

## THE USEFULNESS OF AN HCI SYLLABUS

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**ABSTRACT** : This paper is a response to the BCS Working Group's proposed syllabus for IT specialists. While the education and training in the domain of HCI to IT-specialists is of importance this only addresses the "technology push" of improving system design. For improved systems to be put into use it is necessary to address the problem of "user pull". This requires non-IT specialists to be made aware of the importance of HCI. The current awareness of non-IT specialists and their professional curricula are analysed. Means of raising this awareness by professional liaison and improved HCI education are proposed.

### INTRODUCTION

This paper is in response to one produced by the BCS HCI Education and Training Working Group (Kirby et al 1994). The Working Group was mainly concerned with the identification of an HCI curriculum which would be appropriate for students of IT undergraduate and postgraduate courses and their potential employers.

I believe that the curriculum developed will improve the understanding and application of HCI. This will go some way to improving the design of systems. However, systems design is only one part of the problem of getting improved systems into use. It is also necessary to have users and purchasers of systems who appreciate the value of well designed human-computer interaction and who are prepared to pay for it. The development of an HCI curriculum for IT specialists does not address this part of the problem.

### HCI for Non-IT Specialists

It is recognised by the Working Party that HCI should be taught on non-IT courses :

"There was also a feeling that HCI should be included in other, non-computing courses, such as organisational psychology; business studies; and vocational courses in management." (Kirby et al 1994)

The Working Party took this point no further. Without further action it is unlikely that the education of non-IT specialists will be changed to include HCI in any significant form. The education of non-IT professionals will remain weak with respect to HCI and the specification, selection and management of systems will not be as good as it could be.

### EVIDENCE OF THE NEED FOR WIDER HCI EDUCATION

The National Audit Office (NAO) reviewed nine management support systems within the Department of the Ministry of Defence (Bourn 1991). Although the systems were all within the military domain this is not thought to invalidate them as an illustration of the low importance placed on HCI by non-IT professionals. They were not "military" systems but were typical of commercial information systems. Functional areas were : station administration, payroll, inventory & logistics. The size and significance of this programme can easily be seen :

"The Department spend over £200 million a year on support information technology. They operate some 25 large mainframe computer centres, hundreds of other systems, and thousands of micro-computers." (Bourn 1991)

The NAO report identifies a number of problems with the development of these systems (Bourn 1991). Projects were large and inflexible, there was inadequate user involvement, there was a need for significant post-implementation enhancement, and technological developments were not utilised. While these are not *exclusively* HCI issues there were other problems which clearly are : "users' inexperience of information technology" and "difficulty establishing user needs". In one system there was an enhancement programme which addressed 6,600 proposals for change from users, in addition to hardware upgrades, at a cost of £10 million. Thus, while the low level of attention given to HCI issues is not the only cause of problems with these systems it is a significant element.

### HCI EDUCATION IN NON-IT PROFESSIONS

An analysis of syllabus and curriculum documents of a range of professional bodies has been carried out. These were selected on the basis of their ready availability and the need to represent a range of decision makers' professions. The British Psychological Society (BPS) was also included as being of obvious potential source of HCI professionals. The professional bodies reviewed were :

**ACCA:** Association of Chartered & Certified Accountants,

**CIMA:** Chartered Institute of Management Accountants,

**CIM:** Chartered Institute of Marketing.

Existing professional and vocational courses give very little consideration to HCI. Where it is considered the treatment is often superficial in scope, content and amount. The BPS Occupational Psychologist curriculum is an exception. This is a special case and will be discussed after the others.

Another consideration is that there is often an explicit link, through the exemption process, between the content of courses delivered by universities and the examinations of associated professions. For an undergraduate course to be considered for exemption to professional exams the content must be sufficiently similar. Thus if HCI is not seen as an issue for professional bodies it is unlikely to form part of a university education.

#### HCI in Commercial Professions

The title of the relevant exam for the ACCA is "Information Analysis" the syllabus of which covers a very broad range. Under the heading of systems analysis and design there is a sub-section devoted to HCI issues :

- “..Basics of human computer interface design
- i) means of interacting with a computer
  - ii) prototyping
  - iii) implications of poor design
  - iv) preferences for type of interface from novice and experienced users
  - v) validation and verification of data
  - vi) security measures depending on the type of system”

While this covers some important points it does so in a very erratic way. Differences between types of user are limited to consideration of the difference between novice and expert; other differences between users are not considered. Usability measures are only implicitly covered under point iii). System evaluation is not explicitly considered under section 3 of the syllabus or under section 4 of the syllabus: Systems Evaluation.

Within the ACCA approved text ( Eardley et al 1994 ) HCI issues are considered under a range of sections and chapters and are integrated with other material. For example, "Output and dialogue design" is a section within the chapter on "Analysis and design tools and techniques". There is a little less than five pages of text used to cover the following areas :

- printed output design;
- pre printed forms;
- reports;
- screen dialogue design;
- interface techniques (forms, menus, WIMP).

The issue of evaluation is covered in the ACCA text although not apparently required in the syllabus. Five points, loosely usability issues, are each given a whole sentence of coverage! There is no discussion of how usability measures may be implemented or the significance of any of them.

In this way elements of HCI have been integrated with other design issues. This has various implications. On the positive side HCI is not considered as a discrete bolt-on component of system design. However, it is also possible that by not explicitly considering HCI as a discrete issue theoretical and practical advances in the field are less likely identified and adopted by ACCA professionals.

In the recently revised CIMA syllabus references to HCI are few and mostly indirect. In the stage 1 paper the only references close to HCI are to input and output devices and to the effect of IT on organisational structure. The stage 4 syllabus refers to "Social dimensions of information". This is largely concerned with the effects of information systems on social structures. The "employment" sub-section has the most direct relevance to HCI practice :

“Employment : restructuring of departments and tasks; human factors in systems development; designing the human computer interface; human information processor capacities and limitations.”  
(CIMA Student 1994)

The granularity of these headings suggests that the issues will not be considered in depth. For example, there is no mention of usability specification and evaluation. This interpretation is supported by the author's past experience with assessing CIMA examinations in which questions on HCI have not been considered worth inclusion.

The CIM has five qualifications at three levels. At Certificate level students are required to study "Information technology for business communication". This is 15% of one exam, and focuses on technology. For the "Understanding Customers" exam the ability to use database systems is a requirement. There is no

mention of computer technology in the other two sections of either of the Certificate programmes.

For Advanced Certificates there is an exam: "Management Information for Marketing and Sales". This exam has a weighting of 10% for information systems and technology. This section consists of: management and marketing information systems, database management, developments in information technology. In the exam "Effective Management for Marketing" a 40% weighting is given to "personal effectiveness" in which there is no mention of the use of information technology. Within the Diploma in Marketing consideration of information technology is limited to "impact of information technologies on marketing communications strategy". This is one point on a list of 21 points the whole of which is worth 30% of one exam! For the CIM the focus is on the functionality of IT but not on its usability. If marketing managers know anything significant about HCI issues then this will not be as a result of studying for the CIM series of exams. As a result consideration of usability is unlikely to be a significant factor in the specification and selection of business systems in this area.

#### HCI within the BPS

Three articles in the Student issue of the Psychologist (Sherwood S.J. 1994, Ball B. 1994 and Radford J. 1994) indicate that the BPS gives HCI, an obvious application for psychology, very little recognition. From Radford (Radford J. 1994) it seems that undergraduates are "...more concerned with the practical and people-oriented aspects of psychology, and less with the technological, computer-based experimental or theoretical parts." Two further articles consider the career options for psychology graduates (Ball 1994, Sherwood 1994); neither of them mention HCI as a potential or actual first destination. In an article on first destinations Sherwood (Sherwood 1994) mentions a number of specific occupations and professions, but computing and HCI are not amongst them.

The "Regulations and reading lists for the qualifying exam" (BPS 1994b) make little mention of HCI. The *option* on occupational psychology requires an understanding of task analysis and of cognitive ergonomics but does not have HCI texts on the reading list. In the cognitive psychology option HCI is listed as a required area of knowledge *and* there is one recommended text in HCI, however it is not marked as being "of particular relevance" as some other texts are. All of this seems to suggest that HCI is not perceived by the BPS as a mainstream component of psychology and can safely be regarded as optional by most designers of psychology courses.

In contrast the Occupational Psychologists (BPS 1994a) of the same society consider it to be a very important issue for a significant section of professional psychologists. To gain the BPS Postgraduate Certificate in Occupational Psychology, via the Society's own exams, it is necessary to study eight subject areas - one of which is "human machine interaction" (BPS 1994a). However, much of the syllabus content is applicable to both computerised and non-computerised types of machinery though the reading list of nine texts contains three with "human-computer interaction" in the title and many of the others are also directly relevant.

Psychologists fair better with the teaching of HCI than professionals in finance or marketing. However, this is at postgraduate level and only for a subset of the profession - those choosing to be occupational psychologists. Not all of this group will be professionally involved with the specification and selection of computer based systems. It could also reasonably be argued that clinical psychologists and developmental psychologists really don't have much need for an understanding of HCI. From this it seems that at the postgraduate level the BPS may have achieved a reasonable balance with the amount of HCI taught.

#### IMPROVING THE SITUATION

To improve the awareness of HCI in practice we need to provide the basic HCI education and training available to other professions. This will require the awareness of their professional bodies to be raised. It is also necessary to identify aspects of HCI which are most significant to key decision makers.

#### Inter-professional liaison

The BCS needs to look beyond the HCI education of IT specialists towards the reasons that those specialists are employed: improving the efficiency and effectiveness of IT through improved human-computer interaction. By focusing on the *purpose* of HCI specialists we can see that the terms of reference of a Working Group on HCI Education should include potential HCI professionals *and* the users and purchasers of systems. To bring the necessary change about the BCS could liaise with other professions so that their exams may be brought up to date with respect to HCI. Without such liaison other professional bodies are unlikely to update their own courses and will continue to consider HCI as a side issue.

#### HCI Syllabus for Non-IT Specialists

In many professional courses the space available for information technology is very limited. What space there is now used to cover a broad spectrum of IT

issues ranging across: systems theory, data flow diagrams, hardware, operating systems, system management, security and others. For many professionals a significant part of what is currently taught, in relation to IT, is of peripheral importance. Raising awareness of HCI issues may make a more significant contribution to their personal effectiveness as system users and purchasers. However, as the time available for learning is limited, the question of what to leave in and what to leave out needs addressing.

Non-IT professionals have two main rôles with respect to IT: end-use and purchasing. End users of IT do need a basic understanding if their work is to be both effective and protected. The functional support that IT may provide, its basic operating characteristics and sensible housekeeping measures should be included. From a purchasing point of view the issues of usability specification and evaluation would also seem to be highly relevant. If further syllabus space is available then task analysis and emergent technologies could be added. These last two items, taken together, would allow a better understanding of job design with both present and future technologies. Emergent technologies are often directly relevant to the field of HCI. An example from a recent HCI conference is "the digital desk" (Beaudouin-Lafon 1994). A lack of awareness of such emergent technologies will prevent them from being considered as options for future selection and specification.

## CONCLUSIONS

The HCI syllabus for IT specialists produced by the Working Group is a useful step towards improving the design of computer based systems. It ensures a balanced study of HCI and that students of IT courses such as Computer Science and Business Information Technology gain a broad base of knowledge and skills. However, if the resultant new and improved designs are to be bought and put into use then it is also necessary to improve the HCI understanding of organisational decision makers. This may be achieved by shifting the emphasis from conventional data processing issues towards HCI in general and usability specification and evaluation in particular. For the sake of all system users non-IT specialists need to be made aware that the development costs of HCI are an investment and not an overhead.

Further work needs to be done by the BCS, and by similar bodies internationally, to liaise with other professions on the teaching of HCI. The Working Group's syllabus on HCI is a useful starting point if these issues are to be taken forward and the design of systems in use is to be improved.

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