WWW Enhanced Case Studies

Chris Pilgrim

School of Computer Science and Software Engineering
Swinburne University of Technology
Hawthorn, Victoria, Australia
cpilgrim@swin.edu.au

Abstract

The use of case studies is a common approach to the teaching and assessment of many subjects. Case studies provide the necessary connections between theory and practice and allow difficult concepts to be introduced in a context of use. Unfortunately, a realistic case study requires a large time commitment from lecturing staff since they usually involve personal interviews where the lecturing staff act as clients or users. This paper will report on the use of the World Wide Web to manage more efficiently a case study assignment in a Systems Analysis & Software Engineering subject at Swinburne University of Technology.

1. Introduction

Software engineering and systems analysis are discipline areas that examine how software is developed. Software engineering concentrates on the management of the software process [1] whilst systems analysis focuses on methods that are used to analyse systems, design them and build them [2].

The School of Computer Science and Software Engineering at Swinburne University of Technology offers a number of specialised subjects that examine software engineering and systems analysis separately. These subjects generally have an enrolment of less than 80 students allowing for much flexibility in delivery and assessment. An introductory Systems Analysis and Software Engineering subject is offered to non-computer science major undergraduates and students undertaking a post-graduate diploma in computer science. This subject attracts a larger enrolment of over 200 students. This large number of students presents some challenging problems relating to assessment, particularly for the systems analysis component.

Systems analysis is an important activity that takes place when building new information systems centering around an investigation of the current system operation and possible changes to the system resulting in a specification for a new system. It is the systems analyst’s job to do the actual work of gathering the necessary data and developing plans for the new system. An understanding of the system cannot be developed by analysts by simply examining the current system documentation. The analyst must immerse themselves in all aspects of the system in order to correctly identify the problems and system requirements. The usual approach to systems analysis is for the analyst to spend time with the users, finding out how they use the current system, any problems they find with the system and what they expect from it [2].

The sources of information used by systems analysts includes documents, computer programs, reports, manual and the users themselves. In fact system users are usually the first information source investigated by analysts and the most common and effective technique used is interviewing [3]. Interviewing is a planned and structured process that the analyst uses to build up a model of the system and to gain a better understanding of problems.

The standard university approach to teaching systems analysis is through the use of a case study. Case studies mimic real life scenarios which involve people, procedures and systems where there is a central problem that must be identified, analysed and addressed. The advantages of case studies to the educational process are undisputed [4] [5] [6] [7]. Case studies have long been recognised as an effective method of making the necessary connections between theory and practice. They allow the students to experience realistic situations where they must collect and analyse information, identify possible solutions, make and justify decisions and evaluate the consequences of those decisions. Case studies usually involve teams of students working collaboratively which enhance the depth of the experience. Real world cases also aid understanding of difficult concepts and techniques by introducing such concepts and techniques in situations where they are applied [3].

The traditional process for managing case studies is to first outline the scenario through the use of handouts and then to schedule individual meetings with the project teams in which the lecturer acts as the user or client. The meeting gives the
students the chance to practice their interview skills by having to form and ask questions in relation to the problem situation. Each interview typically lasts for 15 minutes. This interview experience is an essential element of the overall assignment and cannot be discarded.

With an increased enrolment in the Systems Analysis and Software Engineering subject it has become impractical to continue with the face-to-face interviews. The logistics of organising interviews for 50 or more project teams is impossible within the time constraints of the normal working week. In order to provided students with some experience with forming and asking questions, a new strategy based on the use of a video and the World Wide Web has been developed and trialed in first semester 1996.

The actual case study used involved a fictitious dental practice in which there were a number of key characters, actual defined processes and existing systems. A number of mock interviews were taped using lecturers and tutors as the characters in the scenario. These interviews focused on questions dealing with the characters' perceptions of the existing system, the people involved and any problems they feel should be addressed in a new system. This video was shown to the lecture group to allow students to view how an interview should be performed.

The use of video in this way allows students to passively participate in an interview with a user. Video alone is not sufficient, students need an interactive experience of forming and asking questions. The World Wide Web can provide this experience.

2. The Internet

The subject uses a variety of Internet services such as the World Wide Web, ListServ and E-mail as tools to support the educational process. These services are not used directly as an instructional medium but as efficient management and communication tools.

2.1 World Wide Web

The subject has its own World Wide Web home page as shown in Figure 1 (http://www.csse.swin.edu.au/chris/softeng/softeng.html) which contains links to documents such as the syllabus, assessment details, assignment specifications, tutorial sheets and solutions, sample programming code and past exams. Very few graphics are used in these web pages in order to reduce response times. These web pages contain most of the handouts that are normally given out during the semester therefore saving a considerable amount of paper as well as distribution time. Students have responded positively to the open access to these documents rather than having to spend time getting copies from the library counter reserve. Part-time students in particular have indicated that this system gives them the flexibility of being able to access documents from home.

2.2 ListServ Discussion Group

An electronic discussion group service has been set up specifically for the subject which provides an additional method for students to interact not only with lecturers and tutors, but also with other students. The system uses the LISTSERV features of the Internet. A LISTSERV is a mailing list program designed to copy and distribute electronic mail to everyone subscribed to the particular mailing list. LISTSERVs work on a concept called 'mail explosion'. An e-mail message is sent by a subscriber to a central address (the LISTSERV's address) which 'explodes' the message by duplicating it and sending a copy of it to every subscriber. This 'mail explosion' concept allows the lecturer to communicate with all the students who have subscribed with just a single e-mail letter sent to a central address. It also allows students to send a message to the whole student group.

This new discussion forum allows students to find answers to specific questions about the course material by e-mailing questions to the discussion group. All other students receive the question and are encouraged to send answers back to the discussion group. The lecturers and tutors also participate in the resolution of the questions. During the semester a variety of questions were discussed, some discussions lasting several days and involving a number of students and staff. Students, especially the part-time post-graduate students, indicated that this provided them with a mechanism for opening up a debate on issues that could not be resolved in lectures.

2.3 E-Mail

ascilite.org.au/conferences/.../28.html
Traditional e-mail is also encouraged, particularly as a tool of communication with the lecturer. E-mail is particularly important considering there are over 200 students who study the systems analysis and software engineering subject. Whilst questions about the content were directed to the discussion group, many personal queries were answered via e-mail reducing the queue at the lecturer’s door.

3. The Virtual Surgery

In order to provide students with an interactive experience in collecting information about the case study, a Virtual Surgery as shown in Figure 2 (http://www.csse.swin.edu.au/chris/softeng/surgery.html) was created on the World Wide Web which allows students to meet the characters, find out about their problems and view the documentation associated with the existing systems in the surgery.

The surgery page contains links to additional pages for each of the characters in the case study. The novel feature of this site was that it provides students with an experience of interviewing each of the characters through the use of set questions (see Figure 3). By embedding the details of the scenario in a set of questions and corresponding answers, students were forced to think about the questions and answers in order to extract the relevant information. This method of presenting a case study is obviously more realistic than simply outlining the scenario on a paper handout. Students must interrogate each character individually and consider all responses to enable an understanding of the problem situation and user requirements to be identified.

An additional feature of the Virtual Surgery site was a forms interface which provided the capacity for students to form and ask original questions (see Figure 4). This page required students to enter their name, student identification number and subject code for authentication. The student would select the character to whom the question was to be directed from a list and then enter the question in a scrollable text entry area. Answers to these original questions were posted back onto the site weekly (see Figure 5). Whilst the the process of answering each individual question did take time, this feature enhances the site by providing students with a higher level of interactivity.

4. Evaluation

The use of the World Wide Web Virtual Surgery for the management of a systems analysis case study was innovative and hence was evaluated in a number of ways.

4.1 Formative Feedback

The site contained a link to a forms based feedback page in order to obtain suggestions, ideas and other formative feedback from students whilst the trial was under way. Whilst this feature was not utilised by many students, some feedback was obtained and the design and function of the site was adjusted accordingly.

4.2 Server Statistics

The Virtual Surgery site contains approximately 50 individual pages. Whilst server statistics were available for every page, three key pages were monitored closely in order to establish the popularity of the three different sections of the site (see Figure 6).

(a) The number of accesses to the main surgery page was monitored in order to gain some indication of the use of the site over the six week period of the assignment. Hits on this page peaked during the third week, the fourth week being Easter. High hit counts were maintained during the final weeks of the assignment period.

(b) The popularity of the Original Questions and Answers feature also peaked in the fourth week but recorded a high rate...
of access in the final week.

(c) Students did not utilise the \textit{iSurgery Documents} feature of the site until the final weeks of the assignment. These pages did not change over the period of the assignment hence it is to be expected that the number of overall hits would be less than other site pages.

\section*{4.3 Student Evaluation Survey}

An evaluative survey was completed by the students at the conclusion of the assignment period in order to gain summative feedback. This survey was completed by 76 students and contained questions concerning both their use of the site and how useful they found the different features of the site. Students were encouraged to write comments to back up their responses.

The survey found that:

\begin{itemize}
\item 86\% of students used the site with 25\% using it more than 5 times. Reasons for not using the site included \textit{other members of project team using it}, \textit{lack of access}, and \textit{enough information on the video and handout}.
\item 71\% of respondents thought that the information about each of the characters was useful with 16\% claiming it was essential. One student commented that it was \textit{good to have more than enough information} although another stated that he/she would rather have an information sheet, the web structure is often too complex to find information.
\end{itemize}

\begin{figure}[h]
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\includegraphics[width=\textwidth]{Figure6.png}
\caption{Server Statistics}
\end{figure}

\begin{itemize}
\item 85\% of respondents indicated that they thought that the original question/answer section was useful. Many students commented that this feature was essential. One student wrote that it was good to have some interactivity in the assignment.
\item Only 65\% of students found the documentation section useful. Students commented on the poor quality of the scanned documents and the time to download images over a slow link.
\item 79\% thought that the site was generally useful with 18\% claiming that it was essential. One student commented that it was good to see the web being used for something practical, not just as a way of wasting time!
\end{itemize}

\section*{5. Conclusions}

asclite.org.au/conferences/.../28.html
The aim of this project was to investigate a technique for managing essential case study based assignment work in subjects where the enrolment numbers prohibit personal interviews. In these days of increased enrolments and reduced funding development of cost-effective and time-effective management techniques is a priority.

Feedback from the World Wide Web implementation of a Virtual Surgery case study is quite positive. Management of the case study in this way forced students to actively seek out and analyse information in order to gain an understanding of the problem situation. This definitely provides a more authentic experience for students than simply giving students a handout. Students generally agreed that the site provided an interactive experience which allowed them to develop interview and analysis skills.

6. References


