OZCHI'96 Industry Session

Sixth Australian Conference on Human-Computer Interaction

Edited by Chris Phillips & Janis McKauge

Table of Contents

OZCHI'96 Industry Session

Foreword

The idea for a specific industry session at OZCHI was first mooted at the 1995 conference in Wollongong, during questions following a session of short papers which happened (serendipitously) to be presented by people from industry. An animated discussion took place, most of which was about how OZCHI could be made more relevant to people in industry, be it working as usability consultants, or working within organisations either as usability professionals or as 'champions of the cause'. The discussion raised more questions than answers, about the format of such a session, about the challenges of attracting industry participation, and about the best way of publishing the results. Although no real solutions were arrived at, it was enough to place an industry session on the agenda for OZCHI'96.

The results of our efforts are contained in this post-conference supplement to the OZCHI'96 proceedings. Over 250 invitations to participate in the session were sent out, and these have resulted in three industry presentations (and associated short papers) and a panel discussion. These cover a range of issues from usability standards and evaluation to the take-up by industry of usability methods. This may seem scant reward for our efforts, and certainly there does not yet seem to be a lot of usability engineering in progress out there. However, we were operating in a tough economic climate, seeking to bring industry practitioners across the Tasman, and seeking to persuade industry people that a conference organised mainly by academics was worth their time.

Given these difficulties, you might ask why bother. Well we happen to believe that vital feedback loops between the activities of industry and academia are currently missing. On the one hand, a good deal of exciting research is taking place in academia, and on the other hand usability methods are beginning to appear in industry. Each group needs to be aware of the activities of the other: academia must be aware that usability methods developed in the laboratory need to be capable of adaptation to fit with the needs and constraints of industry practice, and industry needs to be aware of what usability methods have to offer, of what is on the horizon, and of how it might implement new system development practices which incorporate these methods.

Academics attend conferences; industry practitioners generally do not. The more a conference can be seen to be relevant to what practitioners do, the more likely it will be that they will attend and keep on attending. On surveying (by a show of hands) the people who attended the industry session at OZCHI'96, about half considered themselves as working *in* the industry and about half as working *with* the industry.

We would like to thank the contributors to the industry session, including the presenters and panel members, and to acknowledge the part played by the Hiser Group in making it happen. The industry session at OZCHI'96 represents a start. It is our hope that it will become an established part of OZCHI conferences in the future.

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Section 1: Contributed Papers

Launching a Corporate Style Guide at the Department of Health & Family Services: Lesson Learned

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Abstract

As large organisations seek to reduce systems development costs as well as improve in-house software tools, they are turning to the use of standards and guidelines. The Commonwealth Department of Health and Family Services (HFS) developed a corporate style guide to improve their internal software tools and reduce systems development costs. This style guide was formally launched with a series of presentations and training workshops serving as the first step in a set of usability initiatives.

Developing a corporate style guide

The Corporate Development Group of the Commonwealth Department of Health and Family Services (HFS) developed a corporate style guide as the major component of the 'Look & Feel' project, which aimed at achieving more usable systems for departmental staff and thereby improving service delivery for the Department's clients. A number of legacy systems were targeted for redevelopment with a graphical user interface, creating an opportunity to design better, user centred systems.

The style guide was developed internally by a usability team set up within the Corporate Development Group. Coached and facilitated by The Hiser Group, the HFS team carried out user-centred design techniques (UCD), including detailed analysis and field studies, setting usability goals and collaborative design. They established benchmarks of a core system, then built and tested an electronic mock-up of the same system. A number of opportunities for improvement were thereby identified, and important statistics for communicating the value of the style guide together with UCD were collected.

HFS has a policy of joint system development between the IT area and specialists within each of the business areas. The team worked closely with the various HFS business areas to ensure that the design decisions to be incorporated into the style guide were not only user-centred, but business focused as well.

Launching the style guide

The HFS Corporate Style Guide was launched in June, 1996. The challenge was to go beyond simply launching the document and hope that it would be used effectively. The HFS usability team therefore took a proactive approach. With only two staff available to support the many projects underway at HFS, it was necessary to cross train the developers in usability. Hiser therefore developed a presentation on usability as it pertains to HFS which was attended by developers and business area systems managers. These were followed by a series of one day workshops designed to train both groups in how to carry out GUI screen design using the HFS Corporate Style Guide.

In addition, the usability team, together with Hiser, prepared a series of presentations targeted at upper management. The presentations aimed to show how usability was helping HFS meet its corporate objectives. The statistics captured during style guide development proved critical to getting our message across. Statistics included information about training costs, hidden support and productivity of the end users. In addition, by carrying out rapid studies of the current process, we were able to identify opportunities to reduce systems development costs.

Lessons learned

Acceptance of the HFS Corporate Style Guide by both system developers and the business areas has been highly favourable. However, given the current pressures associated with a changing organisation, we now recognise that a number of mechanisms should have been established within HFS before the style guide was launched.

Firstly, while the style guide has been endorsed as an official development tool, there is no mandate to enforce its use. Secondly, developers continue to perceive the associated UCD techniques promoted with the style guide

as additional activities, rather than as a different, user-centred, way to do existing design tasks.

Finally, a usability team of two can only support a number of projects by assigning and training a 'usability advocate' for each project. The usability strategy therefore is to facilitate knowledge transfer and encourage development teams to take responsibility for the usability of their systems.

Summary

Today the usability team at HFS is working directly with project teams on major new projects, while developing strategies aimed at achieving the required support to establish both the Corporate Style Guide and usability as an integral part of systems development in the future.

Profiles

Jon Mysel is Principal Consultant with The Hiser Group in Sydney, Australia. He joined Hiser to head up their Sydney office in 1994 after 9 years with the Usability Design Group at Digital Equipment Corporation. Jon served as lead consultant on the HFS Corporate Style Guide project.

Chris Lloyd is the lead member of the HFS usability team and the author of the HFS Corporate Style Guide. Chris has worked as the business area system manager on a number of system developments within the Commonwealth Government.

This paper was presented by *Cliff Wilding*. Cliff is a user interface design consultant with the Hiser group, based in Melbourne. He has worked on numerous projects involving analysis, design and usability testing for organisations such as Telstra, the Commonwealth Bank, Health Insurance and the RAAF.

1. Australian Department of Health & Family Services

- Commonwealth Government department
- Broad range of amalgamated programs
- 5,400 permanent staff in 200 locations
- 110 in-house applications
- Corporate Look & Feel Project instigated in late 1994
- The Hiser Group engaged to facilitate development of a Corporate Style Guide

2. What is a corporate style guide?

- A **tool** to promote
  - consistency and ease-of-development for applications
  - ease-of-use and learning for end users across the organisation
- Standard user interface design principles
- DHFS-specific usability goals

3. What is a corporate style guide?

- A **repository** of user interface design information tailored to DHFS
  - Re-usable objects
  - Screen templates
  - Conventions for using windows and window elements

4. What is a corporate style guide?

- An **integral part** of a broader design process
- Will not deliver usability on its own
- User-centred design process
  - Contextual inquiry
  - Collaborative design using paper prototypes
  - Usability testing of prototypes with scenarios

5. Why did DHFS need a corporate style guide?

- Significant numbers of staff spend up to an hour a day asking for help or giving help to others, at a cost of over AU$20M per annum
- On average, users use 4 different applications each day
- 30% staff turnover adds to training costs

6. Style guide development process

- Usability *Champions* identified
- **Analysis** of cross-section of users and applications
  - User Workshops to verify findings
- **Design** of sample application
  - Collaborative design sessions
- **Evaluation** of design using prototype
  - Benchmark usability testing: 20% improvement
  - Development of Style Guide

7. *The politics of user-centred design*

- More usable systems
- Greater style guide acceptance
- Manager, developer and user buy-in
- Paper prototyping
  - Non-threatening
  - Makes people feel consulted earlier
  - People see their feedback incorporated immediately

8. *Style guide training*

- Delivered 5 one-day sessions to 75 staff
- Introduction to style guide contents
- Overview of usability and user centred design process
- Introduction of GUI design concepts
- Exercises which utilise the style guide
- Selling benefits, not imposing rules

9. *High acceptance*

- 91% of attendees said the style guide was explained well
- 100% said the style guide would positively impact the way they work

10. *What next?*

- Style guide has been endorsed as an official development tool
- No mandate to enforce its use so far
- Developers perceive user-centred design as extra work
- Limited capacity of usability team means developers must take on responsibility for usability

Usability Evaluation: Meeting the Needs of Industry

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Abstract

The PUTL (Portable Usability Testing Lab) Project was set up to provide cost-effective, scalable usability testing. Input to the project came from both industry and academia. PUTL has now been renamed "Usability Evaluation Service" and incorporated within the Evaluate and Refine stage of Hiser's Usability by Design ® Method. This paper backgrounds the PUTL project, and describes the current Usability Evaluation Service.

Introduction

From the Hiser Group's inception in 1991 usability evaluation has been an important part of our user interface design method. In early 1994 a project was begun to refine and formalise techniques consultants had been developing in the field. The project was launched through support of a Government Innovative Grants Program, the aim of which is to encourage collaboration between industry sectors and academic institutions, and was a two year industry-based research and development project. The project was christened the PUTL (Portable Usability Testing Lab) Project, and the Hiser Group collaborated with Swinburne University of Technology's SCHIL (Swinburne Computer Human Interaction Laboratory) group. The project allowed Hiser to draw on the latest research in the HCI field, while providing practical testing of theoretical concepts for Swinburne.

The PUTL project

From the outset the goal of the PUTL project was to provide cost-effective, scalable usability testing to our clients. As we often work within the constraints of different budgets and timeframes (more often that not, small and short!) and in typically "uncontrolled" environments, the challenge was to come up with a re-configurable set of techniques, technology and materials (with the emphasis on techniques) for conducting usability testing that would optimise the quality of usability data collection and analysis.

Through researching pros and cons of fixed lab versus portable lab testing and taking into account feedback from our clients the PUTL process was refined. Towards the end of the project we also conducted an independent "meta" evaluation (evaluating our evaluation tool) of PUTL by involving SCHIL's HCI Masters Program students in an exercise which was incorporated into the practical component of their course. Thus students learned how to conduct usability testing from an industry perspective, and in doing so provided feedback on the usability of our tool which was provided to them in the form of a "PUTL Pak". Part of Hiser's goal is to be able to provide knowledge transfer (with initial consulting) to enable and encourage clients to undertake usability testing independently. The students were therefore suitable "evaluators" given they were relative novices, as is often the case with our clients. On the whole the exercise illustrated to us the importance, as usability practitioners, of validating the usefulness and usability of one's own tools

The Usability Evaluation Service

PUTL has now been renamed "Usability Evaluation Service" and incorporated within the Evaluate and Refine stage of Hiser's Usability by Design ® Method (Observe and Analyse, Envision and Design, Evaluate and Refine). It includes an Evaluate and Refine Toolkit which provides examples and templates for questionnaires, task/scenario structure, consent forms, log sheets, reports etc., along with instructions for their use. The service also provides expertise on appropriate data collection techniques and when to use them (e.g think aloud vs. active intervention vs. co-discovery), appropriate data analysis techniques to facilitate rapid turnaround of results (e.g. post test debriefing and affinity diagram sessions) as well as appropriate use of technology (e.g. use of video vs. scan converter remote observation).

Summary

Through input from academia and clients and trialling of our techniques and technology we have evolved our Usability Evaluation service - a process that will necessarily be iterative as we continue to monitor the needs of industry.

Profile

Fiona Dorward is a user interface consultant with the Hiser Group's Melbourne office. Fiona has a background in psychology and has been working for the Hiser Group for the past 2 years. In that time she has primarily focused on developing Hiser's usability evaluation service for both business applications and multimedia.

1. Overview

Evolution of The Hiser Group's Usability Evaluation Process:

- The PUTL (Portable Usability Testing Lab) Project
- Independent "meta" evaluation of PUTL with Swinburne University of Technology
- PUTL's metamorphosis: now the Usability Testing Tool within Evaluate and Refine Toolset

2. The PUTL Project

- Usability Evaluation an important part of The Hiser Group's UI Design Process
- PUTL Project: to refine and formalise techniques consultants had been developing in the field
- Government Innovative Grants Program: industry-based research projects
- Collaboration with academia: Swinburne's HCI Group
  - Hiser: opportunity to draw on latest research
  - Swinburne: practical testing of theoretical concepts

3. Goals of the Project

- to provide cost-effective, scalable usability testing to our clients
- constraints:
  - differing budgets and timeframes (usually small and short!)
  - "uncontrolled" environments
- to develop a re-configurable set of techniques, technology and materials...
- ...whilst optimising quality of data collection and analysis

4. Iterating PUTL

- researching the pros and cons of fixed lab versus portable lab testing
- utilising PUTL on projects and incorporating feedback from clients
- evaluating PUTL with Swinburne's HCI Masters Program students
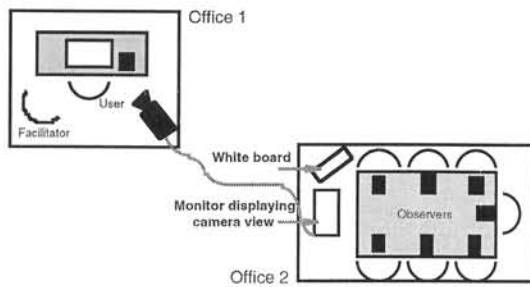- incorporating PUTL within the Hiser Group's Usability By Design® Method

5. Usability By Design® Method

Observe & Analyse → Envision & Design → Evaluate & Refine
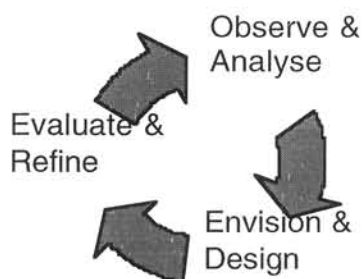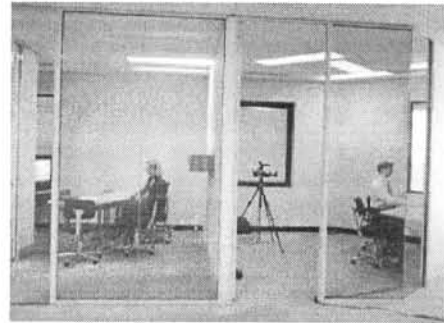
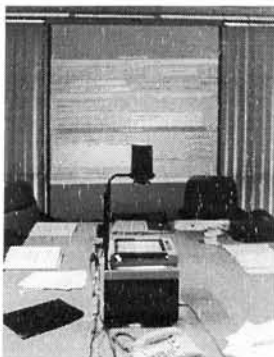## 6. Fixed Lab Layout
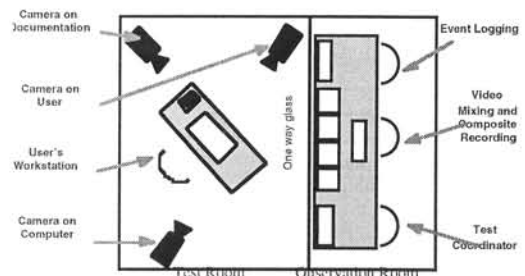
7. *Portable Lab Set-up*

8. *Like this...*

9. *Or this...*

10. *Or like this...*

11. *Evaluating PUTL*

- exercise incorporated into practical component of HCI Masters students' course
- given instructional lecture and Pak" of materials
- conducted own usability tests of VCR interface in Swinburne's Management Behaviour Lab
- we used PUTL to observe

12. *Evaluating PUTL*

- Hiser's goal: to provide knowledge transfer to clients
- students were suitable "evaluators" since relative novices at usability testing (in practice), like our clients
- importance of validating usefulness and usability of one's own tools

13. *The Metamorphosis*

- PUTL ->
- Usability Testing Tool ->
- (within) Evaluate and Refine ToolSet ->
- (within) Evaluate and Refine Phase ->
- (within) Usability By Design® Method

14. *Usability Testing Tool*

Consists of:

- examples and templates for questionnaires, task and scenario structure, consents forms, log sheets, reports etc.
- instructions for their use

But most importantly...

15. *Expertise on...*

- appropriate data collection techniques and when to use them (eg. "think aloud" vs. active intervention vs. co-discovery)
- appropriate data analysis techniques to facilitate rapid turnaround of results (eg. post-test debriefing and affinity diagram sessions with observers)
- appropriate use of technology (eg. use of video vs. scan converter; remote observation)

16. *To summarise:*

- Evolution of a process
- Evaluation of (an evaluation) process
  - clients
  - academia
- Further metamorphoses!

Potpourri Usability Testing

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Abstract

This paper profiles an evaluation session where a number of usability evaluation techniques were combined to maximise the number of areas the testing could cover in the time available. We were testing an existing prototype which was at the time quite 'out of date' in terms of more recent design work that had been done. Including paper prototyping evaluation methods in the evaluation of the electronic prototype meant we could test the existing framework as well as test ideas that were still on the drawing board. We also included guided exploration sections to elicit information from users and provide the user with "training" for tasks later in the testing session. In one part we even asked the user to draw on paper how they would like to see a section of the screen represented. Both preparation time and user time were quite limited.

The situation

We are part of a usability team whose role (in part) is to design and evolve a GUI framework that is used as a template for all customer support applications built for the organisation. For the purposes of this paper we will call the framework's name Fred. The aim of the framework is to implement a common look and feel across these applications and provide development teams with a good interface starting point.

The constraints

Testing design

We needed to test Fred with users from 5 different business areas: we had very limited resources available to prepare the testing, a large number of items to test and a prototype that was a year old. None of the users had any previous exposure to Fred. On top of this, testing an application framework as opposed to an application has its own challenges.

We started by brainstorming with the usability team a list of 'hypotheses' about Fred: statements we were making about Fred (or would like to make) that we hoped were true. Measurement was basically true/false. The team came up with consensus rankings of relative priorities (most were deemed high priority).

For each hypotheses we determined the best method for testing. We then determined, for each, whether the existing electronic prototype was sufficient and where it would need to be supplemented by paper mock-ups. We then ordered these in terms of what would make logical sense to the users as they learnt more about Fred through the process of the testing session.

Procedure

Five testing sessions were held over three days. The session with each user lasted 90 minutes. Each session was structured as follows:

- A guided exploration eliciting feedback via "active intervention" by the test facilitator. This served the dual purpose of gaining first impressions from the users while "training" them for the tasks in the session to follow. The user was asked to point to various features and describe what they thought they did and how they might perform certain tasks.
- Task completion through scenario: the scenario was guided by questions from the test facilitator.
- General questions about tasks completed so far. The user was given a 10 minute break at this point.
- Guided exploration of performance support tools.
- Paper prototype testing of various Save options. We had arrived at 4 design solutions for saving data and wished to test which was most effective. Users compared paper prototypes of solutions.
- Paper prototype comparison of four implementations of the customer information area. We tested how the information could be changed and relocated, with users still able to recognise what items were and what to do.
- Quick paper screen designs by users of the customer information area they had seen previously. This was to elicit ideas on what would suit their particular area.
- Quick scenarios of typical scenarios (there wasn't actually time for this in the sessions).
- A post evaluation questionnaire.

The results

We were able to test a large number of areas of Fred in the time available, and to familiarise the user with Fred so we could test more complex tasks. We were also able to elicit their design input through asking them to draw their own designs for the customer information area. We arrived at clear yes/no conclusions to the hypotheses we tested, although no real measure of degree of how "true" (or false) the hypothesis was. Where the matter of 'degree' was important, this could be followed up with further testing. It was relatively easy to arrive at a list of next steps - whether it was further design work or testing or specific changes to make.

Conclusion

We felt this was an excellent approach to the testing situation. The only negative comment we had about the evaluation was that it was not rigorous enough, however, this was never our aim. We covered a great breadth in our testing and gained much information across many areas. It gave clear feedback on what was working and what areas were unclear to the users. The approach we used deserves further refinement, as is could provide a rich means of evaluation in many commercial situations.

Profiles

Janis McKauge is principal consultant for VisionDesign a Brisbane based company specialising in GUI design and usability. Janis come from a software development and project management background. Janis has been working specifically in the area of GUI design for the last 5 years.

Fiona Dorward is a user interface consultant with the Hiser Group's Melbourne office. Fiona has a background in psychology and has been working for the Hiser Group for the past 2 years. In that time she has primarily focused on developing Hiser's usability evaluation service for both business applications and multimedia.

1.   **Potpourri Usability Testing**

- combining a number of testing techniques
  to:
  - maximise number of areas tested in the time available
  - test an "out of date" electronic prototype
- *by:*
  - eliciting information from users by guided exploration
  - users drawing a part of the interface themselves

2.   **The Situation**

- part of a usability team
  - designing and evolving a corporate GUI framework (template)
- the template ("Fred")
  - customer support applications
  - used by 5 different business units
  - implementing a common look and feel
  - provide developers with a good interface starting point

3.   **Constraints**

- keeping 5 business units happy with a single interface
- limited people resources to prepare and perform testing
- large number of items to test (nearly all given an "A" rating)
- the electronic prototype was a year old and much design work had happened since
- testing an application framework
- users had no exposure to software at all
- Janis in Brisbane!
- politically hot

**4.**   **The Method**

- establishing "hypotheses" to test
  - statements we were making about FRED (or would like to make) that we hope were
  - true/false result
- team established consensus rating of relative priorities

5.   **More Method**

- for each hypothesis we determined activities for testing:
  - tasks to be carried out
  - exploratory activities
  - host questions
  - post-testing questions
- established which tasks could be tested on the electronic prototype and which by paper
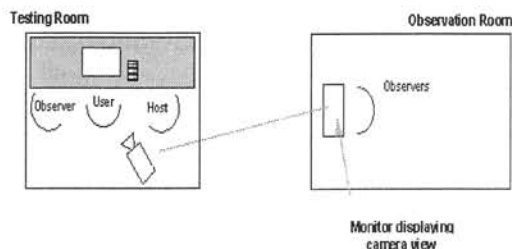- arranged activities in a coherent order

6.

7.

8.

9.
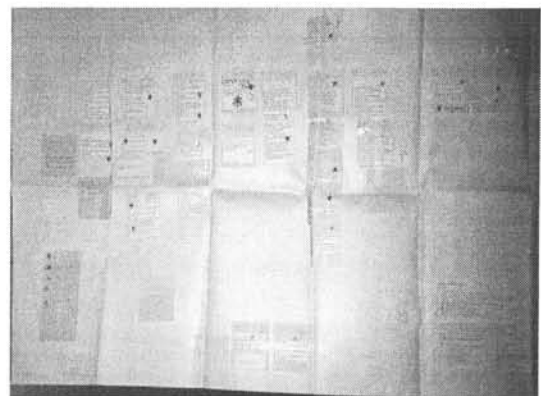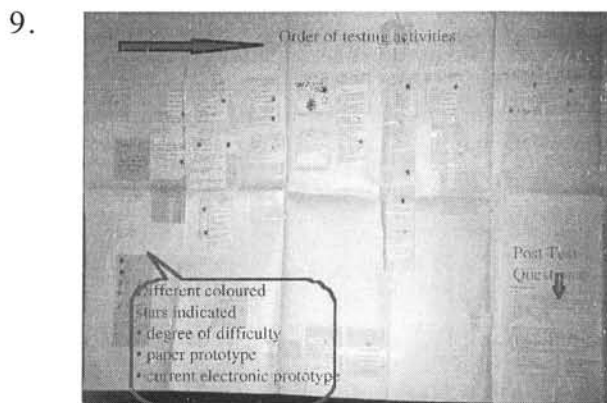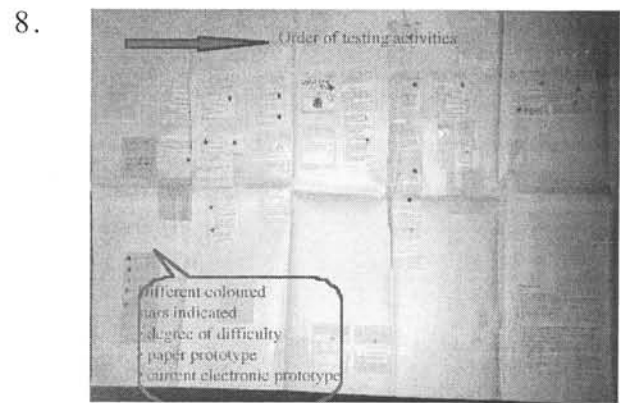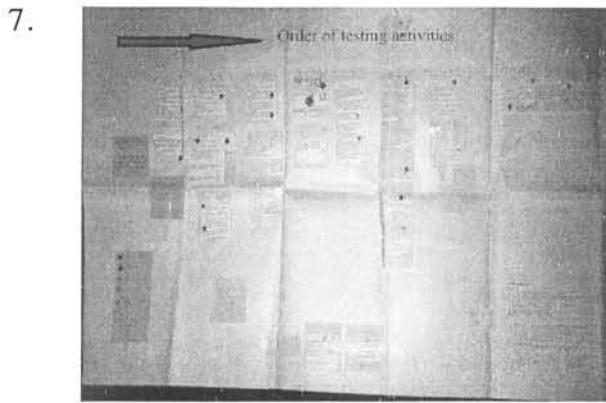
10. # The Procedure

- 5 testing sessions over 3 days
- users were drawn from each business unit
- session with each use lasted 90 minutes
  - pre-test questionnaire
  - testing activities
  - post-test questionnaire

11. # The Setup

12. # The Testing Activities

- guided exploration eliciting feedback via "active intervention"
- task completion by scenario guided by test facilitator
- general questions about tasks completed so far
- guided exploration of performance support tools

13.   Testing Activities cont.

- comparative paper prototype testing of:
  - tab save options
  - 4 implementations of customer information area
- quick paper screen designs by users of the customer information area
- quick scenarios of typical situations (no time for this)

14.   Some User Designs

15.   The Results

- tested a large number of areas of Fred in short time
- were able to familiarise user with Fred so we could test more complex tasks
- elicited their design input

16.   More Results

- clear yes/no answers to hypotheses but no degree of how "true"
  - where important this was to be followed up by further testing
- relatively easy to arrive at a list of next steps - further design, testing or specific changes

17.   The Conclusion

- excellent approach given the constraints
- some comments about lack of rigor but that was not our aim
- covered a great breadth in our testing and gained much information across many areas
- gave clear feedback on what was working and what was unclear to users
- appeared to be the right level of testing granularity for the situation

Section 2: Panel Session

The Usability Factor in Industry
Panel/Forum

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Introduction

This interactive session involved a panel and an open forum in which members of the audience were invited to take part. The focus was on issues relating to the take-up by industry of HCI and usability methods, and the level of maturity of HCI in Australia and New Zealand.

Panel

Mark Apperley

Mark is Professor and Head of the Computer Science Department at Waikato University, New Zealand. Mark's involvement with HCI goes back at least 15 years, and his HCI interests include interface design methodologies, data presentation techniques, and computer-supported cooperative working.

David Comberg

David practices design, writes and teaches in New York. He has his own office where he designs print and multi-media. He teaches a course on interactive media design at the Cooper Union School of Art. For 12 years he worked for DEC as a graphic designer and user interface designer.

George Coulouris

George is Professor of Computer Systems at Queen Mary and Westfield College, London University. He has worked in areas which include interactive system design, human-computer interaction and distributed systems, involving the development of generic tools and system components.

Janis McKauge

Janis is Principal Consultant for VisionDesign a Brisbane based company specialising in GUI design and usability. Janis come from a software development and project management background, and has been working specifically in the area of GUI design for the last 5 years.

Shane Morris

Shane is a Senior Consultant with the Hiser Group in Melbourne, Australia, specialising in multimedia and intelligent user interfaces. He has been involved in design, prototyping and project development for major organisations including KPMG Peat Marwick, Hewlett Packard and Telstra.

Chris Phillips (Moderator)

Chris is an Associate Professor in the Department of Computer Science at Massey University, New Zealand, where he teaches and researches in HCI. His main research interests are in interface design methods, especially notations and tools for requirements analysis, high level design and early prototyping.

The discussion

Each member of the panel made a short position statement relating to their views and experiences of usability issues in relation to industry:

Mark Apperley identified a number of constraints which apply to interface design projects in industry, including deadlines, house styles, legacy systems, and available I/O devices, and posed the question: what proportion of projects really have room or incentive for usability assessment? His experience was that in many cases usability issues were considered too late. He suggested that if industry was to take up usability then ideally some kind of 'usability meter' was needed - one that was easy to apply, and which would produce a number which indicated how usable a piece of software was.

David Comberg's experience as a user interface designer in the areas of multi-media, film and publishing had led him to the view that very little HCI method was being applied. Most of what he had been involved with had been about control (of a page, screen, message etc) rather than method. Adjusting to the unexpected, rather than applying a predefined method, can be important in interface design. There is a need for designers to be prepared to unlearn some of what they know with each new project. This is particularly relevant in the context of designing for the World Wide Web.

George Coulouris's experience with usability had come from teaching an interactive system design course to

masters students specialising in HCI. Newman and Lamming [1] had proved to be a useful text in this area. He was particularly interested in the training needs of industry in the areas of usability and interface design - there was always a significant lead time between ideas appearing in academia and those ideas being applied in industry (structured programming was a good case in point). Communication between the industry and academia was often less than ideal.

Janis McKauge felt that perhaps the two key issues for industry in connection with usability were incentive and process. One approach she had experienced in the Australian industry was the 'message from God' which said "thou shalt do usability". One company had put Human Factors kits on each person's desk. This had proved less than effective. Janis had recently been involved in launching her own company in Brisbane specialising in the usability area. Industry had shown more interest in the user-centred design process, from a quality perspective, than in usability per se. She also felt that until there were contractual obligations relating to usability and the delivery of products, it would be an uphill battle.

Shane Morris posed the question: how do we measure the uptake of HCI by industry? HCI practice will be seen as 'mature' when it becomes an acceptable part of the software development process. At present there is an 'us and them' syndrome between software developers and HCI experts. User interface designers are typically being hired not by software development sections, but by marketing departments or business process re-engineers. Telecommunications companies, service industries (banks, insurance companies etc) and companies involved in multi-media applications would be exceptions to this, but they have the advantage of being able to relate usability easily to their profit margins. Evangelising and education will be needed to spread the word and improve the uptake.

In general discussion the following points were made:

1 Academia needs to avoid evangelising over issues such as usability, and to listen better to the needs of industry. It was suggested that both the HCI community in particular, and the academic community more broadly, don't understand how systems are developed in the real world. There is a need to be able to adapt usability methods to fit with development models and practices used 'out there'.

2. Usability can be introduced into an organisation in two ways: one is simply to introduce it as a 'cure' for current ills, the other is to involve the organisation in the process so that it eventually becomes a natural part of what they are doing. The second approach is to be preferred.

3. Enforcing human factors work to occur by contractual means is difficult because of the lack of objective criteria to measure it in the final product and a shortage of human factors practitioners to oversee it. The contractual 'checklist' may be a flawed approach to usability anyway.

4. Some companies have started down the usability track and have become disillusioned. This has included difficulties in knowing how to correct usability problems which have been uncovered (e.g. a user not noticing something on a screen, and therefore not detecting a problem), and of finding a balance between what is technically feasible and what would be a good solution.

5. Humans are really quite good at working around bad interfaces to get on with what they perceive as the main task in hand. This includes the students who go on to be the next generation of project developers. There is a need for students to spend time evaluating interfaces, and to have their interface designs subjected to peer evaluation, if this cycle is to be broken.

6. With some projects there may not be a big enough pay back to justify the extra effort involved in creating a 'usable' system.

Conclusions

Perhaps the discussion raised more questions than answers. Industry clearly needs an incentive to take up usability methods, and academia must recognise that there is always a significant lead time for new practices to be adopted. Key issues identified in the forum included the need in the short term for usability methods to be adapted to fit with current industry development models and practices, if they are to be taken up; the need in the medium term to produce a new generation of developers familiar with usability issues; and the need in the longer term to implement new and flexible system development practices which incorporate usability methods.

Reference

[1]   Newman, W.M., & Lamming, M.G. (1995): *Interactive System Design*, Addison-Wesley, Wokingham, England.