

THE RIPPLING POND: RUMINATIONS AND OTHER MUSINGS ON THE DEVELOPMENT AND USE OF AN ONLINE LEARNING ENVIRONMENT IN THE FACULTY OF INFORMATION TECHNOLOGY

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Abstract

The Faculty of Information Technology at the Queensland University of Technology (QUT) is committed to ensuring that its students are not only discipline savvy but highly information literate. To facilitate the development of information literacy the Faculty, in collaboration with the university's Teaching and Learning Support Services (TALSS), supported a project which involved the creation of an online learning tool known as the Reflective Online Searching Skills (ROSS) Environment. ROSS aims to be a flexible and interactive online learning site for developing student skills and knowledge within the area of online searching. The paper will outline the development of ROSS, explaining how QUT's Online Teaching (OLT) multimedia technology has been used in the learning environment. A case study of how ROSS is being used within the unit ITB322 Information Resources will be presented. The paper discusses the practical implications of using online learning environments to facilitate student development of online searching skills. The discussion will focus on what the authors have learnt as educators and how they are continuing to craft the educational experience from a holistic perspective.

Keywords

e-learning, online learning and teaching, online searching, information literacy, holistic approaches to teaching and learning

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Introduction

In recent years, much has been written about e-learning and its role in higher education in universities in Australia and around the world. The benefits of e-learning, and consequently the driving forces behind the e-learning uptake in higher education, have been widely discussed. Specific benefits to e-learning include greater accessibility and flexibility, a more cost effective and cost efficient program of study, and a higher quality student learning experience. In 2001 Zenger and Uehlein observed that in the recent "rush to e-learning the emphasis has been largely on the *e* and not on the *learning*" (p. 60). If e-learning is to have a meaningful role in higher education in fostering quality student learning it is important that universities actively examine how e-learning is being implemented within their institutions and establish

criteria and standards for best practice. This paper will explore the design and implementation of an online learning environment developed at the Queensland University of Technology (QUT) as a means of fostering student's skill and knowledge of online searching. Supported by the School of Information Systems and the QUT Teaching and Learning Support Services (TALSS) the Reflective Online Searching (ROSS) Environment was tested in ITB322 Information Resources in Semester 1 2004. The paper will provide a brief discussion on e-learning focusing on its current status at QUT. A brief discussion on the academic context and the ROSS environment will follow. The paper will conclude with a brief discussion on the practical implications of using online learning environments to facilitate student development of online searching skills.

e-Learning

A Definition

e-Learning has been defined as "instruction and learning experiences that are delivered via electronic technology such as the Internet, audio, videotape, satellite broadcast, interactive TV, and CD-ROM" (Imel, 2002, p. 3). Much of the discussion on e-learning focuses on the use and impact of electronic technology in distance learning. That is, the design and delivery of learning process is carried out wholly online without any involvement of traditional face-to-face approaches. This however is only one aspect of e-learning. Electronic technology can also be integrated into the design and delivery of traditional learning processes so as to develop a richer more dynamic learning experience. It is this latter view of e-learning which will be explored in the current paper.

e-Learning at the Queensland University of Technology

The QUT university is based around 8 faculties: Built Environment and Engineering, Education, Business, Information Technology, Health, Science, Law and Creative Industries. QUT is committed to "[providing] outstanding learning environments and programs that lead to excellent outcomes for graduates" (QUT, 2003, p. ii). In pursuit of this goal the university has identified as one of its "top priorities" the "[integration of information and communications technology into our teaching... functions and infrastructure" (QUT, 2003, p.ii). QUT will "make a coordinated and strategic effort to use the increasing capacity and flexibility of technologies to transform our teaching and learning environment in ways which engage and challenge students, and which enable different learning environment, on-campus and off-campus, to be used in ways which are complementary and mutually reinforcing" (QUT, 2003, p. 4). To help fulfil this top priority the university has developed an Online Teaching (OLT) environment to foster the development of e-learning or online learning approaches within the university. QUT teaching staff are encouraged to use the OLT "in conducting and facilitating instruction" (QUT, 1999, p. 2).

The Academic Context

ITB322 Information Resources

ITB322 Information Resources is an elective unit offered within the Faculty of Information Technology. The unit introduces students to the value of information both personally and professionally and introduces the wide variety of information resources available. There is a major focus on the identification of user needs and the development of information searching skills across a wide variety of online resources, including bibliographic databases, the Internet and traditional print materials such as grey literature books, journals and conference proceedings. The unit can be taken by any undergraduate enrolled at QUT. The unit has an average enrolment of 46 students per semester. In Semester 1 2004 18 students (5 female and 13 male) were enrolled in the unit, 5 part time and 13 full time. Ten students were classified as International enrolments. The majority of students (n=11) were enrolled in the Bachelor of Information Technology. Other enrolments included Bachelor of Business/Bachelor of Information Technology (n=3), Bachelor of Engineering (n=2), Bachelor of Applied Science/Bachelor of Information Technology (n=1) and Study Abroad Scheme (n=1).

The Teaching and Learning Approach

Students enrolled in ITB322 are required to attend three hours of classes (lectures and computer based practicals) per week for 13 weeks. The framework developed by Luca, Oliver, Omari and Dunbar (2001) guided the development of the learning processes within the unit. According to Oliver, successful instructional design should consist of a finely developed relationship between assessment, learning

activities, learning supports and learning resources (Figure 1). In this relationship *assessment* is “instrumental to the whole design process and is considered in each element of the framework” (Luca, Oliver, Omari & Dunbar, 2001, p. 11-1). In ITB322 three assessment items are used. Table 1 provides a brief description of each item. The three assignments provide the students the opportunity to reflect upon, develop and practice their information searching skills. The assignments are designed to provide

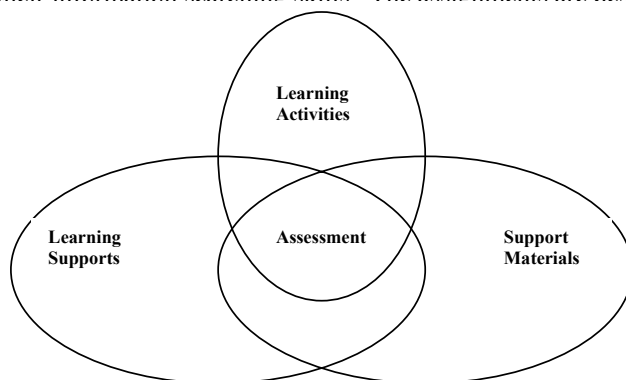


Figure 1 The framework developed by Oliver (Luca, Oliver, Omari, Dunbar 2001)

Learning activities in ITB322 are designed to “promote authentic context, self regulation and reflection” (Luca, Oliver, Omari & Dunbar, 2001, p. 11-2). A collaborative learning environment whereby students support each other through the learning processes is fostered. Small group work, self assessment and class discussion are key ingredients in this environment. The unit’s teaching team provides support during learning activities by fostering a safe and non-threatening learning environment, guiding the students through the learning process with regular constructive comment and feedback. The unit’s OLT site was established to act as the key *support material* in the unit. The OLT site provided students with access to all materials used in the learning activities as well as recommended readings and links to useful resources on key topics such as teamwork and online searching. The site also provided access to general unit information including the unit outline and the assessment guide. Additionally, the site allows students to participate in an online discussion forum through which they could communicate freely with others in the unit without the restrictions of time and distance. Furthermore, students could contribute to the learning community by adding the details of any interesting or relevant materials they found during the course of the semester via a Student Recommendations Page.

Assessment 1: Resource Guide	Conducted: In small groups	Weighting: 40%
Summary: Students are required in teams to develop a resource guide on a topic of their own choosing. The resource guide should provide only the best quality resources on the topic and should be able to guide any one interested in the topic (i.e. a business in that area) in responding to any questions they may have.		
Assessment 2: Information Consultant’s Report	Conducted: Individually	Weighting: 40%
Summary: Students are asked to pretend they have recently been appointed as an Information Consultant for a large information service. They have been approached by their first client and are required to meet their specific information need (i.e. they are to select from 3 possible scenarios). To meet this need students are required to design and conduct a sophisticated search of online resources (i.e. bibliographic databases or Internet search tools) that will produce high quality results. Students are asked to recommend only the top 20-25 results.		
Assessment 2: Reflective Learning Journal	Conducted: Individually	Weighting: 20%
Summary: Each student is required to write and submit six journal entries over the course of the semester. Entries are submitted fortnightly. Students are asked to write their critical and reflective thoughts on what they are doing, seeing, reading, hearing and learning.		

Table 1: ITB322 Assessment Items Semester 1 2004

An examination of student experience in developing online searching skills whilst enrolled in ITB322 was conducted from 2000 to 2002. 23 students enrolled in the unit were interviewed, some students interviewed both at the beginning and the end of the semester, with 35 interviews in total (Edwards & Bruce, 2004). The study showed that whilst each student possessed very different experiences of searching for information, each student perceived that their experience of information searching had changed as a result of their involvement in the unit. Each student believed that their information searching experience had improved in both speed and the end quality of the results found. More importantly, most students talked of their ability to both transfer the knowledge gained to other units of study, and to help their peers when they searched for information. The students identified two reasons for the change in their searching experience: assignments designed to encourage reflection; and, the characteristics of the teaching staff. The study by Edwards clearly showed that the ITB322 learning environment was successful in developing the information searching skills of student enrolled in the unit. However, the study also revealed that “there is a need to design the assessment to make the assignments work harder” (Edwards & Bruce, 2004, p. 154). Recent observation from the unit’s teaching staff supported this conclusion. In particular, it was noted that whilst Assignment 1 (The Resource Guide) and Assignment 3 (The Reflective Learning Journal) were contributing successfully to student learning, Assignment 2 (The Information Consultant’s Report) was not impacting upon student learning as significantly as it could. Consequently, Assignment 2, and the learning activities, learning supports and learning resources supporting this assessment item, were re-evaluated and re-designed in an attempt to make them ‘work harder’. The challenge for the unit’s teaching staff was to identify how the current existing environment could be carefully re-constructed to bring about change without detracting from the elements in the environment that were working well. E-learning was identified as a possible answer to this challenge.

The Online Learning Environment

The Theoretical Framework

Teaching and learning research to date has found that ways of experiencing something are essential to the learning that takes place (Shulman, 1985). Marton & Booth (1997) contend that qualitatively changed ways of experiencing something is the most advanced form of learning. Therefore, if learning can be described as coming to experience something in a qualitatively changed way, it must also be acknowledged that experiencing something must require the ability to discern this new way of seeing the experience. Discernment then, is a significant attribute of learning (Runesson, 1999). In order to discern a difference however, we must have experienced a variation from our previous experience. Therefore, this means if we are able to discern a difference, we must have experienced a difference, or a variation, from our previous experience.

Edwards (2004; Edwards & Bruce, 2004) has applied this idea of variation to information searching. Using the phenomenographic method Edwards identified variation in the experience of information searching in the online environment. Participants in the study were 32 students from six of the eight QUT academic faculties, with a total of 44 interview transcripts. Different cultures, ages and genders were represented. Four categories that captured the variation in the students’ different ways of searching and learning to search for information were identified. The categories include:

- Category 1: Information searching is seen as looking for a needle in a haystack
- Category 2: Information searching is seen as finding a way through a maze
- Category 3: Information searching is seen as using the tools as a filter
- Category 4: Information searching is seen as panning for gold.

A detailed summary and discussion on each category and the different meanings assigned to each search experience can be found in Edwards (2004; Edwards & Bruce, 2004). In short, Edwards concluded that for students to successfully develop information searching skills the teaching and learning environment needs to be designed to encourage “students...to see things happening differently to what they have previously experienced in order to discern a difference” (Edwards, 2004, p. 112). That is, students need to experience the wide variation of online searching experiences so they may compare and contrast these different experiences to their own. Edwards contends that “if we can do this, we will move our students into a deeper understanding of the searching experience, we will provide them the opportunity to discern

a variation in what they have previously experienced, and, hopefully, we may encourage learning” (Edwards, 2004, p. 112). Edwards provides four guiding principles when designing a learning experience that will allow student to experience variation: provide students with opportunities for reflection; improve assessment to make it both authentic and to encourage students to see the variation; use online tools to further enhance the learning experience; and finally, encourage staff development to enable understanding and application of the findings. The principles outlined by Edwards were used to guide the design and development of an e-learning environment as a support for Assignment 2 in the unit.

Reflective Online Searching Skills (ROSS)

The Reflective Online Searching Skills (ROSS) Environment was designed specifically to support the Assignment 2 – The Information Consultant’s Report. ROSS was developed using the Dynamic Menu tool recently introduced into the QUT OLT environment. The main page of ROSS is provided in Figure 2. The ROSS environment was incorporated into the learning environment during Weeks 8 through to 13. Each week during this period students attended a three hour computer laboratory based class.

[Week 3: Introduction to Dialog](#)

[Week 4: Introduction to Internet Searching](#)

[Week 5: Introduction to Print Resources & The Power of Information for Business](#)

[Week 6: People as Sources of Information & Introduction to Grey Literature](#)

[Week 7: Assignment 1 Major Presentations](#)

[Week 8 - 12 Session Materials](#)

Introduction to the ROSS Environment

Reflective Workspace

ROSS Module 1 - Understanding the Client Interview

[Module 1 - Activity 1](#)

[Module 1 - Activity 2](#)

[Module 1 - Activity 3](#)

[Module 1 - Activity 4](#)

ROSS Module 2 - Planning an Information Search

[Module 2 - Activity 1](#)

[Module 2 - Activity 2](#)

[Module 2 - Activity 3](#)

[Module 2 - Activity 4](#)

ROSS Module 3 - Search

Introduction to the ROSS Environment

ROSS = Reflective Online Searching Skills

This is a new online tool designed to help you improve your skills in online searching. There are 5 modules to be completed.

Module 1: The Client Interview - will introduce you to process of obtaining information from a client so that you can successfully search for the clients information need.

Module 2: Planning an Information Search - will introduce you to the steps you should follow when preparing to conduct an online search.

Module 3: Search Strategy Preparation - will introduce you to the process of developing search strategies specific to the online resources you have selected.

Module 4: Introduction to SDIs - will introduce you to the next step in searching for information online - Selective Dissemination of Information (SDI) or alerts!

Module 5: Critical Reflection - will introduce you to the process of selecting high quality results from the many results you will have obtained from your searches. You will also be given the opportunity to critically reflect upon the new skills you have been developing.

Each module builds upon the previous one. By working through the modules during class time you will develop your searching skills. Feel free however, to explore the ROSS environment in your own time. To access the modules use the menu bar on the left hand side of the screen.

The **Information Searching Process Model** (see image) is used in ROSS. In each module you will be given the opportunity to explore the components of this model.

ROSS is designed so you can enjoy using the OLT, but it means the emphasis is on you. You are going to have to read the screen carefully and follow instructions, and at the same time think about the things you are doing. Don't forget, whenever you want to, you can record a few notes in your **Reflective Workspace**. The Workspace

Figure 2: The Reflective Online Searching (ROSS) Environment

Using a role play approach ROSS requires the students to take on the role of an information consultant who has been approached by a client with a specific information need that needs to be met. A Reflective Workspace is provided for the students. The Workspace can act as a ‘sandpit site’ where students can apply what they are doing within the ROSS modules to their own assignment.

Figure 3 provides the role play synopsis of the client and the information need. The student is required to locate information to meet the client’s information need by selecting and searching online resources (i.e. Internet search tools or bibliographic databases). The Reflective Online Searching Model (as seen on the right hand side of Figure 1) guides the student through this process and consequently forms the basis for the ROSS environment.

TO: Jane, Information Broker <info@info.com.au>
FROM: Mr E. Jones (Secretary to Dr Jonas Faultless) <e.jones@promhospital.com.au>
SUBJECT: Request for Information

Dr Jonas Faultless is a world class medical scientist working for a prominent Australian hospital. Dr Faultless has just been informed that due to a colleague's severe illness he will have to give a speech at this year's annual national medical convention. The topic of the presentation is the use of nanotechnology in medicine - this unfortunately is not Dr Faultless' area of expertise. The Doctor would like to obtain information on nanotechnology and its application in medicine. The Doctor is also interested in obtaining some data on who is currently using nanotechnology to aid medical practice. As the presentation is for an Australian conference Doctor Faultless is particularly interested in current use of nanotechnology in the Australian medical context. The Doctor is interested in obtaining the views of experts and researchers in the area and any key organisations. Case studies of the real life use of nanotechnology used in medical practice would be helpful.

Figure 3: ROSS Client information need synopsis

ROSS consists of five modules. The modules are inter-related with subsequent modules building upon the former. A brief summary of the five modules can be found in Table 2. A short video introduces the students to each module, explaining the purpose of the module and the activities to be completed. Whilst the students will be completing the modules in class time they are also encouraged to use the ROSS environment as a self paced learning tool that they can access and use at any time during the course of the unit. Each module is interactive requiring the students to answer questions, make observations and complete exercises.

- **Module 1: The Client Interview** - introduces the steps in obtaining information from a client so that the clients information need can be successfully met.
- **Module 2: Planning an Information Search** - introduces steps in preparing an online search.
- **Module 3: Search Strategy Preparation** - introduces the process of developing search strategies specific to the online resources selected.
- **Module 4: Introduction to SDIs** - introduces Selective Dissemination of Information (SDI)
- **Module 5: Critical Reflection** - introduces the process of selecting high quality results from the many results obtained from the searches.

Table 2: The five modules of ROSS

The Evaluation

A number of evaluation strategies were used to assess the effectiveness of ROSS on teaching and learning within the unit. These included:

1. *Reflective Learning Journals:* Each student enrolled in the unit is required to complete a Reflective Learning Journal as part of the unit assessment practices. Submitted fortnightly over the course of the 13 week semester students are asked to provide critical comment on their experiences in the unit generally, and of the lectures, tutorials and readings specifically. Students were also encouraged to comment upon their experience in using ROSS.
2. *Formal Feedback:* Two formal methods for obtaining student feedback were used. In both methods the students were informed that their comments would be completely anonymous and confidential and that their involvement in the feedback process would not impact upon their results in the unit. Ethical clearance for the study was obtained.

- i). Surveys were administered in Week 12 of semester. The survey was developed to determine the success of ROSS in supporting student learning and to explore student perception and experience in using the e-learning environment. Quantitative data was obtained by asking students to indicate if they agreed or disagreed to a series of statement about their experiences in using ROSS on a 7 point Likert scale. Open questions were included to encourage students to respond freely about their experiences. Nine out of the 18 students (4 males and 5 females) enrolled in the unit completed the survey. All but 1 of the participants were full time students. Ages ranged between 21 and 35 with the majority of the participants aged between 21 and 26 (n=7). Seven of the participants were enrolled in a Bachelor of Information Technology. Other courses included a Bachelor of Information Technology/Bachelor of Applied Science (n=1) and the Study Abroad Scheme (n=1).
- ii). Semi-structured interviews were held at the end of the semester with 3 of the enrolled students (2 male, 1 female). The interviews were designed to elicit detailed feedback on their experience of ROSS and how the online environment impacted upon their learning in the unit. All interviews were conducted by a Research Assistant and an observer (project student).
3. *Teaching Staff Feedback:* The teaching staff made notes at the end of each teaching session on their experience of using the ROSS environment as a teaching tool and how it could be improved. In addition the staff member took part in a semi-structured interview with the Research Assistant and the observer. Held at the end of the semester the interview obtained observations on the success of ROSS within the unit to impact upon student learning.
4. *Formal System Evaluation:* Evaluation of the learning environment is also being undertaken via a IT Project Student, who also acted as the observer in the interviews above. The student is using the model EvaluateIT Model (QUT, n.d). This review is currently taking place and data is not available to be discussed in the paper. Findings will be discussed during the conference presentation. As a former ITB322 student, the reviewer is familiar with the unit content and the teaching and learning objectives of the unit.

The results from the evaluations suggest that the students and the teaching staff viewed the experience of using ROSS favourably. Table 3 provides a summary of the results obtained from the survey administered in Week 12. Student responses clearly indicate that ROSS is an online learning tool of merit. The overall average responses ranged from 4.56 to 5.11. The highest average response was obtained in relation to ROSS ability to be “easy to use and understand” and to “increased flexibility in my studies within this unit”. Both statements received an average response of 5.11. Also of note is the response obtained from the students when asked to indicate the extent to which ROSS “helped me to understand the unit’s content” (5.00) and “improved the teaching and learning value in the unit” (5.00). Since a score of greater than 3.5 can be viewed as a positive response the results suggests that ROSS as an online environment designed to support students in their development of their online searching skills appears to have been successful. Statements in support of this were obtained from the Reflective Journal and the three semi-structured interviews. Comments received from the students included:

“I now realise that there is more to searching online than typing the keyword to be searched in google.com and pressing the search button”

“I really like how...ROSS [has] been developed to directly relate to what you are doing in the assignment, this is a very good way of putting into practice what you have learnt in class”

Students however did indicate areas for further improvements with comments such as the following being provided: *“some modules were too large and could be broken into small modules”;* *“it is time consuming”*. The majority of comments obtained focused on the time consuming nature of the modules and the repetitive questions and activities between the modules. Students frequently commented that the need to “do the assignment” stopped them from working through all the modules and activities. Students also indicated that whilst they valued the self paced instructional aspect to ROSS they felt it was equally important to attend classes to ensure a rich and well rounded learning experience. From the teaching perspective, ROSS provided a wonderful means of introducing new energy into the unit. However, it also posed challenges in how best to integrate the technology into the curriculum in a manner that balanced

the virtues of self paced instruction alongside the benefits of maintaining a collaborative learning community in which peer discussion and small group work play central roles. It was noted by the teaching staff that whilst students worked on the modules during class time, the different student working styles and paces directly impacted on the extent to which the learning environment could be designed to provide students the opportunity to actively engage in peer discussion on the work being undertaken.

(1= Strongly Disagree, 5=Strongly Agree)	Mean Rating
ROSS is easy to use and understand	5.11
ROSS has increased flexibility in my studies within the unit	5.11
ROSS has facilitated my studies within the unit	4.88
ROSS has helped me to understand the unit's content	5.00
ROSS has improved the teaching and learning value of the unit	5.00
ROSS has helped me to successfully complete Assignment 2	4.56
I liked using ROSS in this unit	4.78
Overall I was satisfied with my experience of ROSS in the unit	5.00

Table 3: Summary of student survey results (n= 9)

Future Directions and Conclusion

The ROSS project has clearly shown that students enjoy, and benefit from, using technology in the learning environment. The project also shows that technology should not be the sole focus of that learning environment. E-learning should be a part of a 'whole of learning' approach in which technology is not just an add on to traditional teaching, nor is it the central focus of learning, but rather, it is one of many tools that is integrated into the curriculum to foster learning. ROSS will continue to play a vital part in the unit ITB322. A revised version will be tested in Semester 2 2004 on a new cohort of ITB322 students. The online environment will also be introduced into a new unit ITN273 Information Retrieval which will be part of the Master of Information Management program commencing in 2005. E-learning should be a university wide endeavour, where individuals and groups involved in e-learning initiatives should communicate and share work being undertaken. Because information literacy, and more specifically, online searching is a vital skill for every student at QUT, a generic version of the ROSS environment, that can be integrated into units across the university, will be developed in the near future. The current project helps QUT develop a profile of how e-learning is being applied within the university. In addition, the project contributes to the formation of standards of best practice in e-learning at QUT.

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