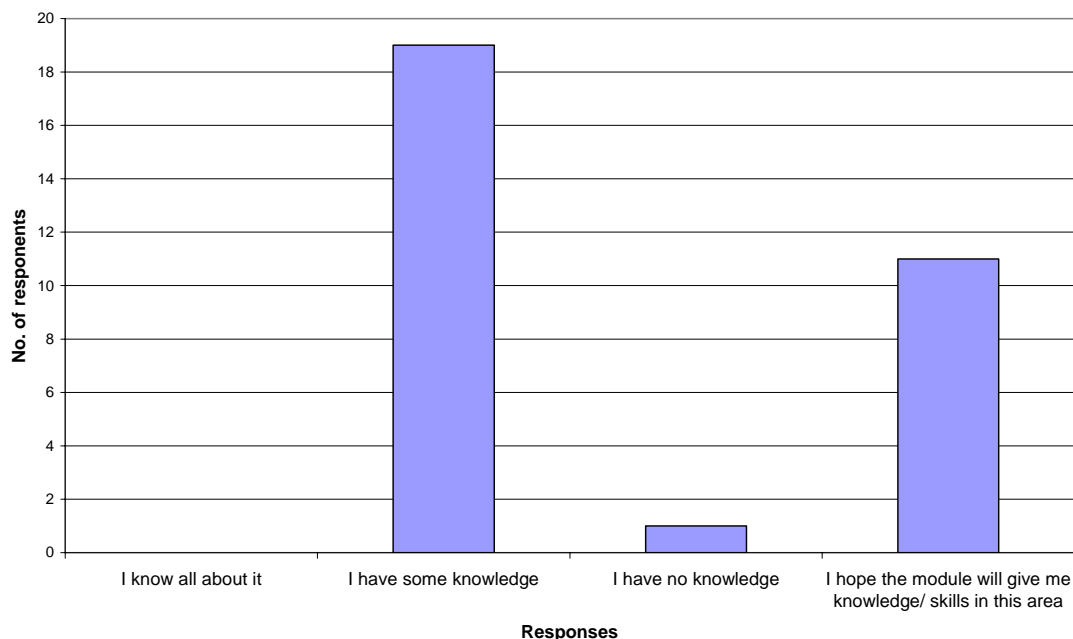
Figure 4 Pre-questionnaire responses - 2.1.2.1

Pre-course comments

- I know a lot (PR1)
- Year 1 and 2 modules (PR6) (PR19)
- Have written a short essay on inclusive design but no great depth of knowledge (PR12)
- Know a little about it but no great detail (PR18)
- Limited to ergonomics issues with returning injured workers to modified work & Canadian legislation ((PR20)
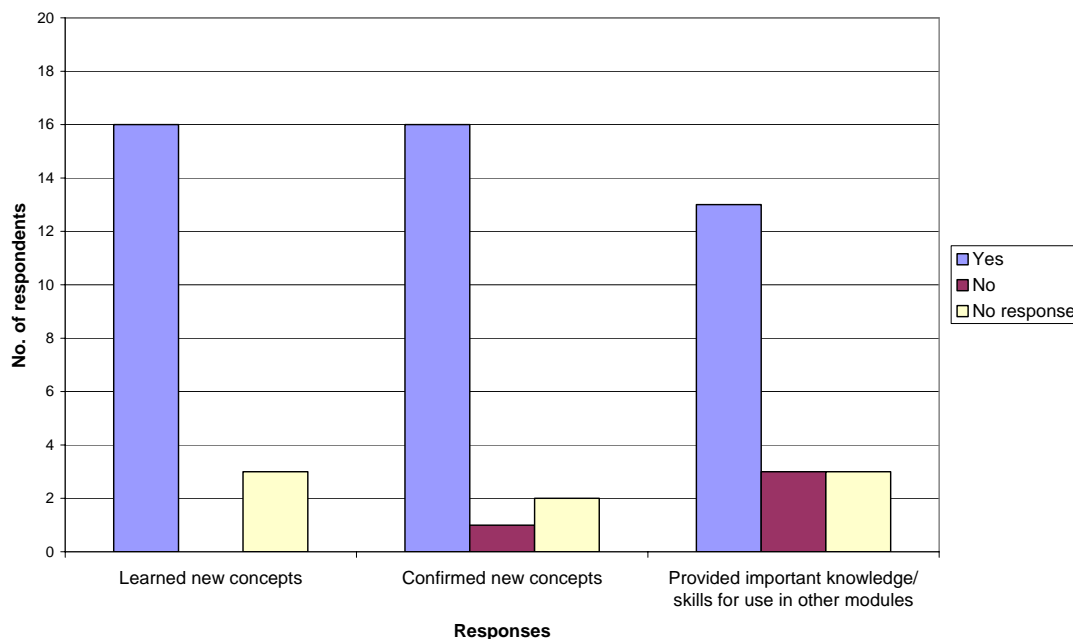
Figure 5 Post-questionnaire responses - 2.1.2.1

Post-course comments

- Coming from a different background I was expecting to get more knowledge about skills and methods (PO2)
- Wide range of disabilities covered (PO8)
- Good (P14)
- Raised my awareness from a basic knowledge (P18)

Question 2.1.2.2 Why Design for All? Ethical, legal and commercial considerations
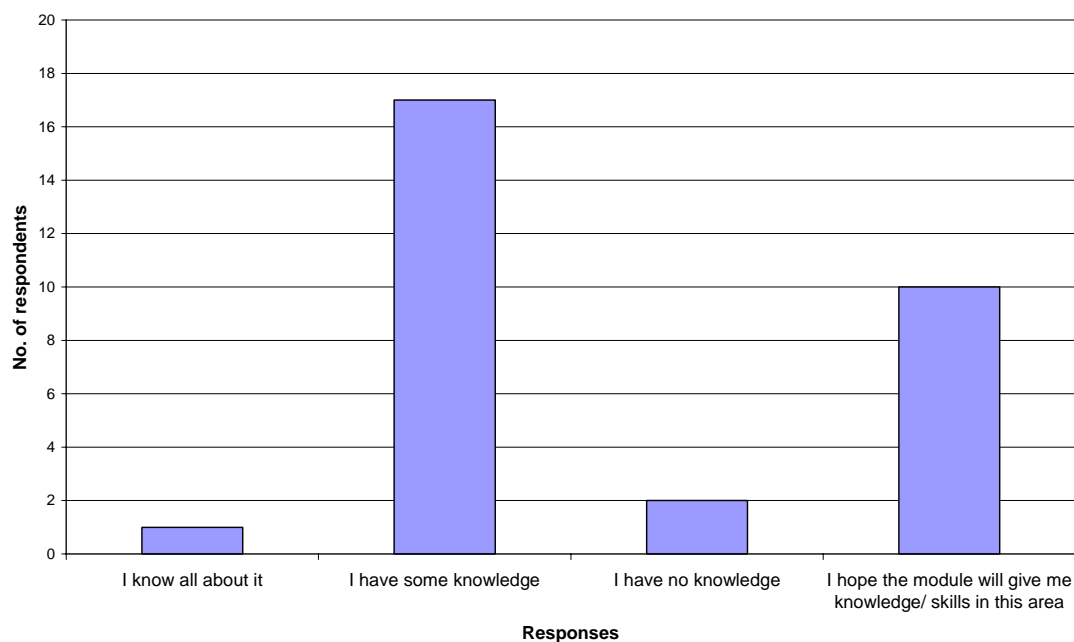
Figure 6 Pre-questionnaire responses - 2.1.2.2

Pre-course comments

- Aware of the reasons to design for all. Not aware of legal and commercial considerations (PR3)
- No basic outlines and ideas but nothing substantial (PR18)
- Aware that these exist but don't really know a great deal about them (PR19)
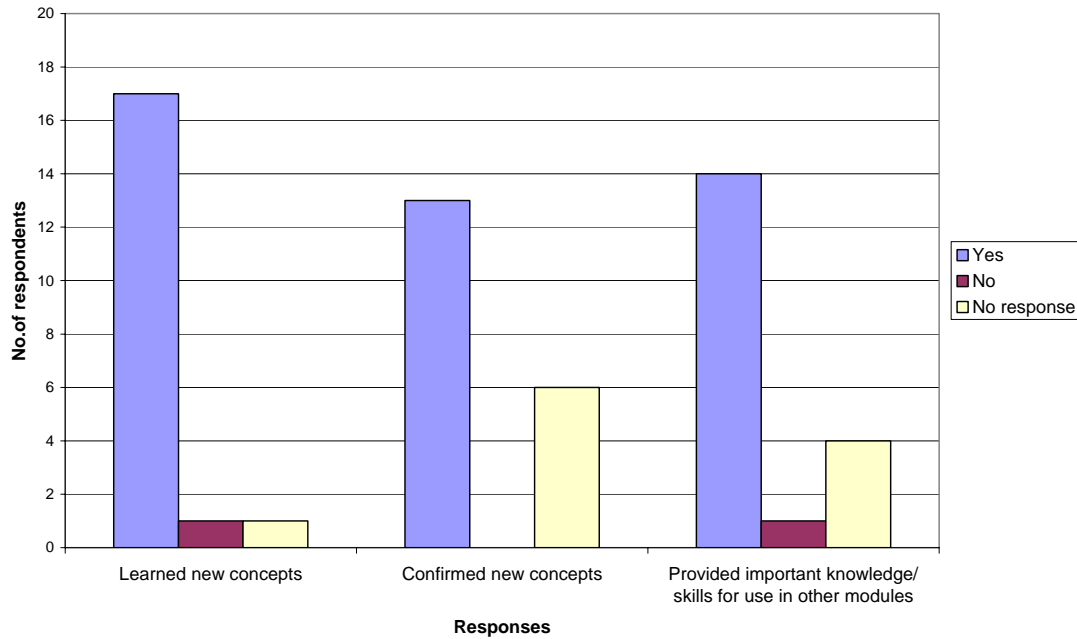
Figure 7 Post-questionnaire responses - 2.1.2.2

Post-course comments

None

Question 2.1.2.3 Recommendations, guidelines, standards etc., that have a bearing on Design for All
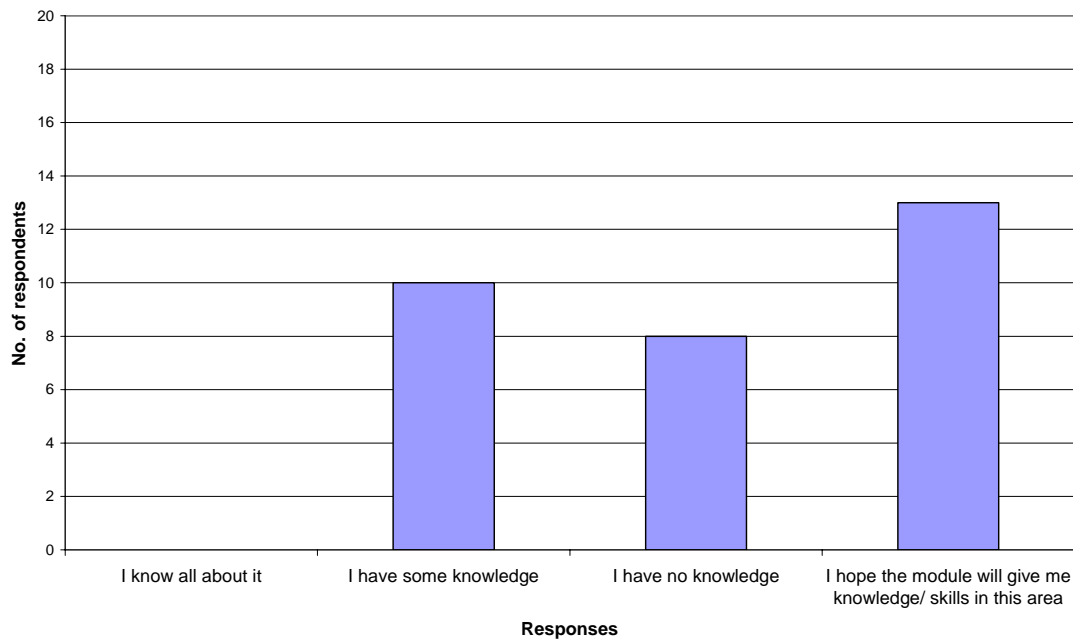
Figure 8 Pre-questionnaire responses - 2.1.2.3

Pre- course comments

- Have a very small amount of knowledge about guidelines and standards from a Health and Safety induction but not much more (PR18)
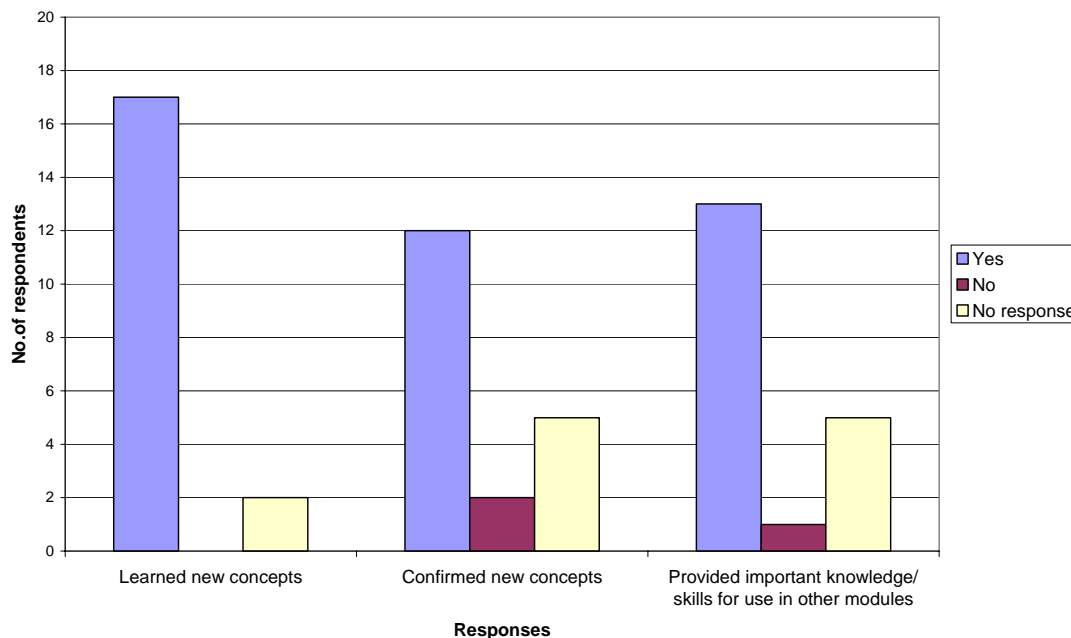
Figure 9 Post-questionnaire responses - 2.1.2.3

Post-course comments

- More skills and methods are needed (PO2)

Question 2.1.2.4 Interpersonal skills for teamwork, experience in communicating the Design for All concept with other members of a team
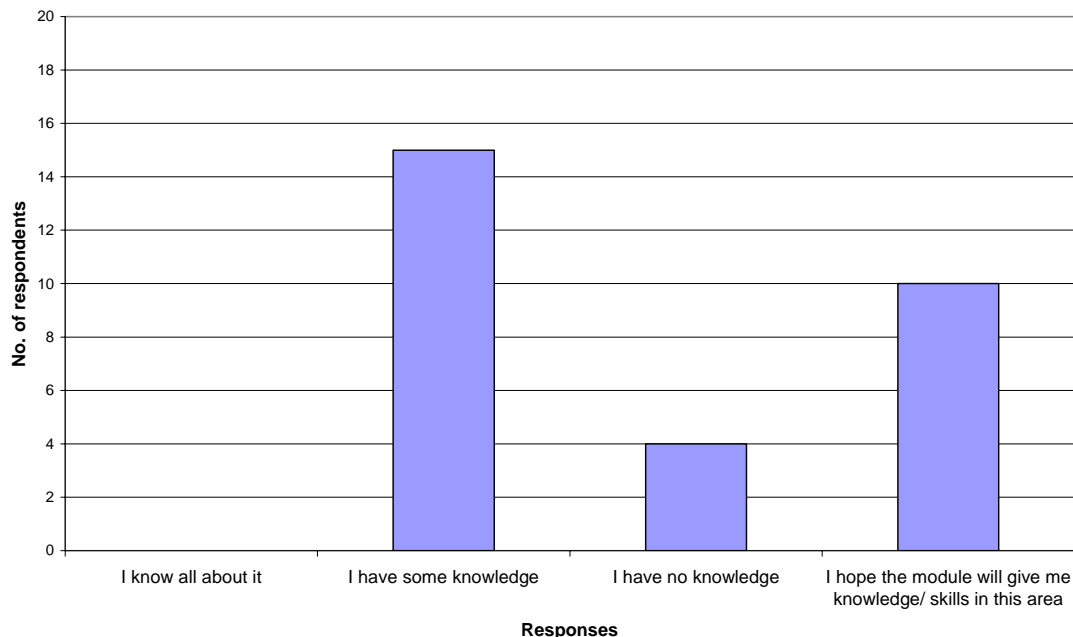
Figure 10 Pre-questionnaire responses - 2.1.2.4

Pre- course comments

- Would like to know more (PR18)
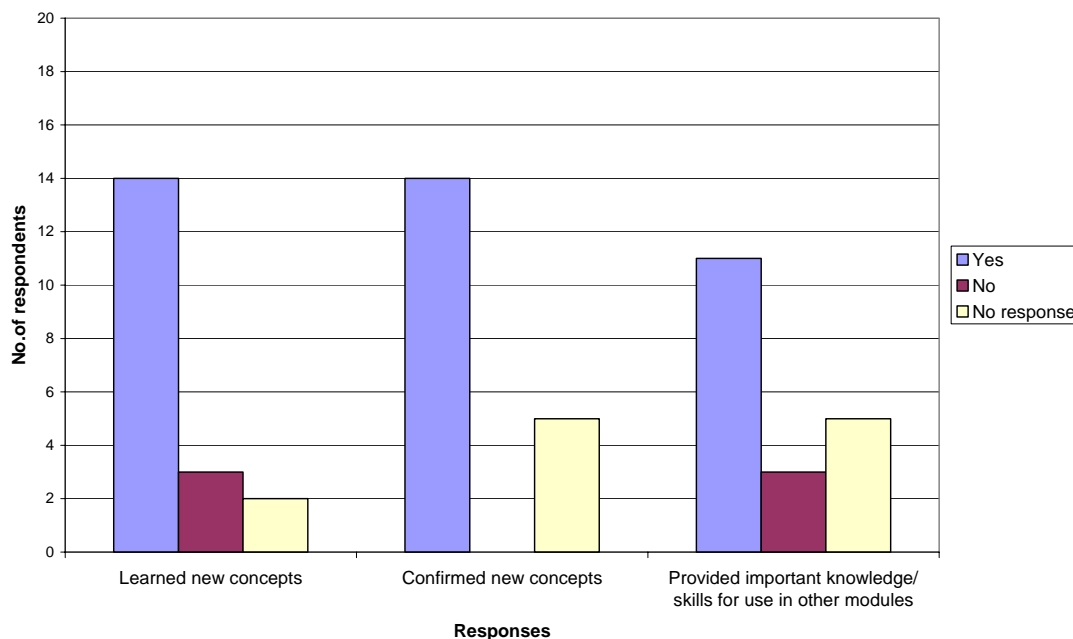
Figure 11 Post-questionnaire responses - 2.1.2.4

Post-course comments

- I found the role play work useful as even though the person was acting their disability, it made you approach it in a different way (P018)

Question 2.1.2.5 Accessible content: knowledge on making content of documents, multimedia and Web sites accessible to all users, e.g. by making alternative forms of media available
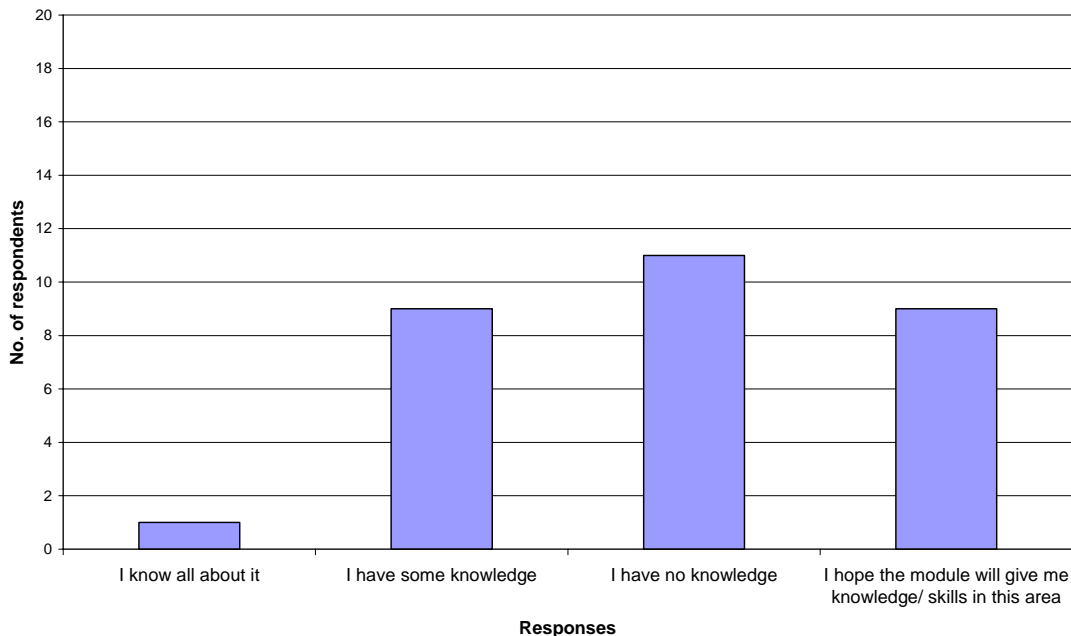
Figure 12 Pre-questionnaire responses - 2.1.2.5

Pre-course comments

- Familiar with Windows XP accessibility options (PR12)
- From observing in real life situations – no knowledge from an "expert's" point of view (PR19)
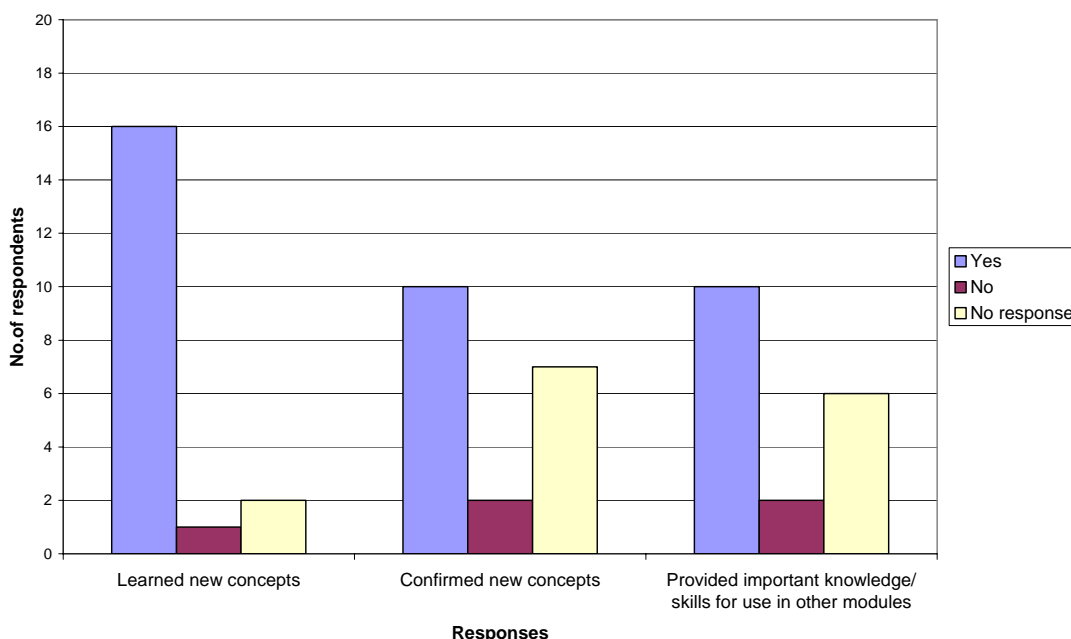
Figure 13 Post-questionnaire responses - 2.1.2.5

Post-course comments

- I already had experience in this area before the module (PO1)
- Bobby/WAI – as web designer found this very informative (PO10)

Question 2.1.2.6 Accessible interaction: knowledge about assistive and adaptive devices that enable alternative input and output, e.g. speech synthesisers, screen reader software, alternative keyboards, etc.
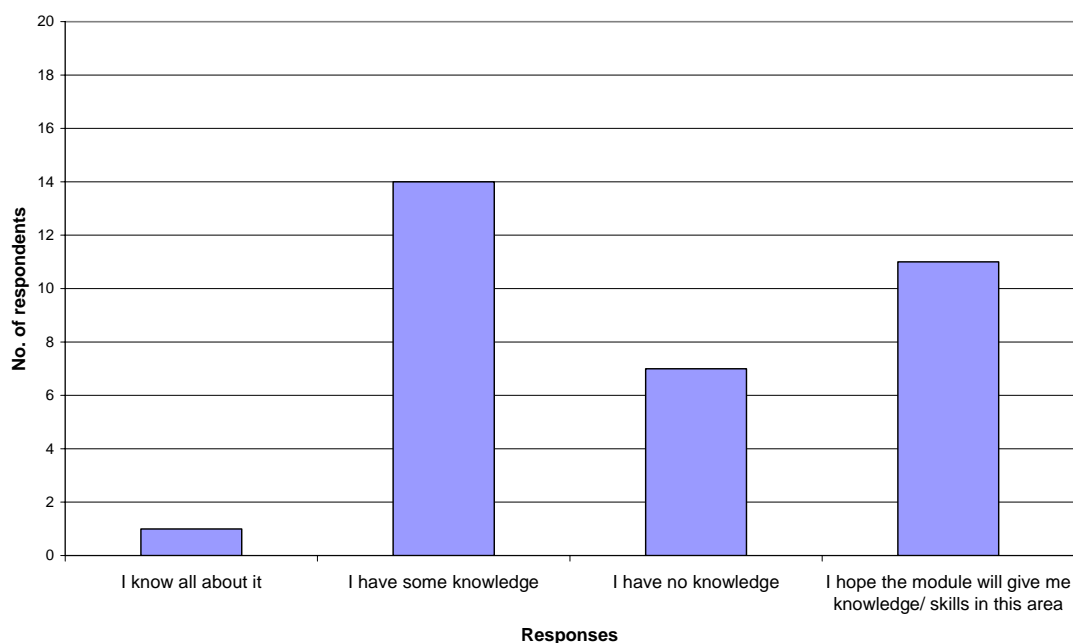
Figure 14 Pre-questionnaire responses - 2.1.2.6

Pre-course comments

- I worked in this area on my placement (PR3)
- Familiar with Windows XP accessibility options (PR12)
- Some knowledge but not a great deal! (PR19)
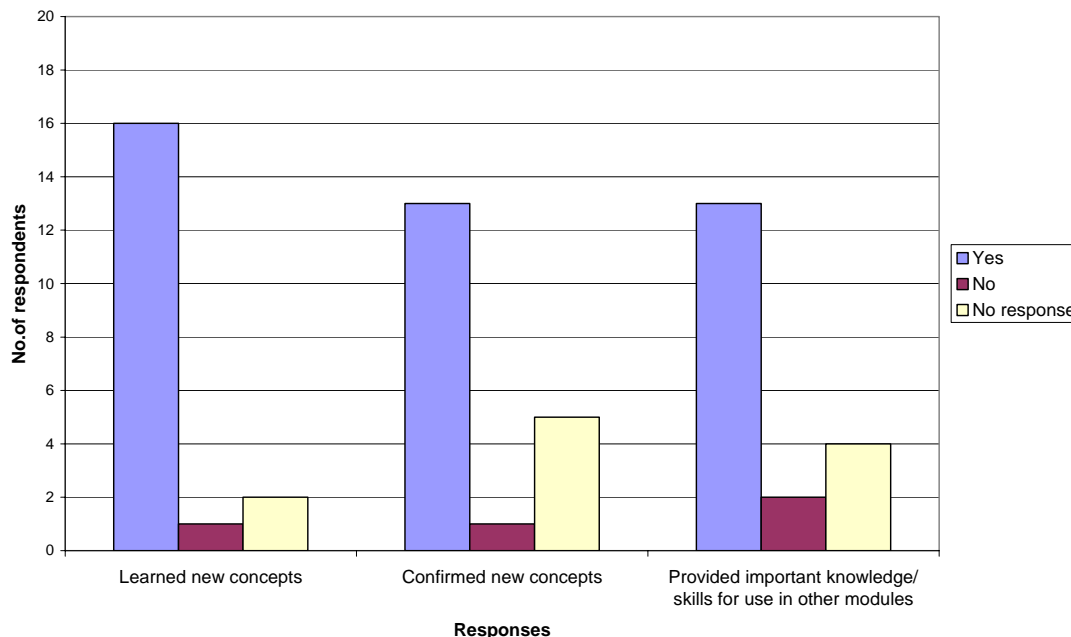
Figure 15 Post-questionnaire responses - 2.1.2.6

Post-course comments

- Did not learn new concepts because I am an Occupational Therapist (PO2)
- Good information about accommodating various user groups (PO8)
- Didn't know much prior to the module (PO17)

Question 2.1.2.7 New paradigms of interaction, that is, new research being conducted in areas such as smart computing applications, smart homes, clothes, cars etc.
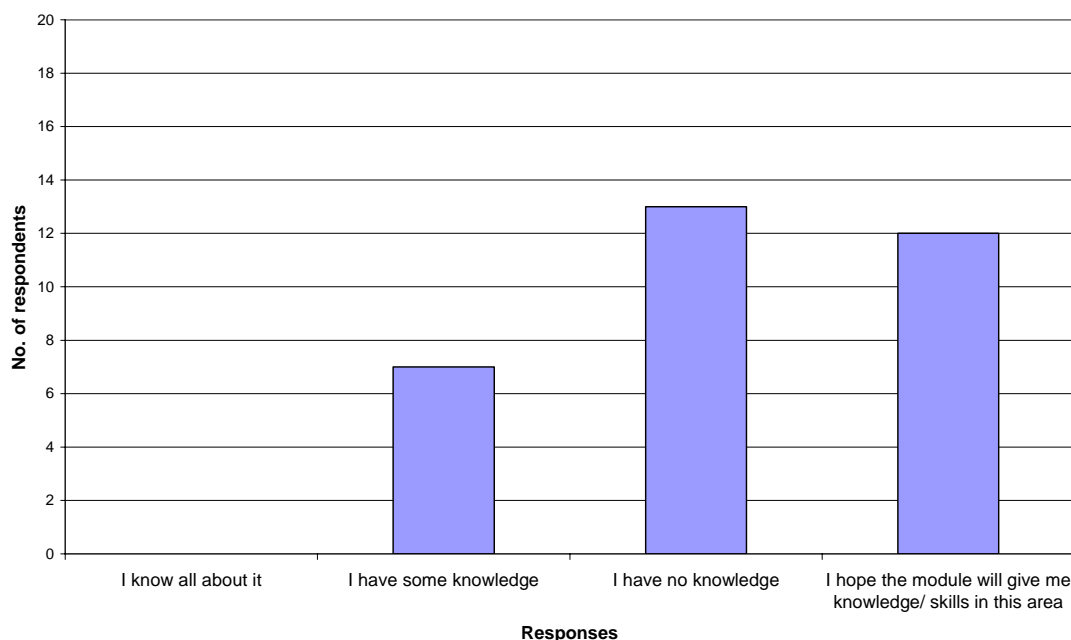
Figure 16 Pre-questionnaire responses - 2.1.2.7

Pre-course comments

- Year out involved intelligent automotive systems so have more knowledge on this than subjects listed previously (PR18)
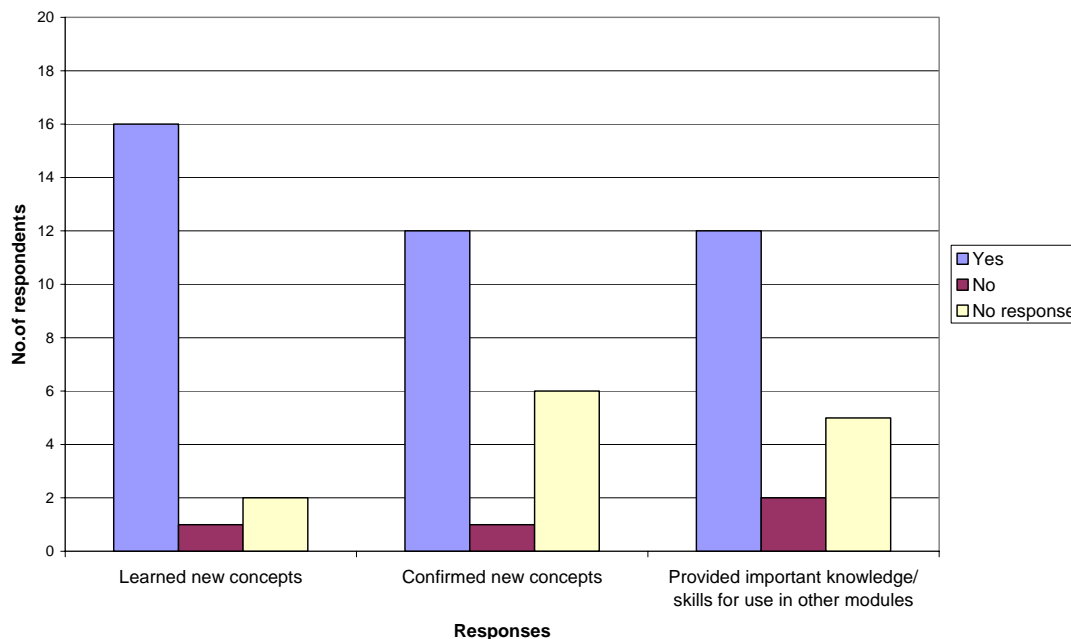
Figure 17 Post-questionnaire responses - 2.1.2.7

Post-course comments

- Learned new concepts about smart homes (PO10)

Question 2.1.2.8 User centred design, including methods, tools and techniques to capture user requirements and evaluate designs with users
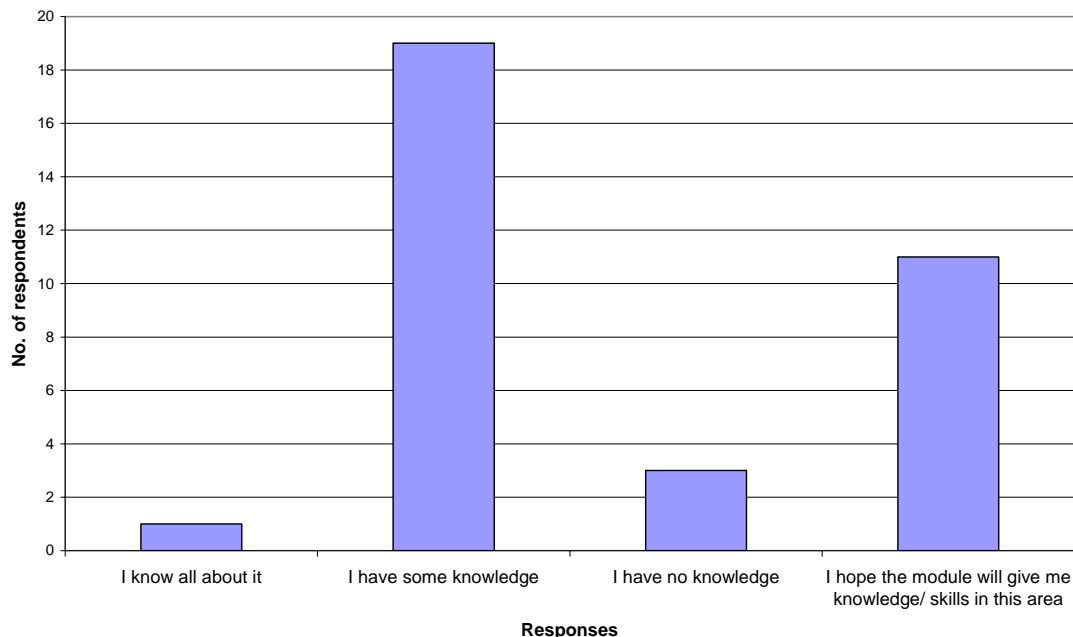
Figure 18 Pre-questionnaire responses - 2.1.2.8

Pre- course comments

- I know a lot about this (PR1)
- 2 undergraduate systems courses on UCD techniques (PR20)
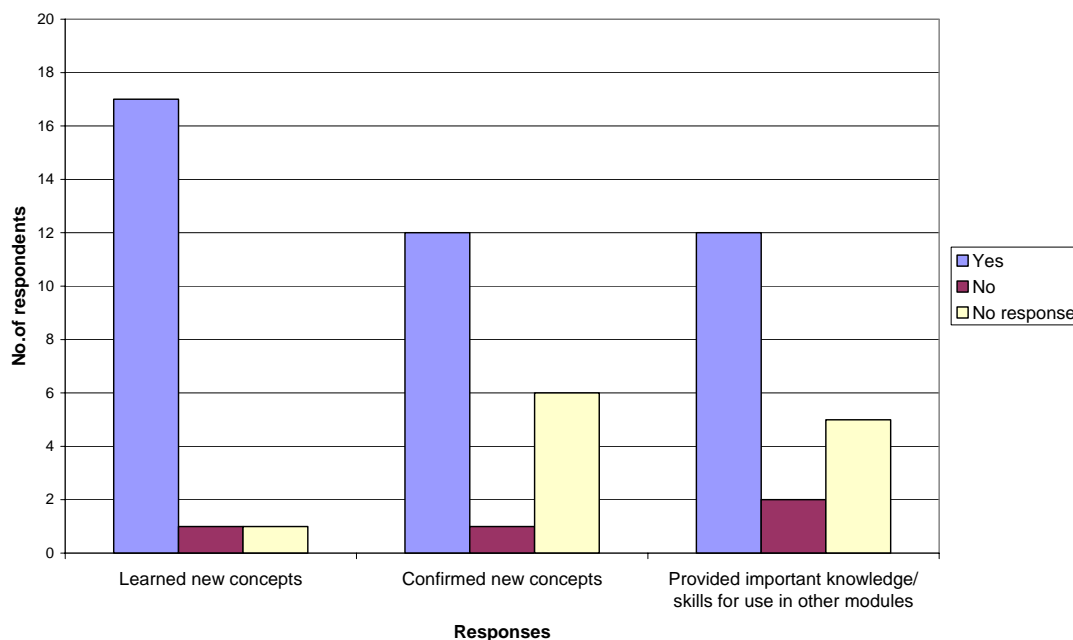
Figure 19 Post-questionnaire responses - 2.1.2.8

Post-course comments

None

Question 2.1.2.9 Application domains and research where Design for All issues are relevant, e.g., public access to information, health monitoring, technology enhanced learning, etc.
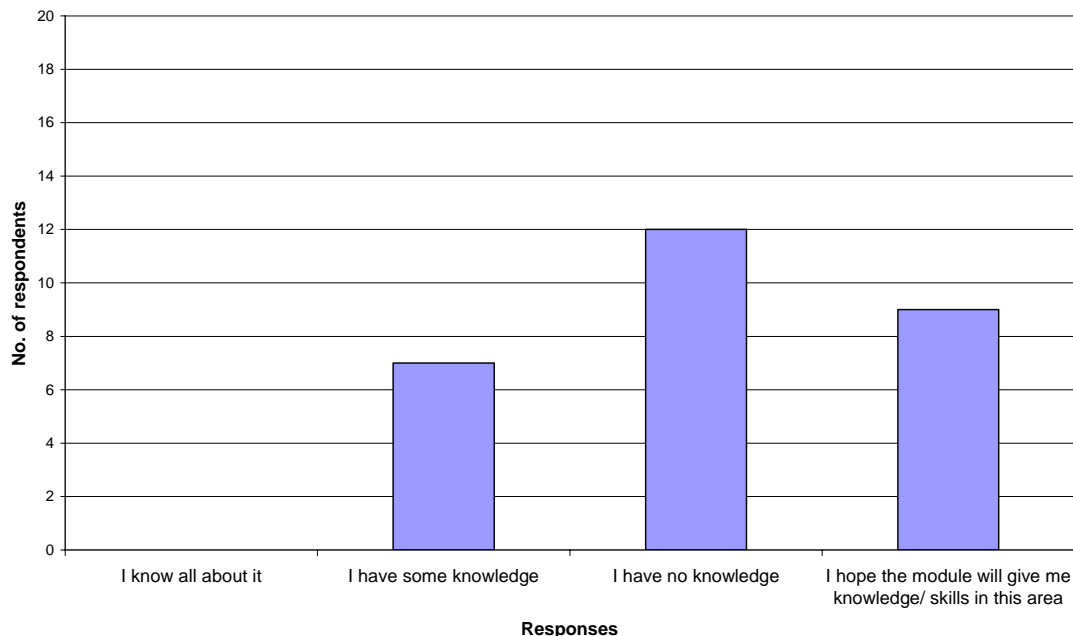
Figure 20 Pre-questionnaire responses - 2.1.2.9

Pre- course comments

- Previous modules on ergonomics course have involved discussion of these (PR18)
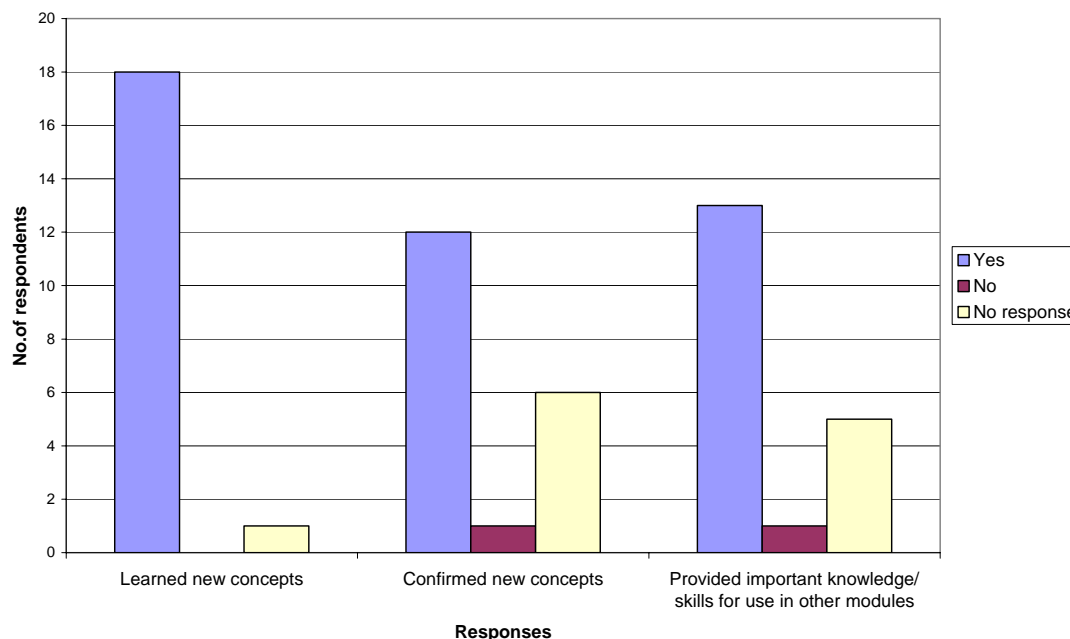
Figure 21 Post-questionnaire responses - 2.1.2.9

Post-course comments

- Learned about Helen Hamlyn / RNIB (PO10)

Additional questions pre-questionnaire

Question 2.1.3 Overall, do you think that the knowledge and skills listed above would be useful in the future?

All 24 respondents answered yes to this question.

If so why and how?

The following comments were recorded. A summary of these comments is provided after this list.

- I am interested in designing products as an Occupational Therapist (PR1)
- Allow insight into the subject (PR5)
- To get general overview of how certain groups interact with the environment etc. (PR7)
- I hope to do physiotherapy in the future and so knowledge of the problems occurring due to disabilities would be specifically useful to me (PR10)
- Broad view of user centred design and inclusive design, whilst increasing breadth of knowledge in all aspects of ergonomics (PR11)
- For project work and general awareness (PR12)

- Because I want to bodyform it for them (PR14)

- In future product design, knowledge on inclusive design leads to a greater project (PR15)

- All these areas of inclusive design are vital in my opinion in product design (PR17)

- Development of such skills will be useful in what ever field I progress to. They can be carried into most design and evaluation situations (PR18)

- It is important for people to be aware of the issues and get over fallacies that 'if I can use it, anyone can'. Access to information in all areas would encourage every one (i.e. designers engineers etc.) to consider the issues (PR19)

- I think approaching the area of aging and those with disabilities can be awkward if you have never encountered it before. Information on how to interact and deal with it would be very useful and help you take the first step (PR19)

- Average working population in Canada is approximately 45 years old. Large proportion of population (baby boomers) will be aged 65 or older and will affect our population as a whole (PR20)

- Essential to meet legislation and improve accessibility (environment and information) for elderly and disabled –area in which I hope to work in the future (PR21)

- Would like to work in some of the areas listed above (PR22)

- "Inclusive Design" or designing to take into account different difficulties or needs can only help everyone – clearer signing, easy access for pushchairs etc. (PR24)

Summary of responses to question 2.1.3

The comments of the 15 students who elaborated upon their answer to question 2.1.3 can be summarized as follows:

- Hoped the knowledge and skills listed would provide them with a general awareness of the concept of inclusive design – 5 students (PR5, PR7, PR11, PR12, PR19)

- Hoped to apply the knowledge and skills listed to product design in either future projects or careers - 4 students (PR15,PR17,PR18, PR24)

- Perceived the knowledge and skills listed as relevant to existing or future career in rehabilitation - 2 students (PR1, PR10)

- Would like to work in the future in areas relating specifically to Inclusive design – 2 students (PR21, PR22)

- Anticipate that the skills and knowledge learnt would become more essential in the future as the proportion of older people in the general population increases – 1 student (PR20)

Additional questions post-questionnaire

Question 2.1.3 What did you like about the topic?

- The concept of inclusive design (PO1) (PO15)

- Useful and applicable to other modules (PO4)

- Built environment (PO7)

- Web design (PO7)

- Wide range of topics covered (PO8) (PO18) (PO19)

- Flexibility with coursework topic (PO8)

- Design issues / new technologies (PO10)

- The design aspects – taking into account the needs of different users (PO14)

- The general overview approach (PO18)

Question 2.1.4 What did you dislike about the topic?

- Would have liked more practice in practical assessment techniques and design (PO1)

- Legislation (PO4)

- It was on a Thursday morning! (PO6)

- More examples of applications instead of summaries (PO8)

- Standards and guidelines (PO11) (PO12)

- Computer software design (PO14)

- The length of the lectures. Not enough inclusion[of students] – too much being talked at (PO17)

- Doesn't really look at the company/ designers difficulties when approaching these issues. The ideas and tools etc. are great but it was a slightly biased view (PO18)

- Some areas seemed unnecessarily detailed (PO19)

Question 2.1.5 What did you find most useful?

- Case studies, knowledge of the broader field (organisations, research), good coverage of Inclusive Design (PO1)

- Gave an insight into the needs of disabled people and the ways they find tasks difficult. Therefore when designing in the future I will consider issues such as these (PO3)

- Techniques for identifying user needs or problem characteristics existing in products/ services (PO4)

- The video clips as you can see things in action and grasp the concept that is being discussed (PO5)

- The lectures gave good insight into the disabilities that individuals can have (PO5)

- Learning about methods used to design to include elderly and disabled people (PO6)

- Web design. Seeing the design implications of different impairments (PO7)

- Large amount of information (PO8)

- Internet guidelines – Inclusive Design (PO10)

- Case studies (PO11) (PO12)

- Coursework audit option (PO14)

- The project workshop was useful (PO16)

- Building environment information (PO17)

- How to perform access audits and other built environment issues (PO19)

Question 2.1.6 Overall, do you think you will use this knowledge in the future?

17 out of the 19 students (89.5%) that completed the post course questionnaire thought the knowledge gained from the course would be useful to them in the future. 1 responded that most of it would and 1 thought that it would not be of use in the future.

Question 2.1.7 Do you have any further comments or suggestions?

- I think there is a problem when mixing undergraduate with post graduate students because the background is very different. The undergraduates have a lot of knowledge about methods and tools in ergonomics but we don't. This is the most important knowledge that was missing (PO2)

- More product design or options within coursework to redesign (PO14)

- Informative module (PO17)

- Design of this questionnaire is not great – it is unclear whether all the sections should be filled in (PO17)

9.2.2 UK: Loughborough University, Institute of Polymer Technology and Materials Engineering (IPTME)

Pre and Post Questionnaires Background

The pre questionnaire was completed by 12 students on 23rd October 2003 before a 50-minute simulation workshop. The post questionnaire was completed by 11 students on the next day, following a two-hour lecture and discussion about inclusive design (see report for categories covered from the taxonomy).

The code in brackets after the comments provided is a unique code for each respondent. This allows comments to be cross referenced across questions. However no matching of pre and post questionnaire responses is possible as the questionnaires were filled in anonymously. PRI codes refer to comments recorded on the pre questionnaires for IPTME students. POI codes refer to comments made on the post questionnaires for IPTME. Similar comments have been grouped to avoid repetition. When this occurs all the relevant respondent codes are included.

Respondents were allowed to select more than one response to any question. This accounts for the different number of responses for each question.

Question 2.1.1 Why did you choose this module?

The lectures were compulsory for all students on the IPTME module in Applied Design Ergonomics.

2.1.2.1 Awareness of Design for All, Inclusive Design, Universal Design
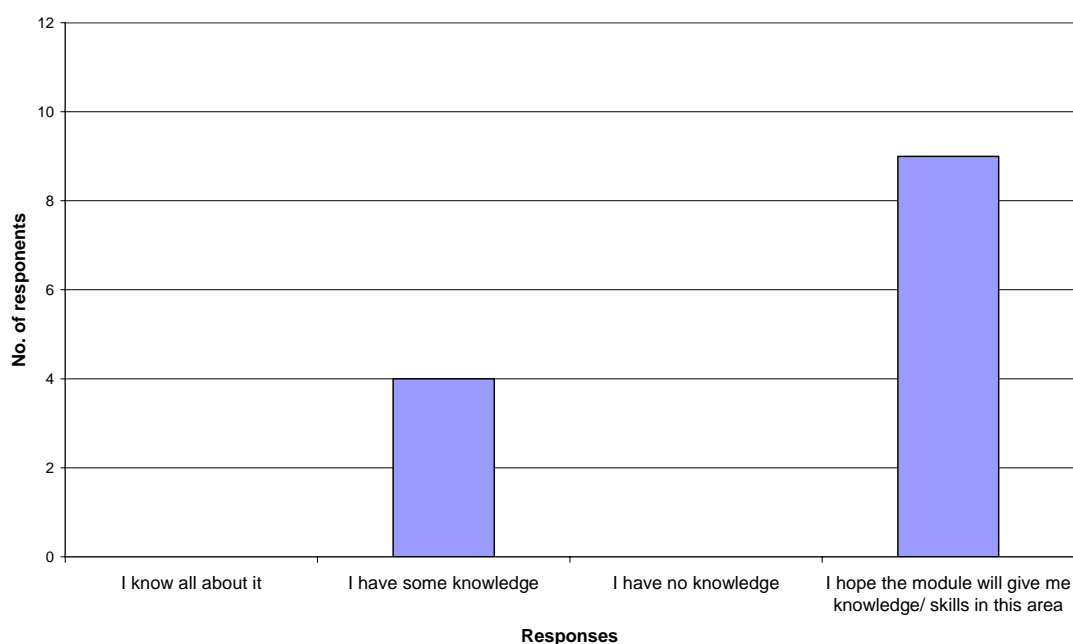
Figure 22 Pre-questionnaire responses - 2.1.2.1

Pre-session comments

- I have A level Design and Technology (PRI5)
- I have very little knowledge but the module looks interesting (PRI7)
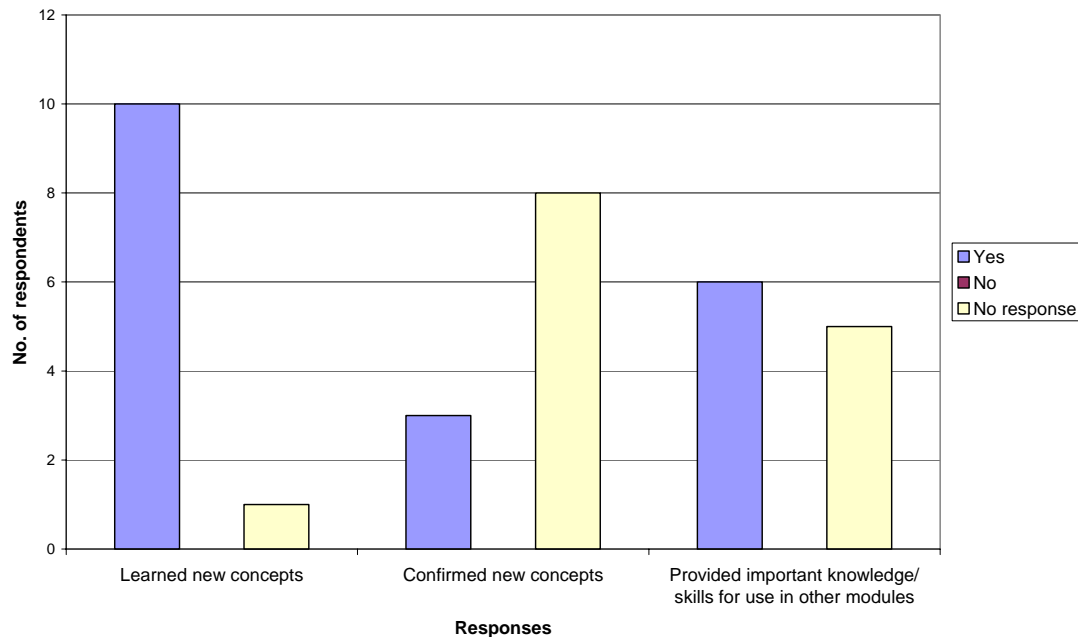
Figure 23 Post-questionnaire responses - 2.1.2.1

Post-session comments

- Very interesting concepts (POI6)

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations
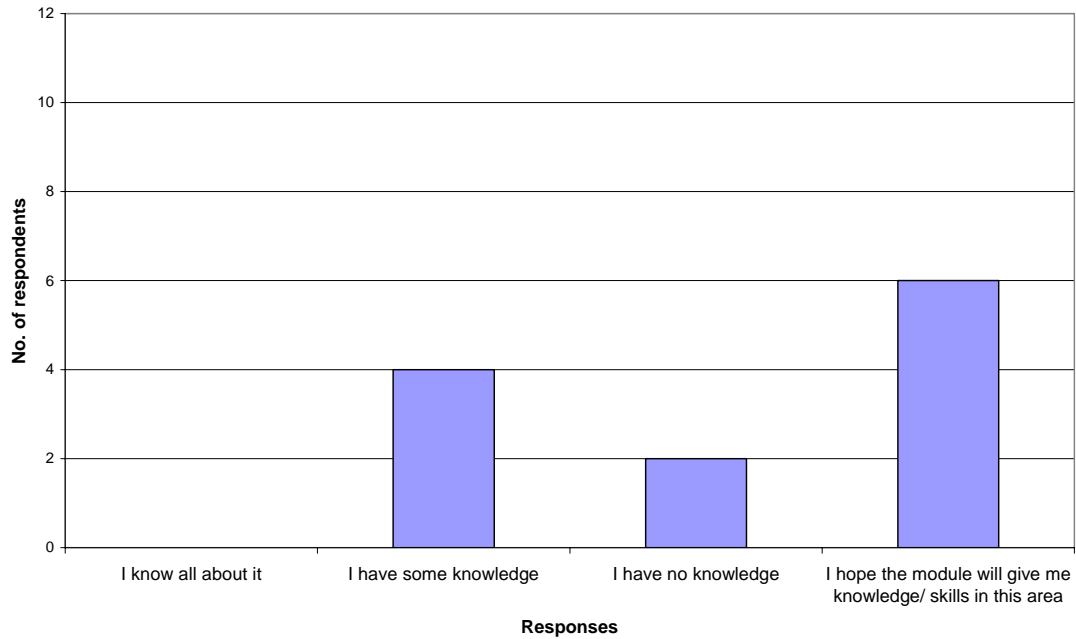
Figure 24 Pre-questionnaire responses - 2.1.2.2

Pre-session comments

- I have A level Design and Technology (PRI5)
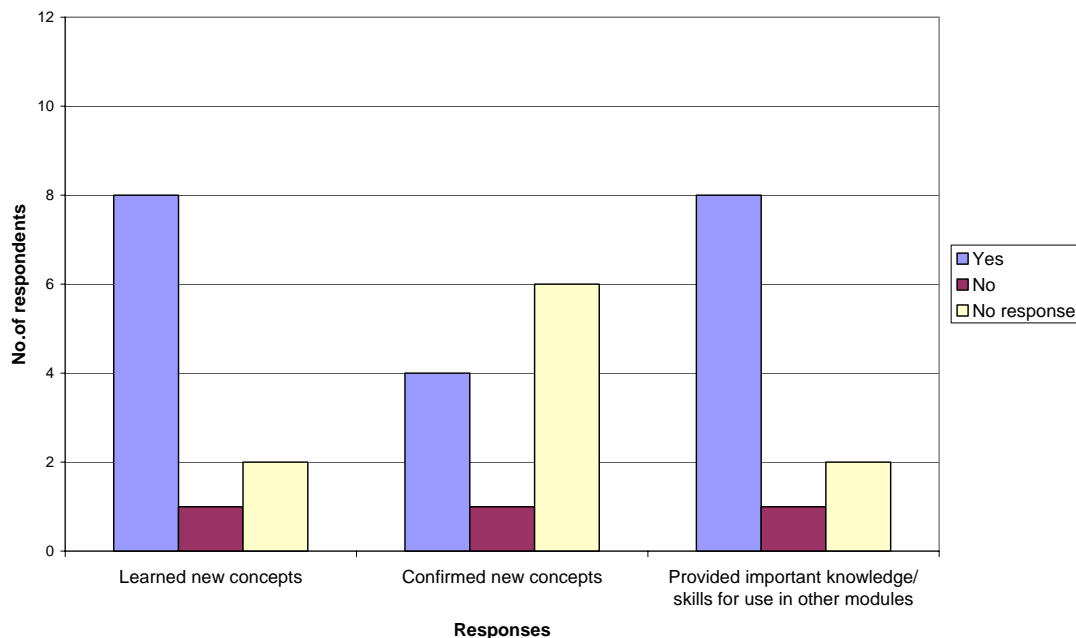
Figure 25 Post-questionnaire responses - 2.1.2.2

Post-session comments

- It made me open my eyes more to other considerations in design (POI6)

2.1.2.3 Recommendations, guidelines, standards etc. that have a bearing on Design for All
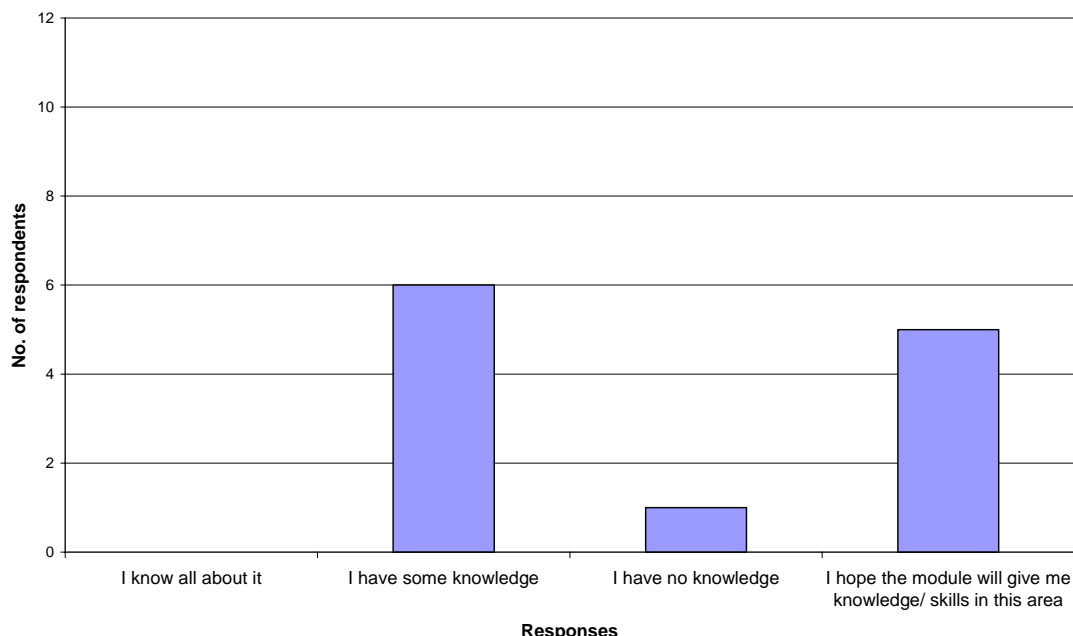
Figure 26 Pre-questionnaire responses - 2.1.2.3

Pre-session comments

- I have A level Design and Technology (PRI5)
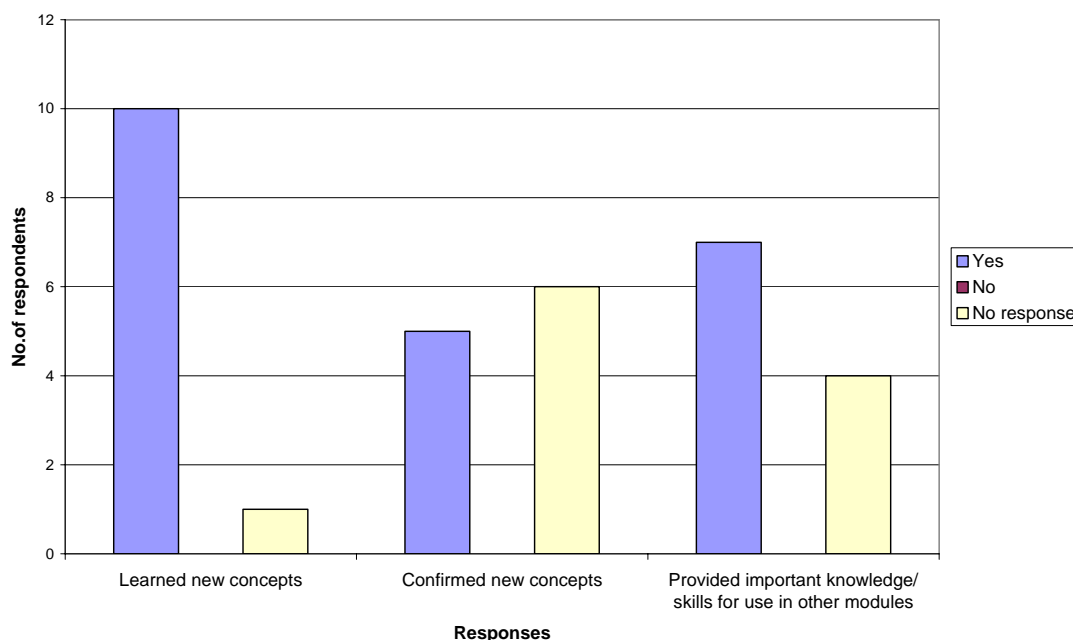
Figure 27 Post-questionnaire responses - 2.1.2.3

Post-session comments

None

2.1.2.4   Interpersonal skills for teamwork, experience in communicating the Design for All concept with other members of a team
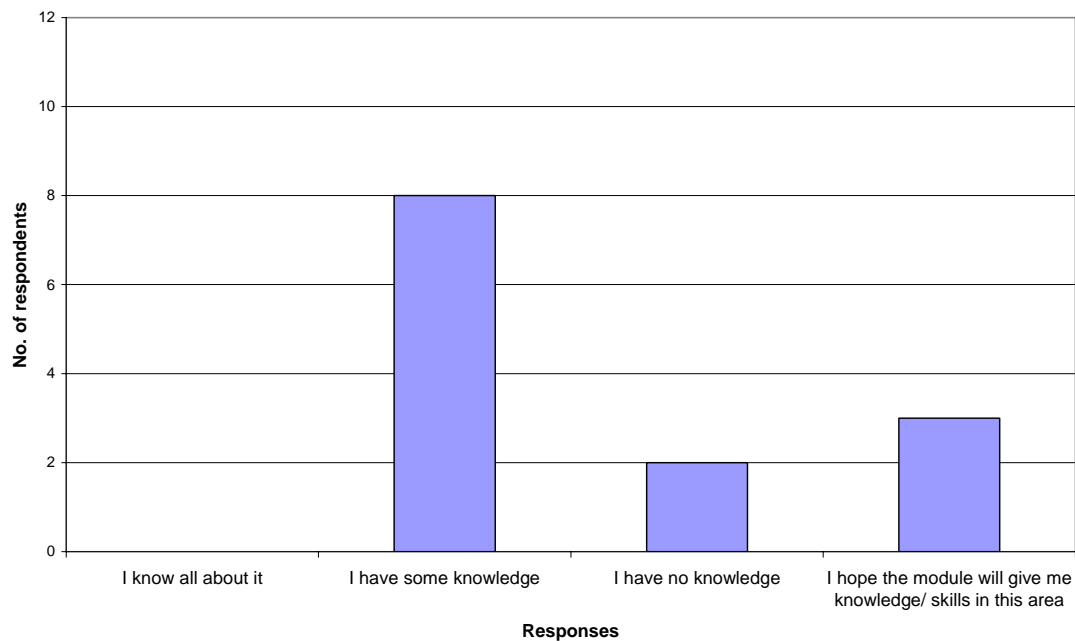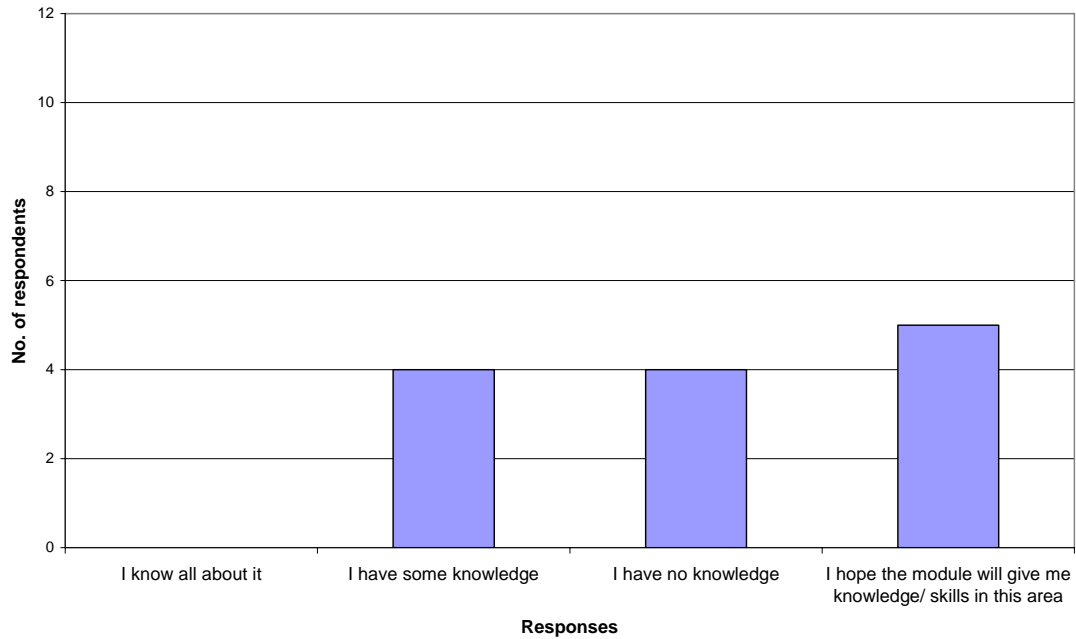

Figure 28 Pre-questionnaire responses - 2.1.2.4

Pre-session comments
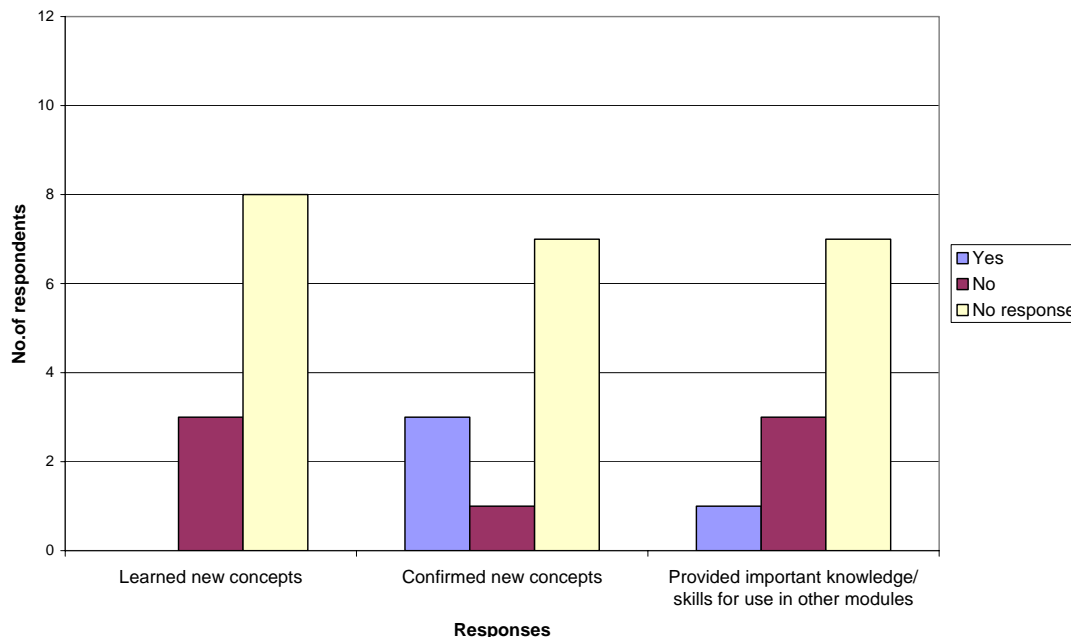
None

Figure 29 Post-questionnaire responses - 2.1.2.4

Post-session comments

None

2.1.2.5 Accessible content: knowledge on making content of documents, multimedia and Web sites accessible to all users, e.g. by making alternative forms of media available
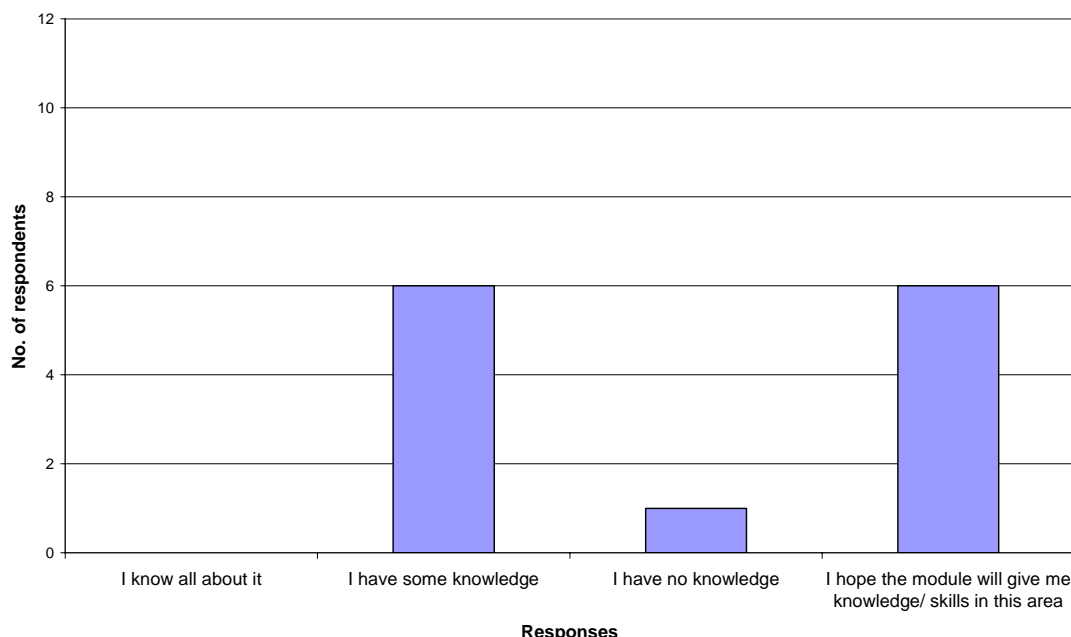
Figure 30 Pre-questionnaire responses - 2.1.2.5

Pre-session comments: none
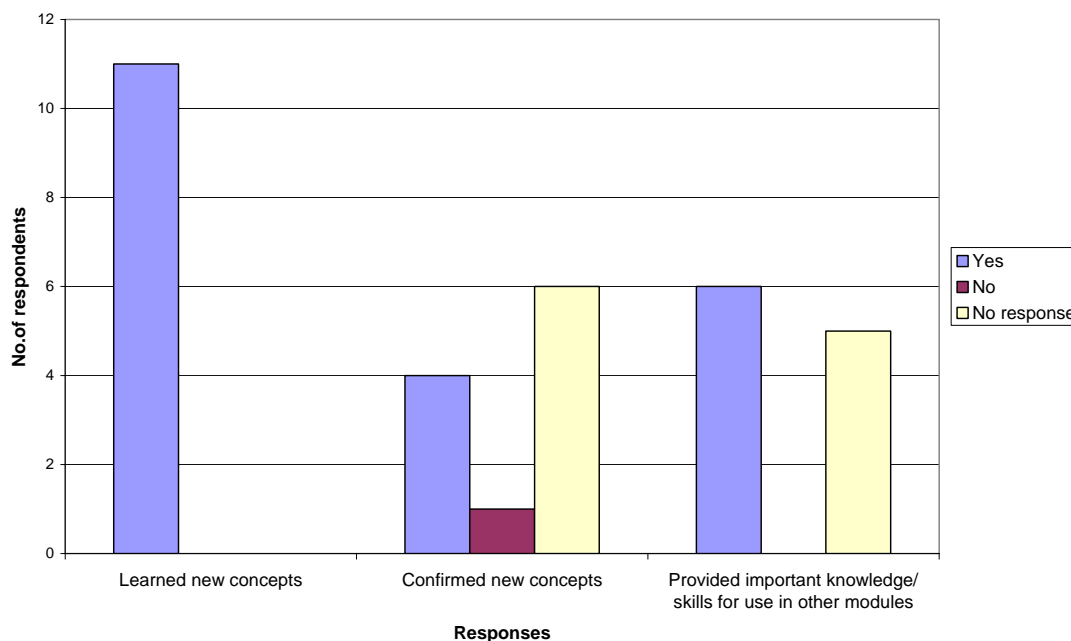
Figure 31 Post-questionnaire responses - 2.1.2.5

Post-session comments

- I learned more about what is available now and in the future (POI6)

2.1.2.6 Accessible interaction: knowledge about assistive and adaptive devices that enable alternative input and output, e.g. speech synthesisers, screen reader software, alternative keyboards, etc.
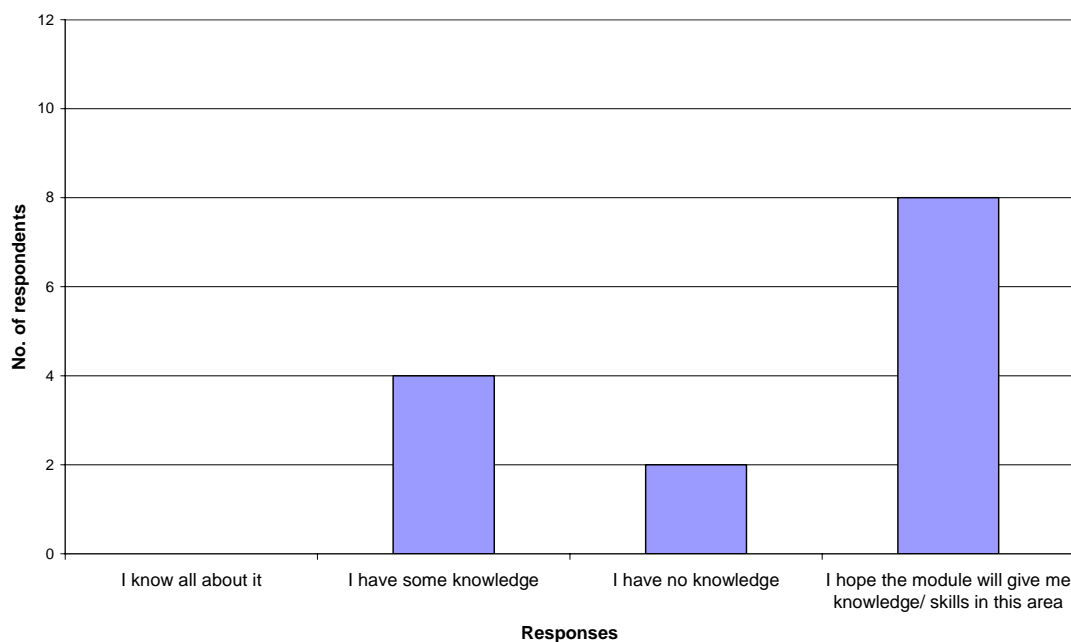
Figure 32 Pre-questionnaire responses - 2.1.2.6

Pre-session comments: None
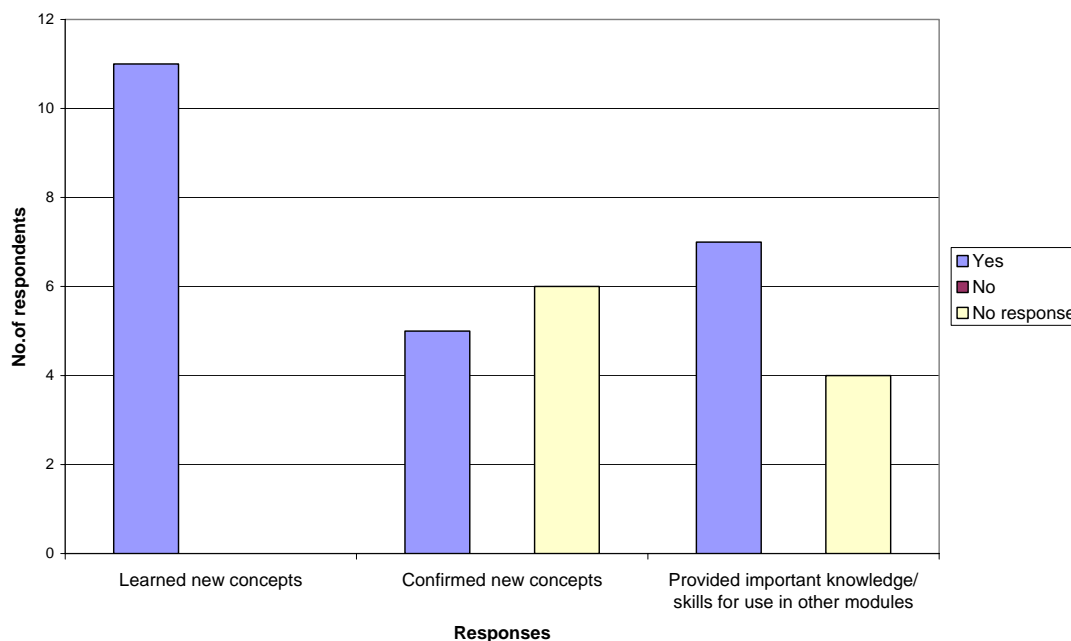
Figure 33 Post-questionnaire responses - 2.1.2.6

Post-session comments

None

2.1.2.7 New paradigms of interaction, that is, new research being conducted in areas such as smart computing applications, smart homes, clothes, cars etc.
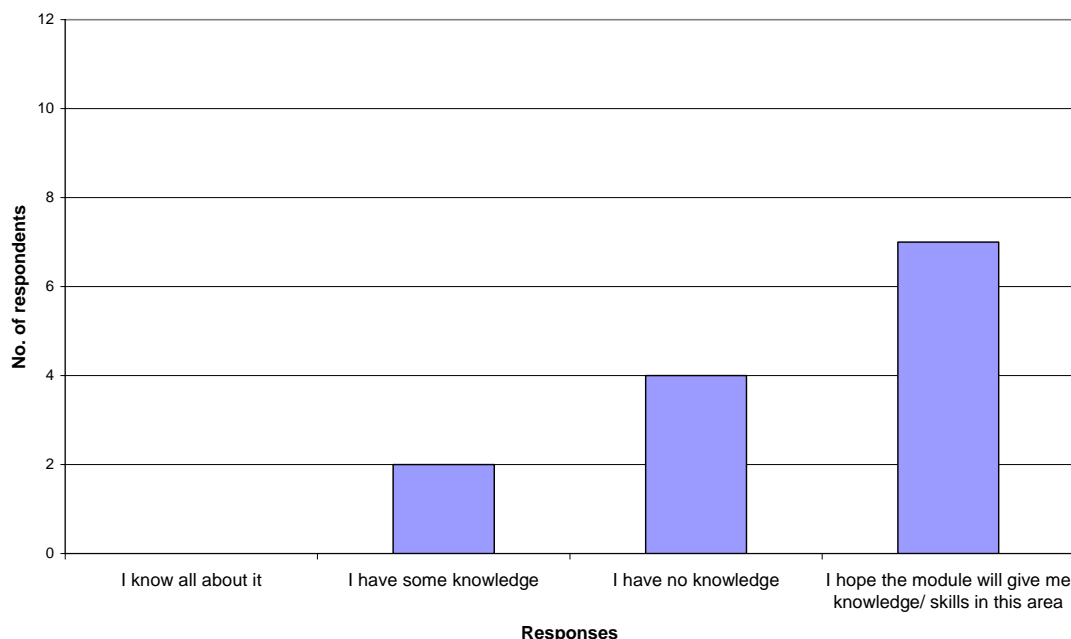
Figure 34 Pre-questionnaire responses - 2.1.2.7

Pre-session comments: None
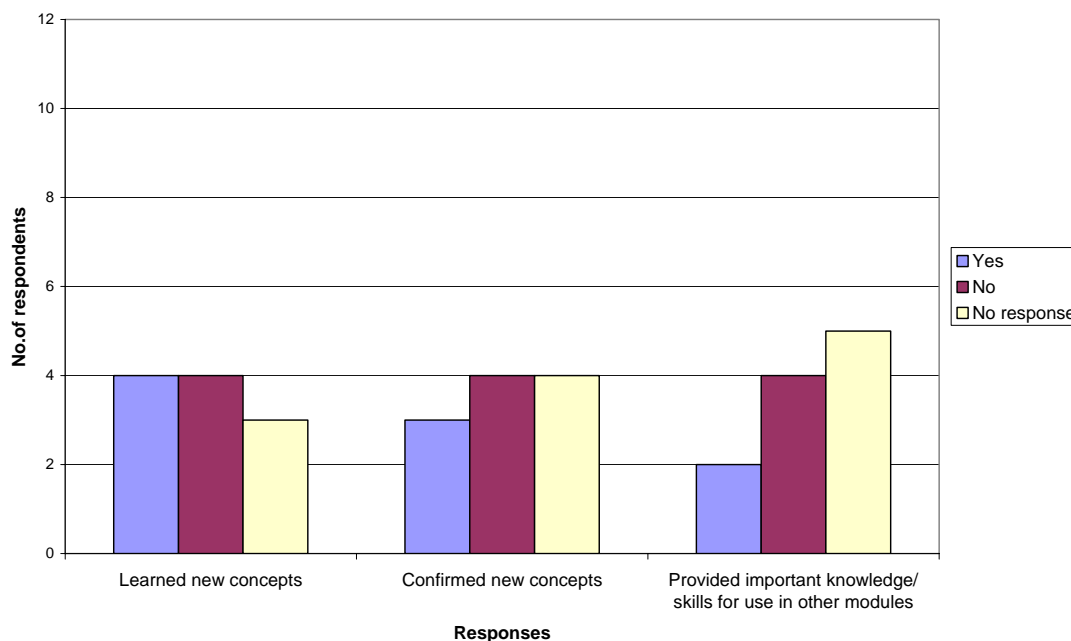
Figure 35 Post-questionnaire responses - 2.1.2.7

Post-session comments

- This will help me with my ergonomics individual project (POI5)

2.1.2.8 User centred design, including methods, tools and techniques to capture user requirements and evaluate designs with users
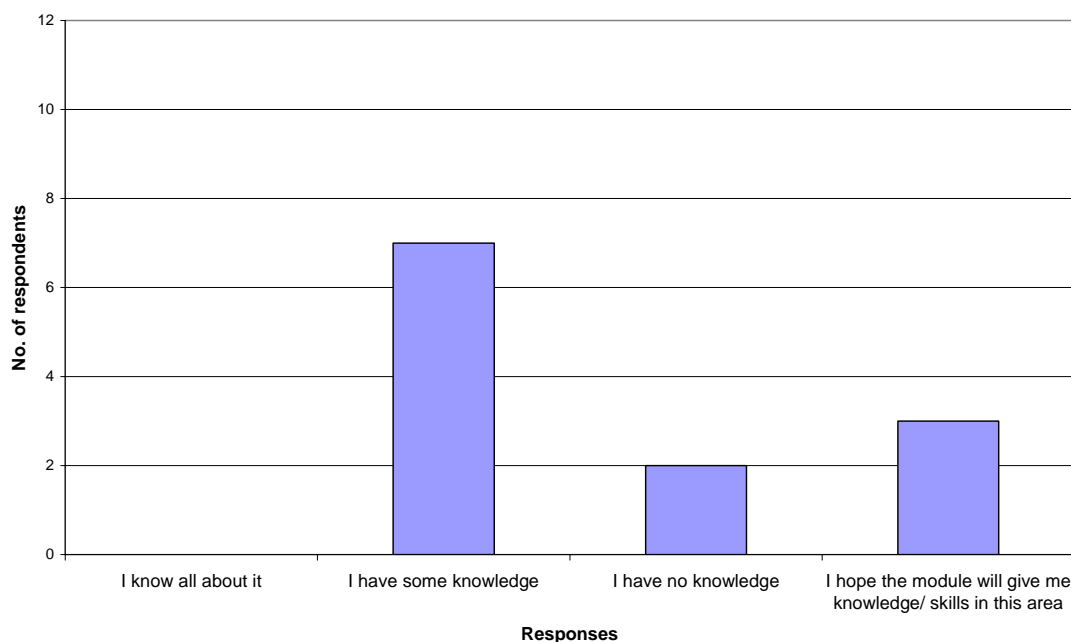
Figure 36 Pre-questionnaire responses - 2.1.2.8

Pre-session comments: None
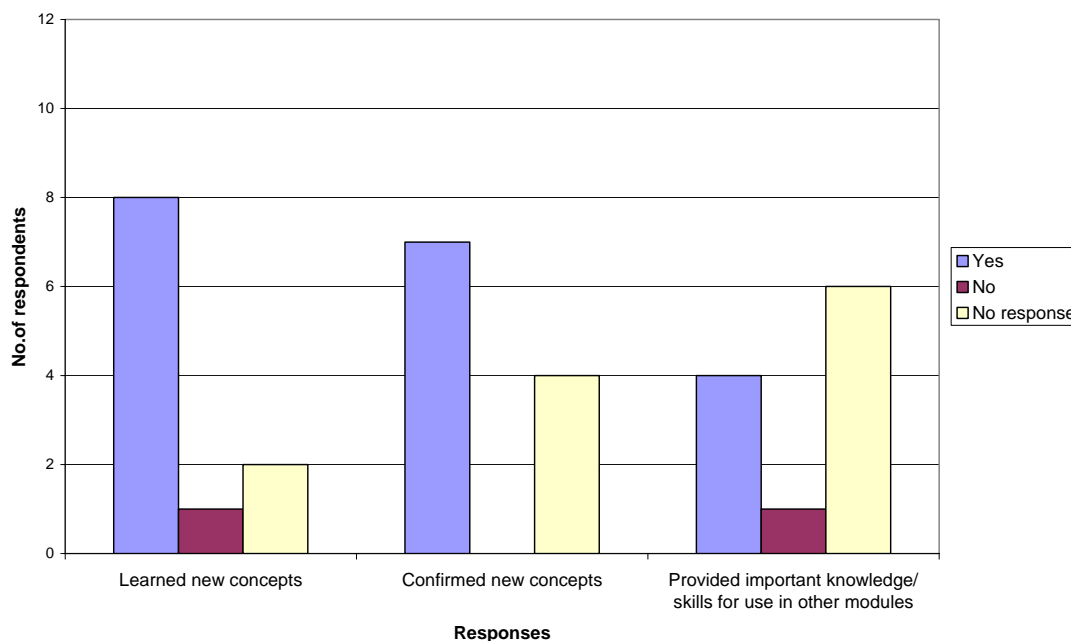
Figure 37 Post-questionnaire responses - 2.1.2.8

Post-session comments

More information on this would have been useful as this is an area of interest (POI1)

2.1.2.9 Application domains and research where Design for All issues are relevant, e.g., public access to information, health monitoring, technology enhanced learning, etc.

Figure 38 Pre-questionnaire responses - 2.1.2.9

Pre-session comments
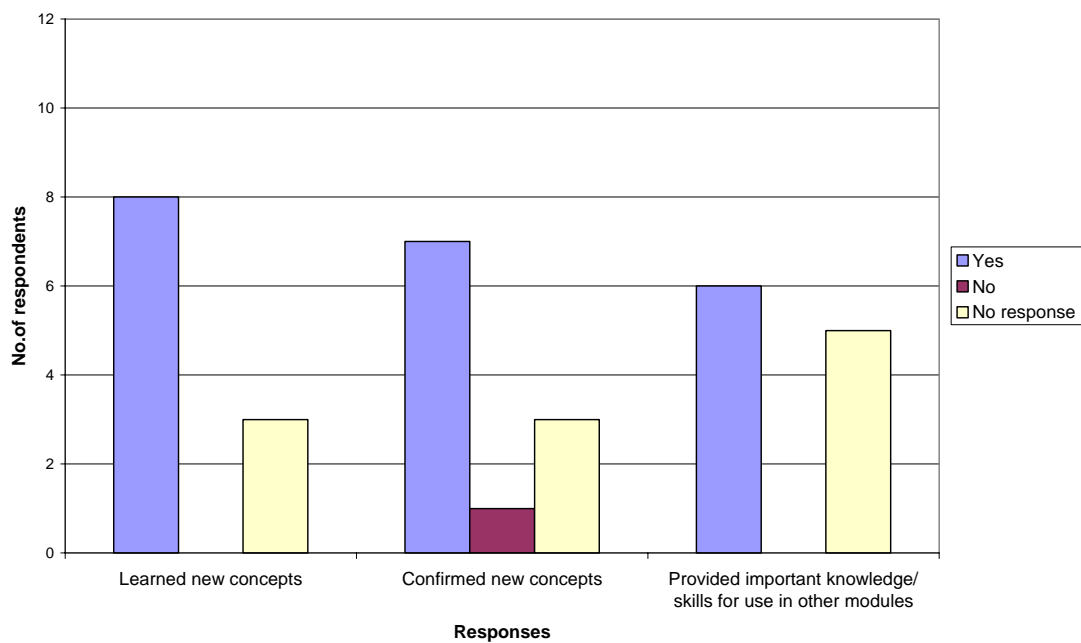
None

Figure 39 Post-questionnaire reponses - 2.1.2.9

Post-session comments: None

Additional questions pre-questionnaire

2.1.3 Overall, do you think that the knowledge and skills listed above would be useful in the future?

All 12 respondents answered yes to this question.

If so why and how?

- They are useful for my chosen career path (PRI1)
- They will help me improve lifestyle and living conditions for both able bodied and disabled people (PRI 2)
- For work as a designer and to consider other people's everyday problems and difficulties (PRI 3)
- Understanding other people (PRI 4)
- Further design career (PRI 5)
- Knowledge and understanding of the subject helps to produce better products (PRI 6)
- Design will be an essential part of my future so the above skills that are listed will be very useful to develop my design ability and knowledge (PRI 7)
- All the skills listed could be very useful when evaluating or creating a product (PRI 8)
- In design for the future it will be vital to be able to consider all kinds of abilities and backgrounds (PRI 12)

Additional questions post-questionnaire

2.1.3 What did you like about the topic?

- I enjoyed the way we were taught to think like the user in order to produce suitable designs (POI1)
- Generally interesting facts and figures. I didn't realise the problems the handicapped had. (POI2)
- Interesting (POI3)
- Was very relevant to the course (POI5)
- Was interesting and I had limited previous knowledge of the subject (POI8)

2.1.4 What did you dislike about the topic?

- It was very interesting and therefore longer could be spent on this area as it is an important area for design (POI1)
- Two hours listening quite hard (POI2)
- A bit too many statistics (POI7)

2.1.5 What did you find most useful?

- Thinking like the user (POI1)
- Lists of addresses and hands on! (POI3)
- Designing WWW and differences in definitions that can easily be confused (POI5)

- Designing for disabled. Looking at product designs etc. (POI7)
- The importance of including 'ageing and disabled' when designing (POI9)
- Learning about designing for disabled people or old age (POI10)
- How need to design for disabled users (POI11)

2.1.6 Overall, do you think you will use this knowledge in the future?

10 out of the 11 students (90.9%) that completed the post session questionnaire thought the knowledge gained from the course would be useful to them in the future. The remaining student provided no response.

2.1.7 Do you have any further comments or suggestions?

No responses

9.2.3 Greece, University of the Aegean, Department of Product and Systems Design Engineering

The students were told about the set of pre and post self completion questionnaires and that they would be collected and the information used for a European wide survey of Design for All teaching.

The questionnaires (both pre and post) were put on line for the students to view after the first introductory "taster" class was given. Once the students had enrolled for the class, they were invited to fill in the questionnaires online. The pre questionnaires trickled in throughout the first weeks of the class, the online system was new, and the students had to be reminded frequently to do it, although it was a voluntary exercise. The post questionnaires were requested from them after the completion of the course and the exam.

From a total of 66 students enrolled, 48 completed the course, fulfilling both project and written exam requirements. 5 students failed to reach the 40% pass mark on the written exam, one project failed to reach the 40% pass mark, and was re submitted. The students who failed the written exam have the right to re-sit the exam in September.

In all 22 students completed the pre-questionnaire, and 17 students the post questionnaire, 11 of the students completed both pre and post questionnaires.

A graphical display of the results is shown below for questions 2.1.2.1-2.1.2.9, and following this the comments of students are given.

Question2.1.2.1 Awareness of Design for All, Inclusive Design, Universal Design
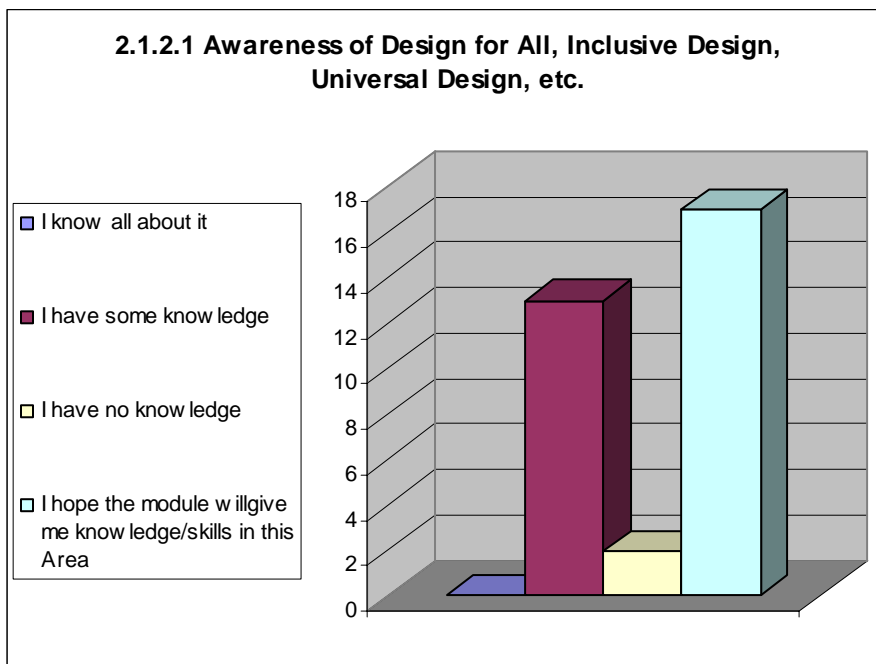
Figure 40 Pre-questionnaire responses - 2.1.2.1
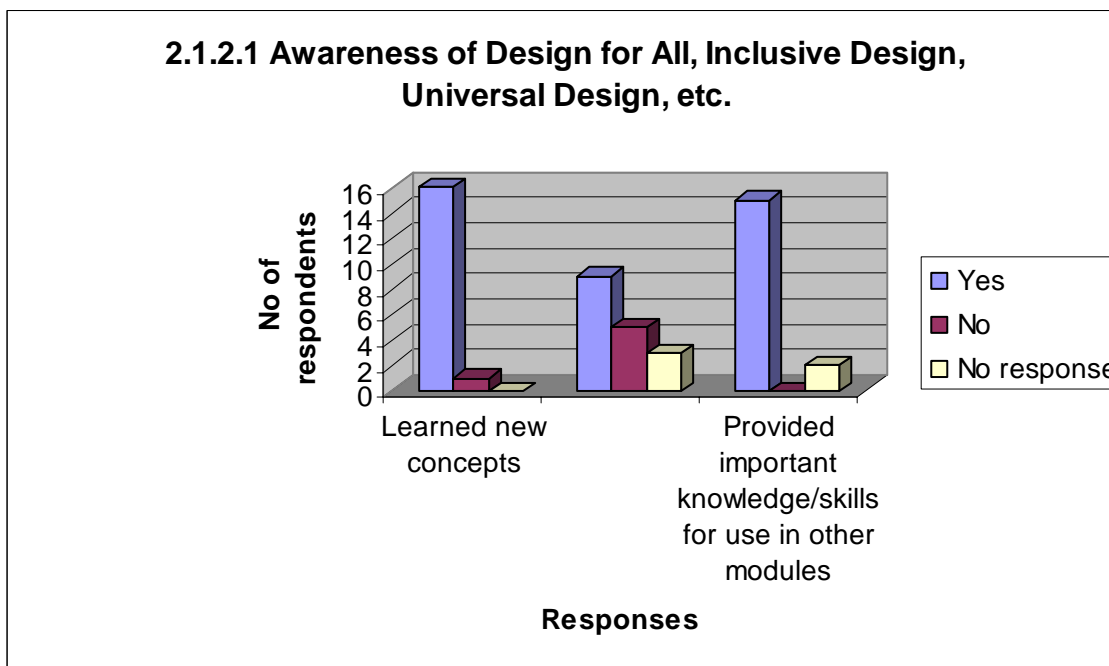
Figure 41 Post-questionnaire responses - 2.1.2.1

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations

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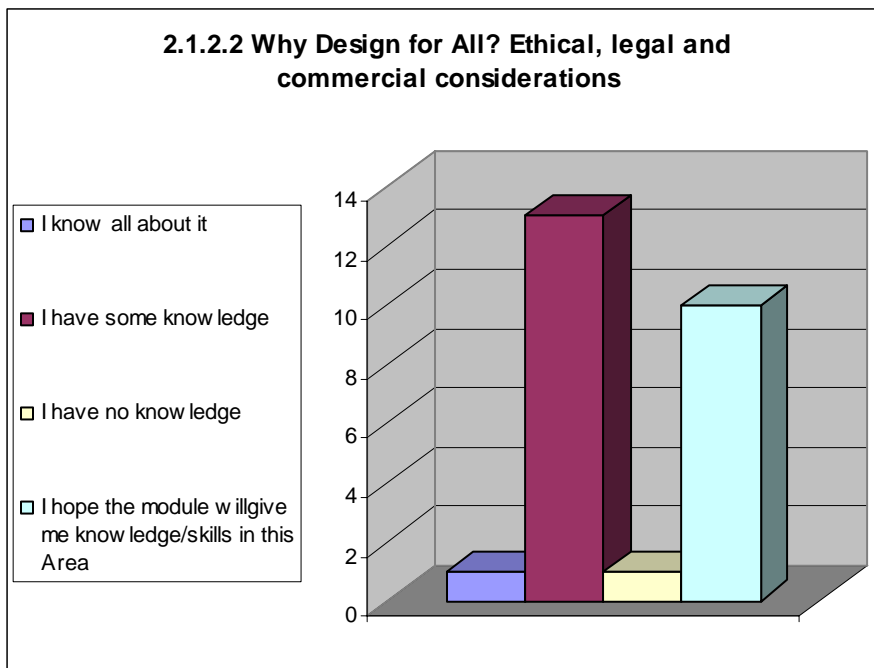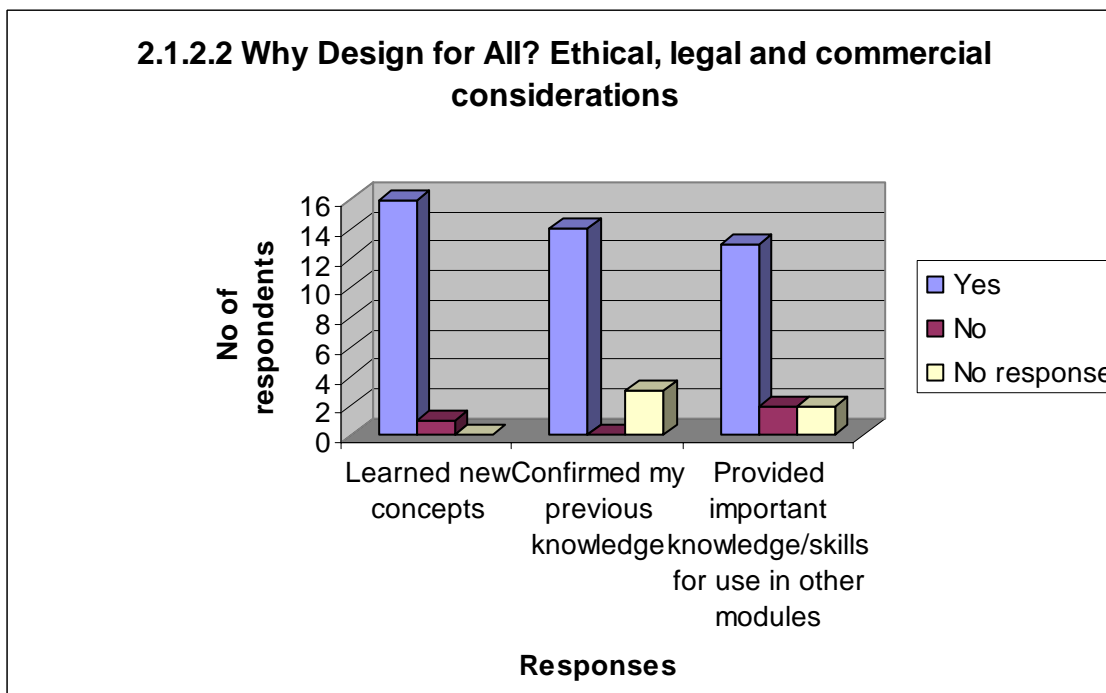

Figure 42 Pre-questionnaire responses - 2.1.2.2

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations

Figure 43 Post-questionnaire responses - 2.1.2.2

2.1.2.3 Recommendations, guidelines, standards etc. that have a bearing on Design for All

2.1.2.3 Recommendations, guidelines, standards, etc., that have abearing on Design for All

Legend:
- I know all about it
- I have some know ledge
- I have no know ledge
- I hope the module w ill give me know ledge/skills in this Area
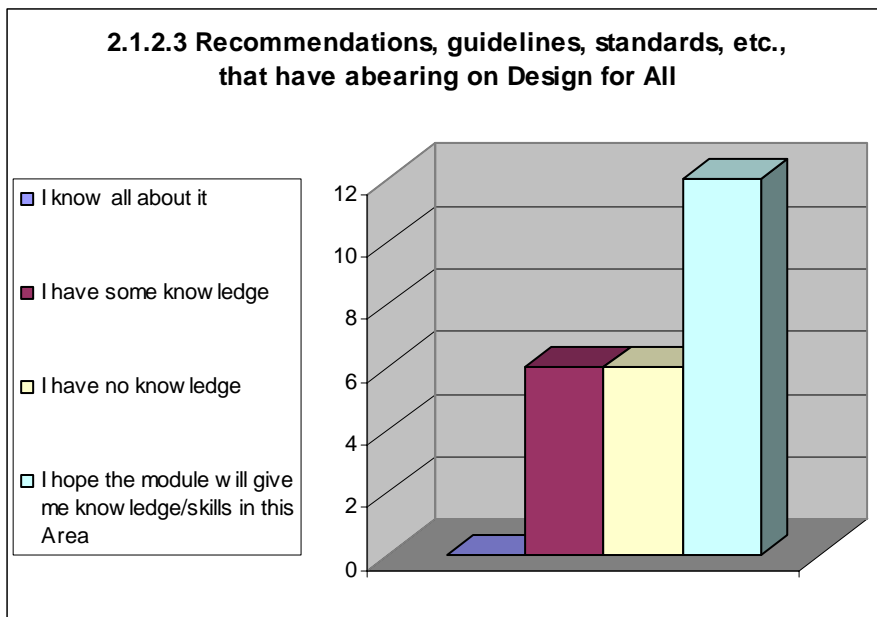
Figure 44 Pre-questionnaire responses - 2.1.2.3

2.1.2.3 Recommendations, guidelines, standards, etc., that have abearing on Design for All
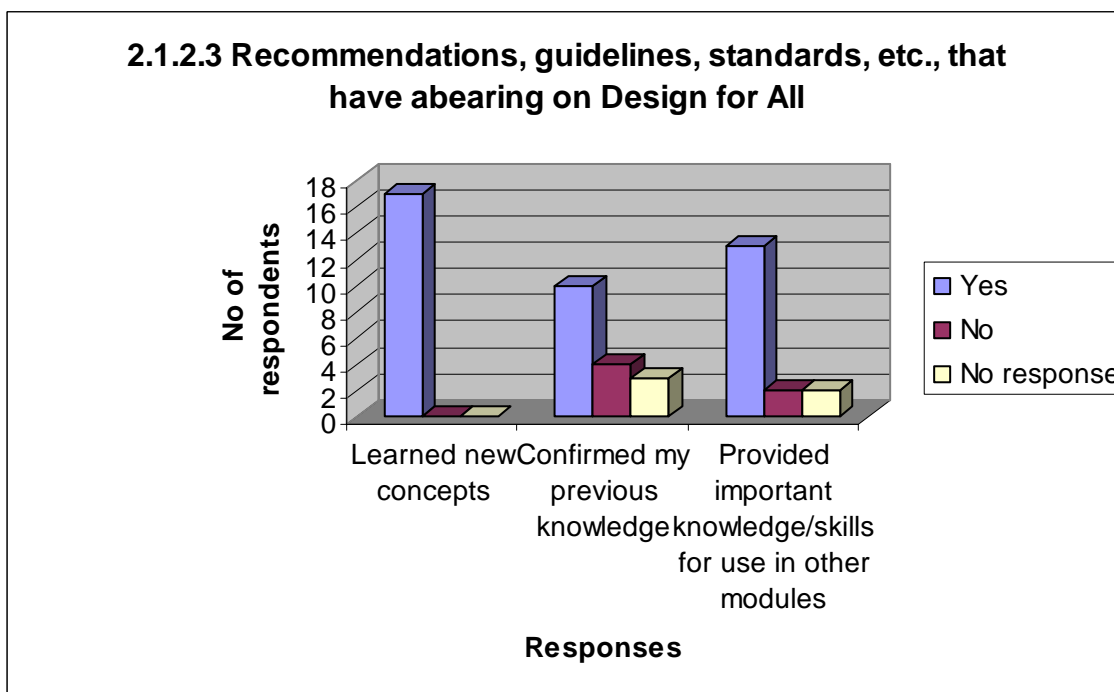
Figure 45 Post-questionnaire responses - 2.1.2.3

2.1.2.4 Interpersonal skills for teamwork, experience in communicating the Design for All concept with other members of a team

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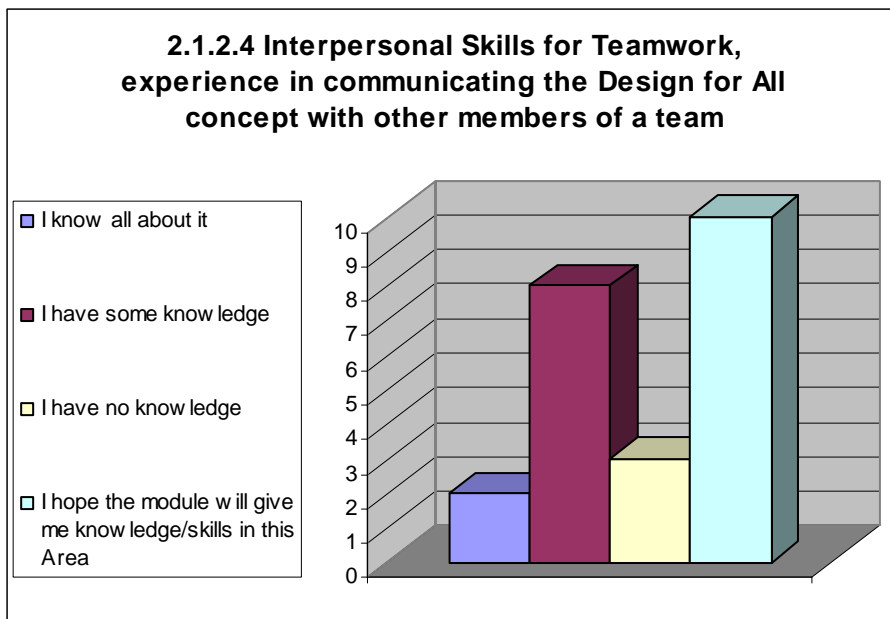
Figure 46 Pre-questionnaire responses - 2.1.2.4

2.1.2.4 Interpersonal Skills for Teamwork, experience in communicating the Design for All concept with other members of a team
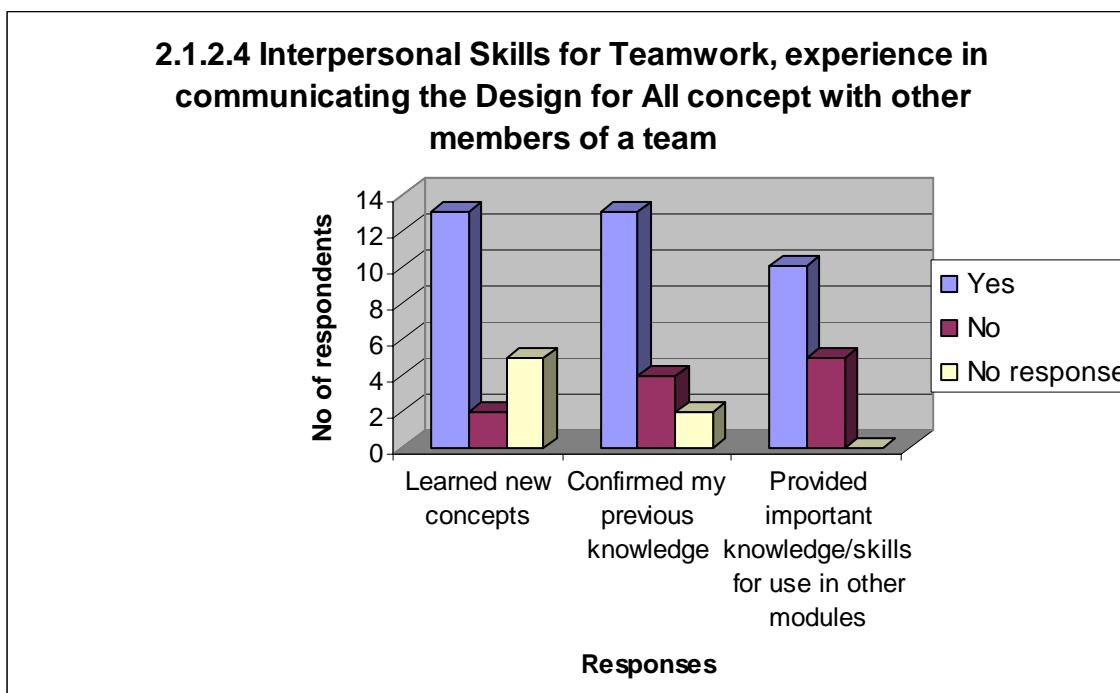
Figure 47 Post-questionnaire responses - 2.1.2.4

2.1.2.5 Accessible content: knowledge on making content of documents, multimedia and Web sites accessible to all users, e.g. by making alternative forms of media available

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- I know all about it
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- I have no know ledge
- I hope the module w ill give me know ledge/skills in this Area
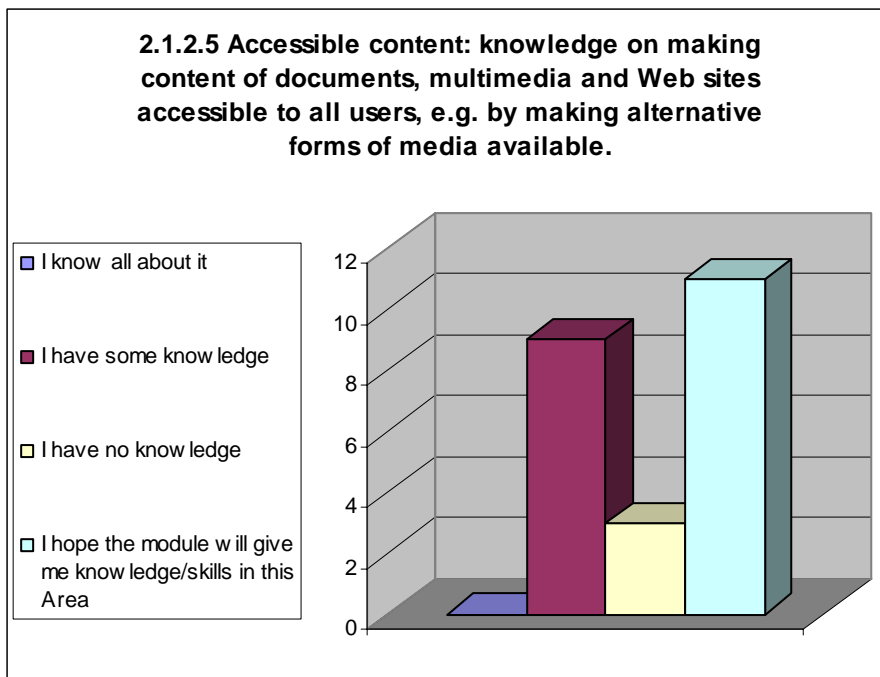
Figure 48 Pre-questionnaire responses - 2.1.2.5

2.1.2.5 Accessible content: knowledge on making content of documents, multimedia and Web sites accessible to all users, e.g. by making alternative forms of media available.

No of respondents

- Yes
- No
- No response

Learned new concepts | Confirmed my previous knowledge | Provided important knowledge/skills for use in other modules
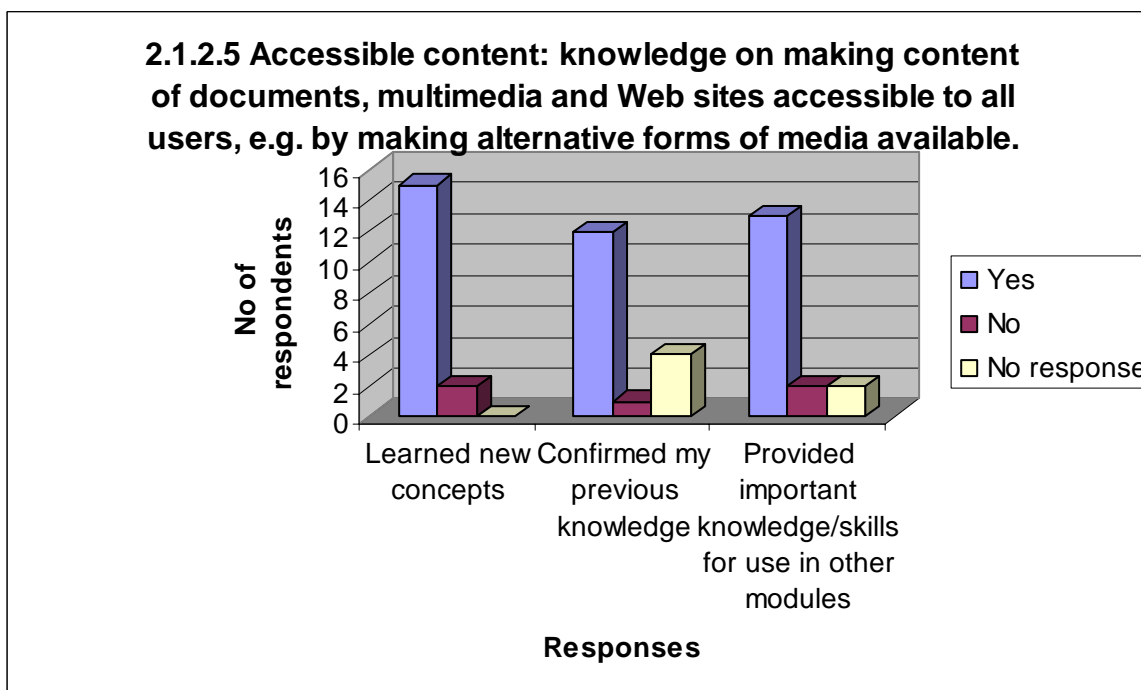
Responses

Figure 49 Post-questionnaire responses - 2.1.2.5

2.1.2.6 Accessible interaction: knowledge about assistive and adaptive devices that enable alternative input and output, e.g. speech synthesisers, screen reader software, alternative keyboards, etc.
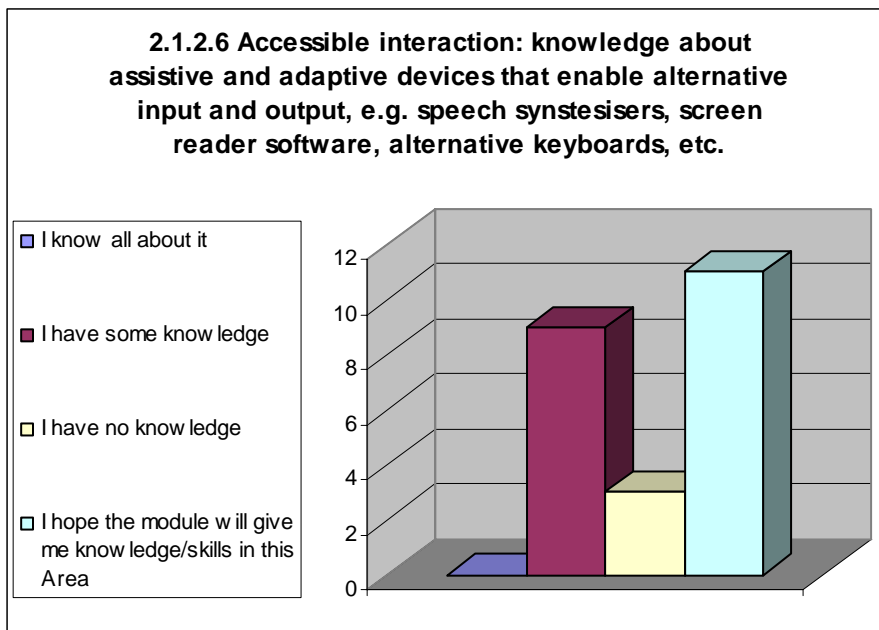
Figure 50 Pre-questionnaire responses - 2.1.2.6
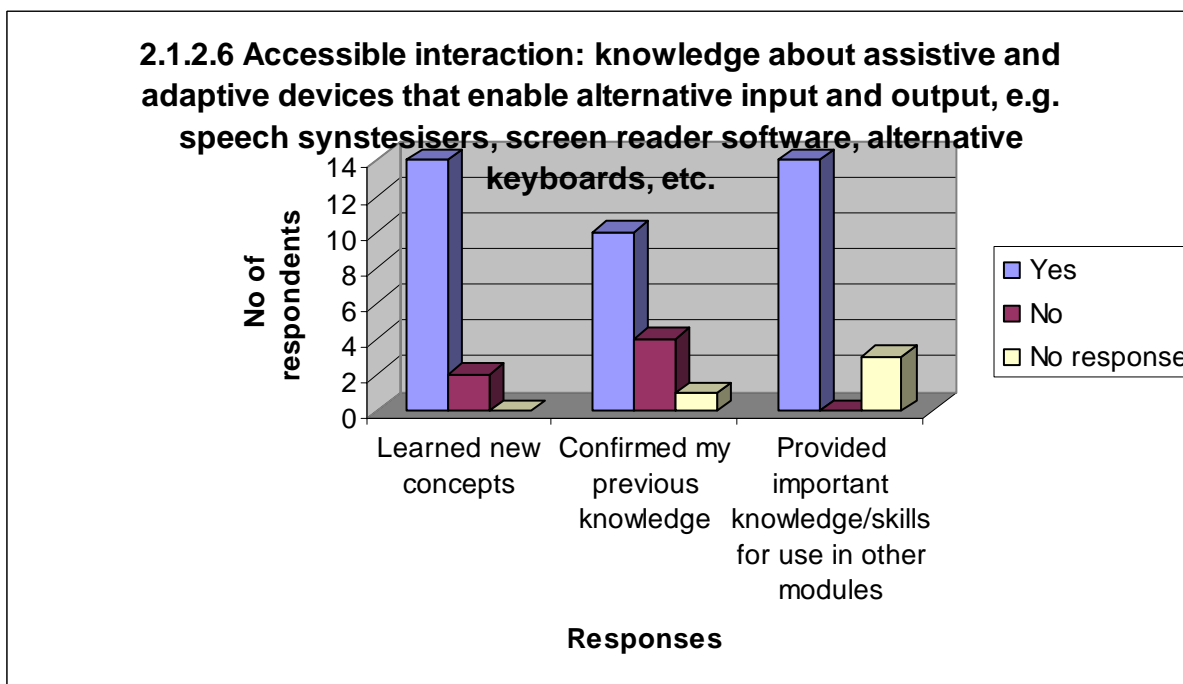
Figure 51 Post-questionnaire responses - 2.1.2.6

2.1.2.7 New paradigms of interaction, that is, new research being conducted in areas such as smart computing applications, smart homes, clothes, cars etc.

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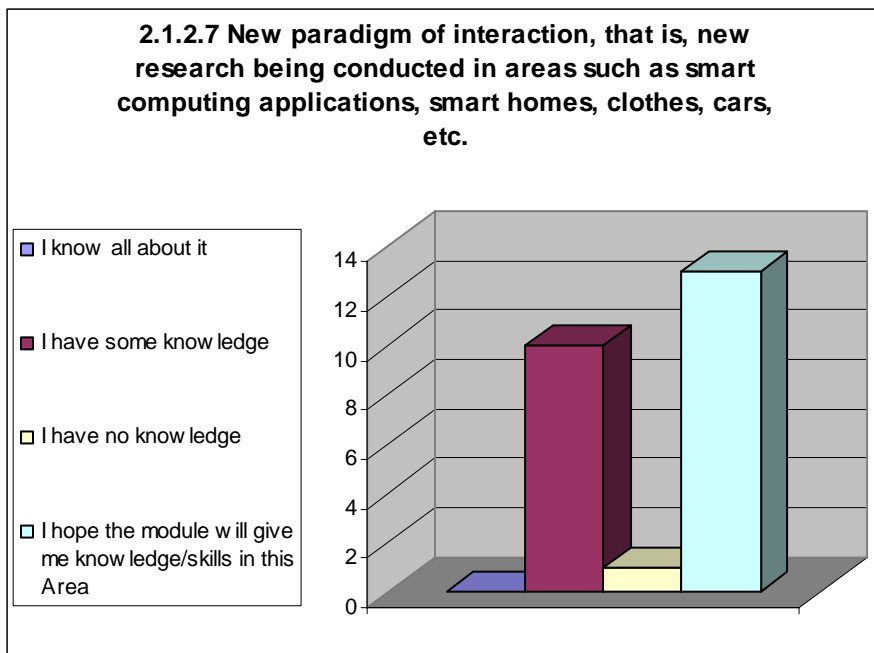
Figure 52 Pre-questionnaire responses - 2.1.2.7
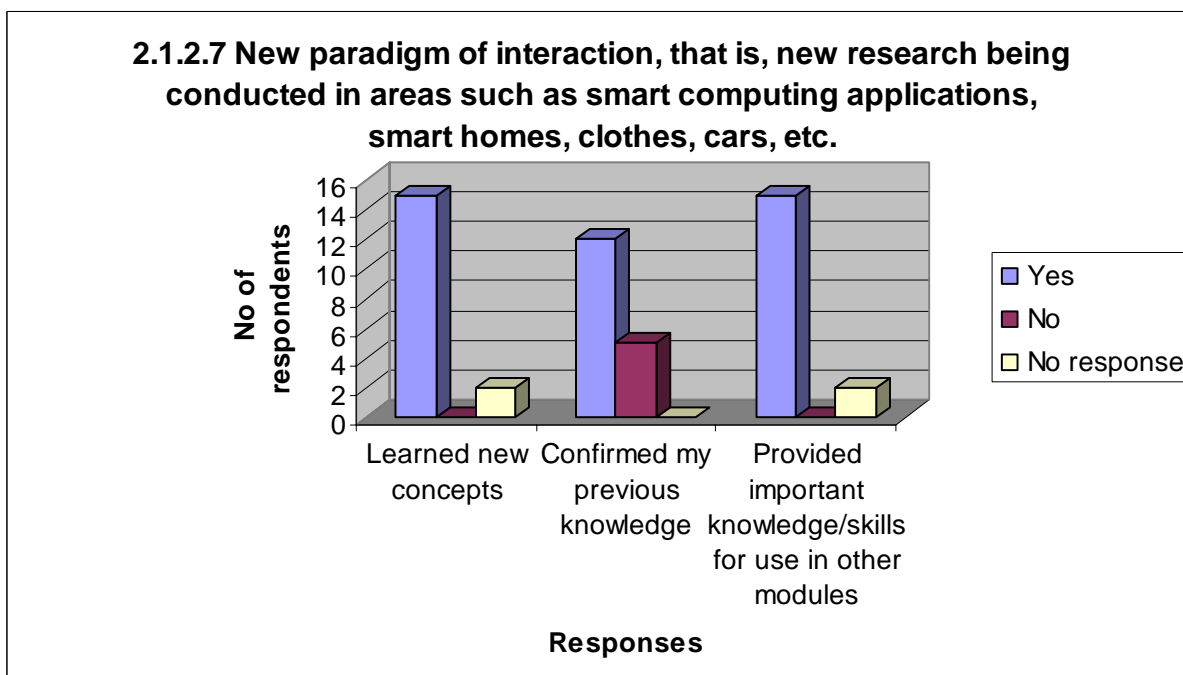
Figure 53 Post-questionnaire responses - 2.1.2.7

2.1.2.8 User centred design, including methods, tools and techniques to capture user requirements and evaluate designs with users

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- ☐ I know all about it
- ☐ I have some know ledge
- ☐ I have no know ledge
- ☐ I hope the module w ill give me know ledge/skills in this Area
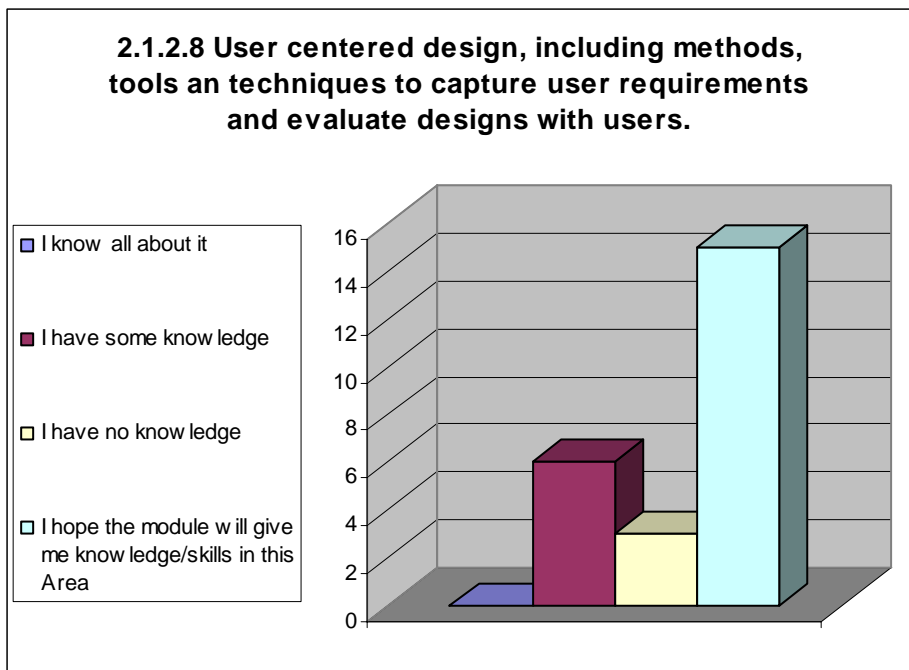
Figure 54 Pre-questionnaire responses - 2.1.2.8

2.1.2.8 User centered design, including methods, tools an techniques to capture user requirements and evaluate designs with users.

- ☐ Yes
- ☐ No
- ☐ No response
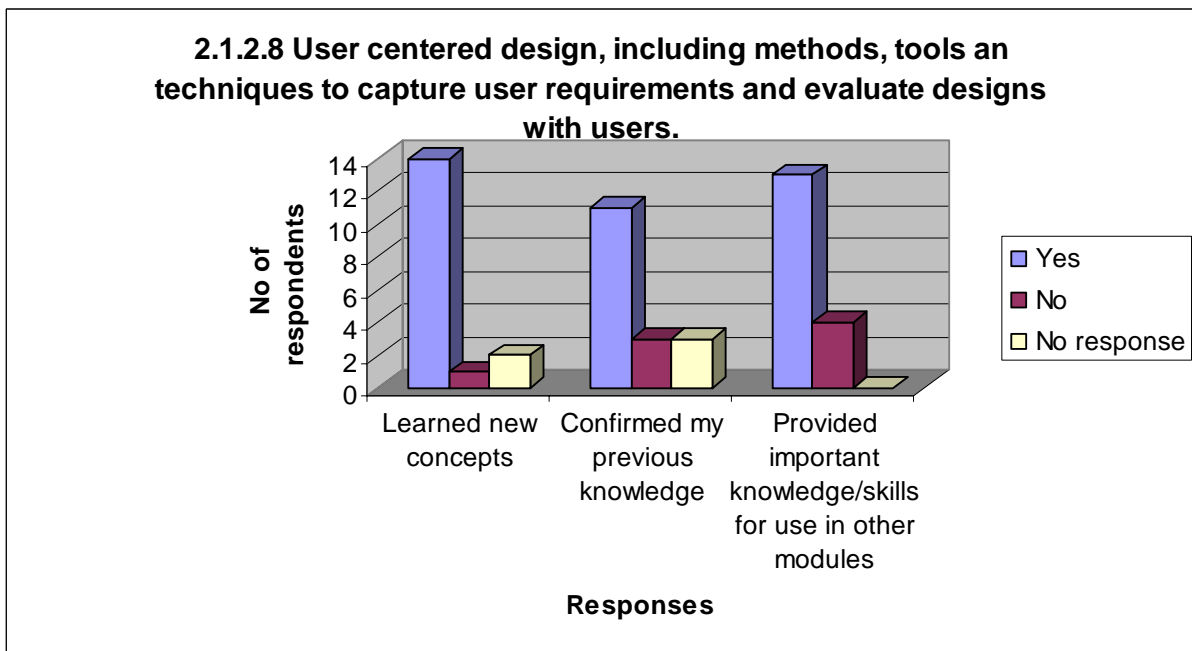
Responses

Figure 55 Post-questionnaire responses - 2.1.2.8

2.1.2.9 Application domains and research where Design for All issues are relevant, e.g., public access to information, health monitoring, technology enhanced learning, etc.

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- □ I know all about it
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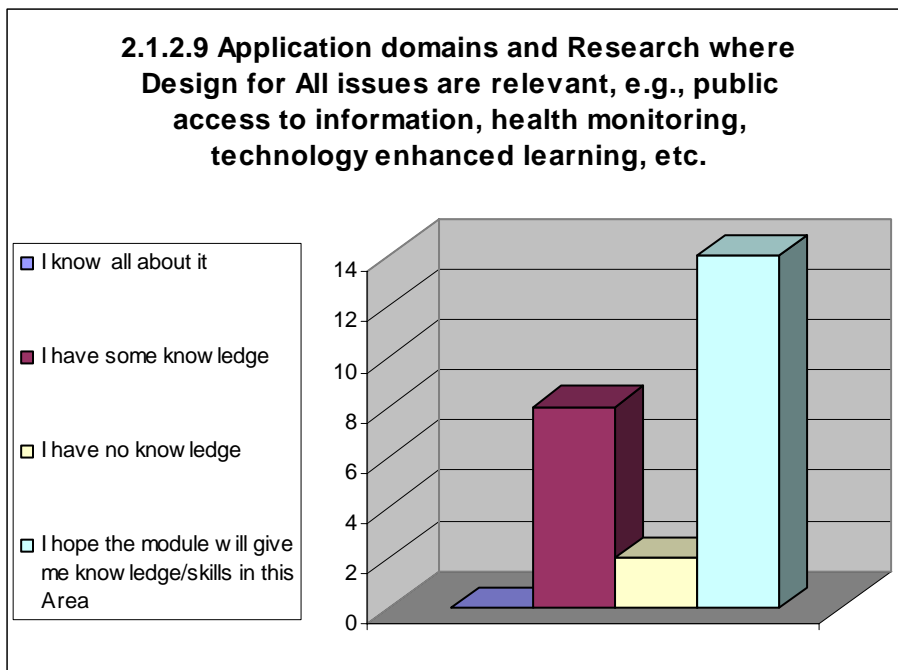
Figure 56 Pre-questionnaire responses - 2.1.2.9

2.1.2.9 Application domains and Research where Design for All issues are relevant, e.g., public access to information, health monitoring, technology enhanced learning, etc.

- □ Yes
- ■ No
- □ No response
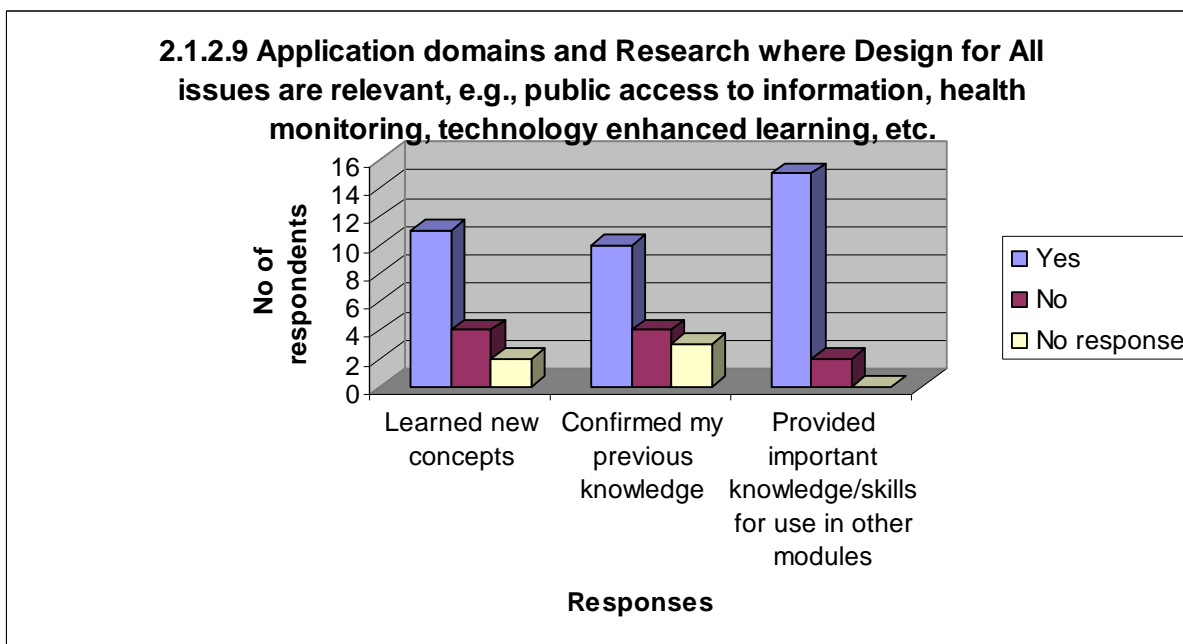
Figure 57 Post-questionnaire reponses - 2.1.2.9

From the pre questionnaire the students were asked about their expectations for the course.

21.3 Overall, do you think that the knowledge and skills listed above would be useful for the future?

12 out of 22 students (58%) replied to this question

To the corollaries to this question **Why or How?** some had practical concerns, hoping that it would gain them added value in the job market.

- They will help me in my job

- Πιστεύω μπορεί να παρέχει στο φοιτητή τα απαραίτητα εφόδια για το μέλλον, όσον αφορά το χώρο του design οποιαδήποτε μορφής. Γνωρίζοντας διάφορα στοιχεία γύρω από την πρόσβαση κ διαχείριση της πληροφορίας, το βαθμό αλληλεπίδρασης διάφορων μελλοντικών συστημάτων, που τώρα βρίσκονται στα πλαίσια έρευνας, και τα απαραίτητα guidelines, standards που αφορούν το design for all θα είμαστε σε πλεονεκτική θέση για το σχεδιασμό οποιουδήποτε συστήματος (υλικού ή μη) έναντι του επαγγελματικού ανταγωνισμού. I believe it can give the student the necessary resources for the future, in what concerns the area of design of whatever type. Knowing various details about the subject of accessibility and management of information, the degree of interaction of different future systems, which are still in the research stage, and the necessary guidelines, standards which refer to Design for All, we shall be in an advantageous position for the design of whatever system (material or otherwise) in the area of professional competitiveness.

One student expressed the hope that it would provide knowledge and skills useful for other areas of their studies as well as the future.

- Πιστεύω πως τα παραπάνω γνωστικά θέματα είναι απαραίτητα και πολύ χρήσιμα για την σταδιοδρομία των φοιτητών και μελλοντικών μηχανικών στο χώρο του σχεδιασμού προϊόντων και συστημάτων I believe that the above knowledge areas are essential for students and very useful for their development as future engineers in the world of product and system design.

Some felt it logical step

- Because the future design should be inclusive

- Design is very important for everyone's daily life.. Due to this fact, it is also very important to design products in a way that they can be used by a large amount of people an not only the ones who have some skills or knowledge

- Because the way that functionality, usability and accessibility are combined concerns and assist all people. Also trying to design for people with special needs inspires design in all ways

- Design changes the way we perceive the world, so if it's available to everybody the world would be much more interesting

- Absolutely they're going to be useful. First off they will help us to realise all these little details that can make handicapped people's life much easier. They have the right to live normal as anybody else and it'sour duty to help them. Even though if we don't design such systems in the future, the knowledge we will have received by. that lesson will be useful and it will make us view life and people in a much better way.

- I believe that this knowledge will be useful for me in the future, when I'll have to design something accessible and useful for everyone

- It seems that design is becoming nowadays more user-cented and the disabled users are often it's aim

- Γιατί εφόσον θέλω να γίνω σχεδιάστρια θα πρέπει να γνωρίζω τέτοιου είδους καταστάσεις έτσι ώστε να μπορώ να τις αντιμετωπίζω όσο το δυνατών καλύτερα και πιο αποτελεσματικά (Because, since I want to become a designer, I must know about such things in order to be able to deal with them as effectively and efficiently as possible).

Some were more idealistic, one student whose id was "hope for a better world" wrote:

- Θα είναι πολύ χρήσιμα επειδή θα βοηθήσουν στην δημιουργία ενός καλλίτερου κόσμου ο οποίος θα είναι προσβάσιμος από όλους, χωρίς εξαιρέσεις. It will be very useful because it will help in the creation of a better world which will be accessible to everyone without exception.

From post questionnaire

and **What did you dislike about the course?**, and **What did you find most useful?**, and 4 with further comments and suggestions

The students were more inspired to loquaciousness by the post questionnaire (or perhaps they felt they had more to say!) Their comments to each question are below:

Question 2.1.3-What did you like about the topic?

(15 from 17 replied to this question 88%)

- The innovative point of view, the fact that it concerns the future

- Learning how to design for all people, new methods in use, new ways of design, to care more about the disabled, how important is design for all

- I learned useful things and designing for an other point of view

- The fact that I learned more about inclusive design and in particular about e-accessibility

- Η συνεργασία με την διδάσκουσα του μαθήματος και τα μέλη της ομάδας μου, πάνω στο θέμα της εργασίας "SMART HOMES AND BUILDINGS" στα πλαίσια του μαθήματος. Επιπλέον οι γνώσεις που πήραμε και μέσω των μαθημάτων και μέσω της έρευνας για την εργασία, οι οποίες θα μας είναι πολύ χρήσιμες στο μέλλον. (The collaboration with the instructor of the course and the members of

my team, on the theme of our project "Smart homes and Buildings" within the framework of the course. In addition the knowledge we acquired both from the classes and from the research for the project, which will be very useful to us in the future).

- I learned not only recommendations and guidelines as I did in other courses in the past, but also the exactly reasons why DfA

- I learned things about people that I had never thought

- Μ` αρεσε η τοποθέτηση του μαθήματος επάνω στον σχεδιασμό αντικειμένων ,προσπαθόντας να συνδιάσει εργονομία και χρηστικότητα σε όλους.Είδα ενδιαφέρον αντικείμενα που δείνουν μεγαλύτερη προσοχή στην λεπτομέρεια και δεν σχεδιάζονται μόνο για να υπάρχουν ,αλλά έχουν πιο υψηλούς σκοπούς/στόχους σε σχέση με αλλά αντικείμενα καθημερινής χρήσης. (I liked the setting of the course on the design of objects, trying to combine ergonomia and usability for everyone. I saw interesting objects which give greater attention to the detail and are not designed merely to exist, but which have higher aims/goals in relation to other objects of everyday use).

- That it broadened our point of view about design.

- That we have an idea what we are about to do.

- I have learn (sic) very interesting things which I have never before thought.

- User centred design, including methods, tools and techniques to capture user requirements and evaluate designs with users and Interpersonal Skills for Teamwork.

- I found useful the research I did on the web for special devices which helps people and I also saw new innovation that I hadn't seen before.

- How it combines design aspects and produces a way of thinking needed in our society.

- All.

Question 2.14 What did you dislike about the topic

(16 of 17 students replied to the question = 94%)

- The fact that it was difficult for me to understand some points.

- There is nothing I can think of.

- I didn't find something wrong about DFA.

- There is nothing that I disliked about the topic.

- Δεν υπήρχε κάτι που να μη μου άρεσε , πήρα πολλές γνώσεις πάνω στο αντικείμενο και έμαθα νέα πράγματα που θα χρειαστώ στο

μέλλον. (There was nothing that I didn't like, I gained much knowledge about the subject and learned new things that I will need in the future).

- I would like to see more examples of industrial products where all this knowledge was applied successfully or not.

- I learned things about people that I had never thought.

- Sometimes watching so many disabled made me feel sad.

- Δεν υπήρχε κάτι που με απογοήτευσε. Όλες οι πληροφορίες του μαθήματος ήταν πολύ ενδιαφέρον ,αν και ίσως θα προτιμούσα να υπήρχε και κάποιος εργαστηριακός τομέας σχεδιασμού κι απ την πλευρά των φοιτητών.(There was nothing that disappointed me. All the information about the class was very interesting, although perhaps I would have preferred that there was an practical design part from the side of the students).

- That it is misunderstood with design for Disabled and Elderly (editor's note: e.g. that DfA is a euphemism for design for the Disabled and Elderly).

- The word 'all' because it is not true.

- We talk much about the disable (sic) people.

- Nothing.

- Μερικούς καινούργιους τρόπους οι οποίοι βοηθάνε ανθρώπους με προβλήματα όπως οι προτάσεις για captions όπου τις θεωρώ πολύ λανθασμένες και η προσπάθεια να γίνουν όλα κατασνοητά και εύκολα όταν σε πολλούς αρέσει η δυσκολία καθώς τους κάνει να ασχοληθούν περισσότερο με τα πράγματα που είναι δυσκολα παρά με τα εύκολα. (Some new ways that help people with problems, like the suggestions for captions where I believe that these are problematic and the effort to make everything understandable and easy when for many people they like the difficulty because it makes them take more time with things that are hard, than with the things that are easy.)

- The depression that is occurred (Editor note "encountered" is meant) trying to face problems of DfA.

- None

Question 2.1.5 What did you find most useful

(15 out of 17 students replied to this question = 88%)

- The different way of thinking. The different point of view

- The importance of design for all. The ways of design. There are so many things I didn't know they existed and which are very interesting.

- Learn about the exist of laws and the ethical reasons for DfA.

- Accessible content and accessible appliances.

- Διδακτίκαμε και ενημερωθήκαμε για θέματα τα οποία δε γνωρίζαμε. Διαπιστώσαμε ότι το Design For All πρέπει να προσαρμόζεται κάθε φορά ανάλογα με το κοινό που απευθύνεται και τις ανάγκες που καλείται να ικανοποιήσει. Δεν είναι κάτι standard και συνεπώς πρέπει να μελετείται ανάλογα με τις ανάγκες της αγοράς.

- I thing (sic) everything is useful for different reasons.

- The presentations of every topic.

- Όλο το μάθημα ήταν χρήσιμο ,καθώς μου παρείχε χρήσιμες γνώσεις αλλά βρήκα πολύ ενδιαφέρον την έρευνα που έκανα στην αγορά. (All the course was useful, because it contained useful knowledge, but I found very interesting the research I did on the market).

- Recommendations, guidelines, standards.

- Almost everything, especially the way you see the world after all that experience.

- The most useful thing about me (Ed note –"for me" is meant) is that some things are not how they look to the whole people and mean something else. I understand these things after the lesson because I didn't know them

- Tools and techniques to capture use requirements.

- Χρήσιμες γενικές και ειδικές γνώσεις γύρω από «design for all», όπως τους λόγους που πρέπει να συμπεριλαμβάνεται στη σχεδιαστική διαδικασία (ηθικοί, νομικοί, εμπορικοί, δημογραφικοί λόγοι), τι είναι «design for all». Νέες τεχνολογίες για ανάπηρους ή μη – υποστηρικτές τεχνολογίες. Τρόπους για να κατανοήσουμε πως θα γίνει ο σχεδιασμός καλύτερος (παρατήρηση-προσομοίωση). Αρχές του universal design. Σχεδιασμός βασιζόμενος στον άνθρωπο (userfit) – εργαλεία και τεχνικές (kansei modelling) Τις καινοτομίες σε αντικείμενα καθώς είναι πολύ πρωτότυπες αν και θέλουν πολύ δουλεια ακόμα (Useful general and specialised knowledge about design for all, like the reasons for which it should be included in design (ethical, legal, commercial, demographic reasons), what is "design for all". New technologies for people with disabilities, or not – supportive technologies. Ways to understand how the design can become better (observation simulation) Principles of universal design. Design based on the human (userfit) tools and techniques (kansei modelling).

- The guidelines, instructions about user interface and software in order to be accessible and the principles for universal design.

- Recommendations, guidelines, standards.

Question 2.17 Do you have any further comments or suggestions?

(4 students from 19 replied to this question (21%)

- Θα υπάρξει κάποια συνέχεια του μαθήματος; Και αν ναι τι μορφής θα` ναι; (Will there be some follow-up to the course, and if yes, what form will it take?)

- Περισσότερα παραδείγματα εφαρμογών με μορφή εργαστηρίου, ώστε να βρούμε από τα καθημερινά προϊόντα τις ελλείψεις που έχουν. Τρόπους βελτίωσης. (More examples of applications, in a laboratory setting, so that we can find from everyday products the defects they have. Ways of improvement.)

- Θα ήταν καλήτερα το μάθημα να μην ήταν τόσο θεωρητικό και να υπήρχε μία εργασία σχεδίασης αντικειμένου DFA παρά εργασία εύρεσης πληροφοριών ,τουλάχιστον εγώ αυτό περίμενα πριν κάνω το πρώτο μάθημα και ο λόγος είναι πως κάνουμε ήδη πολλά θεωρητικά μαθήματα στην σχολή και όχι πράξεις. (It would have been better if the course had not been so theoretical and if there had been a project to design a DFA product rather than a project based on searching for information. At least that was what I thought before I did the first class and the reason is because we already do many theoretical classes in the department and not enough practical work.)

- DfA should become a science taught at every university intensively, as it is not only useful, but important for the development of our society. Such knowledge should be required in order to start designing…

9.2.4   Multimedia Campus Kiel, Chair of Human Centered Interfaces

Background

The pre-questionnaire was completed by 12 students on 8 March 2004 at the start of the module. The post questionnaire was completed by 12 students at the end of the entire module on 22 March 2004.

Respondents were allowed to select more than one response to any question. This accounts for the different number of responses for each question. 12 students completed the pre-questionnaire and 12 the post-questionnaire. The section headings numbers below refer to the actual numbers found in the questionnaire.

2.1.1 Why did you choose this module?

Pre-course:
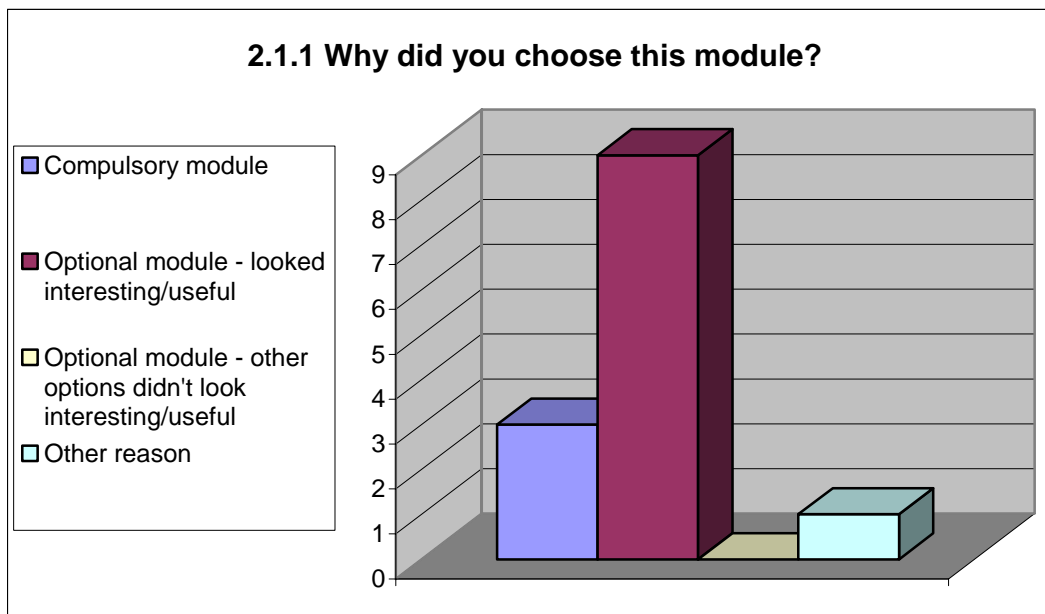
Post-course:
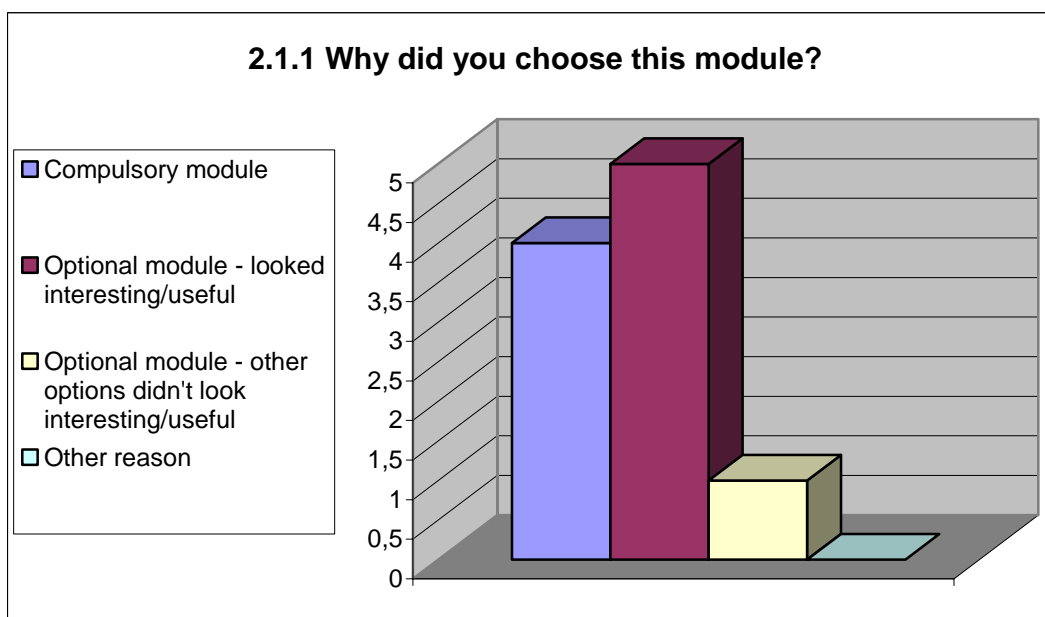
2.1.2 General comments provided on background and previous knowledge

- This gives me better understanding about all concerned topics and hopefully help me in future

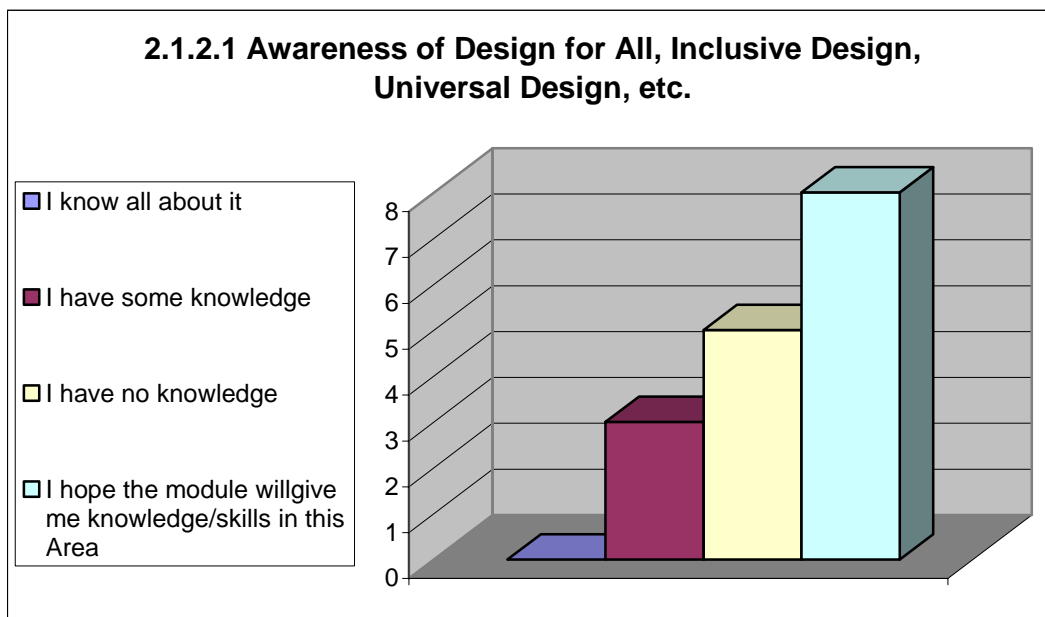## 2.1.2.1 Awareness of Design for All, Inclusive Design, Universal Design etc.

Pre-course:
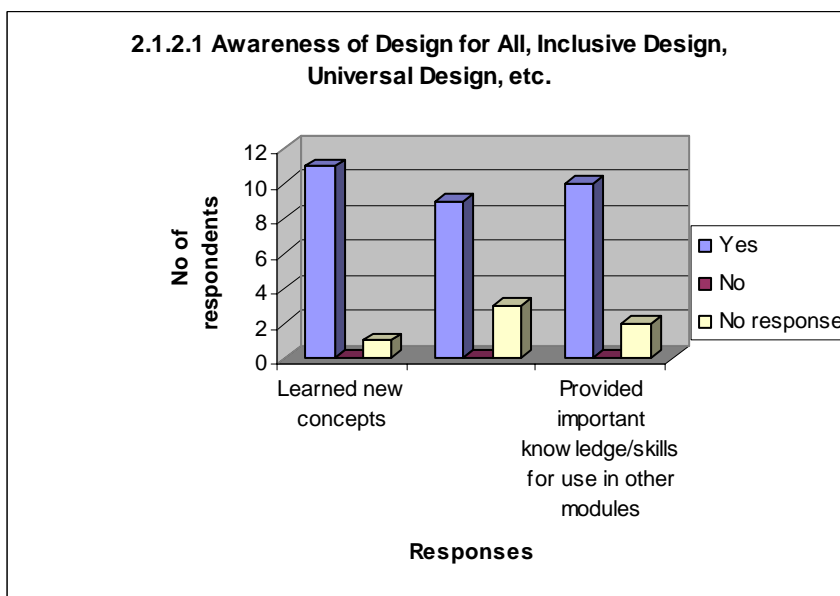

Figure 58 Pre-questionnaire responses - 2.1.2.1

Post-course:

Figure 59 Post-questionnaire responses - 2.1.2.1

Comments

- It is good to understand needs of groups which we are not familiar with

- As all persons are not familliar so it is good to understand need of groups

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations

Pre-course:

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations

- I know all about it
- I have some knowledge
- I have no knowledge
- I hope the module willgive me knowledge/skills in this Area
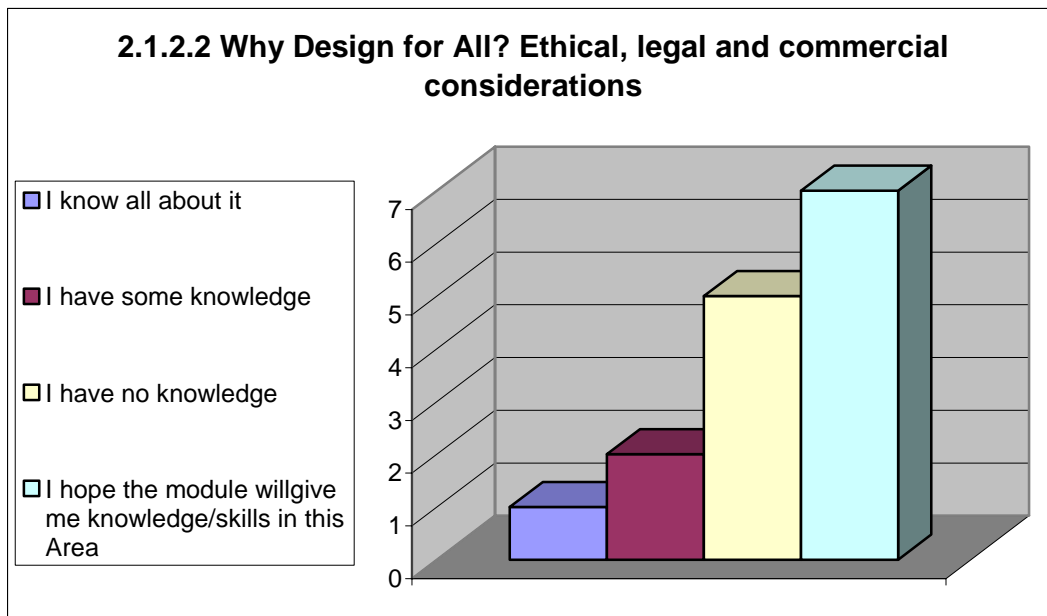
Figure 60 Pre-questionnaire responses - 2.1.2.2
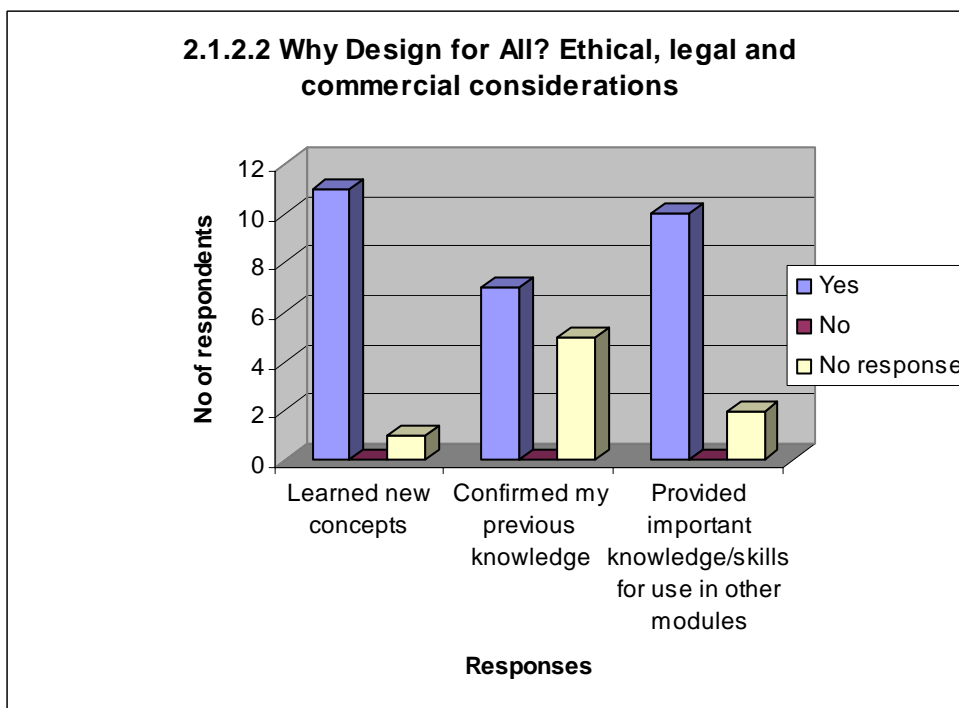
Post-course:

2.1.2.2 Why Design for All? Ethical, legal and commercial considerations

Figure 61 Post-questionnaire responses - 2.1.2.2

2.1.2.3 Recommendations, guidelines, standards etc., that have a bearing on Design for All

Pre-course:
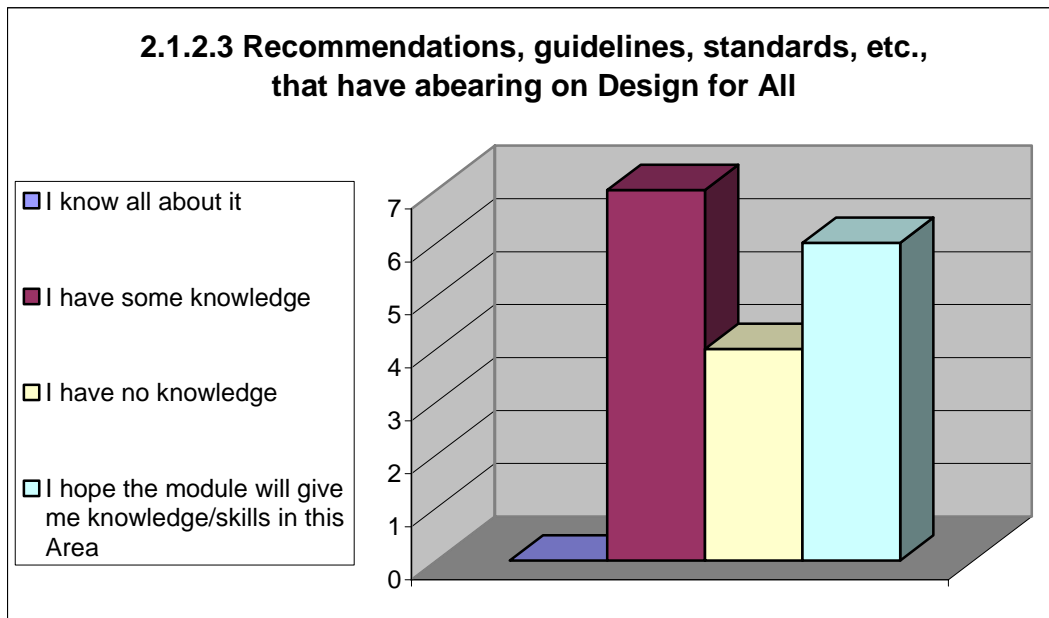
Figure 62

Pre-questionnaire responses - 2.1.2.3
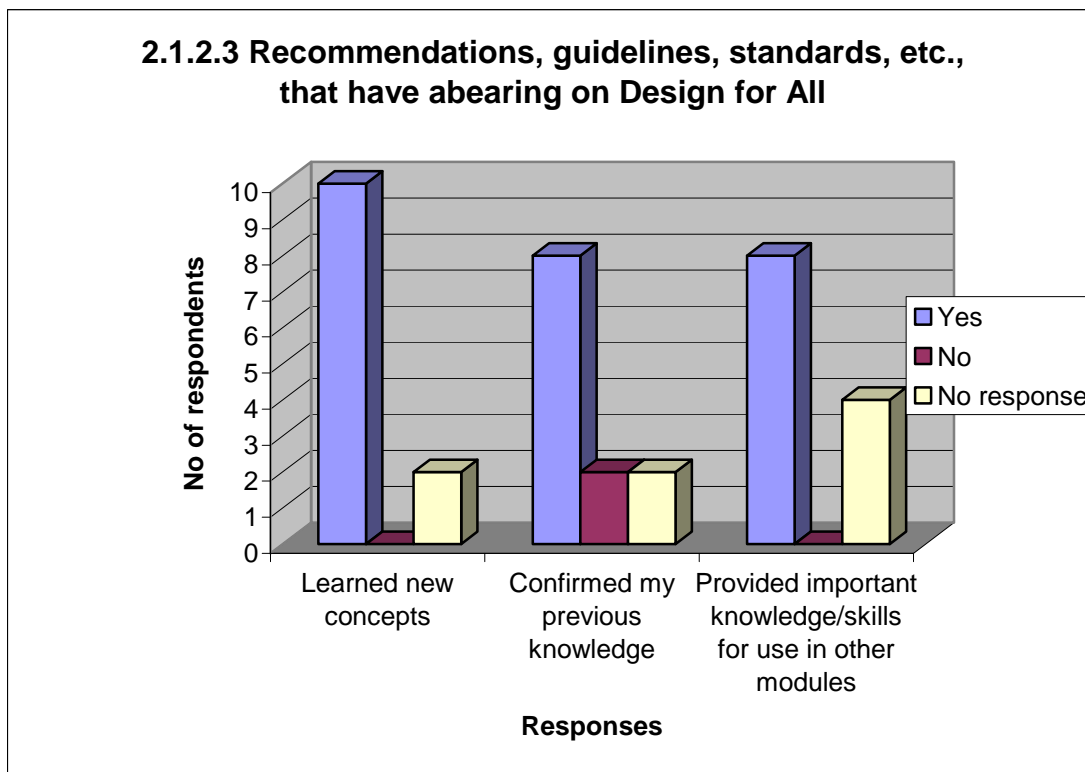
Post-course:

Figure

63 Post-questionnaire responses - 2.1.2.3

2.1.2.4 Interpersonal skills for teamwork, experience in communicating the Design for All concept with other members of a team

Pre-course:
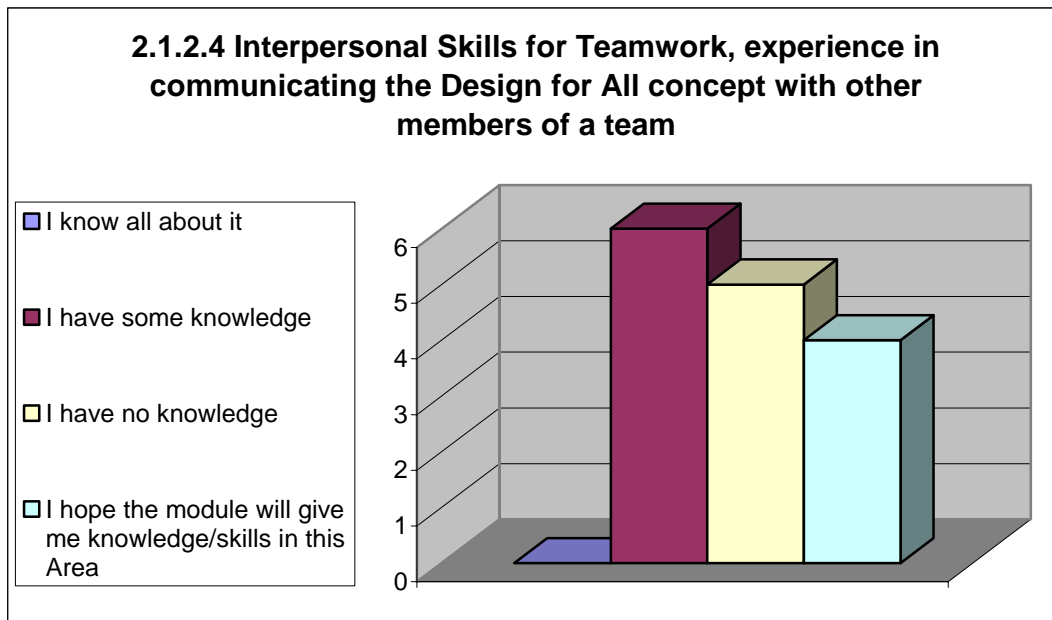
Figure 64

Pre-questionnaire responses - 2.1.2.4

Post-course:
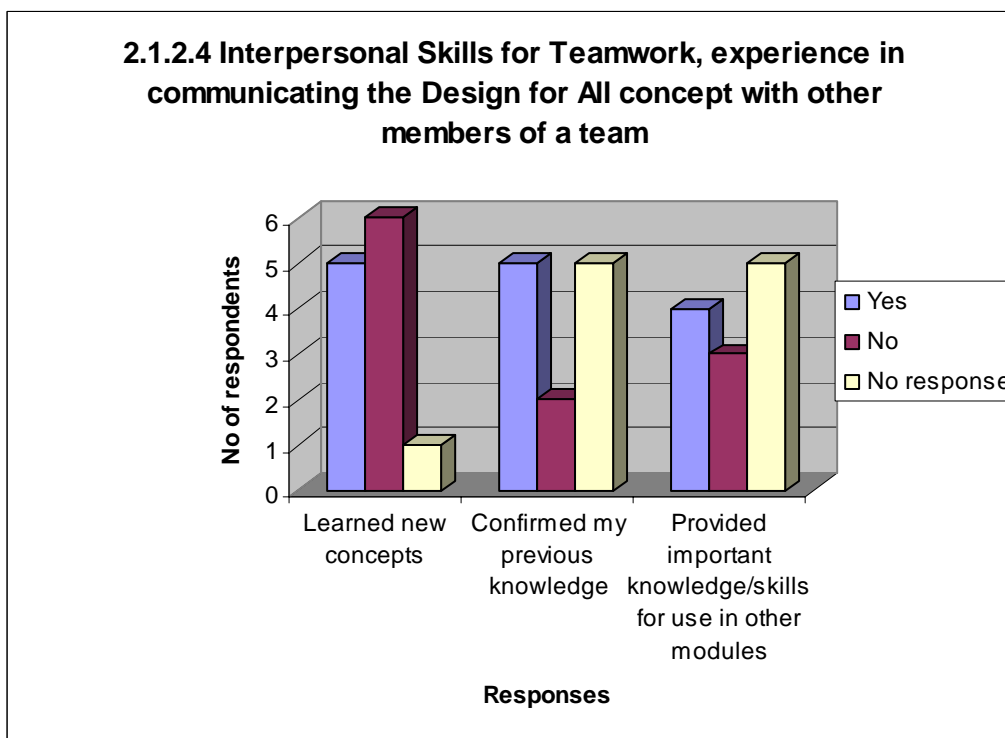
Figure 65 Post-questionnaire responses - 2.1.2.4

2.1.2.5 Accessible content: knowledge on making content of documents, multimedia and Web sites accessible to all users, e.g. by making alternative forms of media available

Pre-course:
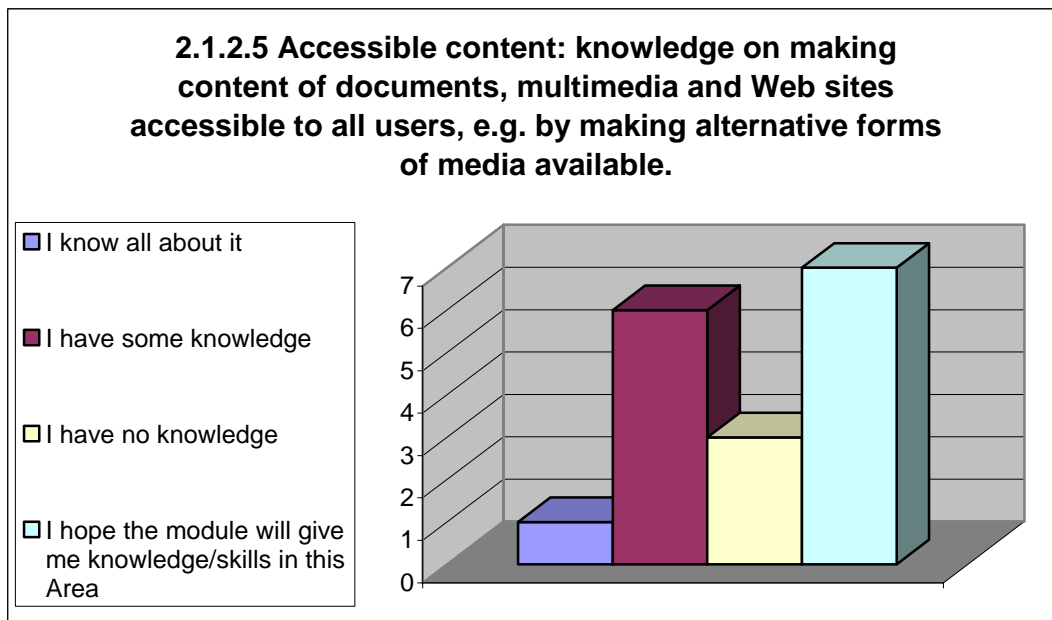
Figure 66

Pre-questionnaire responses - 2.1.2.5

Post-course:
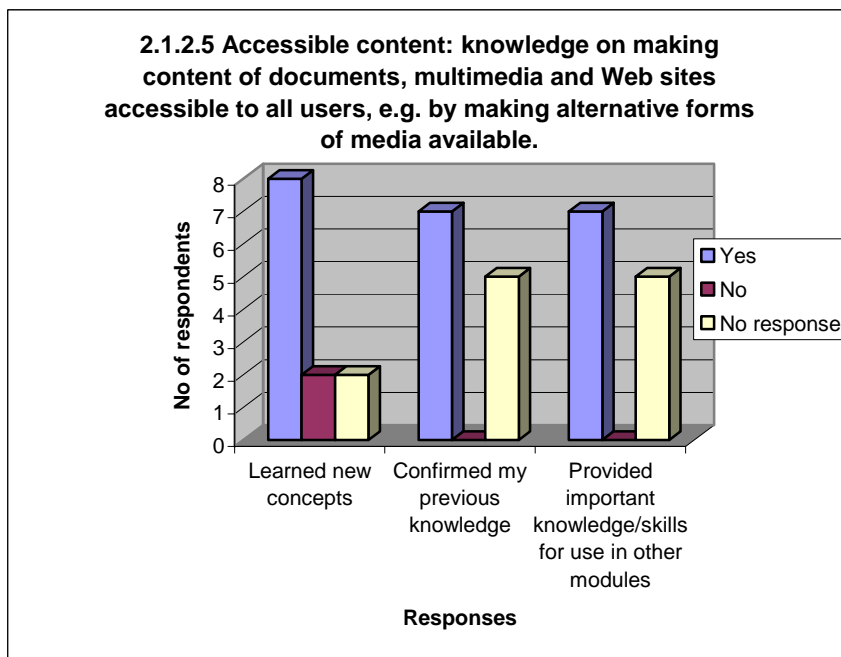
Figure 67 Post-questionnaire responses - 2.1.2.5

2.1.2.6 Accessible interaction: knowledge about assistive and adaptive devices that enable alternative input and output, e.g. speech synthesisers, screen reader software, alternative keyboards, etc.

Pre-course:
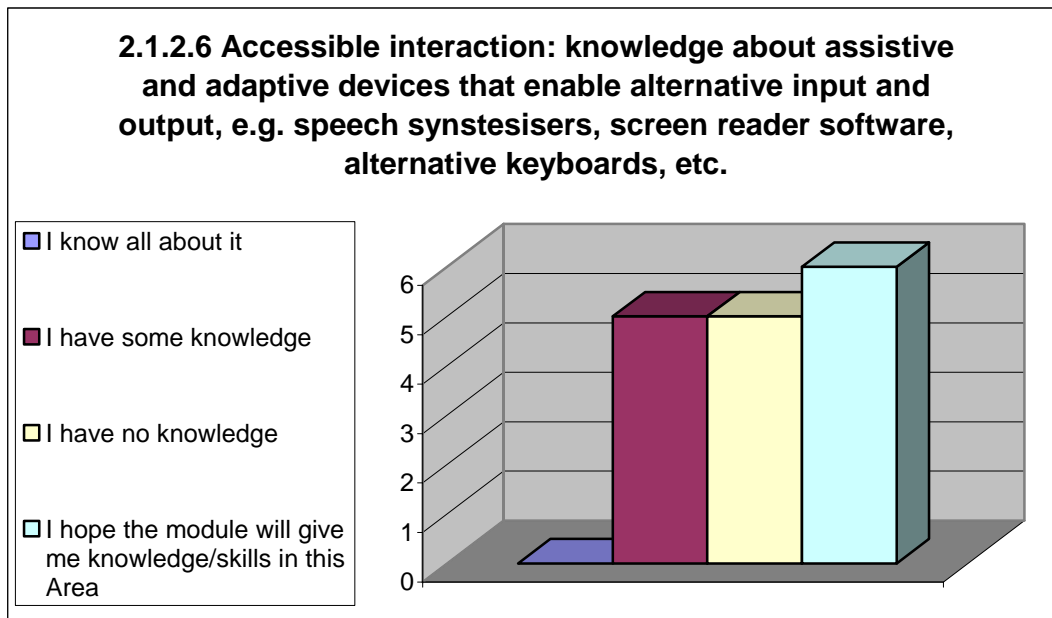
Figure 68

Pre-questionnaire responses - 2.1.2.6

Post-course:
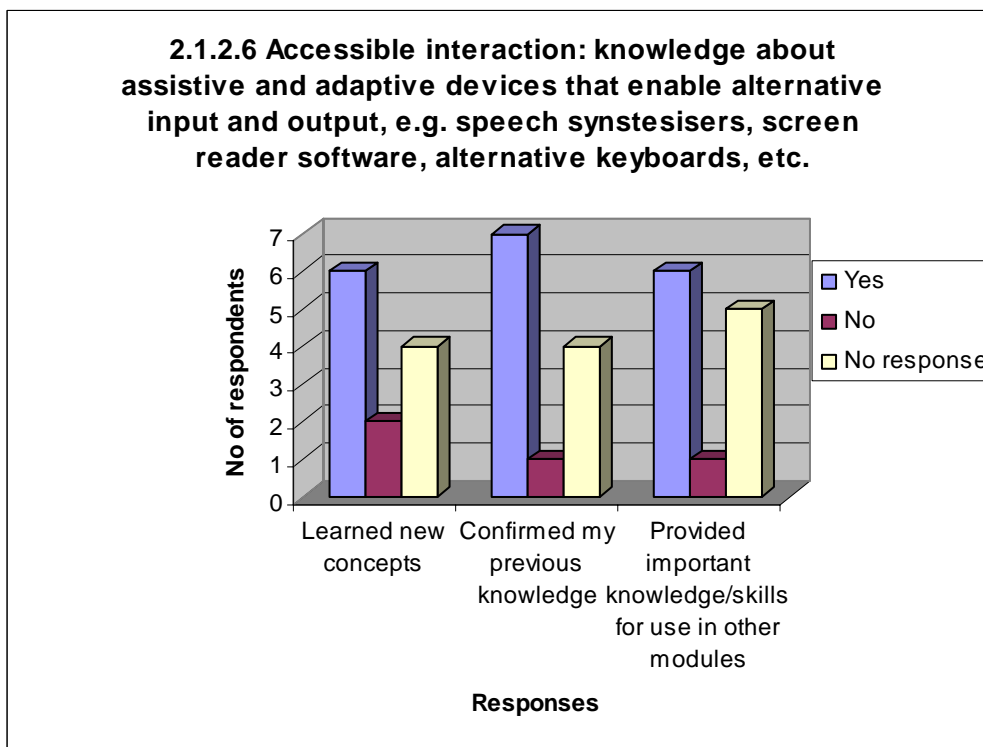
Figure 69 Post-questionnaire responses - 2.1.2.6

2.1.2.7 New paradigms of interaction, that is, new research being conducted in areas such as smart computing applications, smart homes, clothes, cars etc.

Pre-course:
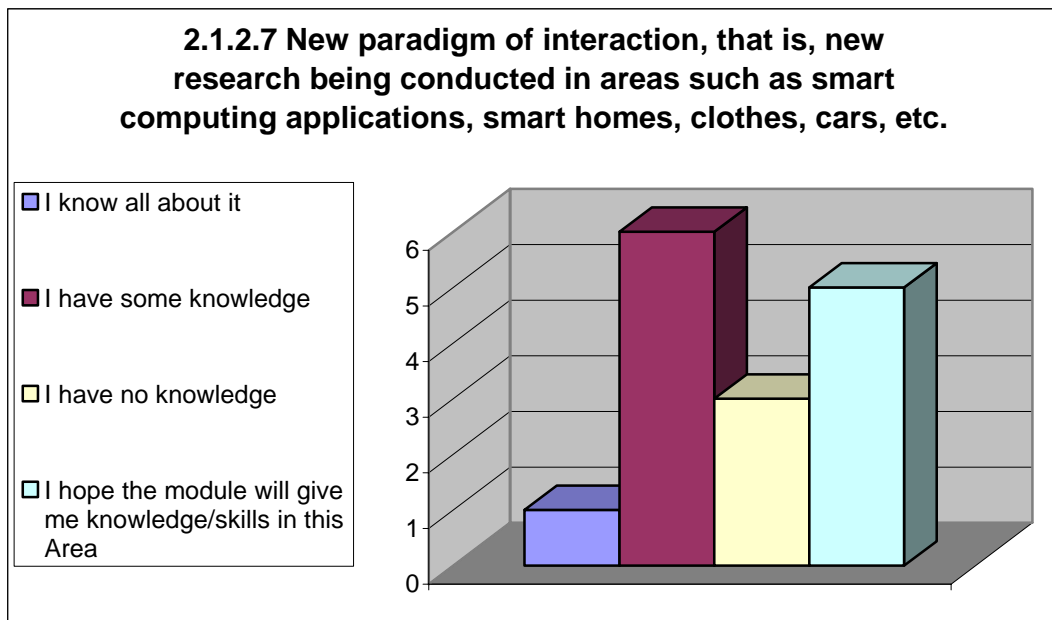
Figure 70

Pre-questionnaire responses - 2.1.2.7
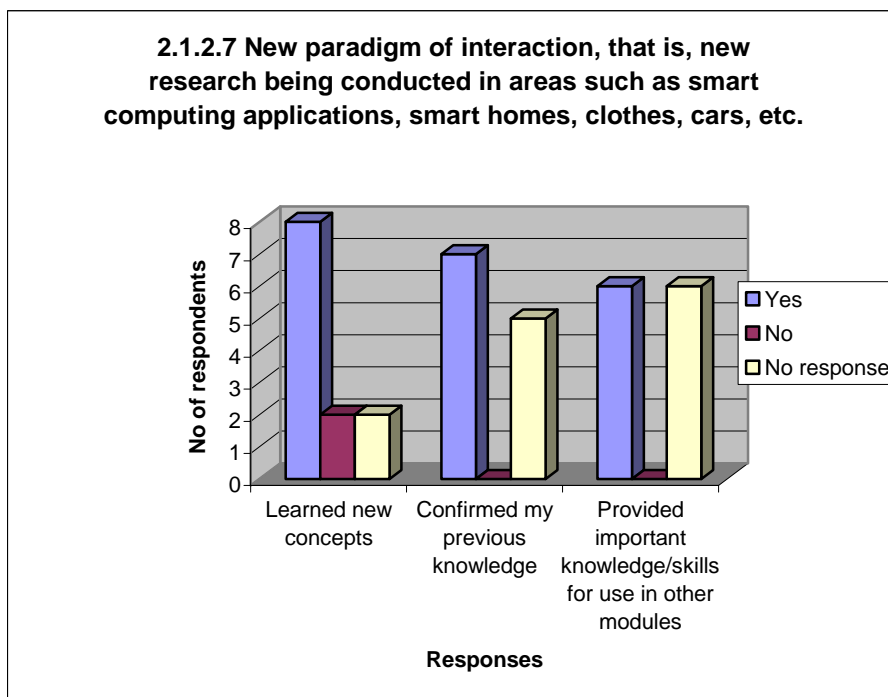
Post-course:

Figure 71 Post-questionnaire responses - 2.1.2.7

2.1.2.8 User centred design, including methods, tools and techniques to capture user requirements and evaluate designs with users
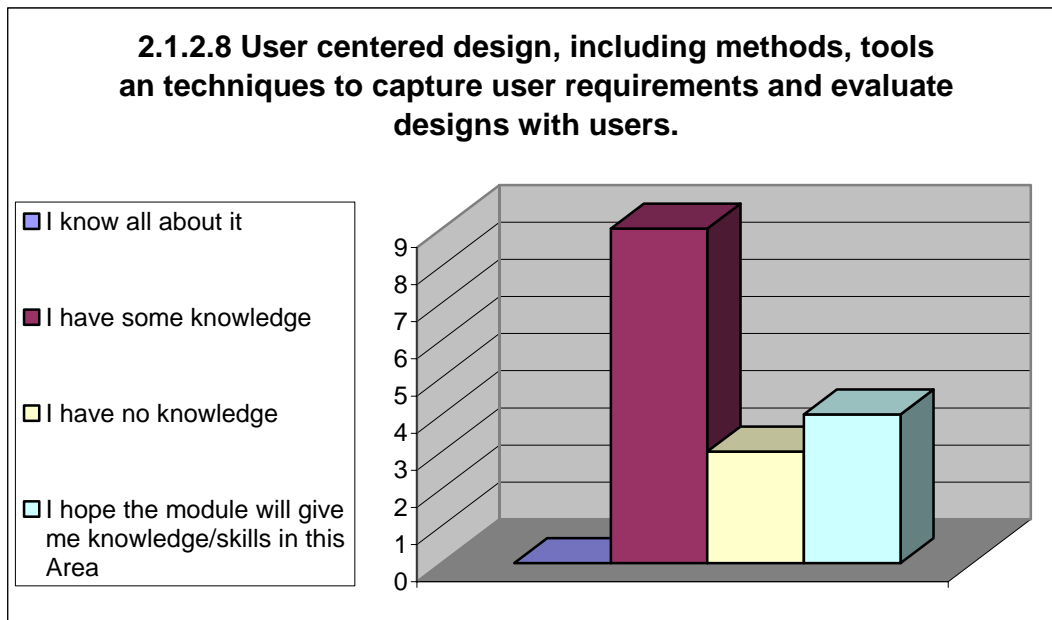
Pre-course:

Figure 72

Pre-questionnaire responses - 2.1.2.8
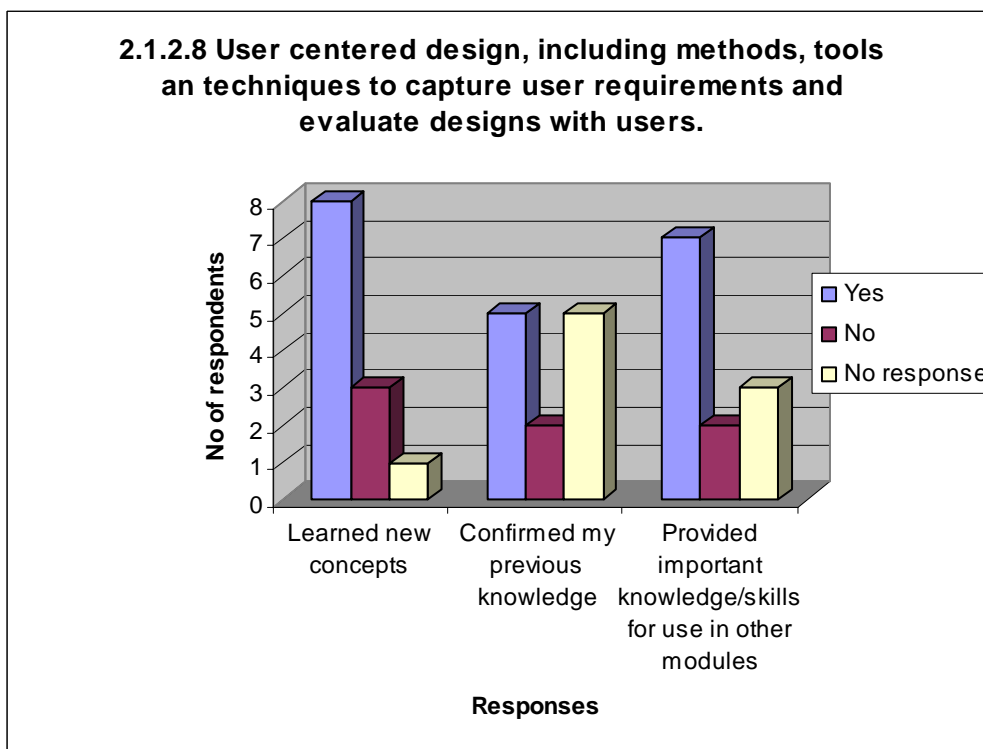
Post-course:

Figure 73 Post-questionnaire responses - 2.1.2.8

2.1.2.9 Application domains and research where Design for All issues are relevant, e.g., public access to information, health monitoring, technology enhanced learning, etc.
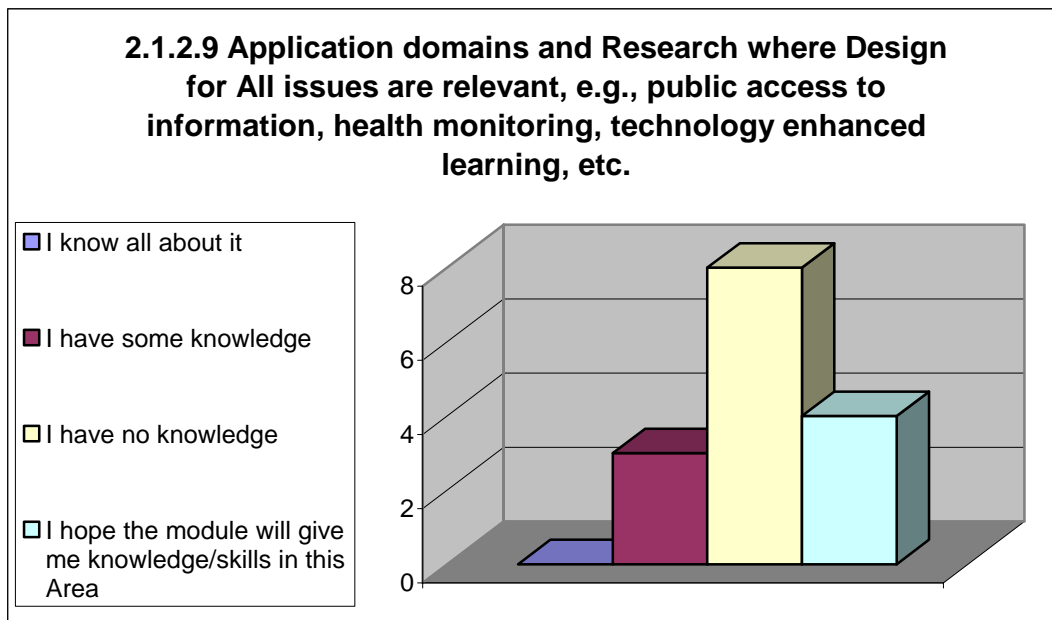
Pre-course:

Figure 74

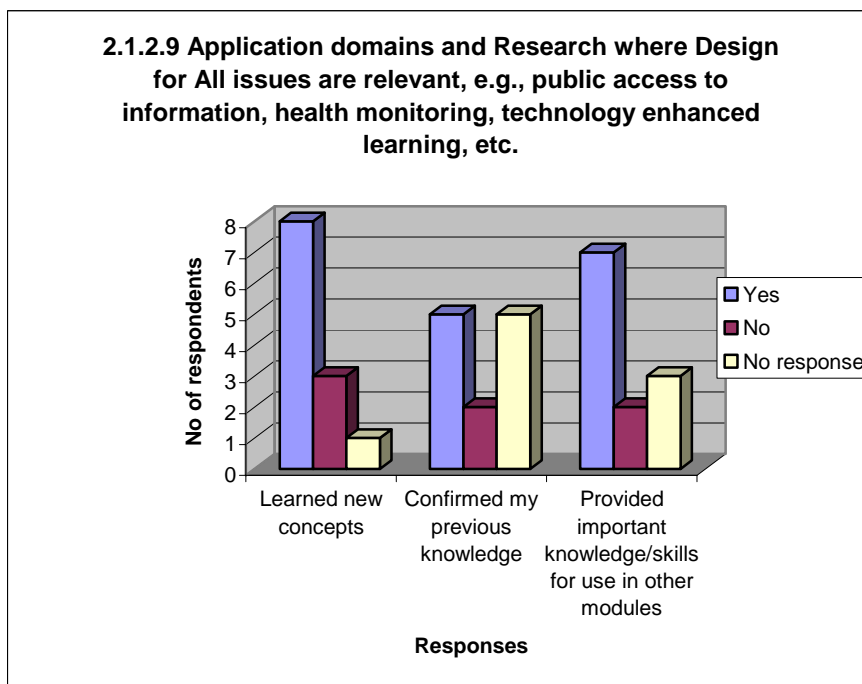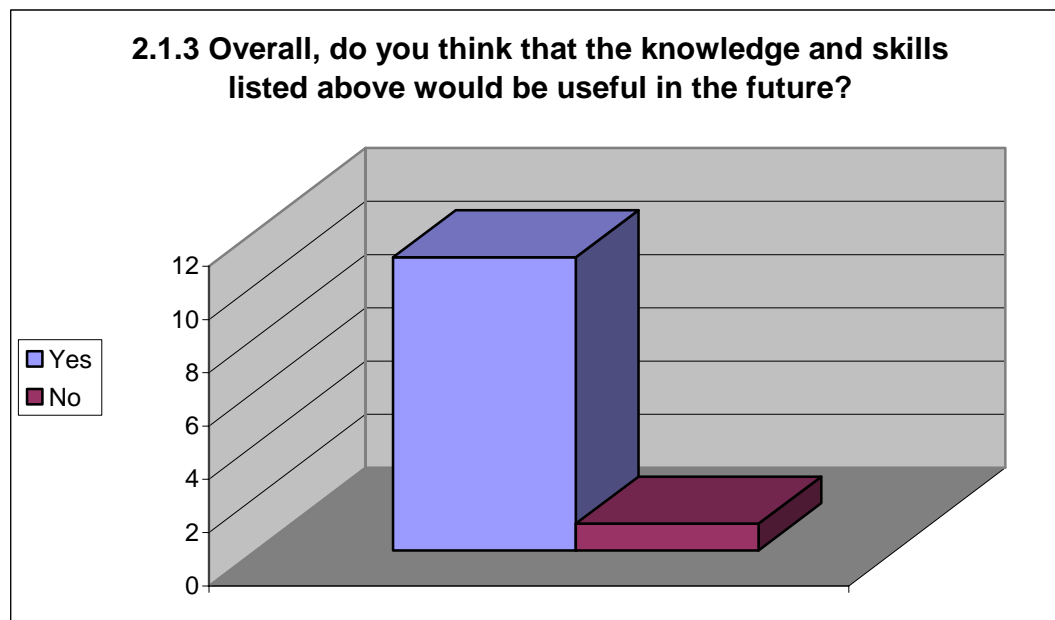**Pre-questionnaire responses - 2.1.2.9**

Post-course:

Figure 75 Post-questionnaire responses - 2.1.2.9

Additional questions pre- questionnaire

2.1.3 Overall, do you think that the knowledge and skills listed above would be useful in the future?

- Yes because a society is formed of all the people who are whether for different backgrounds or have handicapedness
- It will help me and develop me as a specialist in Multimedia Management
- All knowledge is usefull, once put in to practice
- If working with computers is a part of a job, all those knowledge is necessary
- Help me to improve my existing knowledge

Additional questions post-questionnaire

2.1.3 What did you like about the topic?

- Normally not taught in developing countries
- I think, it's all information
- I liked the innovative thing that I learned

2.1.4 What did you dislike about the topic?

- **Nothing**

- **No real connection to previous subjects**

- **Not enough time for topic**

2.1.5 What did you find most useful?

- Needs of different groups and how they are attacked at the moment
- Interactive learning techniques. User interfaces with disability
- New knowledge on how to make computers more accessible to handicapped people
- All information

2.1.6 Overall, do you think you will use this knowledge in the future?
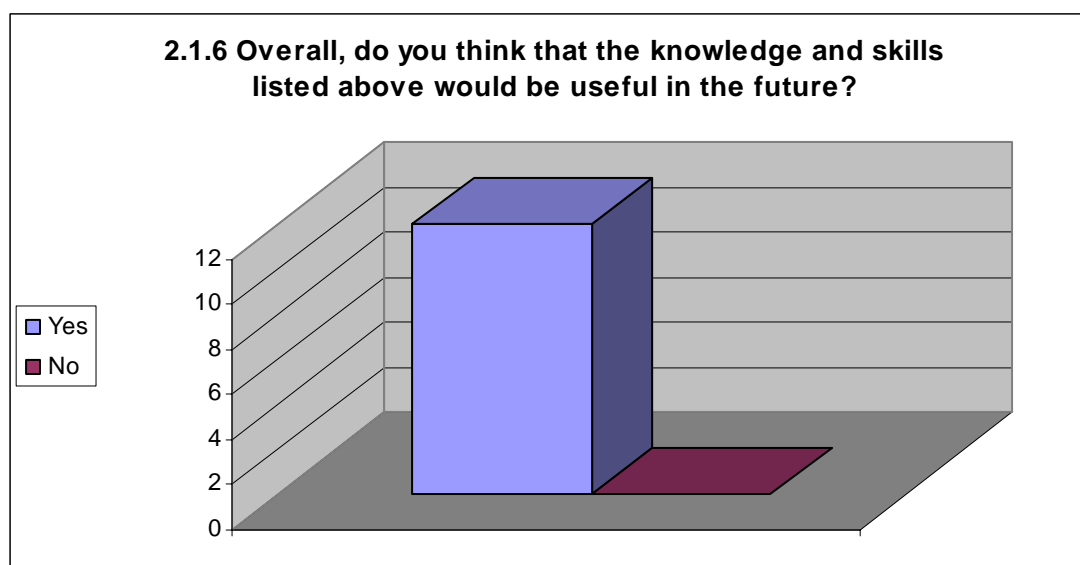
- almost everything covered was useful

2.1.7 Do you have any further comments or suggestions?

- Some more need to do. Which is easy to understand to all kind of people.

9.3   Taxonomy of Design for All core knowledge sets and skills, with topics

Example 1

An example from Loughborough showing the lecture plan and the categories of the taxonomy used. This is a 12 week lecture course

Week 1 - Awareness

Lecture Title: Introduction to module, and Experiential workshop

Week 2 - Awareness, Why design for all, Recommendations

Lecture Title: Perspectives on disability and the process of ageing.

> Overview of:
> Definitions, statistics and classifications
> Disability and ageing in society
> Functional model, medical model of disability
> Legislation
> Universal Design, inclusive design, design for all

Week 3 - Awareness, Why design for all, Recommendations

Lecture Title: The Built Environment.

> Overview of:
> Bailey's Model and the Built Environment
> Exercise on components of the Built Environment
> Design concepts, approaches and criteria
> Exercise on assessment of the Built Environment
> Good and bad applications of Design
> Critical Issues

Week 4 - Awareness, User-centred design, Application domains and research

Lecture Title: Design of everyday products.

> Overview of:
> Role of Ergonomics in Design and the AT Sector
> Design for Accessibility/Inclusive Design
> The Assistive Technology Sector
> Problems with User Centred Design in AT
> Case Studies
> Abandonment of AT products

Week 5 - Application domains and research, New paradigms of interaction

Lecture Title: Advanced technologies for ageing and disability.

Overview of:
Definitions and General Principles
Range of Technology used in AT
Switches
Dispersed Alarm System
Environmental Control Systems
Motorised Wheelchairs
Augmentative Communication Aids
Speech recognition and synthesis
Sensory aids
Telemedicine
Bionics
Case Study. The TIDE CASA project (smart home technologies)

Week 6 - Awareness, User-centred design, Application domains and research

Lecture Title: Effects of disability and ageing on everyday life (The Third Age Suit)

Introduction and overview
Products for the elderly and disabled
Work for the elderly and disabled
Transport for the elderly and disabled
Design exercise and the use of anthropometric data
Case study: The Third Age Suit
Workshop activities
Summary

Week 7

Reading and Coursework

Week 8 – Accessible content, Accessible interaction

Lecture Title: Access to computers

Definitions and Importance
Accessibility
Keyboards
Accessibility options in Windows
Software Solutions
The Mouse and its alternatives
Specialist adaptations
Alternatives to keyboards
Adaptations to Displays
Display alternatives
Designing Accessible Applications

Week 9 – User-centred design

Lecture Title: Ergonomics tools, methods and techniques

The role of the Ergonomist

A conceptual map for the provision of aids

An example of the ergonomics intervention in the design process

Methods, tools and techniques 'Walkthrough', including review of USER*fit*

The European Union '5 Phase' Model

Some core tools / Appropriateness for different user groups

Week 10 – Interpersonal skills for teamwork and communication, integration of other categories from the taxonomy

Lecture Title: Requirements capture and evaluation in practice + Visiting Lecturer, Chairman of ISdAC (see this report of IDCnet pilot section 4.1.3)

Week 11 – User-centred design, New paradigms of interaction, Application domains and research

Lecture Title: Case studies:

1. The Effects of Ageing and Disability on Travelling - Implications for Design, including

- Mobility for people who are older or disabled. Advantages? Relevance of ergonomics?
- Tools and methods to identify requirements. How? Results?
- Vehicles and systems designed for all travellers. Examples of good and bad design?
- Assistive Devices and Intelligent Transport Systems. Implications for design?

2. Designing systems for people with dementia who wander.- The boundaries of ergonomics: strategies of care?

- Tools and methods to identify requirements. How? Results?

- Tagging technologies when people cannot give their consent. An ergonomist's role?

- Designing technology and the environment for people who are elderly and disabled, especially for those who cannot give their consent. Examples of good and bad design?

3. Improving Access to the Internet within the AAC Community - Understanding requirements of people with complex communication needs

- Difficulties in using the internet

- Demonstration of results of the WWAAC project
- W3C-WAI Web Content Accessibility Guidelines
- Discussion of web accessibility issues

Example 2

Topics in lectures for DfA Modules within HCI course from University of Crete, Department of Computer Science

1. DfA Module within course "Introduction to HCI" (3 weeks duration)

Awareness:
Introduction to the Information Society and its dimensions of diversity

Why Design for All:
Overview of different approaches to accessibility

User Centred Design:
User-centred design, Evaluation methods, techniques and tools

Recommendations:
Guidelines and Standards, Methods, techniques and tools for the accessibility of web applications and portals

2. DfA Module within course: "Advanced topics in HCI"

User Centred Design:
Methods and techniques for user requirements elicitation and analysis, including the requirements of users with various types of disabilities, Design for All methods, techniques and tools, Unified User Interfaces development methodology, techniques and tools

Recommendations:
Design for All methods, techniques and tools, Unified User Interfaces development methodology, techniques and tools, Case studies of universally accessible interactive applications and services

Accessible Interaction: Input and Out Put:
Non-visual interaction, Switch-based interaction, Input / output devices and interaction techniques for users with various types of disabilities, Case studies of universally accessible interactive applications and services

Accessible Content:
Non-visual interaction, Input / output devices and interaction techniques for users with various types of disabilities,

New Paradigms of Interaction:
Non-visual interaction, Input / output devices and interaction techniques for users with various types of disabilities

Applications and Research:

Non-visual interaction, Input / output devices and interaction techniques for users with various types of disabilities, Design for All methods, techniques and tools, Unified User Interfaces development methodology, techniques and tools, Case studies of universally accessible interactive applications and services