

Management of learning and assessment processes

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Education in and within HCI: teaching, learning and efficient administration.

Abstract

Web tools are used to enrich the learning experience for students, and ease the administrative burden for lecturers ... a genuine win-win situation. This short paper highlights how at Portsmouth we use our HCI website to support the formative and summative assessment of a large group of final year undergraduates studying a 20 credit unit in HCI.

1. Learning environment

Many of our HCI learning resources are web based, mostly consisting of simple web pages, and web viewable documents. An important aspect of our teaching is a process based active management of learning.

Students engage in an extended coursework that runs through the main contact period of the unit. Initially students form their own groups, and this data is used to automatically generate a web group directory, and allocate coursework tasks to groups. There are typically forty-something groups, each of four students, and we use three different coursework tasks that exhibit different categories of HCI application development. Typical categories are:

- online applications (often web-based),
- the development of an embedded application, or
- a desktop application development.

Coursework development is staged in accordance with an HCI development lifecycle, and at each stage in the process students report their progress via web forms, and upload evidence of progress in web viewable formats (text, html or graphics files). Tutors view the uploaded evidence online, and provide group formative feedback via email.

The aim of this approach is to optimise student-tutor engagement in learning activities, and to reduce the amount of time spent on administration and management by both tutors and students. The staging of the coursework is in the best interests of all concerned as students receive formative feedback on their progress and tutors get reassurance that the groups are functioning properly (and are able to take corrective action if this is not the case).

Our approach uses standard site management tools, web-server features, and server based scripts with a minimum of customisation. It provides an interesting contrast with off the shelf Managed Learning Environments.

Web usage is monitored and evidence of both engagement, and variations in usage across the student user population are considered. Limitations in the approach to web usage (caching, off-line viewing, departmental policy) are discussed. Ethical aspects of web usage are considered as a natural aspect of our approach.

2. eLearning and eAdministration

eLearning methods enable learning to be mediated through a computer system, typically web based. In their most general form eLearning systems also include eAdministration, thus encapsulating two of the major roles of teachers and students. Computer-supported administration is particularly powerful when managing large groups of students, and can make significant savings in the time required of teachers to complete administrative functions.

A system that knows the identity of students as individuals can be utilised in learning situations such as group work. It helps if the software can support the concept of a group – this is something fundamental to our approach and our software. Working in groups is particularly important in Computer Science education, reflecting the widespread employment of teamwork in the workplace in general, and HCI in particular.

eLearning systems typically exploit group work through some asynchronous conferencing software where students post messages to threaded lists. We have developed a more automated tool where students use web forms to post documents and references that remain private to the group and the tutors. Postings arrive as email in a tutor's mailbox where they are sorted by mail filters.

The strengths of the method are that it is convenient for computer-literate students, and requires very little effort of the tutor. However the method may not work in a particular Virtual Learning Environment (VLE), except as a third party application that is linked to the VLE. The tool is convenient for the teacher because it requires little management. It is convenient for the learners because they have only to complete a simple form and tick some boxes. The technique affords different ways of working than having a shared web page for example.

At the end of the coursework period a final written report is submitted that integrates the earlier reports. These interim reports may have been improved following formative feedback from a tutor. Our web form is capable of handling the upload of this final document, and many groups do

submit this way as a backup, however our regulations require that coursework for summative assessment must be submitted on paper at the departmental office.

3. Ethical Issues

One of the features of eAdministration is that the system needs to know the identity of each student. Many systems support more personalised learning by allowing students to log in and see a view of the system that is customised to their learning plan and progress. The main focus of this site is to track group progress, and display this to the class. Rather than the 'portal' approach where each learner gets a customized view of the learning material and their learning process, the website is used a general communication tool. The system maintains a record of group membership including name, email address, and (optionally) telephone number and records progress as described above. The individual contributions to group-work are recorded within the system by the members of the group – our system enforces a rather coarse scale of qualitative and quantitative contribution appropriate to this kind of judgement.

Students also have the facility to make more general comments as anonymous feedback to tutors via a webform.

Many MLEs record and monitor student progress so that tutors are able to obtain summary reports on student activity. Our system contrasts quite sharply with this approach. We do receive reports on student progress posted by the students themselves (rather than generated by the system), and individual contributions to a group's work are also provided by the group members. Hence our system makes no unseen or covert record of group progress.

Every student has an individual login ID to our HUCID website. Therefore we can, and do, record how often each individual logs in, and how much time they spend with the web site open. This data is accumulated to provide us with an overall, summary picture of student activity.

We include discussion of ethical approaches to usability evaluation and subjects in our unit, and have considered the way we collect usage data. In our current unit we have moved to an anonymised user id, and have given students the option to exclude their data from subsequent research.

4. Engagement and usage

Web usage logs do not provide definitive evidence of how people use a website for a variety of reasons, for example caching distorts counts of access to a page. Web pages caches may be maintained by the user's browser, and by Internet service provider's proxy servers. Whilst it is possible to disable caching, it is generally an undesirable thing to do as it has impact on levels of network traffic.

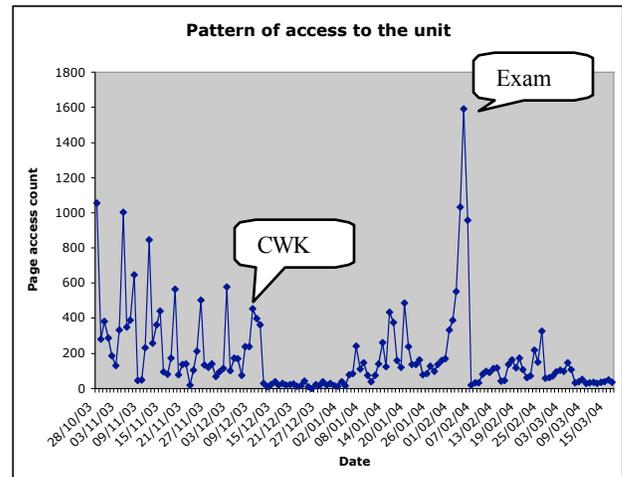
We use a simple approach to maintaining a log of access to the site that uses the web server's security features to record username, IP, date and time of access to each tracked page. The logs generated are a simplified version of the usual http access log maintained by the web server, and are generated by a very simple PHP script called from the tracked pages.

Access to the learning resources is not entirely through the web, some students strongly express a preference for a printed copies of notes. Departmental and Institution policies imply that printed notes should always be distributed. Students opt to print notes. Many students

download lectures and display them on a laptop rather than view them on a projection screen. It all highlights how variable individual behavior is.

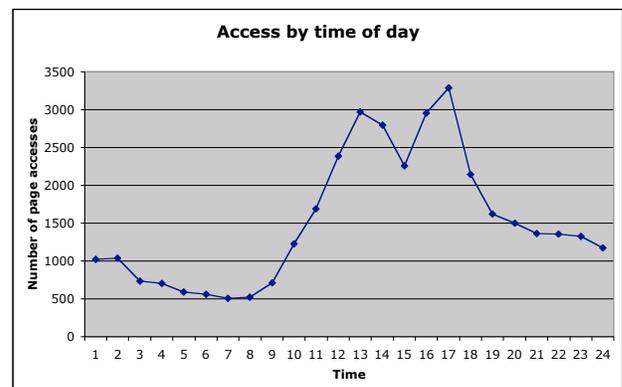
Wireless Internet access was not available in the lecture theatre we used in Semester 1 2003-4. When available in later presentations of the unit we anticipate it will have an impact on what we do and how students interact with the learning material.

Never the less web server logs provide an unobtrusive (if not totally reliable) view of interaction with the online learning materials. Whilst not recording all access to a web site they do provide information about minimal access. In the following diagram we can see a pattern of usage across the life of the unit. (Burton, M. C. and Walther, J 2001, Goldberg 1995) Both review issues with the use of web statistics in the evaluation of web site usage.



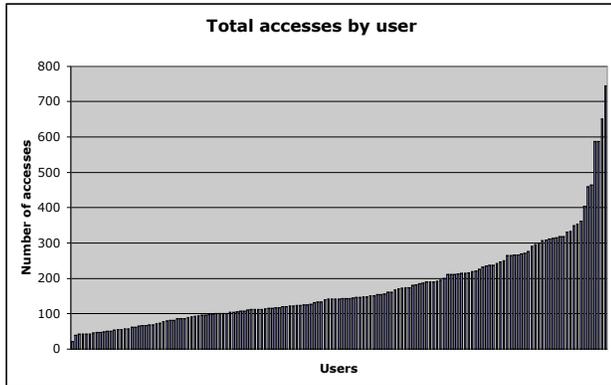
There are several clear patterns. One, access is very much related to the day of week of the lecture. Two, access declines as the unit progress (NB: this may be an artifact of caching). Three the exam stimulated the largest amount of site access. The only day in the period that had no access was 25th December.

A similar chart shows student access by time of day. This demonstrates features of a student's working day, with a significant amount of access in the evening, and in the early hours of the morning.



During this unit 157 users from 1427 locations accessed the site using 129 different platform/browser combinations. 38% of the accesses were from within the University.

There is a significant amount of individual variation in access. There is no correlation between the number of accesses and the score at the end of the unit.



Student feedback on the unit was provided using a feedback form based on the University of Portsmouth standard form, delivered as a web form. The web form did not identify students. In the semester 1 presentation one of the exam questions caused a good deal of debate among the students. This led to an increased level of feedback on the unit, with a 30% response rate, the feedback rate on this unit is usually rather lower, about 10%. Feedback on most items was positive, with a large number of constructive comments. There were many comments on the involvement that the coursework engendered, because of its pervasive and periodic feedback and formative submission process.

Student performance in the unit reflected the high level of engagement with the coursework, however the focus on practical work was highlighted by a mediocre performance on the more abstract examination.

5. Summary: HUCID Coursework Protocol

The table below specifies the detailed procedures followed by students and staff when completing the coursework for the Human Computer Interaction Design (HUCID) unit, and summarises our approach.

The coursework extends over the first fourteen weeks of the semester. Its primary aim is to give students the opportunity to realise in practice the full HCI development process. To further promote realism students work in small teams, and there is an element of peer assessment included.

Much of the management of the coursework is driven by on web forms that are found on the unit website. Tutors support the development of the coursework through weekly timetabled, face to face tutorial sessions. Lecturers support the coursework by relating theory to practice, and reminding students of the next stage in the coursework development. To help ensure the smooth running of the coursework tutors use positive reinforcement (rather than punishment) by awarding a small administration mark for fully completing all the stages on time.

The column headed LO relates to the learning objectives published in the unit specification document.

Week	What students do	What tutors do	LO
1-2	Form groups of 4 and report the group composition using the web form <i>progress report 1</i> .	Publish the groups on the unit website and handbook. Resolve any outstanding problems to do with the composition of groups. Allocate one of the three pre-defined tasks to each group.	3
2-3	Perform user analysis and task analysis.		3
4	Upload <i>progress report 2</i> : user and task analysis. Report on the contribution of each individual to the stage.	Provide brief formative feedback on <i>progress report 2</i> relating the student submission to theory.	2,3
5	Develop evaluation procedures and resources (prototypes, evaluation documents, etc)		3
6	Upload <i>progress report 3</i> : evaluation plan. Report on the contribution of each individual to the stage.	Provide brief formative feedback on <i>progress report 3</i> relating the student submission to theory.	2,3
7	Preparation for the evaluation: making prototypes, interview and questionnaire forms. Piloting evaluation procedures.	Allocate groups to weeks for implementing their evaluation. Ensure the subject group's task is not the same as the evaluator's task.	3
8	Evaluation run by half the group using the other half as subjects in the evaluation.		3
9	Evaluation run by half the group using the other half as subjects in the evaluation.		3
10	Analyse the evaluation. Integrate all the draft work into a final report.		2,3
11	Hand in <i>progress report 4</i> – a group report on the contribution of each individual within the group, and the printed final report.		

14		Provide provisional feedback to group and to individuals on coursework performance, based on the outcomes and evidence from the progress reports.	
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6. Conclusions

We have found the methodology described above useful for managing the administration of large numbers of students engaged in group activities. By using web tools to support the administration we are able to spend more time on teaching and tutoring activities.

The key points are:

- coursework administration processes are visible to all
- the well defined process and the use of web tools to support activities saves tutors a great deal of time in monitoring students and chasing problems
- students are clearer in their understanding of what they need to do
- our processes build formative assessment into coursework activity, and students are able to use the formative assessment to enhance their learning and the final quality of their work
- problems are identified quickly

The need to be ethically open in our use of web server logs gives students an opportunity to think about ethical issues.

7. References

- [1] Burton, M. C. and Walther, J. B. (2001) The Value of Web Log Data in Use-Based Design and Testing, *Journal of Computer Mediated Communication* 6 (3) April 2001 (<http://www.ascusc.org/jcmc/vol6/issue3/burton.htm>)
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