

Using the Web for teaching – old problems in a new guise

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Abstract

This paper considers the evolution of an e-learning module within a Business degree. The first attempt required students to create and evaluate a website in a group and communicate by an electronic conference. The difficulties thus created are described, together with a revised version of the module. Suggestions are made for general criteria relating to the design of IT assignments in an e-learning environment.

Key words: groupwork, conferencing, Human Computer Interaction, assignment, website creation

1. Introduction

The importance of the interface to computer systems is now widely recognised (e.g. Dix 1998). This is certainly true for business, whose efficiency and in some cases survival can be affected by the usability of their IT systems. For this reason Human Computer Interaction (HCI) is now becoming an integral part of some Business degree courses (Chan 2003). In HCI modules offered within degrees such as Business where the focus is not technical, it is an issue as to how to provide practical assignments that lead to useful and relevant outcomes.

Using the web to teach the practical elements of Human Computer Interaction (HCI) would seem to be an obvious approach. Web sites provide relatively complex interfaces illustrating many HCI topics. When every business has its own website, often using it for direct customer purchases, there is an immediate relevance that appeals to students. This paper arises from experience on an HCI course for Business students of a web-based practical assignment that has been delivered to different cohorts in a variety of ways. The obvious approach, one that has become traditional within the short lifetime of the web, is for students, often working in groups, to create their own websites (e.g. Lazar 2000, Gereffi 2001). In practice, as we show later, there may be difficulties with this approach. An alternative that does not use groupwork nor website creation may get students to achieve the module's objectives at least as well. The effectiveness of one such alternative has been explored, with a view to establishing its viability for Business and related courses. There is also some consideration of closed conferences for communication within group projects.

2. The module and the first assignment

The HCI module that this paper reports on is at final year degree level and is offered to Business Management students taking a range of Business degree courses. These cover the areas prescribed by the UK Quality Assurance Agency in its General Business and Management benchmark document (Quality Assurance Agency 2003), with a slight emphasis on IT. Most, but not all, students taking it had created a simple website earlier in the course. To do this they had used HTML to understand its principles and but had not used an authoring package such as Dreamweaver. Several modules on the course have group assignments, so that students were familiar with working in groups.

The module's aim is that students acquire an understanding of the importance in business of the design of the interface to IT systems of all types. It tries to give an understanding of the factors that allow people to interact effectively with computers in a business context and how the interface to computer systems can be designed and tested. The module focuses on the application area of e-commerce, since businesses often fail to gain benefit from their investment in the internet because of poor interface implementation – as many who have wasted hours online would agree. Thus the primary objectives of the module are not that the students should gain skills in website construction. After graduation it is envisaged that very few of them will need to create websites as part of their professional roles. Rather, they will specify website content and appearance and play a part in or oversee the monitoring of a website's performance and development. In not building their own websites in their future work, they are

similar to students in many other disciplines whose education now includes website creation. Most importantly, this module has to provide knowledge of how to evaluate interfaces. This requires knowledge of such HCI evaluation techniques as heuristic evaluation, cognitive walkthrough and observation.

When first delivered, two fundamental decisions were made in designing the module's practical assignment. These were perhaps surprising in the light of the module's primary objectives and with the benefit of hindsight. Firstly it was decided that students should produce their own website and then evaluate it. This decision was driven by consideration of the format of many web design courses (e.g. Lazar 2000) that placed attainment of skills of website construction as a central aim. Certainly, at the time the module was first run (2000-2001), the prevailing ethos was that students should learn website creation skills and this module seemed to be an opportunity to build on the skills that some of the class already had. The consequences of this decision are examined later.

The second decision followed, in part, from the first. To create a website and evaluate it with several HCI techniques would have been a disproportionately lengthy task for an assignment for a single student. Hence it was decided that the assignment should be a group project. The choice of having a group project seemed to provide the opportunity for gaining the well-known educational benefits of teamwork (e.g. Jaques 2000, Shneiderman 1998). These include learning about project management, leadership styles, group structure and group dynamics and communication within groups. Special considerations may apply where the subject is more technical (McBean 2001). Making the assignment a group project also emphasised that in practice most significant IT systems are developed by teams. This applies to large websites as much as more traditional software systems.

The benefit of learning about communication by electronic means was important for this HCI module. Working in a group emphasises that interfaces to computer systems are often used to communicate with other people: by email, by electronic conference or instant messaging. Hence the assignment was structured to ensure that part of a group's communication was electronic. A conference was established for each group and students were told that the final contents of their group's conference would be taken as one part of the record of the group's working, for which a small proportion of the group's assessment mark would be awarded. The incorporation of electronic communication as a necessary component of the work seemed an advantage in an HCI module that considered Computer Supported Cooperative Work (CSCW). It was envisaged that before meetings group members would post their latest documents to the discussion group, to make them available to others in the group. This would be done by zipping a complete website into a single file and attaching this to the posting.

These considerations led to an assignment with the following specification:

- students should choose their own groups of four members and the topic for the website;
- they should produce a prototype website following a design methodology that had been taught and should apply standard evaluation techniques;
- they should record their design decisions and evaluations through their electronic conference.

In addition each group member should produce a short individual report on project progress from their own perspective.

The means of producing the website was left to the students. At the College Dreamweaver and other web authoring packages were available, and documentation and instruction in their use were provided. However students increasingly complete computer-based tasks at home on their own equipment. Dreamweaver is relatively expensive for individual purchase, so most students do not have this software on their home computers. It was therefore accepted that the website could be produced with any software. This decision had implications for the working of some groups where the software was only available on one computer accessible to only one student.

3. An assignment in practice – student and staff reaction

After delivering to two cohorts an evaluation of the module's effectiveness was made. This started by considering written student feedback collected at the end of the module. Amongst other questions were ones asking for comments on the assignment. The comments made in response were similar for the two cohorts. The most common one was that too much work was required. In part this was a response to the weighting of the assignment, which was only part of the overall module assessment. Of more importance for this paper was the perception that the range of tasks was large. Having to learn to use Dreamweaver was seen as an additional burden. For some the variety of tasks had made them confused as to what was wanted. They found the assignment too diffuse and lacking clear objectives.

The use of a conference for communication was not liked. The students were attending a weekly lecture, so it seemed natural for groups to meet afterwards in the flesh to discuss the assignment. Any discussion could be verbal and direct and partially completed websites and evaluation plans could be displayed to the whole group and discussed directly. These comments (as student comments do) ignored the advantage to the lecturer of having a comprehensive record of group working.

There were only a few comments about groupwork, which seemed to be accepted as a viable method of working by the class. However one comment referred to the difficulty of forming teams and another expressed a preference for working individually.

Interestingly, two students suggested that the range of tasks be reduced by asking only for the evaluation of websites and not their creation as well.

From the lecturer's perspective the websites produced were at least satisfactory, whilst many were of a pleasing standard, presenting a topic in several well-designed pages. However the evaluations were not of quite the same standard. Only a limited number of evaluation techniques had been used. This was perhaps an inevitable consequence of having to produce the website to start.

One issue was the possibility of unequal contributions from group members. This is a well-known problem for group learning (e.g, Jaques 2000) and several strategies have been proposed to encourage equality of effort and to judge fairly the contributions of individuals. These include peer assessment of contribution. In the present instance it was judged that such a scheme would be a complication, since effective peer assessment requires some training of the students undertaking it. So a simpler scheme was used that in the first instance awarded marks for the group deliverables. Students were informed that these marks could be adjusted according to individual contribution and performance. The main evidence for any adjustment would be the individual reports. In fact these often concentrated on the difficulties of group management and they confirmed the lecturer's observation that this had often been problematic.

For several groups the work seemed to have been concentrated in the hands of only some of the group. No doubt this was partly due to the normal processes of group dynamics, but in this e-learning environment there seemed to be other factors operating – confidence with and access to the technology being used. The role of guru was clearly evident in some groups. The guru was someone who had confidence in using, say, Dreamweaver and would use the software to make progress in developing the website to the exclusion of the involvement of other group members and a proper consideration of overall design. One scenario was that someone would propose the use of software that only s/he had, and this on their home computer. This meant that they took sole responsibility for the website creation, limiting the experience of other group members by so doing. This difficulty of getting access to the requisite software outside the College has already been referred to.

Another aspect of the distribution of the work in the group was that, even when the team was looking at the site together, the technically confident would make the crucial decisions. For example, in some groups it seemed that the work had been fairly distributed, with each group member responsible for the production of the same number of web pages. However, closer investigation showed that the crucial design decisions as to the appearance of the template for all pages had been made by just one or two of the group. Thus the experience of making such design decisions had not been gained by all of the group.

To summarise this evaluation, the inclusion of website creation within the assignment, as much as it might be desirable for other reasons, was in fact making it more difficult for students to achieve the primary objectives of the module. The inclusion of electronic conferencing was also not helpful, because its use seemed contrived and unnecessary. A redesign of the assignment was called for and this is discussed in the next section.

4. A redesigned module

For the next cohort it was decided to concentrate the tasks of the assignment on the objectives of designing and evaluating an interface, with an emphasis on evaluation. This seemed a natural response to the problems reported above, and it was the suggestion, independently, of two students in their feedback. The new assignment was completely individual with no element of groupwork and there was no mandatory use of a conference.

Another factor driving the removal of website creation was the increasing range of technologies needed within business web pages. A student wanting to become a competent web page programmer would now need to learn such technologies as Java, Javascript, ASP and PHP. This goes considerably beyond what could be taught on a Business degree. Students restricted to standard authoring packages and with limited time will only be able to produce web pages that are fundamentally simpler than those generated by commerce. This indicates that it is better to concentrate upon evaluation of websites to support the business roles of these students.

The focus of the new assignment was on the analysis of two websites, chosen by the student. It was felt that the assignment should be completely individual and that each student should work on the evaluation of their own sites. To this end, students were asked to submit their choice of websites to be checked for suitability. If these were judged to be acceptable they were posted against the name of the student on a generally accessible web page. Before submitting their choices students consulted this web page to see whether a particular website had already been chosen by another student. In this way student choice of website was guaranteed to be unique. This was a simple way of individualising the assignment and thus guarding against plagiarism. Of course students could collaborate with each other in understanding theories and techniques, and this would be welcome, but they could not directly copy each other's work. There was no possibility, as with groupwork, of being able to depend upon the work another.

There were two stages to this new assignment: evaluation followed by design. The first was to analyse the sites using the principles of HCI and various evaluation techniques. Evidence was collated in the form of screen shots and the results of evaluation. In the second stage students were asked to produce mock-ups of improved versions of the web pages, explaining the reasoning behind the design improvements in terms of the results of stage one. This was an altogether more limited assignment than the earlier group

work one. The task was capable of being undertaken without any IT abilities beyond those needed for the rest of the course. It required no special software and could be done equally well at home as in the College.

In the student feedback very few took the opportunity to comment on the assignment. There was no suggestion that a group project would have been preferable. It seemed that this new format was acceptable to the students.

The standard of the assignments was, in general, at least equivalent to that of previous years. However the mean mark was somewhat lower than that of the earlier two cohorts. A change in one year is not of particular significance, but it may be that with individual assignments weaker students were no longer being shielded within a group. The mark distribution supported this conclusion with a higher proportion of marks around the pass level.

Apart from intangibles such as not gaining experience of group dynamics, there was little indication that students had lost out by not having a group project. Some of the evaluation techniques required direct observation of subjects using an interface and these experiments were more difficult to organise. Although there were no group conferences, there was a class conference for the assignment. On this students could raise questions about what was required and difficulties they were having. In this way some limited experience was gained of using a conference.

5. Conclusion

A comparison of the two assignments shows the second to have been focussed on a much narrower range of tasks than the first. The additional tasks incorporated into that first assignment were not central to the module's objective. It would have been beneficial to the students if it had been possible to include these tasks without any other effects, but this was not the case. The inclusion of website creation led to groupwork and communication by conferencing. This distracted from the achievement of the module's primary objectives. The second assignment may also have been a fairer test of student's ability, in that weaker students were not propped up by the work of other group members.

It may be that there are general issues here that have a wider relevance than Business Management. Other subjects are not teaching the details of the technology but are using e-learning as their students become proficient in employing IT. After all, any domain that involves the transformation of information, can benefit from the use of some type of e-learning. It is suggested that for such subjects the same questions arise as we have addressed for a Business Management module.

This work indicates some criteria to be met in designing assignments in the IT environment. The primary learning objectives of a module need to be kept firmly in view. The IT environment is a rich one and it will always be possible to link additional relevant activities to any task. Because society currently values IT knowledge and skills these will seem worthwhile. But any benefits may be gained at the expense of diluting the emphasis on the main subject. Therefore any additional activities should be added only after careful consideration.

Another criterion is that the difference in capabilities of students in handling IT assignments should be considered. There will always be disparities in capability, but it may be that IT exacerbates their effect. This is due to differences in experience with particular technologies and it may be differences even in access. Assignments should be designed so as to differentiate student achievement only in topics that are the focus of the e-learning.

Finally, methods of organisation and delivery should be determined by the requirements of the subject, rather than by technological possibilities. For example, groupwork and conferencing may not always be appropriate or helpful.

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Biography of David Rush

David Rush is a Senior Lecturer in Business IT at King Alfred's College, Winchester. His IT experience stretches back to the introduction of computers into HE. Present interests include improving computer interfaces and web design.