

# ENGAGING LARGER HCI CLASSES

## WITH A MIXTURE OF METHODS AND RESOURCES

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### ABSTRACT

We describe our efforts to engage a large HCI class using a variety of teaching styles, methods, and resources. With larger classes, practical work to illustrate key HCI issues becomes less feasible. This course was run using a series of short, primer lectures in combination with student presentations and a number of web-based resources (including a weblog, bulletin board, and web links). Many students found this approach beneficial, and they gained a lot. Overall, the course was a success, but some students still expected a more traditional lecture-based course, and did not make the best use of the resources we offered. We consider the implications and possibilities for using a variety of methods for teaching HCI to larger groups and give some pointers to ways in which this approach can be improved.

### Keywords

HCI teaching, HCI teaching styles, web teaching resources

### 1. INTRODUCTION

Human-Computer Interaction sits on the intersection of many different fields – from psychology to computing, art to sociology, ethics to technology – and requires a broad understanding of all these fields. This makes it notoriously difficult to teach. A lecture course tends to take a theoretical point of view – students know about the principles yet still design hard to use software. Previous approaches have used a studio approach, in which practical-based expertise has been prioritised, with the theory done ‘just-in-time’. This works well with small groups, and has been successfully run with up to 120 students. However, the further increase in class size makes this less practical. We wanted to provide an

educational approach that i) was effective for large class sizes, ii) covered theoretical, empirical and practical skills, and iii) increased the students awareness of the main problems and interested them in the subject. We also wanted the approach to be efficient in terms of academic time, and potentially extensible into distance or intensive teaching modes. In addition, we wanted to try to encourage a more student-centric approach to learning, to resist the move towards more spoon-feeding and less individual research and learning. This course was created over the summer to address these goals.

"This course is not a standard lecture module, in that the materials presented in lectures are designed to outline the field, make you aware of some issues you may have not thought about before, and spark your interest and direct your work. They are not supposed to give you all the information you need.

You need to do the actual work, on your own or in groups. Each week you should work through the reading and the resources detailed on the [resources page](#). Some of that is compulsory, and you can expect to be examined on the materials in the **Essential** part. The other section expands and builds upon that basic knowledge, giving you a broader perspective. These resources are not the only ones you can use: there are a number of relevant books and readings in the school and main library as well as a host of online sites that offer interesting and relevant information."

(taken from the course website)

In other words, this was run as course in which responsibility for learning was transferred towards the student. More detail is available on the course website, <http://www.cs.bham.ac.uk/~rx/Teaching/HCI/>

### 2. COURSE PRESENTATION

The course made a great deal of use of electronic support, in 4 main ways:

- Web page resources: including links to sites, papers, and online tasks
- HCI weblog: a blog created specifically to support and complement the issues raised in lectures

- Bulletin board: an online board where students could post their own messages
- Email: a specific mailing list set-up for the course

This allowed us to see, amongst other things, how effective the different approaches were, how well the students took to the approach, and whether the course could be given at a distance.

The course each week comprised a 1-hour session in a lecture theatre and a 1-hour group presentation session. In the lecture slot, we gave students an overview of an area of HCI, the issues in that domain and the approaches used. This session was used to try and pique their curiosity and interest them in the subject. The group presentation had 3 groups of 5 students, 15 minutes per group, presenting to the rest of the class on a topic they had been given the week before. This had a number of goals:

- introduce rapid group working – members who did not know each other well beforehand, undergraduate and MSc, had to communicate, meet, manage the process of dividing up the work, research it, form their own views, create a presentation, coordinate it, and present it, all within 7 days
- ensure that they knew how to use the web resources and to encourage good research practices
- develop their presentation skills and confidence
- present areas of HCI related to the current weeks topics in much more detail

Students who turned up for these sessions (and not all did) therefore gained a detailed insight into three aspects of the week's topics, to complement their own research.

Evaluations for the course are presented from the web logs and the mid-semester questionnaires – the end of term questionnaires have not yet been processed and made available.

The main resources for the course were the web resources, as illustrated in Figure 1 below. These were split into i) *Essential*: focussed chunks of material that formed the basis for the course and that could be examined; and ii) *Interesting*: additional work that was not directly assessed, but which formed the wider context and would allow students to gain above average marks more easily. The pages were viewed fairly heavily: figures for page views for October, November and December are 327, 441, 755, showing an increase in activity over the duration of the course. Note that December figures include the vacation

period, and so the acceleration of interest is even more pronounced than these figures suggest. This is pleasing, as it shows that the students move from expecting a more conventional approach towards one where they use the web resources much more heavily (approximately 3x usage at the end compared to the start).

However, we should point out that for approximately 180 students, we would expect the page views to be about 5 per main topic, hence averaging 50 per student - 9000 in all: we got 1523 - 17% of the ideal. We will revisit this statistic later.

We implemented a voting system for the Interesting work, to allow students to feed back to their colleagues (and to us) how they found the additional work. This allows us to improve the materials, and it also allows slower students to focus on the stuff that their peer group finds more appropriate. This was used and appreciated by a number of students, but take-up was not widespread.

Supporting the web resources was the HCI blog - a weblog of relevant issues in the news and comments inspired by our recent experiences (e.g. Virgin train toilets). Students who followed this gained an insight into the scope and relevance of HCI, and could start to see the overall context of the individual topics we were addressing. This blog has, by popular request, continued after the end of the course. The blog views for October, November and December were 528, 343, 382 respectively, though these include some external viewings.

Whereas the blog is for us to present information to the students, the bulletin board allows the students to develop conversations amongst themselves, and to follow up issues raised on the blog (e.g. Virgin trains). This was again well received by a small subset of students, though postings were low: 12 topics and 32 postings, with approximately 12-1400 page hits, similar to the blog and resources. This suggests that there was a concentration of students who used these resources extensively, and a majority who used them hardly at all. This bimodal approach is backed up in other areas of the statistics, and forms the characteristic group response to the course.

Some of these resources are available within the University's chosen e-delivery package, WebCT, but taking this approach has allowed us greater control over the details of presentation and information gathering. In general, we would suggest that the overhead in setting up and managing the different systems is not worthwhile, unless detailed control or analysis is required.

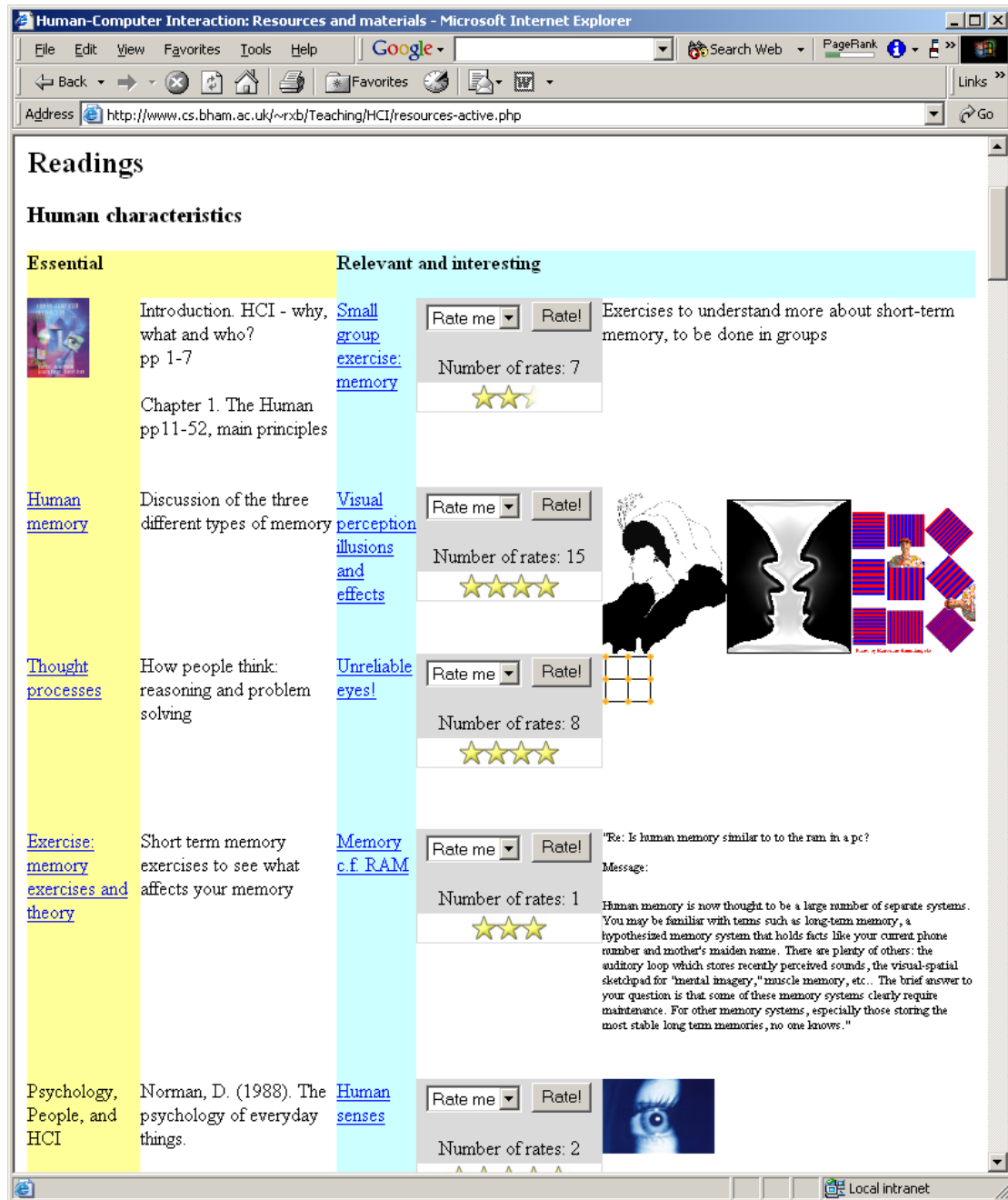


Figure 1: web resources page for the HCI course

### 3. QUESTIONNAIRE DATA ANALYSIS

We can briefly review the questionnaire results (attached). As a general-purpose questionnaire, it is inappropriate in many places (and in fact is clearly biased towards the prevailing trend in delivery: lecture, handout and supporting exercise, in that order of importance). The questions are addressed in order.

Questions 1 (amount of assessed work completed) and 2 (non-assessed work completed) are open to conflicting interpretations - does it mean the group projects (which

are assessed) or the Essential work? There is a bimodal distribution for the first - students have either done stuff (generally the case), or they have not, especially if it is assessed. Most find the module valuable, though less than the school average. It is found to be on the easy side of normal, with a close correlation between that and how much is being learned. More on this later. Speed of presentation appears excellent (not too fast or too slow), and clarity is greater than usual. Lectures are as interesting as any others (which is lower than we would expect, as they focus on raising interest). There are no

handouts from the lectures (to reinforce the need for individual study, a deliberate ploy), so how we score even an acceptable number is beyond me, but we would expect this value to be low. Students are divided: half think that there are just the right number of exercises, whilst the other half think there are too few, and we will address this issue in the next incarnation of the course. This fact will be picked up in a different guise later. Those exercises that there were, however, were felt to be at the ideal level. No exercise classes were given - many students found them fine! We assume this to mean that they were relatively happy with the feedback to questions in lectures, via email, and in the presentations. Most were happy with their choice of module, but a substantial number were unhappy.

This is an important result, and quantifies other staff observations that students are becoming more passive: they expect the lectures to cover all the examined material, expect course material to be precisely delineated, and for there to be handouts that cover all this. The lack of note-taking and annotation during lectures has been commented on by other staff members too.

#### **4. CONCLUSIONS**

In conclusion, for the HCI course, those that 'got it' worked in their own way through the resources, enjoyed the course and found it one of the best they did. But a substantial portion did not really 'get' it, have currently done little outside, and as a consequence found there to be less value in it. We have backed up these findings with informal discussions with the students as well.

Overall, the course fares slightly better than most in the school, with this bland result hiding the fact that those who did the expected extra work gained hugely whilst those that did not lost out. This raises some interesting issues: as a premier University, which approach should we favour: one in which those students who work most are rewarded, or one in which we adapt our teaching styles to ensure all have an acceptable experience, almost independent of their individual effort?

#### **4.1 Future work**

One area we will address is adding in further exercises to allow the students to assess their level of competence within an area, and we will also be providing example exam questions so that they can see the extent and depth they are expected to go into.

We will also try and address the issue of lack of external untimetabled work. One strong possibility is that students are taking a very pragmatic approach to the demands on their time, and are prioritising work according to assessment deadlines: no assessment, no work. Therefore, this switch to expecting them to do untimetabled hours on work with no immediate assessment, relying on stimulating their interest in the topic and their innate curiosity may be too much – especially if it is in a wider context that tends towards less independent learning, not more. We will therefore look at some notion of summative assessment for this work. However, this becomes highly staff-intensive (unless we move to purely online, computer-based assessment, which is hard to set up and easy to plagiarise) and against one of the initial principles of the course. Incidentally, we expect the Resources part of the site to be hit very heavily as the students approach exam time, and they actually do the work they should have been doing all the previous semester.

We believe the course to have been a great success. We have really succeeded with a substantial number of students, who now have both a theoretical and practical comprehension of many of the key aspects of HCI. Many of them have a deep appreciation of interactive issues and are capable of applying that insight to their own designs and code. We have missed a chunk of our audience too, mainly, we believe, though them not doing the required additional work. However, these have not fallen by the wayside completely, and are in a much better position to catch up (since all the work and expertise is still available on the web for them to do and take advantage of). In addition, the course has been relatively simple to actually present, has been time-efficient, and has shown the benefits of electronic support.

# Mid Semester Student Questionnaire Autumn 2003

# Results By Module

0608167

Human-Computer Interaction 1

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#Students Registered: 155 #Forms returned: 47  
#Answers

Question	0	1	2	3	4	Meaning of 0 mark	Percentage of forms with the mark	Meaning of 4 mark	Average for this question for This Module	Average for this question for All Modules
Amount of assessed work completed	24	8	0	4	71	None or hardly any	17	All or nearly all	3.04	3.27
Amount of non-assessed work completed	16	19	19	6	13	None or hardly any	44	All or nearly all	1.25	2.35
Value of module	47	17	26	32	17	Worthless	9	Worthwhile	2.32	2.98
Difficulty of module	47	13	40	9	0	Easy	13	Difficult	1.45	2.49
Amount being learnt from this module	46	11	33	35	7	Nothing	11	Much	1.74	2.66
Speed in lectures	47	0	2	87	4	Too slow	0	Too fast	2.13	2.26
Clarity of lectures	47	2	9	30	21	Confusing	2	Clear	2.68	2.44
Interest value of lectures	47	15	11	26	34	Boring	15	Interesting	2.23	2.29
Quantity of handouts	40	38	20	30	13	Too few	38	Too many	1.18	1.76
Clarity of handouts	28	7	18	54	18	Confusing	7	Clear	1.93	2.42
Usefulness of WWW support	47	4	2	13	32	Useless	4	Useful	3.19	2.33
Quantity of exercises	32	22	22	53	0	Too few	22	Too many	1.41	2.02
Difficulty of exercises	22	9	5	82	0	Too easy	9	Too difficult	1.86	2.35
Usefulness of exercise classes	15	20	0	67	7	Useless	20	Useful	1.80	2.64
Happiness with choice of option (IF it was an option)	43	12	28	35	14	Very unhappy	12	Very happy	2.28	2.51

Number of lectures given (average if values returned differ): 12.79

Question	#Answers	Avg	StDev	Min	Max	Average for this question over all modules
Number of text books owned	46	0.61	0.54	0.00	2.00	0.71
Percentage attendance of lectures	38	84.29	24.04	14.29	177.78	91.83
Hours per week working on this module (excluding timetabled lectures and classes)	42	1.09	0.84	0.00	3.50	3.02
Hours per week (excluding timetabled lectures and classes) necessary to keep up	42	2.57	1.38	1.00	6.00	4.19