E-conomy- from here to where? 3rd international We-B conference

Nick Lethbridge (Ed.)
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3RD INTERNATIONAL WEB CONFERENCE 2002
PERTH, WESTERN AUSTRALIA 28 & 29 NOVEMBER, 2002

"e-conomy – from here to where?"

PROCEEDINGS

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Nick Lethbridge
"e-conomy – from here to where?"

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All papers that appear in these Proceedings have been subjected to a blind review by two or three anonymous reviewers.
FOREWORD

Welcome to the 3rd International We-B Conference 2002.

The conference is hosted by the We-B Centre (working with e-business) in the School of Management Information Systems at Edith Cowan University. This year’s conference is being held at the Sheraton Perth Hotel in Adelaide Terrace, Perth. Papers for this conference have been written by a wide range of academics and industry specialists. We have attracted participation from both national and international authors and organisations. The papers cover many topics, all within the field of e-business and its applications, now and into the future.

The papers have been grouped into several broad streams:
- learning
- organisation
- process
- community
- society

All submitted papers were subjected to a blind review process by two or three anonymous peer reviewers. Reviewers provided both judgement and constructive criticism; several of the papers are even better after the authors followed reviewers’ suggestions for improvements. Thank you to all reviewers, for their prompt and professional support.

I would like to thank the Conference Committee and all other people who have helped with the preparation for this conference. In particular I would like to mention:
- Lindsay Davies-Moore, Conference Coordinator, for her tireless efforts at coordinating and managing all the details of the conference
- Professor Janice Burn, Head of School, for her good advice and unfailing support of the concept of the We-B Conference.

Many people have made valuable contributions to this conference. The most important of these are the authors of all submitted papers. Even those that we could not accept demonstrated good standards of academic and professional effort; I hope that the reviewers’ comments will help you to success with future publications. To all of the authors: Thank you.

Welcome to the 3rd International We-B Conference 2002.

Enjoy the conference.

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Designing an Object-Oriented Programming Unit for Business Students

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ABSTRACT

Object-oriented systems development is widely used when designing and creating applications for e-commerce systems. Therefore, business students studying an information systems major are required to complete units that provide a grounding in the fundamental object-oriented principles and development methods. This paper discusses the issues that must be considered when designing and delivering an object-oriented programming unit to business students. The author also suggests recommendations that address the issues raised, using a unit currently be delivered as a case example. In general terms, the recommendations focus on the need to provide resources that allow the students to concentrate on the fundamental object-oriented concepts while programming (avoiding complex syntax and features of the programming language that are not relevant) and requiring students to problem solve in the business domain.

Keywords: object-oriented programming, information systems education

INTRODUCTION

For an e-commerce system to function several key technologies must be in place. These include the networked hardware, network transmission software (e.g. TCP/IP), client/server applications to name a few (Kalakota & Whinston, 1996). Due to the network centric nature of e-commerce systems applications have become widely distributed, with client/server applications communicating over the Internet through web browsers a common approach. This is the foundation of e-commerce applications, whether they are business-to-business (B2B), business-to-consumer (B2C), or enterprise resource planning (ERP) systems.

The distributed nature of network based information systems introduces problems for analysts and programmers because of the event driven, peer-to-peer communications of the applications that facilitate the behaviour of the system. These problems are best solved using an object-oriented (OO) approach when developing the information system (Gold-Bernstein & Marca, 1998, p. 8; Kalakota & Whinston, 1996, p. 226).

It is proposed, given the above requirements for e-commerce systems development, that business students enrolled in an information systems (IS) major need to be given a grounding in the fundamental OO principles. Furthermore, it would be to their advantage to complete a unit in object-oriented programming (OOP).

The purpose of this paper is to discuss the obstacles faced in designing an OOP unit for business students and offer solutions that have been successfully implemented. The unit being discussed is MIS3354 Software Development III, which is offered by the School of MIS, Faculty of Business and
Public Management, Edith Cowan University in the third year of the IS major. Students use the Java programming language to apply the OO concepts covered by the unit. It is a prerequisite that students complete a second year programming unit before enrolling in MIS3354. The second year unit uses the Visual Basic programming language and does not cover object-oriented programming.

TEACHING OOP TO BUSINESS STUDENTS

Explicit reference to business students is made because, in the author’s experience, the requirements for an OOP unit offered in a computer science major differ significantly to those of an OOP unit offered in an IS major. The differences lie in the conceptual focus of the unit and the students’ experience and expectations. In teaching a computer science unit the focus is largely on the design of the programming language and how the programs are managed by the hardware at run-time. An IS unit should focus on the management of data for business applications.

When comparing computer science and business students it is common to find differences in their attitudes toward technology focused and programming units. While computer science students, in general, have a desire to understand how the hardware and software work, IS students tend to avoid the technological issues and focus on what the system can do. In not knowing how the hardware is used by an application (i.e. lack of knowledge about memory management) IS students attempt to memorise rules and sections of code in an effort to write functioning programs. Not only is this approach of little use when faced with a new type of problem, it affects the student’s willingness to explore features of the programming language not explicitly covered in the unit materials. Furthermore, students tend to program by “trial-and-error”, guessing at solutions by combining example code. When a solution is found the student does not understand why it works and is not able to learn from the experience.

In some cases it is the IS student’s lack of experience with programming that causes them concern. In other cases it is the difficulties with completing an earlier programming unit (in this case using Visual Basic) that cause concern. In either case their apprehension leads to a negative attitude toward the topic and a lack of confidence. It is of interest to note that several IS students (independently and on separate occasions) have expressed the view that they don’t need to learn programming as they plan to be an analyst.

The differences outlined above have an affect on decisions that are made when designing and delivering an OOP unit for IS students. When designing the unit the level of technological explanation of concepts (e.g. memory management, advanced data structures) and type of programming exercises to be completed by the students must be considered. The lecturer/tutor must also appreciate that assumptions can not be made about the students’ understanding of fundamental programming concepts. For example, concepts such as parameter passing, local scope of variables, and logical control structures may need to be reviewed.

Recommendations

Problems associated with designing and delivering an OOP programming unit to IS students and recommended solutions are given in Table 1.
Table 1 – Teaching IS Students OOP

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit must focus on business programming</td>
<td>Provide examples that deal with simulated business situations. In essence, examples should gather, store, update, and report on data. Simple transaction processing should be the focus. Avoid examples that require the use of graphics, scientific calculations, and the use of data structures such as stacks, linked lists, recursion etc.</td>
</tr>
<tr>
<td>Avoidance of hardware and technological concepts</td>
<td>The author has found that explaining (diagrammatically) how memory is used diagrammatically helps some students, but it must be made clear that students are not expected to reproduce such knowledge. Forcing students to trace through program code as if they are an interpreter, and recording objects’ data values on paper also helps many students. In general, explanations of how and why a code example functions must be given precedence over simply showing the output from the examples.</td>
</tr>
<tr>
<td>Appreciate students may lack programming experience</td>
<td>Provide an overview of the logical control structures and other fundamental programming concepts with sample code. This allows students to “catch up” and/or revise the topics.</td>
</tr>
<tr>
<td></td>
<td>The unit being considered by this paper assumes students have completed the second year programming unit (using Visual Basic), therefore they should have an understanding of logical control structures and the basics of modular design. Therefore, these are not explicitly covered during lectures. However, it is possible that students have completed the unit several semesters earlier and do not remember the concepts in detail. With MIS3354 the revision of the fundamental concepts is provided through on-line HTML documents and self test questions. These documents also show the syntax used to implement these concepts using Java.</td>
</tr>
<tr>
<td>Encourage experimentation during lab time</td>
<td>When a student is faced with a problem while completing set exercises the student must be asked to explain what is causing the problem before they are given guidance to find the answer. Only after the student has considered possible solutions and explained their reasoning should they be given the solution. The solution must be accompanied by an explanation. In the case of MIS3354 solutions to common problems have been placed on-line in HTML format with accompanying self-test questions. Students are asked to consider, and modify, these solutions before they are given any further assistance.</td>
</tr>
</tbody>
</table>

Issues relating to the conceptual content of the unit and the use of business examples are further discussed in the section relating to OOP textbook selection and support materials.

DIFFICULTIES IN LEARNING OO CONCEPTS

Students learning an OOP language are not only faced with learning the language syntax; they must also struggle to grasp the fundamental OO concepts. A full discussion of these concepts and the difficulties faced by students is beyond the scope of this paper.

Note that difficulties in gaining an understanding of the fundamental OO concepts are not limited to IS students. The same problems are found with computer science students, and with programmers experienced in structured programming languages (Agarwal, De, Sinha, & Tanniru, 2000; Harrison, Counsell, & Nithi, 2000; Johnson, Hardgrave, & Doke, 1999).
Difficulties specific to learning an OOP language add to the difficulties associated with software development in general. Armarego (2002) states that “... the difficulty of verifying and validating proposed solutions and the inadequacy of methods and methodologies in guaranteeing the quality of the result ...” makes software development problematic.

EMBEDDING OO DEVELOPMENT METHODS

OO development methods tend to be iterative in nature due to the high cohesion and low coupling affected through the use of objects, and the code reuse facilitated through the use of inheritance. This is one reason for the popularity of OO approaches when developing information systems, as the rapidly changing business environment requires that the systems supporting those businesses also change (Gold-Bernstein & Marca, 1998; Kalakota & Whinston, 1996).

It is difficult for students to appreciate this aspect of OO development in a fourteen week unit where they are working on programming exercises that must be limited in size. There is no advantage in overwhelming students with assessments of the scale required to have them experience the benefits of iterative development first hand. To be faced with such an assessment would, however, encourage students to make effective use of the OO principles.

Recommendations

The recommendations in Table 2 outline the approach taken for the unit MIS3354 that has been found successful (success is measured by the degree to which the unit integrates the iterative development approach, and the ability of student groups to complete a large programming assignment).

Student feedback has shown that students believe the large assignment has tested their ability and understanding. It also shows that a reduction in the amount of work required for the completion of the assignment and lab work may be required. One student commented “... given the extent of the assignment I feel that no exam should be set, since the assignment more than tested [our] ability.” (Unit Evaluation Instrument, 2002 Semester 1)
Table 2 - Encouraging the use of Iterative Development

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop class structures iteratively</td>
<td>Programming problems are presented to student in the form of five lab exercises and a group assignment. The lab exercises require students to create several classes, with later exercises modifying the classes created in the earlier labs. These classes are then used to complete the group assignment. Students are made aware of the fact that correct design of the classes for the labs will simplify the completion of the assignment. See Appendix A for an example of the lab questions.</td>
</tr>
<tr>
<td>Large scale project</td>
<td>If considered separately the group assignment would be too large to complete in the available time. However, there are two features of the unit design that makes the completion of the assignment possible. Firstly, the incorporation of the classes created in the lab exercises reduces the workload. Secondly, students are given the source code for the user interface. Given the time consuming nature of writing code for a user interface in Java this reduces the time required of students significantly. Having this source code also allows students to concentrate on the processing of the objects.</td>
</tr>
<tr>
<td>Appreciate the benefits of iterative development</td>
<td>In most cases the group assignment is not fully functional by the due date. Students are warned that this may be the case when the assignment is handed to them, and told that this will not automatically result in a failure for that assessment. The author's intention is to explain the best method for completing the assignment so that groups following the method experience the benefits, while groups that are unable to complete the assignment appreciate why they should follow that method in the future. Emphasis is placed on the OO design and logic used in the assignment when it is assessed.</td>
</tr>
<tr>
<td>Prepare students for industry</td>
<td>The problem set for the group assignment is based on requirements for business systems that exist in the &quot;real world&quot;. Having faced some of the difficulties with creating a commercial application students appreciate what is expected of programmers in industry.</td>
</tr>
</tbody>
</table>

OBJECT-ORIENTED TEXTS AND SUPPORT MATERIALS

A survey of the target audience of texts addressing object-oriented programming would show that the majority is aimed at industry practitioners or computer science students (see Appendix B). There are few texts currently available that meet the requirements of an IS (i.e. business based) unit, and of those available none have been found that match the required content or approach of the unit designed by the author. Note that the currently available IS texts became available after the unit was designed so they do not match the approach to programming adopted for the unit.

In the event that a suitable text is not available support materials must be developed to assist students in their understanding of the concepts being covered in lectures.

Recommendations

Recommendations given in Table 3 are biased due to the fact that a suitable text was not available when the author designed the OOP unit. The principles, however, are written with this bias in mind and should be applicable in the case where a suitable text is available.
Table 3 – Suitability of OOP Text and Support Materials

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Solution</th>
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</thead>
<tbody>
<tr>
<td>Suitability of text</td>
<td>The textbook for the unit must match the requirements for teaching IS students (as discussed above) and the style of programming being used for the unit (e.g. whether using Applets, applications, or Swing classes in Java). In the event of no suitable text being found a comprehensive set of lecture notes must be developed to guide students and a text selected that can be used as a technical reference.</td>
</tr>
<tr>
<td>Examples in text must match approach adopted for the unit</td>
<td>Programs in Java may be written as Applets or applications. While an OOP unit using Java should cover both approaches, one approach should be focused upon to avoid confusion. If the choice is made to concentrate on Applets for the unit then the text should present examples in this manner. Another factor to consider is whether to use the standard AWT or the Swing components when creating the GUI. Once again, the choice for the unit must match that of the text.</td>
</tr>
<tr>
<td>Focus on OO</td>
<td>Examples in the text should emphasise the application of OO concepts to programming, not the features of a particular programming language. If the text does not provide suitable examples supplementary examples (based on the lecture notes) must be created and the code made available to students.</td>
</tr>
<tr>
<td>Iterative development of a system</td>
<td>The text should provide an iterative approach to the learning of OO concepts and the development of case examples (as discussed above). Once again, supplementary materials should be created as needed.</td>
</tr>
</tbody>
</table>

SUMMARY

Designing an object-oriented programming unit for business students requires that several factors be considered. These include (but are no limited to):

- Business focus of students
- Difficulties associated with learning the object-oriented approach
- How best to demonstrate the importance of OO design with an iterative development approach
- Selection of suitable textbook and support materials

The interdependence of these factors could be considered a factor in itself, particularly in the area of matching code examples used to explain the fundamental OOP concepts. The unit must encapsulate the materials and processes required by the student to understand OOP. In effect, the unit must be a well-designed object.

REFERENCES


APPENDIX A

This appendix includes a set of lab questions as an example of the iterative development approach used in MIS3354. The first two laboratory exercises introduce students to event handling with Java. Note that the group assignment question is not included due to space limitations.

Laboratory 3

Tutorials three to five require that you create several classes that store and process data. These classes can be used as the basis for the second assignment. You may use (or modify) the user interface defined by the Assignment2.java file (available on the WebCT server):

You are expected to:

1. Create classes that meet the following criteria:

<table>
<thead>
<tr>
<th>Class Name</th>
<th>Description</th>
<th>Attributes</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>Stores data relating to clients and provides access methods to process data</td>
<td>Private Variables: first name, surname, customer number, and customer type</td>
<td>set and get methods for each private variable e.g. setFirstName()</td>
</tr>
<tr>
<td>Account</td>
<td>Stores data relating to accounts and provides access methods to process data</td>
<td>Private Variables: account type and account name</td>
<td>set and get methods for each private variable e.g. getAcctType()</td>
</tr>
<tr>
<td>Branch</td>
<td>Stores data relating to branches and provides access methods to process data</td>
<td>Private Variables: branch name and branch code</td>
<td>set and get methods for each private variable e.g. getBranchCode()</td>
</tr>
</tbody>
</table>

2. Create one object for each class described in the table in the interface and gather data that is to be assigned to each of the objects. A button with a label of "Add Data" may be included on the Applet to allow the user to add the data.

3. Display the contents of the objects described above when the user clicks on another button (a "Display" button may be added to the interface).

See Chapter 6 of Schildt (2001) for a discussion on class design.
Laboratory 4

For this tutorial you need to modify the classes created in the previous tute by adding constructors.

1. Add constructors to each class as described in the following table.

<table>
<thead>
<tr>
<th>Class Name</th>
<th>Constructor Parameters</th>
<th>Purpose</th>
<th>Methods and Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>none</td>
<td>initialise all variables</td>
<td>Same as defined for laboratory 3</td>
</tr>
<tr>
<td></td>
<td>three</td>
<td>set the client's number, first name and surname</td>
<td></td>
</tr>
<tr>
<td></td>
<td>four</td>
<td>set the client's number, first name, surname and type</td>
<td></td>
</tr>
<tr>
<td>Account</td>
<td>none</td>
<td>initialise all variables</td>
<td>Same as defined for laboratory 3</td>
</tr>
<tr>
<td></td>
<td>two</td>
<td>set the account's type and name</td>
<td></td>
</tr>
<tr>
<td>Branch</td>
<td>none</td>
<td>initialise all variables</td>
<td>Same as defined for laboratory 3</td>
</tr>
<tr>
<td></td>
<td>two</td>
<td>set the branch's name and number</td>
<td></td>
</tr>
</tbody>
</table>

2. Create one object for each class (using constructors) listed in the table and use an Applet to gather data from the user. You should be able to assign the data entered by the user to these objects when a button with a label of "Add Data" is clicked.

3. Display the contents of the classes when the user clicks on the "Display" button.

See chapters 6 and 7 of Schildt (2001) for discussions on constructors and overloading.

Laboratory 5

For this tutorial you need to add specialised classes to create an inheritance hierarchy.

1. Add the classes described in the table below.

<table>
<thead>
<tr>
<th>Class Name</th>
<th>Super Class</th>
<th>Purpose</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>Client</td>
<td>Stores data relevant to personal clients and provides methods to access this data</td>
<td>Date of birth (as three integers: one each for year, month and day)</td>
</tr>
<tr>
<td>Business</td>
<td>Client</td>
<td>Stores data relevant to business clients and provides methods to access this data</td>
<td>Australian Business Number (ABN), and the name of a contact person</td>
</tr>
<tr>
<td>Address</td>
<td>none</td>
<td>Stores data that is to be used for the address of clients</td>
<td>Street name and number, suburb, city, post code, state, and country</td>
</tr>
</tbody>
</table>

2. Create one object for each class listed in the table (using constructors where appropriate) and use an Applet to gather data from the user. You should be able to assign the data entered by the
user to these objects when a button with a label of "Add Data" is clicked. Note that the Address class should be incorporated into the Client class twice: once as a home address and once as a postal address (how you do this is up to you). Tip: consider whether the Address class should be added to the sub classes or the super class.

3. Display the contents of the classes when the user clicks on the "Display" button.

See chapter 8 of Schildt (2001) for discussions on inheritance and method overriding.

APPENDIX B

The following list shows the texts that have been assessed by the author and the focus of the concepts covered by each text. A text is found to be suitable for use with MIS3354 if it focuses on business problem solving, avoids the use of abstract data structures (e.g. linked lists etc). Texts that have been reviewed prior to 1998 are not included in the list.

<table>
<thead>
<tr>
<th>Author and Title</th>
<th>Business Focus</th>
<th>Avoids Lists etc</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decker &amp; Hirshfield (1998) <em>Programming.java: and introduction to programming using Java</em></td>
<td>Partly</td>
<td>Yes</td>
<td>Too much emphasis on graphical user interface construction</td>
</tr>
<tr>
<td>Deitel &amp; Deitel (1999) <em>Java: how to program</em></td>
<td>No</td>
<td>No</td>
<td>Uses Swing components – would require rewrite of lecture notes</td>
</tr>
<tr>
<td>Duke &amp; Salzman (2000) <em>Java genesis</em></td>
<td>No</td>
<td>Yes</td>
<td>Uses graphics features as first examples</td>
</tr>
<tr>
<td>Farrell (1999) <em>Java programming: comprehensive</em></td>
<td>Yes</td>
<td>Yes</td>
<td>Extensive use of command line input and output – not suitable for objectives of MIS3354</td>
</tr>
<tr>
<td>Harrington (1998) <em>Java programming: an IS perspective</em></td>
<td>Yes</td>
<td>Yes</td>
<td>Too much emphasis on graphical user interface construction</td>
</tr>
<tr>
<td>Horstmann (2003) <em>Computing concepts with Java 2 essentials</em></td>
<td>Largely</td>
<td>No</td>
<td>Focuses on low level language concepts and implementation</td>
</tr>
<tr>
<td>King (2000) <em>Java programming: from the beginning</em></td>
<td>Partly</td>
<td>Yes</td>
<td>Extensive use of command line input and output – not suitable for objectives of MIS3354</td>
</tr>
<tr>
<td>Morelli (2000) <em>Java, Java, Java: object-oriented problem solving</em></td>
<td>No</td>
<td>Yes</td>
<td>Focuses on low level language concepts and implementation</td>
</tr>
<tr>
<td>Riley (2002) <em>The object of Java</em></td>
<td>No</td>
<td>No</td>
<td>Uses graphics features for most examples</td>
</tr>
<tr>
<td>Schildt (2001) <em>Java 2: a beginners guide</em></td>
<td>Partly</td>
<td>Yes</td>
<td>Not advanced enough for use with MIS3354</td>
</tr>
<tr>
<td>Staugaard (1999) <em>Java for computer information systems</em></td>
<td>Largely</td>
<td>No</td>
<td>Fails to address OO concepts to adequate level</td>
</tr>
<tr>
<td>Winder &amp; Roberts (2000) <em>Developing Java software</em></td>
<td>Partly</td>
<td>No</td>
<td>Excellent text for computer science</td>
</tr>
</tbody>
</table>
Electronic Commerce, Education And Enterprise: Bridging The Gaps

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ABSTRACT

The recent past has seen the rapid development and adaptation of electronic commerce applications in many aspects of business. Being a fairly recent development, a commonly accepted definition of electronic commerce is yet to emerge. This paper provides a brief discussion of some of the current definitions. To gain an understanding of where current and future demand for electronic commerce professionals may lie for academia, the current offerings in electronic commerce graduate programs from a selection of universities based on an internet search are reviewed.

Keywords: Electronic Commerce; Education; Enterprise

INTRODUCTION

Electronic commerce is now widely accepted to be a key feature of competitiveness in business relationships and transactions. Defining electronic commerce, or indeed the scope of the phenomenon (technical, political, economic, legal etc.), is presenting itself as a major issue.

An example of the problem of defining electronic commerce (EC) is evident in the use of the terms e-commerce and e-business. The former emphasizes transactions with the latter reflecting the broader aspects of networking and business relationships (Greenstein and Feinman, 2000). The meaning of the term e-commerce is likely to evolve over time, not unlike the shifting conception of the Internet, which has moved from an emphasis on public communications to one that now embraces commercial activity. The future meaning of e-commerce will no doubt reflect theoretical developments but equally as well be influenced by business practice and technological developments. In the light of this lack of clarity and agreement about what electronic commerce actually is, definition becomes an important conceptual issue and as such can have an important impact on firm strategy, specifically business strategy and technology strategy as well as greatly influencing the program offerings in academia.

SOME POPULAR DEFINITIONS OF ELECTRONIC COMMERCE

It is not our aim in this paper to develop a single definition of electronic commerce, but rather to provide an overview of some popular ways of interpreting (or defining) electronic commerce. Indeed the diversity of definitions of electronic commerce is one of its more interesting features. Three major sources of definitions are identified: textbooks on electronic commerce designed for business schools; government documents; and academic literature.
The Business School-style textbook: Operational or technology-oriented definitions

Current ‘Business School textbooks’ on electronic commerce are a good source of definitions that focus on the operational or ‘know-how’ side of electronic commerce. Of course, we do not argue that such books limit themselves to technological aspects, but their mandatory chapter on definition is often quite embedded in the description of how electronic commerce takes place. For example, Kalakota and Whinston (1997), while trying to provide a broad perspective depart little from including operational objectives in their classification:

‘Depending on whom you ask, electronic commerce has different definitions.

From a communications perspective, electronic commerce is the delivery of information, products/services, or payments via telephone lines, computer networks, or any other means.

From a business process perspective, electronic commerce is the application of technology toward the automation of business transaction and workflows.

From a service perspective, electronic commerce is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of good and increasing the speed of service delivery.

From an online perspective, electronic commerce provides the capability of buying and selling products and information on the Internet and other online services’.

While seemingly broad in its scope, this definition emphasizes operational aspects in all the chosen perspectives: ‘via telephone lines, computer networks’; ‘application of technology’; ‘a tool that addresses’; and ‘capability’. Of course, the above textbook is not alone in the way it interprets electronic commerce. Another popular text, Turban, Lee, King and Chung (2000), adopts a similar viewpoint.

Government reports: Definitions emphasizing the effects of electronic commerce

Another dimension to electronic commerce definitions are those that emphasize the effects of electronic commerce. Government documents and consultancy firms are good examples of this since such definitions frequently align themselves with interests. For instance, consultants Deloitte, Touche, Tohmatsu observed in 1998:

‘E-business is commerce conducted in cyberspace. It is the result of combining the broad reach and vast resources of the Internet with information technology systems. E-business is about Web-enabling core business processes to improve customer service, reduce cycle time, become more cost effective, and sell goods, services, or information. While some specific industries will be adversely affected, the overall impact of e-business should be enormously positive for commerce, consumers, and society’ (Stewart, 1998).

No doubt, Deloitte, Touche, Tohmatsu may be somewhat more reserved in its enthusiasm for electronic commerce now, after the dot.com crash of April 2000, but the definition serves its point to highlight how enthusiasm for electronic commerce can cloud good judgment.

Equally enthusiastic is the Canadian Government’s Electronic Commerce Strategy. This document’s approach to ‘understanding electronic commerce’, as might be expected, emphasizes technology at the expense of analyzing the link between technology and growth projections:

‘Governments, the private sector, the media, and the academic community - all are heralding electronic commerce as a revolutionary means of conducting business and interacting as citizens and consumers. As with the application of any new technology, our understanding of
Electronic commerce is continually evolving. While many varying definitions and growth projections exist, forecasters agree that exponential growth will continue well into the next century. Electronic commerce, broadly defined, includes all transactions using electronic means (Canadian Government, 1998).

In short, the way government documents and consultancy reports (for governments usually) look at electronic commerce will be shaped by the perceived benefits they are promoting.

Academic Literature: Information-based and strategy-oriented definitions

Finally, we turn our attention to the academic literature. This of course is expansive and we cannot hope to categorize or summarize in this brief paper. It is evident that different academic definitions will depend on the discipline from which electronic commerce is being viewed. Useful approaches in this regard can be found in Clarke (1999) and Bambury (no date). Rather we wish to present the perspective used by Rolf Wigand (1997) which we have found useful. The key to Wigand’s approach is that he sees a distinct role for understanding information as part of the task of developing a definition and typology of electronic commerce:

‘Although electronic commerce has been around for some time in the form of EDI when viewing this setting as a potential market for electronic commerce, one must realize that it is not understood well. One must also make a distinction between markets for information and a market for ordinary commodities on at least two counts. On the surface, information can be considered a factor of production. Another perspective enters the picture when information itself becomes the commodity and when private markets have formed in which information can be bought and sold as a commodity. Information then takes on a more complex role as information has peculiar characteristics in that it is easily copied, transmitted, sold without destroying it, and that it is expandable, diffusive, compressible, difficult to establish property rights to at times and sometimes is a public good. Electronic commerce is, of course, more than the mere use of technology’ (Wigand, 1997, p. 5).

Wigand goes on to develop five theoretical/conceptual approaches to electronic commerce: Transaction cost theory; Marketing; Diffusion; Information Retrieval; and Strategic Networking. We will not discuss each of these approaches but it is evident that each permits a deeper appreciation of the role of information in electronic commerce that is permitted by other more ‘functional’ definitions.

We have a preference for Wigand’s eclectic approach since, in our opinion, it provides a more open and flexible way of interpreting the complexity of the gaps between electronic commerce, education and enterprise. Armed with the overview of some popular ways of interpreting (or defining) electronic commerce, a closer look at some of the common educational opportunities in graduate electronic commerce will assist in identifying the gaps.

Electronic Commerce Education: Master’s Level Degree Offerings

It would appear as if the first few Master’s level electronic commerce degree programs were offered in late 1990s. Since those early-movers embarked upon their pioneering educational activities in the field, both the number of new entrants and the number of individual units being delivered have grown significantly, closely mirroring that of the Internet and electronic commerce itself.

Initially many of the universities that chose to enter this market space did so either from a technical/technological perspective, offering a form of Master of Science degree, or from a business angle. They expanded their MBA programs or alternatively created an entirely new Master of Electronic Commerce degree, commonly offered out of a business school.
As an example of different orientations, Harrow School of Computer Science (in the UK) notes that the units offered in its MSc in Electronic Commerce degree cover “the very fields involved in the technical undertaking of any Internet or E-Commerce activity.” (Harrow School of Computer Science, undated). Whereas The Wharton School’s (in the US) specialized MBA major in electronic commerce, on the other hand, is “poised to address the whole breadth of issues relating to e-commerce” (The Wharton School, 2000). Issues to be considered include legal, strategic marketing and policy, in other words, a strong enterprise-wide theme. These two approaches are supported in a review of MBA programs with some form of electronic commerce concentration by Siau et.al. (2001), which identified two distinct tracks - a business and a technology focus.

Taking more of an international perspective, though still examining Master's level electronic commerce education within MBA programs, Mahrer and Brandtweiner (2001) found that many programs did report an expansion of their MBA offering to include some Electronic Commerce subjects. Amongst these were subjects such as: Internet Functions and Facilities; Electronic Commerce Technologies; and, Electronic Meeting Systems. However, surprisingly, they also reported that 83% of their sample indicated there was no increase in the teaching of information systems or information technology (IS/IT) skills within those degree programs. This conclusion, notwithstanding the teaching of units like those mentioned previously, certainly would have ordinarily been the ambit of an information systems or information technology school.

Both the above-mentioned studies and one of the few others in this field by Whitten and Stephens (2001) focused exclusively on MBA programs. A more complete picture of electronic commerce education is available by including the newly created and aptly named Master of Electronic Commerce degree. Many universities created a virtually new Master of Science (MS or MSc) program specializing in EC, whilst a plethora of others adapted other existing Master's programs to include an EC focus, not unlike those that had adapted their MBA's. In fact, a few universities offer quite a range of EC related master's level education from a range of perspectives, sometimes located in different schools. For example, Western Australia’s Curtin University offers an MBA (eCommerce specialisation) out of its Graduate Business School, a Master of Electronic Commerce out of its School of Information Systems and the very closely related Master of Electronic Marketing out of its School of Marketing (Curtin University, undated).

**Post Graduate program offerings**

We have obtained a general impression of types of program available by searching the internet using a variety of search terms related to the expression “electronic commerce” (EC, E-Commerce etc. were searched). This search strategy located Master’s level EC offerings listed online. For a complete list see Appendix A. The nomenclature of different degree programs is shown in the Figure below. The Master of Science variations topped the list (mainly US universities), with the specialist Master of Electronic Commerce degree second. In Australia, universities offer MEC rather than MSc programs (see Appendix B) and the MBA with an EC specialization. Other variations had their roots in MA, MCom and MMarketing degrees.
From an Australian perspective, why is it that virtually every Australian university offers a Master of Electronic Commerce degree out of a Business School and yet US universities offer their programs either out of their MBA or a MS degree programs - with the latter prevailing numerically? Is there a real difference in the nature of the degree and impact on the enterprise, industry and society as a result of these different focuses?

Further research is needed to find out if the development of graduate EC education in different global locations has had a significantly different focus, i.e. possibly the early degree programs of the US concentrated on the technologies of the Internet and EC whilst early on the Australian institutions adopted less of a technologically deterministic view of the emerging phenomenon, focusing rather on the more long-term business and societal implications. At the time that the US introduced the first EC programs (towards the end in the dot.com boom), there was certainly far more demand in the US economy for technical EC skills, as witnessed by the significantly larger number of dot.com start-ups in the US, than there were in Australia. Australia was perhaps watching the US Internet/EC developments from arm's length, trying to assess the bigger picture. This may have been due to the lack of technological critical mass within that country rather than any strategic management choice.

Taking the idea of whether the differing degree offerings will have an impact on particular countries or regions we use phone giant Ericsson and the Scandinavian region as a case in point. Ericsson recently announced that two universities in Denmark would offer world-first Masters degrees in Mobile Internet Communications:

'Two Danish Universities, Aalborg University (AAU), and the Technical University of Denmark (DTU), are pioneering the Master's Degree. Byder says ten other universities in Europe and at least one in the United States have expressed interest in offering the degree as well'. (Ericsson, 2001, online)

We would posit that at least a few of the “other universities in Europe” referred to in the above quotation would most likely be in other Scandinavian countries where the development of mobile communications technologies is currently focused. Whether the increase in universities in Europe offering what is arguably the next generation of EC will shift the EC balance away from the US remains to be seen.

**Electronic Commerce Education: Master’s level unit offerings**

The number and variety of units on offer has changed from the few offered by the early-adopters. In many instances they have expanded the units that were available whilst also ensuring that unit content reflected the rapidly changing EC landscape. Lipman, the academic director of the special Wharton
School e-commerce MBA major commented that “the nature of the Internet and e-business will continue to evolve and as that happens, so too will the requirements and electives of the major” (The Wharton School, 2000).

Units on offer under the EC banner at various institutions include those with a technical focus such as Network Design and Management, Web Client Programming and Search Technology and Text Processing, and those which are more business focused, such as E-Marketing and Technology and Society. It is hard to see that a model curriculum as presented by Whitten and Stephens (2001) and others could extend its coverage to all aspects of Electronic Commerce. A more likely scenario is that what is currently considered as electronic commerce will be better defined in the future and an appropriate curriculum will follow. This view is supported by the authors own experience at Murdoch University were the initial curriculum has evolved to better reflect the recent developments in the field as well as the changes occurring in the industry.

CONCLUSIONS

One of the more philosophical questions often asked, particular by academics, is what constitutes e-commerce. The scope of the phenomenon (technical, political, economic, legal etc) is itself a major issue and will determine the future direction of this new field.

This paper has made a number of observations which in turn raise a number of questions. First, if is accepted that electronic commerce teaching programs vary their emphasis on what is taught according to location (eg. US, Europe and Australia), to what extent have the demands of different geographical locations shaped the type of program offered? Second, at the level of individual units, at what point will the composition of electronic commerce programs shift to reflect the uses of electronic commerce and economic and social issues derived from such use as opposed to purely focusing of the more technical ‘how to’ aspects of electronic commerce? Third, in response to the above two questions, to what extent have universities been merely passive responders to student and business demand, as opposed to pursuing a more traditional role of shaping and steering public and business opinion? If the more progressive universities do follow this path, what might an innovative EC program look like?

On this last point, it is within the ambit of prescribed units that universities can, to some degree, play a role in influencing thinking and possibly also the direction of EC and the Internet. Graduate electronic commerce students are ideal candidates for exposure to a more philosophical and longer term sustainable view of electronic commerce and perhaps it is not only the role but also the responsibility of universities to ensure that their core units do not only pander to market demand but also include examination of some of the deeper and perhaps more profound and enduring issues related to sustainable electronic commerce.

REFERENCES


Harrow School of Computer Science (undated), “MSc in Electronic Commerce””, University of Westminster, Available online http://hscs.wmin.ac.uk/courses/mscec/generalinfo.htm


APPENDIX A

Search Terms Used

The following terms were used to search the Google Search Engine to locate institutions offering Master’s level Electronic Commerce education.

*Electronic Commerce OR EC OR eCommerce OR e-Commerce OR E-C OR e-Business OR eBusiness AND Master AND degree*

APPENDIX B

International Sample of Master’s Level EC Programs

Master's Level EC Programs: Variation by country

<table>
<thead>
<tr>
<th>Program</th>
<th>AUS</th>
<th>USA</th>
<th>Non AUS/USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBA(EC)</td>
<td>2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>MEC</td>
<td>18</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>MComm(EC)</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MSc/MS (EC or Internet)</td>
<td>3</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>MIS (EC)</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MEMIM</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MA (EC)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MPhil (EC)</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

MBA (EC) – specialization in / focus on Electronic Commerce

Master of Electronic Commerce

Master of Commerce (EC) – specialization in Electronic Commerce

Master of Science in Electronic Commerce or Master of Science in Internet Technology

Master of Information Systems in Electronic Commerce

Master of Electronic Marketing and Information Management (MEMIM)

Master of Arts in Electronic Commerce

Master of Philosophy in Electronic Commerce
Teaching Online – Going Beyond Rearranging the Deck Chairs into Virtual Space

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ABSTRACT

The Teaching/Learning process that occurs in online environments is quite different from the traditional model of our classrooms. Teachers – while still leaders – have to recognise that this electronic environment gives their students much more democratic power in the learning process. Moreover, a substantial shift in content presentation and teaching methods is required.

In this paper I hope to firstly address the changes in the Teaching/Learning Process, and what those changes demand of us as educators. The second part of the paper presents some practical ideas for addressing some of the major issues encountered when building online courses.

Key Words: Online Learning, e-Learning, Teaching/Learning Processes, Hypertextuality.

INTRODUCTION

Online Education – education over the internet – is fast becoming the biggest issue to face our Academic Institutions. Whether our Universities and Schools want to face the challenges, or embrace the new technologies is no longer an issue. That fact is, e-learning is here, and it is here to stay. How we address the challenges of what the internet has to offer us will probably not determine the future existence of our institutions, but it will determine whether we successfully attract a whole new group of learners – the online student.

The purpose of this paper is to address the issues facing Institutions and individual teachers as we begin to build e-learning environments and courses. The virtues of e-learning as a process will be assumed in that my position is simply that e-learning is already here. Our institutions, for the most part, have embraced the new technologies, albeit reluctantly at times, and we are now faced with the challenge of how to deliver online content for existing courses as well as create entirely new online courses.

PART ONE: ADDRESSING THE TEACHING/LEARNING PROCESS

The Teaching/Learning Process:

The process of learning online is quite different to learning in a classroom. Yet, one of our most common mistakes in designing and developing online courses is to try and replicate what happens in the classroom.
The most obvious difference between classroom learning and online learning is the change in the interpersonal relationship between teacher and student.

Many instructors rely on their people/communication skills in order to be successful in the classroom. When talking to a student, information can be relayed because the instructor and student are completing the communication model of sender to receiver and receiver to sender. As a very people-oriented person, I often rely on my oral ability to communicate in order to get me through a class. I know that my personality can drive a class. But, one cannot rely on his/her oral presentational ability to teach an online class (Walker).

Considering that the vast majority of teachers rely on this relationship to both teach and evaluate their students, the shift to distance and online learning requires a total rethink in how we teach our students. This rethink is not just about processes, i.e.: the methods we use to teach, but should include a change in attitude towards what effective learning is. There needs to be a move...

from the belief that face-to-face is best, to the belief that various environments support high quality learning. (Walker)

There also needs to be a shift away from the idea that online learning environments are devoid of personal contact and interaction between student and teacher. On the contrary, the level of meaningful interaction between course participants is potentially far greater. Inconsequential banter and classroom disruptions can be practically eliminated in online learning environments.

Online Learning: Challenging Traditional Teacher/Learner Processes

The resistance of some teachers to embrace the new technologies is both understandable and to be expected. As leaders in our classrooms and lecture halls we have the inherent power to move a group of students in a particular direction. Our sense of leadership and identity comes from that power, and our methods are determined by an environment in which we have grown comfortable.

In the post-modern society, the marriage of technology and information has democratized the monopoly of knowledge that used to be vested in gurus or teachers. (Mendis)

Perhaps this is where online learning poses the biggest challenge to us as teachers, by testing the traditional roles of the teacher and student. The boundaries of the classroom walls – as restrictive as they can be to some learning – are our comfort zone, and changing our way of thinking about how and why students learn is the first step to developing an open mind to e-learning.

Recent Cognitive theories in relation to how people learn include the notion of Constructivism. (Hein 1991) Simply defined, constructivism asserts the principal that knowledge is not passively received, but actively acquired through the building of new information into a learner’s previous experience or existing knowledge. If the challenge of developing teaching processes that embrace this way of thinking is already pushing teachers to adopt new methodology within their classrooms, then developing online courses proves an even greater challenge in that it almost demands the instructor embrace a constructivist belief structure.

Web learning environments by their nature are more democratic than the four walls of a classroom. Moreover, the hypertextual environment gives the learner opportunities to learn at both their own rate and in their chosen order. Teachers may always take issue with this feature of web environments.

... most of us constantly vacillate between faith that our learners will indeed construct meaning which we will find acceptable (whatever we mean by that) and our need to construct meaning for them. (Hein 1991)
If we accept the constructivist position we are inevitably required to follow a pedagogy which argues that we must provide learners with the opportunity to:

a) interact with sensory data, and
b) construct their own world. (Hein 1991)

The associative, hyperlinking, and nonlinear features of the Web environment (Ayersman 1995) are well suited to support constructivist learning. (Miller 1999) The challenge then as teachers is to construct environments that provide enough structure to guide a learner to a place where they can connect new knowledge with knowledge already acquired, but with enough variables (in link structure) to allow for individual navigation through the content and learning process. This issue will be dealt with in more detail the following section.

**Online Learning: Challenging Traditional Teacher/Learner Methods**

If the biggest challenge to developing good e-learning courses is a change in our perception of teacher/student roles, then the biggest error we make is the assumption that the same teaching strategies and methods we use in the classroom will work online.

*I realized... that I wouldn't be able to use the same teaching techniques in an online class as I would use in a traditional classroom* (Kruston 2001)

Traditional teaching methods include lectures, text books, tutorials, question & answer sessions, field trips, guest speakers, assignments, exams and the like. The challenge in developing online courses is how to transfer these tried and true methods into an electronic environment. Moreover, how do we overcome some of the common issues we encounter in the classroom, such as motivating students or helping struggling students, when these seem to multiply themselves ten-fold in online environments?

From a constructivist’s point of view, Internet technology has provided an opportunity to develop what Hein’s calls “communities of learners”. Certainly, web environments provide greater democracy and shift the instructional power away from the figure so central to classroom instruction. It is this shift that can make the task of creating online courses seem so daunting to teachers. We are required to change our pedagogy from ideas about learners being sponges ready to soak up the knowledge we impart, and develop methods that allow for learners to bring previous knowledge to their learning with us.

This does not mean doing away with structure. On the contrary, numerous structures need to be developed within each component of a course, that allow students to follow different pathways through the minefield of information, making links of meaning from one component to another.

Few environments actually allow for these types of variables better than the hypertextual one of the Internet.

*The nature of the Web can more accurately model this structure, but the limitless hyperlinking environment can detour the learner from adhering to prescribed learning activities.* (Miller 1999)

Miller raises a key point in the successful creation of online courses. The use of the hypertextual link provides the pathways of information navigation through each component part of a unit. A failure to create what McGuire calls “purposeful navigation” can have the disastrous results

*learners can get "lost" and fail to make meaningful interpretations even in closed hypertext environments* (McGuire, 1996)

Part two of this paper will address some of the practical ways instructors can address the specific issues raised in the previous two sections. Using computer technology in a way that all students
benefit, motivating students by creating opportunities for virtual social interactions between participants and managing the hypertextual environment to provide the best guidance through course content. For the purpose of clarity, the practical ideas have been included within each sub-section (or issue) raised, rather than placed in their own section.

PART TWO: ADDRESSING SOME OF THE PRACTICAL ISSUES

Using Computer Technology

The widespread practice of teaching courses completely online is logistically impossible at most schools because universities and colleges... don't have the infrastructure. students and teachers don't have the necessary basic computer skills. (Krause 2000)

I began my teaching career in 1996 as a high school educator. During the four years in which I taught the lack of basic computer literacy amongst my fellow staff members constantly astounded me. On one occasion a colleague informed me she had just purchased a PC, but didn’t know how to turn it on!

The level of computer literacy amongst teaching staff simply must be addressed by our institutions before we can even consider developing quality online courses.

Computer and Online Access

One challenge of teaching online distance education courses is the fact that the medium for course delivery itself—the computer—automatically creates a disparity in how students access the course. (Rashley 2001)

It is not good enough to assume that students accessing online courses have good internet access or are highly computer literate. People do not enroll in an online course because they love the internet. They do so because they perceive it will enable them to study while continuing their present lifestyle. The only assumption we can make of our students then, is that there will be inequities in their access to the courses we develop.

We can assume that:

1. Each student will have different computer hardware. Some will access our courses with the latest multimedia, 1.7Ghz machine, complete with 512mb RAM, while others will access the same material using a 486 and 32mb RAM. The content we use, and the way we present it should reflect that we have considered both ends of the spectrum.

Some Practical Ideas:

- If video or audio streaming is part of your course content, consider having it burned onto CD-ROM and making it available for your students as you would a traditional text book. An HTML page can be included on the CD-ROM with links to the various audio and video files.
- Remember that PowerPoint presentations are great for lectures, but highly inefficient in the way they store visual information. The result is, their file size is often very large and will take a lower-end user a lot of time to download off the internet. Consider using alternative presentation programs for the online versions of your lecture slides.

2. Each student will have different Software. The issue of what software students’ use goes beyond which internet browser they have. In online courses it is reasonable to assume that students may have to open Word, Excel, PowerPoint, even Access documents. As well as PDF’s, audio and/or video files, and a plethora of other potential formats. Again, the formats you use, and the versions of those formats should be considered carefully.
Some Practical Ideas:

- Make it clear to students in your Course Outline which Software they will need to complete the course.
- Where possible, use formats that are compatible with free Software. *e.g.:* *.pdf* (Acrobat Reader), *.rm* (Real Player), *.html* (IE or Netscape)
- Provide direct hyperlinks to where students can download the free viewing software.
- Where possible, obtain permission and provide free downloadable software on the course CD-ROM. This will allow students to install programs immediately, as well as remove the need for time-consuming (and sometimes costly) downloads of the same software.
- If software such as Microsoft Office is needed, organize with your institution how students can obtain the software at a reasonable price. Also, remember that sometimes view only versions of a program are free, such as PowerPoint Viewer.
- Always ensure you use the correct version of any software. This is particularly important if the new version is incompatible with older versions. *e.g.:* If video streaming, try using an older RealMedia version format. This will allow people with older versions of the software to access the *.rm files, as well as people with newer versions. Remember also, if Office 97 is the S.O.E, then you must save your word, excel, PowerPoint & Access files in ’97. Students using older software often cannot open newer versions of Office documents.
- Consider what standards* and computer settings you require as a minimum for students to view the course material in a browser correctly. *e.g.:* What screen resolution? Which Browsers? Should JavaScript be enabled?

*don’t forget that some students won’t know what you mean by these standards, which brings me to the next point.

3. Each student will have a different level of Internet & Computer Literacy. Courses should be developed in a way that the HTML is easy to navigate, the course essentials are easily accessible, and a set of “How To’s” provided.

Some Practical Ideas:

- Carefully consider each technical skill that a student will need to successfully complete the course you have developed. Develop a “How To” section that addresses each of those skills, from “Using an Email program” to “Effective Searching on the Internet”. This sounds like a lot of work, but a document such as this needs to only be written once and then simply updated regularly. Its development and writing can also be shared between teachers and faculties as a common resource.
- If you are using an e-learning environment like WebCT or Blackboard, provide “How To Use” documents for your students that cover all the basics, from “How to Log on”, to “How to Attach Assignments to Internal Email”.
- Find out if your institution has an IT Support protocol for external students, and make your online students aware of it.

Motivating Students 1: Making Online Information Accessible

In the traditional classroom, motivation to study and learn course material is usually created using the external forces of what Fred Kemp calls...

*...the coercions of grades and certificates and degrees.* (Kemp 2000)

The problem with this type of motivation is that it very rarely works online. Apart from the Pandora’s box issue of how to authenticate that work submitted online is actually from the student it claims to be from, the web-like information structure of the internet rarely lends itself to linear learning.
When we look at the type of people of use the internet to gather information, we find a completely different type of learner. This is demonstrated nowhere more clearly than the way companies encourage users to go to their websites to “learn more” about something. Television programs like “60 minutes” or “A Current Affair” invite their viewers to log-on to their website to read up on, or engage in an online chat/forum on a particular issue. The type of user logging onto these websites is motivated by an interest in an issue and a desire to know more, not because they want good grades.

This highlights a major problem with using the internet as a teaching/learning tool. The traditional student study model, of searching for highly specific information for the purpose of a good grade in an assignment or exam is thwarted by the sheer volume of information and web-like structure of the internet. Finding the equivalent of one page of specific information can take hours of surfing, which students find time-consuming and frustrating. Part of the problem can be addressed by improved web-searching techniques, but the major issue of plowing through the huge quantity of information contained on the internet is one that teachers and students alike need to address before effective online courses can be developed.

Some Practical Ideas:

- Use the internet yourself. Learn the art of successfully searching and finding relevant, and quality course material.
- Research, Search & Link! Provide quality hyperlinks to specific information relevant to the online course you are teaching.
- Remember that the internet is a vibrant, living organism. Pages within websites are moved around constantly, so frequently check that your links still work.
- Keep a Search Engine record of your successful searches. The way meta tags (contained within many web pages) work with search engines should help you find where the page has been relocated.

Motivating Students 2: Establishing A Sense of Community

A second major issue in dealing with student motivation is the same one that occurs in our classrooms. The issue of dealing with the individual student ego.

There are certain students who feel that they deserve more time and attention than their peers, that their work needs to be given special treatment, and that they shouldn’t be held to the same standards as everyone else. (Medis 2001)

The process of addressing students who think the world evolves around themselves can be made easier by the social nature of the traditional classroom. Having their peers around them challenges a student’s perception that their learning experience occurs in isolation. That there are other people in the same boat as them, experiencing the same difficulties.

This same sense of community, if established in an e-learning environment, can be used to address feelings of isolation and lack of motivation in students. Add to this the benefit of peer to peer learning and online learning becomes every bit as effective as the traditional classroom.

Some Practical Ideas:

- Establish and use forum/discussion boards in your courses. Forum boards, if used effectively can:
  - help establish a sense of community,
  - give students the opportunity to reflect and discuss specific course concepts and material with their teacher (you) and each other,
  - offer opportunities for peer to peer learning and sharing of ideas,
  - provide the means and tools for group projects.

*I will discuss the effective use of forum boards further in the next section*
• Use an interactive Calendar that outlines the course, special events, assignment due dates (etc) in chronological order.
  o open source calendars (like forum boards) are available freely on the internet.
  o programs like WebCT come with ready to use calendars.
• Establish email contact early in the course, check and answer email correspondence promptly. Be aware, that your inbox will balloon in size just before assignment deadlines.

Using Online Discussion Forums Effectively.

It has become a common practice to use discussion forums (also called forum boards, discussion boards etc) in online courses. Some teachers however, have discovered the simple truth that ineffective discussion forums can be worse than having no discussion forums at all. Why?... because if discussion boards are not used wisely the problems of misinformation, unnecessary or ignorant comments and general misuse of the forum can cause a great deal of needless stress. Not to mention greatly increase the workload of already time-challenged teachers.

Some Practical Ideas:

• Make your forum boards easy to navigate.
  o Arrange your boards into a set of specific "topics" that follow the course material. If an entire semester’s messages are all posted one after the other, it is very easy for students to miss vital information, and for you to miss a really good (or really bad) post.
  o Include a topic called “announcements” where you can communicate important developments, i.e.: reminding about an assignment deadline.
• Establish a code of conduct that encourages specific types of forum board posts.

  Posts on forum boards have the power to set the tone of an entire course (Kruston 2000)

• Post on the boards regularly yourself. Be prepared that to start with a forum thread (responses to comments) may suddenly come to an abrupt holt if you enter the discussion, particularly if your comment is a correction. It is important however, that students know you are there and involved. An online repartee that facilitates discussion can be established over a few weeks.
• Remember, that you set the tone of the discussions. Make sure you have designer or administrative control to remove comments from the forum board. Although, exercise this right with caution.
• Try to include set course tasks that can involve use of the forum boards. i.e.: if an assignment involves students choosing a specific URL for a case study, have the first part of the assignment (the choice of the URL) a forum board task. “Post your chosen URL onto the forum board and discuss ....”
• Set aside time at regular intervals for checking and involving yourself in the forums.

Developing Content for a hypertext environment.

One of the biggest challenges in developing good online courses, is managing the change from traditional methods of information presentation – most notably text presentation – to presenting material in a hypertext environment.

A hypertext environment is one that operates using markup languages like *.html. They are dynamic environments that allow users to move from anywhere on a page to anywhere on another page with a simple click of their mouse. Pages can be linked (hyperlinked) this way regardless of where in the world they are stored, so the possibility of bringing together relevant information is quite outstanding.
The concept of creating documents that work in a hypertext environment is called hypertextuality. It involves dividing whole documents into chunks of text that are linked together in a web-like structure. To begin writing effective online courses, teachers need to develop an understanding of how to divide their linear-written content into these chunks, which are then linked to appropriate pages and/or sections of pages within the course material.

Some Practical Ideas:

- Read hypertext documents

  *Understanding how to write for interactive media begins with understanding how to read interactive media.* (Fitzpatrick)

- Organize the layout of text documents in a spatial, rather than linear way. An effective way to do this is to make your documents shorter, considering ways to link them together using a hierarchical structure. Map-out each document into sections and make those sections linkable to and from other documents.

- Start looking at your online content as a web designer looks at their websites. Teachers cannot continue to merely upload *.pdf* versions of their lecture slides or unit outlines and call it “online content”. The content has to become dynamic, interactive and engage the student in a knowledge gathering process.

- Have a “print version” of your main online documents. They structured in a traditional linear way so that they can be printed as one continuous document.

**Dynamic / Multimedia environments.**

The protocols of File Transfer on the internet allow for a very dynamic environment. Users are able to open text, images, audio and video formats. In the same way that teachers consider how we present content to our physical classes in a more interesting way, so too we need to consider how to present content to our online classes in a way that involves students doing more than just reading text.

Some Practical Ideas:

- Begin to familiarize yourself with the different types of file formats that are available and what they can be used for.
  
  *Note: It would be unreasonable to expect yourself to then create content in all these formats, the idea is to learn what is available and what is possible.*

- Search for, and consider how you can link to multimedia content already on the web. You may just be surprised how much is already there, and what is available to you.

**CONCLUSION**

The purpose of this paper was to practically address some of the issues facing institutions and individual teachers as we tackle the challenge of building effective online courses. Courses that go beyond merely uploading established classroom content so that we can claim our courses have an “online presence”. Courses that do more than just rearrange the deck chairs into virtual space. Courses that consider the interactive and hypertextual environment into which we are building new ways of teaching and learning.

I understand that I have merely scratched the surface of the huge task before us as educators. I would like to encourage individual teachers by ending with this thought... Remember you are a teacher, not a Web Developer. It is easy to become overwhelmed with the sheer quantity of knowledge you would need to acquire to build a good online course. It is in the hands of our institutions to recognize the magnitude of this task, and to provide resources and training... and perhaps to even question whether
traditional teachers with their traditional teaching methods are even the right people to develop our online learning environments.

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Knowledge Management: Scope and Themes

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ABSTRACT

This paper describes the main themes and activities discussed in papers on "knowledge management". Twenty themes were identified, in five distinct groups. The list of themes may be used to categorise articles that refer to knowledge management, or for filing reference articles. It could also be used to highlight inconsistencies within an article, or to indicate concentrations or gaps in research. Finally, an understanding of the topics - the themes - of published articles helps us to understand the scope of knowledge management. This, in turn, leads us to an understanding of what is actually meant when an author uses the phrase, Knowledge Management.

Keywords: knowledge management, taxonomy

INTRODUCTION

What is meant by "knowledge management"? What are its main themes? What activities are included in its scope? Apparently obvious questions - yet rather difficult to answer. As a Forbes article says, "You can tell Knowledge Management is in the early stages of adoption because there are so many different definitions of the term" (Anonymous, 1998b).

An article in Computerworld (Sutton, 2000) says that major efforts - and millions of dollars - have been spent on failed attempts to capture tacit, workplace knowledge. By now, writes Sutton, "most information warehouses have become junkyards, databases cluttered with forgotten information." Just two weeks later, a Computerworld interview with the new CEO of Lotus Development Corporation seems to indicate that "knowledge management" is all about installation of a particular package (Copeland, 2000).

Knowledge management may be an important technology system: "Knowledge management systems, defined in the survey as networked information systems that facilitate the sharing of corporate information, are the top priority for technology development by 2001" (Anonymous, 1998a). Knowledge management involves sharing: "The most important strategies that can be implemented are those that foster the employee's willingness to share and contribute to the knowledge base" (Puccinelli, 1998).

Knowledge management is one part of a business process: "Close behind culture in overall importance to any KM project's success is the need to integrate knowledge management techniques into a core competency business process" (Moore, 1998). Knowledge management is a business process by itself; it includes organisational learning, knowledge production and knowledge distribution. And, "there is no standard recipe for building a good knowledge management system; it is even hard to identify the ones that are clearly successful" (Sarvary, 1999).

So what does it all mean?
THE SEARCH FOR MEANING

The search for meaning within the field of "knowledge management" is essential. Rigby declares that, "They (a group of management tools including knowledge management) are more like chain saws – potentially powerful when applied to the right problems, but extraordinarily dangerous in the wrong hands" (Rigby, 1998). To minimise the danger, we should understand the tool before we attempt to use it.

The tools are, however, worth using. Knowledge management – from at least one perspective – leverages intangible assets to create real assets. This is done by spreading knowledge across an organization, to ultimately provide new products, increase sales and improve processing efficiencies. In addition, employee turnover becomes less of an issue because expertise is communicated. (Tauhert, 1998)

This paper presents the results of analysis of journal articles, in a search for the meaning of "knowledge management". No single meaning was found. Rather, a range of meanings was found and then categorised, to give some structure to the field.

The research was done using techniques of grounded theory qualitative research (Patton, 1990) using published articles as a tightly constrained – and already existing – set of primary research data. These research techniques are only briefly described; the emphasis of this article is on the results of the research: the main themes and activities discussed in published papers on "knowledge management".

Research Methodology

Concepts described in this section are based on the grounded theory text by Strauss and Corbin (Strauss & Corbin, 1990). Page numbers shown in brackets are from that book.

Grounded theory is based on a study of all concepts relevant to a given phenomenon. The primary data is coded, all relevant items of codes (concepts) are identified. A key category is identified and each code item is related to the key category. The structure of relationships is shown in Figure 1.

![Figure 1. Category Relationships](image)

The phenomenon under study – knowledge management – had been decided, in advance, by the researcher. There was an initial expectation that the phenomenon would relate to a wide range of topics, a wide range of related codes. Beyond this, however, there was no pre-research theory; Any theory was inductively derived from a study of the data (page 23). The theory is "grounded" in the data.
The researcher began with a certain level of theoretical sensitivity, some preconceived "awareness of the subtleties of meaning of data" (page 41). This is from both professional and personal experience: The author is both an IT practitioner and a postgraduate student. Being aware of – and attempting to minimise – the possibilities of bias was a part of the research.

The primary research data is journal articles, selected from ABI-Inform, an online library database. The database was searched for the key phrase "knowledge management". To reduce researcher bias, the articles were analysed in order of presentation by ABI/Inform. A limited number of articles were analysed – purely a practical decision. The result is an indication of the scope of knowledge management, rather than a definitive result.

Each article could also discuss a number of other topics other than knowledge management. Since the researcher was interested only in a part of each article, it was not necessary to code the rest. Knowing that "knowledge management" was the key category – the phenomenon under study – made it easier to identify other related items for coding.

The result of this research was to allow theories to be drawn from the data. The "theories" represent the broad themes into which the field of knowledge management articles may be grouped.

SCOPE AND THEMES DISCOVERED

Causes and Consequences

The axial coding for each article began with causes (or "causal conditions") and ended with consequences. These causes and consequences were examined and grouped.

Causes in the sample articles fall into five major groups, related to: individuals, the organisation, strategy, technology and knowledge. That is, the causes (or reasons) for implementation of a knowledge management system were related to one or more of the five groups. This is the first theory to be drawn from the research:

Theory 1 Causes – reasons given for the development or use of a knowledge management system – fall into one or more of five major groups, related to: Knowledge, Technology, Individuals, the Organisation and Strategy.

(Note that this and other theories are summarised in Table 1 and in Figure 2.)

For example: Cowey (Cowey, 2000) writes of the need to protect major, intangible assets. Knowledge is one of those intangible assets that needs to be protected. Knowledge may be protected by use of a knowledge management system. Thus the existence and value of knowledge lead directly to the need for knowledge management. This article falls into the major group of "knowledge".

Cowey's 1999 article (Cowey, 1999) is an example of an organisational factor being a cause of knowledge management. "Organisations attempting to make the transition from industrial era thinking to knowledge based value creation face enormous change." The attempt to update the organisation structure, to replace the "models that still govern many organisations (that) are not only outdated they are actually counter-productive and constraining" is one cause of knowledge management being implemented.

The article by Copeland (Copeland, 2000) covers two major "cause" groups: individuals and technology. The article is an interview with the new CEO of Lotus Development Corporation, so the phenomenon of knowledge management is strongly related to that individual's views and actions. Then, "The real point of (the package) is the value of being able to know what you know through the
discovery capability that (the package) brings." That is, install the new package – the new technology, the cause – and knowledge management will follow.

Causes in all of the analysed articles fall into one or more of five major groups:

- **Knowledge**: Knowledge itself – its existence, its value, the need for knowledge to be effectively managed or protected – has driven the development of a knowledge management system.
- **Technology**: Implementation of a new technology is seen as being a key factor in the creation of a knowledge management system. Suitable technology – usually in the form of a new application or package – may be seen as all that is required for knowledge management.
- **Individuals**: Implementation or use of knowledge management is a direct result of an individual’s decisions or views.
- **Organisation**: The way in which the organisation operates, or is structured, has a direct bearing on the existence of knowledge management. The knowledge management system exists because of the way in which the organisation operates or is structured.
- **Strategy**: Knowledge management is implemented as part of an organisational or information strategy. Organisational strategy includes responses to external forces, such as customer, supplier, market or environmental effects.

The consequences described in each article – the ultimate effects of knowledge management – fall into four similar yet different major groups:

**Theory 2**

The Consequences of knowledge management fall into one or more of four major groups: Individual, Operational, Strategic and Knowledge Management effects.

- **Individual**: The effect of the knowledge management system on individuals.
- **Operational**: The knowledge management system is used as a part of day-to-day operations of the organisation.
- **Strategic**: Knowledge management becomes a part of strategic planning for the organisation, or, the article discusses the effects on knowledge or information strategies.
- **Knowledge Management**: The article discusses consequences in terms of the overall effects on knowledge management across organisations in general.

*The Economist* (Anonymous, 2000) and Abramson (Abramson, 1999) provide two disparate examples of the individual consequence category of articles. The first points to a negative view of knowledge management, that individuals may be reluctant to surrender their valuable personal knowledge to the organisational system. Abramson sees the positive consequence – for the organisation – that each individual will now be equally capable of providing a high level service to each client.

The analysed articles provide a variety of consequences in the strategic group, both positive and negative. Malhotra, for example, sees situations in which a knowledge management system may undermine organisational information strategies (Malhotra, 2000). Cowey sees knowledge management as a means of avoiding the consequence that he calls "organisational death" (Cowey, 2000). Stepanek provides a case study in which effective knowledge management has led to improved innovation (Stepanek & Weber, 1999).

Sutton writes that actual knowledge management initiatives are often unsuccessful – a consequence of knowledge management across organisations in general (Sutton, 2000). Sutton also describes some operational aspects of knowledge management, so that article fits within two major consequence groups. Tyler sees more neutral consequences for knowledge management in general, that knowledge users will manage knowledge management development and that knowledge management requirements will become more complex (Tyler, 2000).
Context, Situation and Action

The Phenomenon – the central idea under study – is "knowledge management". The Context – "The specific set of properties that pertain to a phenomenon" ((Strauss & Corbin, 1990) page 96) – describes the central form and features of the knowledge management implementation, as described in each article. Each aspect of context is a condition, a point along an axis.

In Copeland, for example, the ideas of the CEO are a part of the knowledge management context (Copeland, 2000). On an implied axis of new to old, the ideas are located at "new". (There is an interesting distinction in the coding of this article. The new CEO is a cause, but the context includes the new ideas of the CEO.)

There are other conditions affecting knowledge management – but not directly a part of the knowledge management system. Strauss and Corbin refer to these as the "intervening conditions", or, "the broader structural context pertaining to a phenomenon" (page 103). In this article the intervening conditions are referred to as the Situation.

Malhotra, for example, refers to "the new world of e-business" (Malhotra, 2000). This is not seen as a cause of knowledge management, rather as an environmental situation which must influence the actions taken as part of a knowledge management implementation. Similarly, Tyler (Tyler, 2000) describes the situation in which customer needs are developing, and these needs must be incorporated in a developing knowledge management system.

Given the knowledge management context and the effects of the situation, what Action has been or should be taken? Strauss and Corbin describe "action/interaction" as, "Strategies devised to manage, handle, carry out, respond to a phenomenon under a specific set of perceived conditions" (page 97). Each action has a consequence, as described in the previous section.

Once again, selective coding lead to key group of codes: for context, situation and action.

Theory 3 The knowledge management context may be grouped as: Managers, Culture, System and Scope.

- **Managers**: The people given responsibility for the knowledge management system.
- **Culture**: The conditions created within the organisation, in order to manage knowledge.
- **System**: Properties of the knowledge management system as implemented. This includes databases and other technologies that form the system infrastructure. (Although existing organisational infrastructure may be coded as a situation rather than context, in the organisation group.)
- **Scope**: Scope or type of knowledge (or information) that is to be managed.

Theory 4 The knowledge management situations may be grouped as: Environment, Organisation and Strategy.

- **Environment**: The conditions are a part of the organisational environment. This includes customers, suppliers, the economy and general industry or technology trends.
- **Organisation**: The structure, management and culture of the organisation. This group also includes processes, technology and systems already available within the organisation.
- **Strategy**: The existence, importance or state of organisational strategies that are not a part of, but can affect, knowledge management.
Theory 5  The actions taken as a part of knowledge management may be grouped as: Environment, Organisation, Process and System.

- Environment: Actions that affect the environment, where environment includes customers, suppliers and industry.
- Organisation: Changes to the organisation, as a part of the implementation of knowledge management.
- Process: Actual operation of – use of – the knowledge management system.
- System: Actions taken as a direct part of the development of the knowledge management system.

An article by Sutton (Sutton, 2000) provides a good example of the range of selective coding.

The context includes a culture of false belief that tacit knowledge can be captured in a knowledge warehouse. The context also contains a culture of disdain for the value of knowledge management, a disdain that increases with the value of the employee. The system was designed by people who did not understand how knowledge is turned into action. The best people to be managers of knowledge management are users not technologists, but the actual managers are "clueless".

Sutton does not describe any intervening conditions, there is no situation code item. The actions, however, continue the generally negative thrust. Millions of dollars are spent on hardware and software systems. Knowledge management experts are hired to manage the process, with knowledge curators who "badger people into entering information". The unsurprising consequence of all this is that information is not used, information warehouses have become "junkyards" and "the results are not pretty".

Stepanek, on the other hand, describes a context where the culture includes a centralised group for innovation, and ideas are encouraged throughout the organisation (Stepanek & Weber, 1999). Organisation structures and suitable reward systems provide a supportive situation. The action taken is to create a knowledge market system. All of this leads to a consequence of successful innovation for the organisation.

In each paper the context, situation and actions are closely linked, and the consequences closely follow.

Can the Theories be Generalised?

Open, axial and selective coding – techniques of grounded theory – have been used to develop group headings for articles that discuss "knowledge management". These groups are listed in the five theories listed earlier in this paper. The theories are summarised in Table 1.

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<th>Table 1. Summary of Group Codes</th>
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<td><strong>Identified Group Codes</strong></td>
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<td><strong>Cause</strong></td>
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<td><strong>Context</strong></td>
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<td><strong>Situation</strong></td>
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<td><strong>Action</strong></td>
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<td><strong>Consequence</strong></td>
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The codes appear, from the selective coding analysis, to be a minimum set, as few as possible to group all identified codes. Are they sufficient? The next stage of research was to apply the code sets – the groups – to more articles, to see if the same groups would apply.

Axial and selective coding of the article by Botkin (Botkin, 1999) indicate only one causal condition for the implementation of a knowledge management system: it should not be introduced as a "mechanism to fix a screwed-up business". This "negative cause" is successfully grouped under "strategy".

The analysis of Botkin's article discovered seven context codes. These were successfully grouped within the managers, culture and system groups from Theory 3. The managers group, for example, included responsibility for knowledge management being with all company leaders, and responsibility for the knowledge management system being with the CKO (Chief Knowledge Officer). There were no codes relating to the "context scope" of the knowledge management system.

Within the "system" group of context (that is, properties of the knowledge management system as implemented that are a part of the knowledge management system) one code item was, that spending on technology should be no more than one third of total spending on the knowledge management system. If more than this were spent, the article states, this is an "information technology" system, not a knowledge management system.

Ultimately, all codes were grouped into one of the groups identified in the various theories. The selective coding groups are successful so far.

The next article to be tested was essentially a product press release (Foley, Gilbert, & Ricadela, 1999). There were only three codes linked to the knowledge management phenomenon, three situations. The group code for each was, environment: The products being discussed would be offered by the supplier to companies considering knowledge management. Each product included features which would support knowledge management.

So far the theories – the set of groups to be used for selective coding – have been sufficient. The next article to be coded (Hickins, 1999) was specific to knowledge management. Each topic was discussed from several different directions. A first pass generated 66 codes items.

The article by Hickins provides a good test of the various code groups that have been discovered in the first sample data. In fact, use of the groups provided assistance in the coding of an article that has a large number of points to make regarding knowledge management.

SUMMARY AND CONCLUSIONS

Analysis of a number of published articles has discovered five groups of topics that represent the main themes and activities discussed in papers on "knowledge management". The groups are listed in Table 1 and summarised in Figure 2.
Figure 2. Summary of Group Codes

The list of themes, aims and activities – the groups that were discovered – have practical applications. They may be used to categorise articles that refer to knowledge management. The author, for example, has a particular interest in the relationship of knowledge management to strategic planning. Cause, situation and consequence code groups include "strategy" or "strategic". So the author would be interested in articles which could be coded within those groups.

A qualitative analysis of a single article – using open, axial and selective coding – could highlight inconsistencies within the article. Is it valid, for example, to begin with "technology" causes and end with "strategic" consequences? Some combinations of group codes may appear logical, others may indicate a need to confirm the logic of the article.

A standard set of group codes could also be used to indicate concentrations or gaps in research. In a given set of articles, for example, do most focus on the system within the knowledge management context? Is there a lack of consideration given to culture? How many articles consider the need to balance system, process and organisation actions?

An understanding of the topics – the themes – of published articles helps us to understand the scope of knowledge management. This, in turn, leads us to an understanding of what is actually meant when an author uses the phrase, Knowledge Management.

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Developments in Management Information Systems and Product Design: Structural Implications and Failure Reduction

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ABSTRACT

This paper draws attention to a shift in the relationship between the fields of Management Information Systems and Product Design due to new developments in the roles of corporate vision, mission and strategy; increased emphasis on brand and image in marketing and business success; the broadening conceptualisations of product and designer; the increased use of outsourcing and virtual organisations; and increased intra- and Inter-networking of computerised information systems. The paper concludes, inline with recent moves by major software developers such as SAP, IBM, PTC, Dassault Systemes and Fujitsu-Seimens, that Management Information Systems is conceptually best regarded as a sub-field of an extended discipline of Product Design.

Keywords: Product Design, Management Information Systems, design management, design failures

INTRODUCTION

This paper describes how changes impacting on Management Information Systems (MIS) and Product Design imply the need for a conceptual review of the relationships between them. It suggests the traditional conceptualisation of their relationship is partly responsible for the high levels of failure in MIS systems. Addressing this issue is important, therefore, because of its potential contribution to reducing the high levels of economically and socially costly failures of management information systems implementations (see, for example, Gottlieb & Salzman, 2000; Kumar, Dissel, & Bielli, 1998; Lyytinen, Mathiassen, & Ropponen, 1998; Rocheleau, 1997).

These serious levels of failure of management information systems contrast with the relatively low levels of failure in projects in other design fields, many of which involve greater financial value or complexity. Differences can be seen in many dimensions when comparing for example, the frequent failures and cost overruns in information system developments in industry and government with the low failure rates in the designs of complex products. Practical evidence is the contrast between the high failure rates in information systems in areas such as banking, air traffic control, e-commerce, student admissions, insurance, and Defence, with the low failure rates of very large scale product design developments in spacecraft, aircraft, motor vehicles, oil and gas extraction and refining, computer hardware, and civil engineering.

During the 1990s, Petroski (1996; 1996; 1992) investigated design failures across a broad front of disciplines and concluded the main reasons for failures lay in design processes, especially where designers did not make explicit their tacit knowledge to enable learning for further improvement (Friedman, 2002). In management information systems design, the focus has been primarily on the technical characteristics of the design problem and its solution (Kumar et al., 1998), and key issues in Product Design, the qualitative human activities of designing and the underlying personal attitudes and human factors of stakeholders, users and other constituents, have remained tacit or poorly represented.
in MIS design processes (Gottlieb & Salzman, 2000; Malhotra, 2001; Roepke, Agarwal, & Ferratt, 2000). Most failures of information systems have arisen from this neglect of these rather than technical issues (Kumar et al., 1998; Lyttinen et al., 1998; Malhotra, 2001). Product design processes address these neglected human issues as a matter of course. This suggests significant improvements to management information systems are possible if the designing of future management and other information systems is undertaken in a product design milieu and under the guidance of experienced product design managers.

MANAGEMENT INFORMATION SYSTEMS AND PRODUCT DESIGN: HISTORICAL PERSPECTIVE

Until recently, the fields of Management Information Systems and Product Design have been regarded as essentially distinct. Management Information Systems has focused on software and data systems that provide management with traditional information and metrics about sales, purchases, stock levels, payroll, and other aspects of a business chart of accounts (Power, 2002). In contrast, Product Design has focused on technical and aesthetic issues associated with products and services; design process methods; and computer-based support tools for designers (see, for example, CIPD, 2002).

From this traditional viewpoint, the characteristic organisational features of both Management Information Systems and Product Design departments originated in organisational theories focusing on organisational structure and business functions. Management Information Systems departments provide services (computer networked information systems) to other departments and to upper management and are often regarded as being associated with management functions. Product Design departments, in contrast, are traditionally regarded as lower level organisational units that take instructions from, and report to, higher management layers whilst providing a service (creation of drawings) handed ‘over the silo wall’ to production departments. MIS departments differ from Product Design departments in terms of their closeness in working relationship with management because of their role in supplying information to managers.

A key factor in the evolution of Product Design from its earlier traditional role is the understanding that the concept of a product (a thing produced) includes all human outputs in physical and abstract domains. These include organisational structures, business enterprises, marketing plans, management processes, government policies, information management heuristics, theories, maintenance plans, social and educational programs, and other systems and services. The field of Product Design contains an extensive range of design methods and theories that address most aspects of human design activity. Historical reasons, however, have meant that in a few design domains - such as management information systems - product design tools elsewhere regarded as essential have not been used. This shortfall in design methodologies and perspective correlates with the reasons identified for failures of designed outcomes.

NEW DEVELOPMENTS IN THE MANAGEMENT OF ORGANISATIONS

The above traditional descriptions of Management Information Systems and Product Design are based on a perspective on organisations that places great emphasis on managers’ experience and skills as key enablers of business success. Increasingly, however, it has become recognized that day-to-day management experience and skill is of less than expected value in achieving business success (see, for example, Malhotra, 2001; Wolstenholme, 1990, p. 29). The field of System Dynamics with its emphasis on designing systemic solutions, and the systematic design methodology movement emerging from the 1962 design conference in the UK (Jones & Thornley, 1963), brought attention to the need to move away from ad-hoc organisational solutions based on managers’ skills and experiences and towards designing improved forms of organisation, enterprise and their management (Forrester, 1998). Modern business organisational theory has moved away from ‘ongoing management’ and towards designing business structures and processes that require reduced levels of
day-to-day management (for example, Grant & Huston, 2000; Mohrman, 2001). In effect, this new perspectives places much greater emphasis on designing organisations that are intrinsically successful. The new approach is perhaps most obvious with respect to virtual organisations that utilize computer automated transactional processes, which depend on prior design of structures and organisational process that requires minimal management intervention.

NEW DEVELOPMENTS IN PRODUCT DESIGN

Traditional perspectives focusing on ‘spheres of managerial responsibility and compartments of activity rather than on processes’ (Wolstenholme, 1990, p. 29) have resulted in a view of Product Design that is limited in scope (Love, 2002, 2002). Conceptually, this is at odds with, and much narrower than, the broad picture of Product design found in the field of Design Research and espoused by many designers and design researchers. For example, Simon (1969) defined designing as a planning activity aimed at achieving preferred outcomes, and Jones (1970) defined design as initiating changes in man [sic]-made things (see, also, Friedman, 2002; Love, 2002).

Recently, this broader picture of Product Design’s central role in human endeavour and business processes has begun to be more widely accepted (see, for example, Bauch & Magura, 2002), which appears to be a result of several factors including:

- Increased understanding of the ways that Product Design activity shapes the brands and images of organisations and products. In parallel is increased awareness of the important contribution of Product Design through value chains to improve organisations economic success and sustainability (this appears to have developed first in Publishing and Graphic Design fields, and then more recently in Product Design).
- An expansion of the definition of ‘product design’ to include the designing of organisations, enterprises, services, systems (perhaps most evident in the designing of virtual organisations, and in designing solutions in communication and informatic domains).
- Increased awareness of importance of product design processes in successfully addressing environmental considerations (in, for example, the field of eco-design).
- Increased awareness of the importance of using the research methods of Product Design for understanding how users/consumers interact with actualized products of design processes. This is based on design research in the areas of, for example, ergonomics, human factors, user interface research, useability, health and safety, and marketing.

BRAND, IMAGE AND BUSINESS SUCCESS

Brand and image are central issues in business success (Hutton, 2001). Developments in Marketing have lead to increased emphasis on brand and image in terms of the products, systems and services an organisation offers, and in terms of the organisation itself - as held in the minds of business constituents whether upstream, downstream or alongside (e.g. collaborative) (MORI, 2002; Tellefesen, 1999, 1995). For most businesses, constituents that lie outside their boundary interact with the business through its products systems and services. These shape outsiders’ views of the business and their assessment of the value interacting with the business offers to them. Product designers, as designers of products, systems, services and the organisation itself, make the choices that define the brand and image characteristics of a business and its value-added outputs. In many cases, upper management undertakes many of these product design roles – particularly with respect to institutional and organisational design issues.

At grass roots level, Marketing consists of identifying wants and needs of likely constituents to support the designing of a business solution. This activity supports economic and other organisational development including organisational and individual learning (hence, in turn improving product design) (Tellefesen & Love, In Press; Tellefesen, 2001). In addition, are marketing strategies that are
part of a broader design brief, and whose purpose is to inform those staff actively involved in persuading constituents to exchange value on the open market to the benefit of the organisation (e.g. advertising and sales departments). In contemporary product design activity, planning for these latter processes, along with investigations into the characteristics of costs and resources available, is usually undertaken very early on in the designing of a product, system, service or enterprise.

Management Information Systems and Product Design address issues of image and brand differently. Management Information Systems typically focuses on information systems processes, and information hardware and software architectures that facilitate how upper management’s choice of image and brand emerge through mission and strategies into management processes. In this sense, management information systems are instruments of the product design processes. In contrast, Product design activities reach to the heart of activities of upper management in that product design activity is the means by which the image and brand are created. Product design is also part of the process by which an organisation or enterprise is itself designed as a ‘product’, in the sense that Jay Forrester coined the term ‘enterprise designer’ (Forrester, 1998). The essence of enterprise, therefore, is in most cases what is created through its product design processes.

Management information systems have a significant role in the propagation of the images and brands of an organisation and its products and services. In failure terms, however, a major issue is to avoid the significant negative impact on a business’s image and brand though malfunction – particularly when it involves management information systems (e-commerce for instance) oriented to, and used by, outside constituents and will give these constituents an adverse impression of the capabilities of the business. This is another aspect of the failure problems associated with management information systems. In essence it is a design issue rather than an issue specific to Management Information Systems theory, because choosing management information systems, and the ways that they are installed and maintained, are considerations central to designing a management information system as a ‘product’, paid for and used by the internal and external business constituents.

**INTRA AND INTER-NETWORKING DEVELOPMENTS**

The early origins of the field of Management Information Systems predate the use of computers, but a convenient ‘birth date’ for modern Management Information systems using computers is the work initiated at the Lyons retail organisation in the UK in 1949 (Land, 1998). Recent changes in network technologies have resulted in the widespread uptake of local area, wide area and Inter-network systems. These developments have supported the geographic dispersal of business processes and management information systems and reduced the need for management information systems to be tightly located around a company mainframe. Middle-ware software services have been developed that support coordination and integration between different proprietary or legacy software applications and hardware platforms, and at the largest scale, Enterprise resource planning programs (ERP) as provided by SAP (www.sap.com) and other business system integrators provide a primary rather than supporting role. These ERP systems are a key Management Information System initiative, improving the efficiency and effectiveness of business processes, and have, until recently, been regarded as the ultimate business system integrator bringing together payroll, inventory, sales, invoicing, accounting, finance, asset management, customer relationship management and purchasing systems.

The dominant effect of computer network systems on Product Design is, as in Management Information Systems, increased freedom in geographic location. In Product Design processes this allows flexibility in location of subsidiary design processes. It also amplifies the benefits as product design methods and approaches are increasingly applied to processes such as: market research; corporate image management; internal and external documentation; packaging; distribution processes; manufacturing processes; stockholding; environmental management; innovation program; asset and plant purchase and maintenance; design management; end of life issues; and all the accounting and financial processes associated with designing a particular product, system, service or organisational structure, whether used in the business or by one of the business’s constituents. Local area, wide area
and Inter-networking has enabled the extension of integrated Product Design (and included business processes) under large scale integrating paradigms such as Product Lifecycle Management and Collaborative Lifecycle Management. Improvements to networking have also supported the design of well-integrated supply and value chain relationships with, e.g. tiered preferred suppliers and distributors. In addition, the relatively recent large increases in available Internet bandwidth have opened the possibility for real time product design processes that can involve remote manipulation of manufacturing plant. For example, automotive engine designers in (say) the UK can change in real time how engines they have designed are being manufactured in (say) China by using Computer Aided Manufacturing (CAM) or Computer Aided Engineering (CAE) design processes to make real time changes to settings on automatic machining systems making engine components. Another major gain in product design from networked information is the enabling of geographically separated concurrent engineering (CE) processes by which an organisation can be created, and production and service processes designed and built, at the same time that research is being undertaken to identify characteristics to design the product, system, services and distribution processes. These concurrent product design processes are relatively commonplace and go back to the early 1930’s in large-scale engineering enterprises (Spoerre, 1999), although are relatively unutilized in other business domains.

DEVELOPMENTS IN OUTSOURCING AND VIRTUAL ORGANISATIONS

The increased flexibility provided by computer-networked management information systems has been a key factor in the increased prevalence of outsourcing arrangements because of its role in reducing management transaction costs particularly where these are time dependent. It has resulted in outsourcing becoming a major topic within the Management Information Systems literature and a common focus for conferences. Surprisingly, in view of the information focus of Management Information Systems, much of its literature on outsourcing is concerned with issues that might be more properly dealt with in other fields such as Management and Accounting. The development of middleware and enterprise resource planning software has not only enabled integration of software and hardware systems and services within an organisation, but also between organisations. This removed or reduced one of the main technical barriers to the success of mergers, acquisitions, and outsourcing arrangements. It has led increasingly to a natural extension of these arrangements, the formation of virtual businesses. These ‘virtual organisations’ consist in some cases almost exclusively of outsourced services held together by management information systems especially large scale, web-enabled integrating software packages such as ERP systems.

In Product design, there is a long tradition of the use of outsourcing and virtual organisation arrangements, especially in engineering domains. They predate similar developments in Management Information Systems by at least 20 years. The historical context is that designers of products, systems services have made arrangements between geographically and economically separate business units for many centuries (the origins of contractual law might be seen as founded in resolving the practical issues involved in bringing together the elements of virtual organisations in order to achieve success in production-based commercial outcomes). In developing optimal design solutions, the location of different aspects of a design’s ‘production’ is a key issue, and ‘outsourcing’ has for several centuries been an element of that product design discourse. A part of the outsourcing issue, in design terms, is the actualization of information and communication analysis processes to support organizationally remote arrangements that form parts of a designed business solution, and this includes the design, or choice, of appropriate management information systems.

Many virtual organisations are, in essence, an extension of outsourcing arrangements. Several different morphologies of physical arrangements are possible for virtual organisations, sometimes best categorized in terms of the contractual arrangements between constituents (Burn & Tetteh, 2000; Lethbridge, 2001; Tellefsen & Love, h Press; Tellefsen & Love, 2001). Like outsourcing, virtual organisations have become a staple of early 21st century Management Information Systems’ literature. Again, like outsourcing, the Management Information Systems literature is marked by issues that lie outside the traditional information focus of the field, and might be more properly be considered as
aspects of other disciplines such as: Management, Accounting, Marketing, Strategic Leadership or Computer Science.

**IMPLICATIONS OF NEW DEVELOPMENTS**

Two factors emerge from the above analyses. First, it is becoming increasingly clear that there is a relationship between Management Information Systems and Product Design as a result of new developments in, e.g. corporate vision, mission and strategy; increased emphasis on brand and image in marketing and business success; the broadening conceptualisations of product and designer; the increased use of outsourcing and virtual organisations; and increased intra- and Inter-networking of computerised information systems. The idea that they are essentially unrelated is illusory and appears to have resulted from early organisation models and theories. Second, the main focus (and core competence) of research, practice and education in the field of Management Information Systems is the designing of management information systems: management information systems are products, sometimes designed for use by internal clients (managers and workers), and other times by external constituents of a business (customers, suppliers, partners etc).

The above analyses suggest that there are likely to be advantages in regarding Management Information Systems as a sub-field of Product Design. The high levels of failure, and explanations of these failures (mainly neglect of human factors), are consistent with the idea that MIS professionals are involved in Product Design without using the skills and processes that other product design professionals have found to be essential to achieving high levels of success, and avoiding cost overruns and design failures. The implication is straightforward:

*Designing management information systems, the focus and core competence of the field of Management Information Systems, is better conceptualised as an element of Product Design.*

There is some urgency in addressing these issues because the large-scale nature of management information systems and their failures in both public and private sectors have significant social and economic costs. Attempts to improve the situation and through improving existing information systems design methods are unlikely to be successful because, culturally, management information systems approaches do not yet emphasise or include many key areas found to be essential to success in Product Design. In addition, the expansion of Management Information Systems design methods is unlikely because its information-based foundations epistemologically exclude many of the key human issues identified by Petroski and others quoted earlier, as being essential to reducing design failures.

**SOFTWARE DEVELOPMENT IN MANAGEMENT INFORMATION SYSTEMS AND PRODUCT DESIGN**

Major management information systems application software providers such as SAP and IBM have recently brought to market first-generation enterprise level software that echo the proposal presented in this paper. These new product design process software products include, and provide substantial added functionality to, all that was previously provided under ERP systems. Recent software developments include the Product Lifecycle Management software of SAP (SAP, 2002) and IBM (IBM, 2002), Collaborative Product Commerce software of PTC (PTC, 2002), and the Collaborative Lifecycle Management software of Fujitsu-Seimens (Fujitsu-Seimens, 2002), all of which provide an overarching Product Design software environment within which enterprise resource planning, business intelligence, supplier relationship management, design support services, and customer relationship management software are situated and have their independent roles. A typical scenario for PLM software is shown below modeled on that of Fujitsu-Seimens.
Overarching product development management frameworks such as PLM have been particularly attractive in the USA and Europe where there is increasing environmental pressure to address product end-of-life issues such as the disposal of cars and computer monitors. Although originating as an eco-design initiative, the concept of PLM has been extended significantly to include most if not all the positive and negative factors that result from the design and diffusion of a product system, service or organisation (Bauch & Magura, 2002; Davis, 2002). Its methods include organisational, technical and business product design processes used by the over 200 different disciplines of designers that may be employed by a global enterprise and needed to realise high levels of business, environmental and human sustainability.

By developing PLM and similar software as a conceptual basis within which other business software such as ERP are located, enterprise-scale software organisations, have made a clear commitment to the idea that Product Design provides the core conceptual functionality in managing business processes.

**SUMMARY AND CONCLUSIONS**

This paper has proposed that there are significant benefits in redefining the relationship between Management Information Systems and Product Design. The underlying premise of the paper is straightforward:

*Designing management information systems, the focus and core competence of the field of Management Information Systems, is better conceptualised as an element of Product Design.*

Implicit in this are changes in focus of the practice of MIS practitioners; changes in research focus for MIS, and changes in MIS education programs. The proposal is supported by analysis of developments in key areas impacting on both fields; by the evidence of and need to address Management Information Systems’ high levels of design failure compared to other product design fields; and by the widespread support evident in recent product developments of enterprise software providers (e.g. SAP, IBM, PTC and Fujitsu-Seimens) who have now swung firmly behind Product Design as the core of business improvement and reengineering and of Management Information Systems.

In the short term, two ways forward are:

- Undertake management information system design activities only within a Product Design process and under the guidance of experienced Product Design managers.
* Include significant proportion of appropriate Product Design theory and practice in Management Information Systems curricula.

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A Reflective Practitioner Writes on Some Issues in Information Management

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ABSTRACT
This paper reports on the methodology of reflective practice and information management in both government and private management. Specifically, we reflect on some topical issues in information management: the information management challenge in meeting customer expectations; strategic & competitive opportunities through information management; databases, data warehouses, and decision making; electronic commerce; developing it systems; protecting information and people. The authors contend that the major contribution of the paper is it demonstrates and supports, both theoretically and practically, a research approach that enables a reflective practitioner to have a voice in academic and research debate in the discipline of information systems.

INTRODUCTION
It is clear that information, and its effective collection, storage, analysis and dissemination, is a key resource for modern businesses. As a result people who are information literate and understand the information processes are likewise highly valued. Haag, Cummings and McCubbrey (2002) coin the term "knowledge worker" to describe these people. They go on to describe the factors impacting on the knowledge requirements of business including globalisation and electronic commerce.

The Management Information System (MIS) Challenge (Haag et al., 2002, p. 5) describes in simple terms what is required of an MIS. It links the MIS back to the demands of the customer, and to the challenge facing all business, that of effectively serving its customers. This is in turn linked to the "customer moment of value", providing product or service to the customer when they want it, in the location they want it, in the form they want it followed up by perfect delivery. The MIS is charged with supporting this process.

METHODOLOGY
In this paper we use a reflective practitioner approach to issues in information management. Reflective practice is a concept developed by Donald Schón in his seminal book "The Reflective Practitioner: how professionals think in action" (1983). In essence it describes a process of understanding the
thought and decision-making processes that underpin the actions of a manager (or practitioner). This approach validates the experience or art of management as an action research tool.

Susan Hall described reflective practice as “making tacit knowledge explicit” (Hall, 1998). Freidman (1998) took it one step further, using reflective practice as a diagnostic tool for those situations where “automatic, skilled reasoning and behaviour” gets managers into trouble.

Reflective practice is underpinned by participatory action research methodology (Ellis & Kiely, 2000). This allows the participants to “create their own knowledge and theory relevant to their own specific situation”. Freidman (1998) pointed out that the challenge in this process is to balance the disturbance in equilibrium necessary to enable change with the psychological safety essential to a learning environment.

Stan comments on the reflective practitioner approach as follows:

To date the main benefit for me in post graduate study has been in terms of more knowledge and better understanding of management tools and concepts. If reflective practice can help me to better understand what makes me tick as a manager, and to use this understanding to perform better, it will be a very worthwhile addition to my personal tool kit.

Mark comments on the reflective methodology as follow:

By way of introduction, I describe a metaphor that I use to represent reflective research approaches. Harry Wolcott (1993, p. 23), writing in Denzin and Lincoln's Handbook of Qualitative Research (1994), gives a descriptive typology of qualitative research in the following diagram (see Fig. 1). On first sighting Wolcott's diagram, I experienced feelings similar to those that Jacques Derrida (1987) reports on first sighting the post card picture of Plato and Socrates that formed the pictorial metaphor for his The Post Card: From Socrates to Freud and Beyond: "I stopped dead, with a feeling of hallucination (is he crazy or what? he has the names mixed up!) and of revelation at the same time, an apocalyptic revelation" (p. 9). The picture shows Plato apparently ordering Socrates to write down Plato's own ideas- a reversal of the common understanding - and also, for Derrida, a "zany confirmation of his own book (in On Grammatology and elsewhere) that writing is the "exile", the "wandering outcast" of Western logocentric tradition, the repressed term whose disruptive effects are non the less everywhere manifest in the texts of that tradition" (Norris, p. 177). I will refer to this again.

Similarly, I thought: "What will my Business Faculty colleagues say when they see a real tree drawn, instead of the analytic top-down chart? But I think that it is finely appropriate to depict the living unity in diversity, the organic essence, which displays itself in the diversity of approaches in qualitative research". In Figure 1, I have drawn a tree house that I have labelled "investigating topical issues in information systems practice and theory" on the top of the bough labelled "field study-phenomenology".

Continuing this pictorial metaphor, researchers using this approach carry the construction materials with them (that is, my own abilities as practitioner and) as they climb the tree (that is, explored the options available in qualitative research). Finding the right spot, we construct our place from which to research.

In my research, I am influenced by certain forms of what is labelled on the tree as phenomenology and post-structuralism. With a reflective turn, influenced by Donald Schon's (1983) idea of the reflective practitioner, I usually climb right up to the top of this bough to the position labelled as heuristic inquiry and construct my heuristically reflective viewpoint from which to pursue my research.
In terms of the metaphor, this place is close to the full theoretical sunlight and fertilising influence of multiple theoretical frameworks. But it is close to the edge, offering a good overview but with the danger of becoming unstable and detached from the main trunk of information systems research. I have chosen to live with a feeling of insecurity while out on the limb, but I was heartened by Eisner's (1992, p. 29) comments that: "As long as your convictions about your aims and your methods are supportable, your own rationality will provide the deepest source of your security."

Figure 2-1. Pictorial metaphor of the place of reflection practitioner research (Adapted from "Qualitative Strategies in Educational Research" (Wolcott, 1993, p. 23))

And my own rationality tells me that Walcott's evocative diagram has to be balanced by another. Renata Tesch's (1990, pp. 72, 73) stylised diagram (Fig. 2) does have a conceptual clarity which I found helpful when re-evaluating my research approach in 1993. This diagram shows the qualitative research interest as the characteristics of language, the discovery of regularities, the comprehension of the meaning of the text/action, and reflection.
With my research interest in the "reflection" area of Tesch's typology, I use "heuristic research" including a type of psychological reflection similar to "reflective phenomenology".

I understand Donald Schon's (1983) notion of the reflective practitioner as part of the self-reflection inherent in qualitative research. Lomax and Parker (1995) cite Griffith's model of action research in which the inner most of three loops is "associated with Schon's idea of reflection in practice" (p. 305).

The research interest is in . . .

- **the characteristics of language** (content analysis, discourse analysis, ethnography of communication, ethnoscientific, structural ethnography, symbolic interactionism, ethnomethodology)
- **the discovery of regularities** (transcendental realism, ethnographic content analysis, event structure-analysis, ecological psychology, grounded theory, phenomenography, qualitative evaluation, action research, collaborative research, critical/emancipatory research, holistic ethnography, educational ethnography, naturalistic inquiry)
- **the comprehension of the meaning of text/action** (phenomenology, case study life history, hermeneutics)
- **reflection** (educational connoisseurship, reflective phenomenology, heuristic research)

Figure 2. A condensed sketch of Renata Tesch's diagram labelled "Graphic Overview of Qualitative Research Types" (1990, p. 72, 73) [my emphasis]

In the following sections, we use the approach to comment on some topical issues in information systems that are raised comprehensively in the university information systems text book "Management Information Systems" co-authored by Haag, Cummings, and McCubbrey (2002).

**ISSUE 1: THE INFORMATION CHALLENGE AND MEETING CUSTOMER EXPECTATIONS**

One working definition of customer satisfaction was meeting customer expectations. This is not dissimilar to Haag’s customer moment of value. Customer satisfaction is actually achieved by exceeding customer expectations. Meeting customer expectations is no more than customers expect and demand, and simply meeting those expectations will provide no reason for this customer to remain loyal. Only by exceeding expectations is the customer satisfaction achieved.

Stan comments that “Haag et al suggest that by satisfying these four dimensions that make up the customer moment of value will result in business success, and to some extent in my experience this is correct. In 1997/98 I was involved in the formation of Employment National, the government business enterprise that replaced the Commonwealth Employment Service. This involved a wide range of physical, financial and cultural challenges, not least of which was examining the nature of the business, the customers and what would constitute customer satisfaction.”

We can take this one step further. Having exceeded customer expectations, what happens to the expectations next time? The customer now expects the level of service delivered previously. Their expectations have increased. For the customer to be satisfied the new, higher expectations must be
exceeded. Hence we can add a fifth dimension to customer moment of value. This is continuous improvement; finding ways of incrementally adding additional value to the customer's experience.

ISSUE TWO: STRATEGIC & COMPETITIVE OPPORTUNITIES THROUGH INFORMATION MANAGEMENT

Haag et al examine ways in which organisations have used technology for competitive advantage. I found this discussion particularly useful because it focussed on real life practical examples of organisations extracting a real competitive advantage from innovative use of information technology.

Of particular interest is the use by Haag et al of marketing theory to drive competitive advantage. This includes Porter's Five Forces Model, and the three generic strategies (Haag et al, 2001, pp 58-59). They go on to use Porter's Value Chain model to examine the contribution each of the elements of the business contribute most to the customer moment of value. Kotler et al (p. 600) attempt to redefine the value chain as the demand chain, suggesting that analysis work backwards from customer demand rather than vice versa.

These are each well accepted tools in marketing theory. The importance of using these tools in the context of information management is that they provide some integration with mainstream management practice.

Stan states that "in my experience the technology, or the technology vendors, rather than the customer has often driven improvements in technology. Technology has been embraced as a method of creating internal efficiencies without adequate consideration of the needs of the customer."

ISSUE THREE: DATABASES, DATA WAREHOUSES, AND DECISION MAKING

This issue is of particular interest and relevance to Stan's recent career as as a consultant and a senior manager in the employment services industry. Since the Federal Government, through the Department of Employment and Workplace Relations (the department) created the Job Network in 1998 a significant element of delivery architecture has been the technology underpinning service delivery. This infrastructure includes:

1. Integrated Employment System (IES) – a segmented database used by the department, Centrelink and Job Network providers to perform and record client transactions and make claims. Initially to access this database Job Network providers were required to install emulation software to allow PC's to act as mainframe terminals.

2. Australian Job Search (AJS) – a web based data warehouse listing all jobs generated by Job Network providers, jobs listed directly by employers as well as from third party vacancy databases. This system is accessible from touch screen units in Centrelink Offices and directly over the Internet.

3. Corporate Interface – a broadband connection to the IES that allows providers to exchange information using third party proprietary software. Using this arrangement providers are able to set up their own transaction processing and data warehousing systems using the segment of the IES database relating to their own clients and activities.

The entire system is underpinned by the department's transaction processing systems. All invoices are submitted electronically and paid by direct credit. There is substantial exchange of information electronically between the department, Centrelink and providers, as well as data matching and fraud prevention strategies based on patterns of information. Finally, the entire system is protected by individual user passwords, and complete audit logs of all on line activity.
In classifying types of decisions Haag et al (2002, p. 129-130) distinguishes between structured and unstructured and recurring and non-recurring. Further the components of a decision support system were identified as data management, model management and user interface management.

While the advantages of Decision Support Systems are clear, we had some difficulty in applying the models to the delivery of social services. Most decisions faced by managers in this context relate to managing agency finances, human resources and clients. Almost by definition services to clients are tailored to meet client needs, and most decisions are unstructured and non-recurring.

There are however circumstances where DSS can be applied, and this is in part the reason that third party proprietary software has become popular with Job Network providers. This software allows managers to:

1. Better understand the nature and make up of its client groups through data warehousing and analysis
2. Track the performance of individual caseworkers
3. Better monitor the performance of different sites and different strategies

Social service agencies generally provide services on behalf of government under a fee for service arrangement. Increasingly payments are made dependent on the achievement of particular client outcomes, providing less financial certainty for agencies.

Stan states that “in my role as a consultant in this field the use of spreadsheet financial models has been a particularly useful decision support system. By changing key variables it is possible to perform sensitivity analysis. By understanding how, for example, the rate and time taken to achieve outcomes affects returns, it is possible to ensure that proposals are appropriately structured and priced for financial viability.”

ISSUE FOUR: ELECTRONIC COMMERCE

Haag et al examine the growth of E-Commerce and identify that B2B (business to business) has been more successful than B2C (business to consumer) or C2C (consumer to consumer). In particular the success of customer integrates systems and value added networks is noted. A key feature of many of these arrangements is that often they are driven by a large corporation seeking to improve efficiencies in their supply chains.

An example is the Federal government, in contracting the Job Network program, tenderers are required to participate in its electronic commerce systems. This incudes:

1. Providers must meet minimum technology requirements including computer specifications, operating systems and browsers
2. They must acquire a broadband internet connection using ADSL, cable or satellite
3. All transactions and claims are lodged on line
4. The department prepares recipient generated tax invoices based on claims
5. All payments are made by direct credit.

In the latest round of Job Network tenders, due later this year the department is taking the process one step further. The new process includes:

1. Some rollover of contracts based on provider results
2. A paper-based process will qualify potential tenderers
3. Qualified tenderers will make on line bids through an Internet auction with a specific time window for providers to make bids
4. There will be as many rounds of bids as is required for all business to be allocated.

The department also contracts other programs such as Work for the Dole and the Personal Support Program. The administration arrangements for each of these programs mirror those of Job Network.

Another example is to effectively deliver training to Indigenous people you must overcome the challenge of remoteness. This is easy enough if you have a group of people with similar needs and aspirations, but far more difficult if you have one or two individuals at an outstation in Western Desert.

One successful strategy delivered by the WA Government is its Telecentre network (Grenwell, no date). This network of 40 community based training facilities is linked by satellite to Perth, and allows remote learners to access Internet, training and teleconferencing facilities in small country centres throughout the state. These facilities have been successfully used to deliver accredited training in Meekatharra and Mullewa.

ISSUE FIVE: DEVELOPING IT SYSTEMS

Stan’s career has been one of a general manager first in government, and then in the community sector. This has been punctuated by short periods as a self employed consultant, using my experience and expertise to help agencies to prepare successful tenders, and implement internal systems and processes for the successful delivery of services. He was for a short period the State implementation manager for a national mainframe computer system. The project involved extending the capabilities of an existing database to include on line data processing and financial recording. As a complete novice in the systems development process he was unaware of the failings in the process used. In particular:

1. The new system involved a significant devolution of data entry and financial management functions;
2. The new system, to be effective, needed to be complimented by substantial organisational and cultural change;
3. Staff required to use the system would need training and ongoing support, none of which was provided for in the project plan.

Stan states that “my role was to collect and disseminate information on behalf of the national project team. It was a part time role in addition to my normal duties. Despite my best efforts line managers did not grasp the significance of the changes until it was too late to adequately prepare, and I was faced with months of crisis management following implementation.”

In examining the description of the Systems Development Life Cycle, provided by Haag et al, all of the steps were followed, and the system met the organisation’s objectives. The planning process failed to take account of the degree of preparation and cultural change that would be needed to support the change. Often a new system has huge implications for people’s jobs and their day-to-day accountabilities. The challenge is not about training and support, but about change management.

ISSUE SIX: PROTECTING INFORMATION AND PEOPLE

In this chapter Haag et al enter a wide-ranging discussion of the downside of information technology. This includes such issues as ethics, privacy, diversity and information protection.

For the last 3 years Stan has been involved as a consultant and a manager for an indigenous specific employment service and training provider. Stan states that:

*While it is dangerous to make generalisations my own observations of a largely Indigenous workforce, and exclusively Indigenous clientele include:*
1. There is often a degree of educational disadvantage with staff less well educated. Often this will reflect in shortcomings in the clerical recording skills that are particularly important in the context of both employment services and training delivery.

2. Staff are often less technologically sophisticated than non-Indigenous counterparts. For example staff were less likely to have a computer and Internet access at home;

3. There are strong family and community networks, meaning there will often be some relationship between staff and clients outside the work relationship. This can have significant implications for confidentiality and privacy of client information.

These issues provide significant challenges for managers. There is a greater risk of security breaches through third parties obtaining user ID's or passwords. There is also an increased risk of inadvertent breaches of privacy. Much of the intellectual capital of the organisation is tied up in individual's relationships with their own community, and much of this intelligence is never recorded anywhere.

There is no easy answer to these challenges. In my own experience the only protection has been the application of consistent processes and procedures supported by ongoing monitoring.

DISCUSSION

We will use this section to conclude the paper by discussing the value and shortcomings of the use of reflective practitioner research in the information systems discipline.

Stan comments that:

Haag et al attempt to take a look into the immediate future and the implications of likely changes. The authors see the final hurdle as achieving IT fusion or technology transparency. More importantly they provide a list of suggestions for preparing for the workforce of the future. Perhaps surprisingly most of their suggestions would have been quite at home in a management course 20 years ago. Their list includes (Haag et al, pp. 353-354):

- Learning Solid Business Principles;
- Effective communication;
- Productive use of technology;
- Thinking globally;
- Acting ethically.

The important challenge in embracing future technologies is in recognising the ways in which they affect our jobs, and ensuring that the focus remains on customer service. Even the humble Email can be a powerful tool or a time wasting imposition depending on how well it is managed.

In using reflective practitioner research to be able to make such comments, I conclude that this approach does have a place in the information systems discipline. However, in my own case, I found it a difficult concept to come to terms with, not as a theoretical approach but as a practical tool. I have examined some samples of writings of reflective practitioners, and my own perception of the potential shortcomings of this approach include: 1. Personal observation can be used as a screen for a lack of quality of enquiry; 2. There seems to be a fine line between reflective practice and self absorption or even self justification; 3. It can be a dangerous tool in situations involving conflict, particularly if the author is involved in the conflict. Notwithstanding these concerns, there does seem to be significant potential for this methodology to produce real gains in personal and professional development.
Mark comments as follows:

As a final comment, I concur with Stan's hesitation about using reflective practitioner research and writing approaches. Indeed, I would go further in that I sometimes find myself sliding into what Appignanesi and Garratt (1996) warn as the dangers of postmodern reflectivity in "ironic self-consciousness, cynicism and politically correct hypocrisy" (p. 73). However, I continue to find reflective practitioner approaches, especially that of action-research professional practice, as fruitful avenue for practitioners to find a voice and be included in the research and academic conversation in the discipline.

One of the reviewer's comments about this paper ("If the author is Stan, a practitioner, then there is some value in the reflective approach. It brings practical thinking into the academic literature. If there is an academic author or even co-author then the potential value is drastically weakened and my recommendation is REJECT.") This comment highlights an interesting point of view about reflection practitioner research. There is a strong assertion that academics should be penalised for using such approaches, even if researching with a practitioner. Is the assumption that academics are not practitioners? Do academics practice information systems education and research and training? How about if academics practice or have practiced some information systems consulting full-time or part-time? In any event, why should academics be penalised for using any form of legitimate research methodology?

It seems to me that there appears to be an emotional resistance to a somewhat new and potentially fruitful research approach, especially for information systems practitioners wishing to research their own practice though research degrees. It strikes me that this issue is a challenge not only for conference paper reviewers.

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A Proposed Model for Evaluating the Benefits of Electronic Marketplaces

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ABSTRACT

Prevailing methods of IS evaluation remain embedded in traditional technical or cost benefit approaches and fail to include the less tangible benefits of current dynamic and complex information systems. This paper uses a review of IS evaluation literature to identify current issues and discusses how these issues can be applied to the evaluation of an example of a contemporary complex information system, the electronic marketplace. A conceptual model is then proposed to facilitate effective evaluation of the benefits of electronic marketplaces. This model shows the inter-relationship between the importance of the process of evaluation, the identification of benefits and the need for a longitudinal approach.

Keywords: Evaluation, electronic marketplaces

INTRODUCTION

Downes and Mui's Law of Disruption states that 'social, political and economic systems change incrementally, but technology changes exponentially' leading to a 'sense of vertigo' in people struggling to cope with the rapid developments of information technology (Downes & Mui, 1998). This is evident in organisations striving to understand the impact of new information systems that they often embrace through perceived competitive necessity rather than as part of long term strategic planning. It is particularly true in business to business (B2B) electronic commerce where the proliferation of Internet-based trading services has led to a complex and dynamic marketplace, with immense pressure on organisations to participate.

Following the key question of how organisations should deploy the Internet (Porter, 2001) comes the question of how to ascertain the true benefits of that deployment. Any process of evaluation is necessarily complicated when a full understanding of the IS and its potential benefits is lacking. This lack of understanding and the complexity of IS evaluations contribute to ineffective evaluation at all stages of system implementation and use and can lead to dissatisfaction with, or even failure of, the system (Irani & Love, 2001). The situation is further complicated by prevailing methods of evaluation. These remain embedded in traditional technical or cost benefit approaches and fail to take into account the less tangible benefits of today's more pervasive and complex information systems (Hirschheim & Smithson, 1988, 1999; Serafeimidis & Smithson, 1994b; Walsham, 1993, 1999; Willcocks, 1992; Willcocks & Lester, 1999).

This paper takes a theoretical approach to examining the evaluation issues in respect of one example of contemporary information systems, electronic marketplaces. These complex, networked, interorganisational information systems are a driving force in B2B e-commerce although evaluation of
the extensive benefits they promise remains, as yet informal and the results anecdotal. The advantage of first taking a theoretical approach to a subject is that it allows for a review of current literature in order to summarise the prevailing situation. This enables the construction of conceptual frameworks and models which serve as a starting point for empirical testing of the propositions (Webster, 2001). In this case, a theoretical model is offered as the basis for facilitating empirical evaluations of the benefits of electronic marketplaces.

This paper examines IS evaluation literature, both theoretical and empirical, primarily published in the IS discipline over the last ten years. This examination allows for the identification of issues that need to be addressed in the evaluation of contemporary information systems. The paper then considers these issues in relation to electronic marketplaces and proposes a model to facilitate a more encompassing approach to evaluation of the benefits of e-marketplaces.

**EVALUATION OF BENEFITS**

Information systems evaluation has long been a controversial subject with widely varying views on how evaluations should be carried out. This is, in part, caused by the difficulties inherent in creating clear definitions of what constitutes a ‘benefit’ and in effectively defining what is to be evaluated.

There have been significant changes in the focus of evaluation studies as information technology has brought extensive change to the business environment and information systems have become more complex and more pervasive. Early evaluation methods concentrated heavily on the technical aspects of system quality to determine system effectiveness in transactional uses. By the mid-1980s systems had developed more strategic value and evaluation methods were extended beyond the technical to include a broader range of aspects. These included user satisfaction, system usage and more commonly, financial measurements such as cost benefit analysis (CBA) and return on investment (ROI) (Hirschheim & Smithson, 1988; Mirani & Lederer, 1998; Serafeimidis & Smithson, 1994a, 1994b; Walsham, 1993; Willcocks, 1992).

A review of evaluation methods in 1992 (DeLone & McLean, 1992) provided a taxonomy of evaluation measures to consolidate the cumulative body of research. The majority of the studies included in this categorisation were of the 'positivist, mechanistic paradigm' (Jones & Hughes, 2001) that still dominates the evaluation process today. The need to extend this process and to develop a more holistic view has been supported by researchers who advocate the perspective of information systems as social entities (Farbey, Land, & Targett, 1995; Hirschheim & Smithson, 1988, 1999; Serafeimidis & Smithson, 1994b; Smithson & Hirschheim, 1998; Walsham, 1993, 1999; Willcocks, 1992; Willcocks & Lester, 1999).

In the current business environment, information systems have become more of a competitive necessity and the network-based, interorganisational systems now available have extensive consequences for an organisation in economic, organisational, social and management terms. These are intertwined with enormous changes in the macro environment where increasing competition and other global pressures are impacting on businesses augmenting the drive towards greater speed, flexibility and responsiveness. The benefits to be gained from implementing such systems are not anticipated to be definable in simple terms. They are often intangible, uncertain and difficult to quantify, and the stakeholders and individuals concerned with the system have different perspectives and goals. To evaluate them in terms of a cost benefit analysis or from a technical viewpoint would overlook the extensive benefits to be gained in strategic and managerial areas as well as the organisational impact.

The urgent need for more effectual evaluation of current systems is underlined by the high costs involved in implementing and maintaining them. Organisations’ expenditure on IT continually increases while IS projects are not seen to be meeting business objectives or investments to be delivering value (Jones & Hughes, 2001). Several studies have shown that effective IS evaluation is
rare, with few organisations able to gain meaningful information from the evaluation process (Ballantine & Stray, 1994; Hirschheim & Smithson, 1999; Ward, Taylor, & Bond, 1996). Practitioners continue to adhere to more traditional methods of evaluation, seeing information systems as technical systems and ignoring the social aspects (Ballantine & Stray, 1994; Hirschheim & Smithson, 1999; Ward et al., 1996), thereby foregoing a rich source of feedback on the benefits that are to be realised from current information systems.

**APPLYING EVALUATION TO THE ELECTRONIC MARKETPLACE**

The opening up of the Internet to the business world can largely be assigned to the commercial launch of the Netscape browser in 1994 (Bar, 2002). Since then the business world has been ‘caught up in the general fervour’ of assuming that the Internet changes everything (Porter, 2001). The confusion over how to deploy the Internet described by Porter is compounded by the perceived need to move quickly to embrace the technology. This sense of urgency has led organisations to participate in e-commerce without a full understanding of what they can achieve by doing so. The complex and dynamic environment of B2B electronic marketplaces is one area where such confusion reigns.

The proliferation of e-marketplaces and the range and diversity of their business models (Kaplan & Sawhney, 2000; Lee, 2001; Piccinelli, Di Vitantonio, & Mokrushin, 2001; Sculley & Woods, 2001) further complicate the picture. Electronic marketplaces fulfil many of the roles of the traditional marketplace, but are essentially interorganisational information systems that link multiple buyers and sellers (Bakos, 1998; Choudhury, Hartzel, & Konsynski, 1998).

Organisations can choose to participate in e-marketplaces at many different levels. They are primarily seen as transactional investments, where the main reasons for participation are a reduction in transaction costs, lower prices and improved access to suppliers (Bakos, 1991, 1998; Lin & Hsieh, 2000). However, the development of extensive further facilities enables marketplaces to deliver benefits in other identified investment areas such as strategy and information (Willcocks, 1994). The implications of this are extensive when organisations are faced with evaluating their participation and assessing the benefits of their involvement.

The aspects involved in an evaluation of the benefits, both tangible and intangible, are identified from the literature and the issues relevant to these aspects are discussed to add clarity to a confused situation.

**Setting the Context**

The context in which an organisation works has an impact on the benefits it can realistic hope to realise from a networked, interorganisational system in economic, social, political and cultural terms. Externally, changes in the macro environment such as globalization, increasing competition, a climate of acquisitions and mergers, and regional and national legislation (Ghoshal & Bartlett, 1998) impact on the business. Internally, individual company culture must adapt to the changing business environment where there is a drive towards greater flexibility, speed and responsiveness to customers (Downes & Mui, 1998; Raisch, 2001; Sculley & Woods, 2001; Senn, 2000; Timmers, 1999).

An understanding of the context of the organisation facilitates a better understanding of the strategic thinking within it and of the differing perceptions of those involved with the IS at varying levels of seniority (Farbey, Land, & Targett, 1999), thereby enhancing the evaluation of benefits.
Identifying the Benefits

The reported benefits of e-marketplaces are extensive, but are dependent on many factors including the type of marketplace and the extent to which a participating organisation makes use of the facilities offered.

As discussed above, the initial question to arise is the complicated and elusive nature of the definition of a benefit. E-marketplace facilities can be extensive and benefits may lie in intangible areas that are hard to quantify, particularly where organisations are driven to participate through perceived competitive necessity and anticipated benefits are not clearly in view. Some definition of categories of benefits would therefore benefit the evaluation process and provide guidelines for assessing where benefits lie. To this end the categorisation by DeLone and McLean (1992) provides a useful starting point. It encompasses a range of evaluation areas from the technical aspects of system quality to the more social and political classifications of user satisfaction and organisational impact. The remaining classifications of information use, information quality, and individual impact support the identification of benefits arising from additional facilities being developed as e-marketplaces evolve.

However, these categories do not address the possible strategic contributions that are anticipated from e-marketplaces (Bakos, 1991; Downes & Mui, 1998). Porter (2001) argues for the recognition of the Internet as a business tool that supports the building of strategy rather than an environment that requires the re-invention of strategy. Nevertheless, the consideration of strategic benefits to be gained from e-marketplaces should not be ignored and three issues have been identified that have a bearing on the consideration of strategic benefits. The level of IT integration in an organisation will influence the degree to which it can optimise its participation in e-markets. In addition, both the internal conditions of the organisation and the environment of the individual industry will have a bearing on the types and level of benefits identifiable in the evaluation process (Bakos & Treacy, 1986; Porter, 2001; Wang, 2000).

The Process of Evaluation

There is an overall consensus in the literature that the process of evaluating IS benefits is inadequately carried out by organisations (Ballantine & Stray, 1994; Farbey et al., 1999; Remenyi, Sherwood-Smith, & White, 1997; Serafeimidis & Smithson, 1994b; Smithson & Hirschheim, 1998; Walsham, 1999; Ward et al., 1996; Wilcock, 1994; Wilcock & Lester, 1999). This view is supported by empirical evidence that highlights the ineffectiveness of current evaluation methods (Jones & Hughes, 2001; Wilcock & Lester, 1996). Factors directly influencing the evaluation process are identified as follows:

Role of the Evaluator

The role of the evaluator in any evaluation process is a key element of a successful outcome. Walsham (1993) describes an evaluator as any person doing the evaluation or concerned with monitoring the actions and consequences of the IS. The evaluator may attempt to minimise the personal bias of the evaluation by using objective methods and data (Remenyi et al 97). However, in an interpretive methodology, the role of the researcher (evaluator) is recognised as an integral part of the process (the instrument) and recognition of the subjectivity of the evaluator contributes to the process provided the subjectivity is recognised and documented (Kvale, 1996). In a complex evaluation situation the perceptions and interpretations of the evaluator will play an important role in the process and need to be recognised. For example, users as evaluators have a different perspective from senior manager evaluators or financial evaluators and to ignore this will distort the outcome of the evaluation.
Purpose of the Evaluation

The difficulties of IS evaluation are exacerbated by the complexity of the business environment (Hirschheim & Smithson, 1999) and this is particularly true in the dynamic environment of the e-marketplace. Clarity of purpose is therefore essential and a key element of an evaluation is the recognition of what is being measured and why (Walsham 93). Without a clear understanding of the reasons (political, social or economic) for the evaluation, effective planning cannot take place.

Recognition of Stakeholders and Stakeholder Conflict

Stakeholders are various interest groups and individuals involved or concerned with the IS and effective evaluation requires an understanding and consideration of the perspectives of those individuals or groups (Walsham 93). Each individual member's interpretation and understanding of the IS will be different and will influence the evaluation (Remenyi et al., 1997), which may introduce conflict. Such factors as the degree of organisational power of the stakeholders and political considerations may have an adverse effect as stakeholders work their own agenda within the evaluation process (Remenyi et al., 1997). Recognition of the political and social aspects of the evaluation process is therefore essential.

Formal/informal

The formalisation of evaluation has become more acceptable with the introduction of quality management standards such as ISO 9000 (Smithson & Hirschheim, 1998), but it would be a mistake to restrict the process to the formal. The social context of IS evaluation brings in an informal assessment aspect which contributes (Walsham, 1993) by allowing continuous sense-making discussion about the IS within a group situation. These informal influences from the various stakeholder groups will change over time and affect the evaluation.

The Longitudinal Approach

The evaluation process is often categorised by the timeframe in which it is carried out and studies therefore emphasise whether they are pre or post implementation projects. Only a small percentage of IS research is carried out over a period of time. Orlikowski and Baroudi (1991, p5) recorded 4.5% of studies to be longitudinal. Indeed, there is a lack of post-implementation measurement in IS (Ward et al., 1996) while the importance of lifetime evaluation is seen as 'fundamental but neglected' (Willcocks, 1992). This is supported by Jurison (1996) who argues that the role of time is rarely considered and the preoccupation with pre or post implementation ignores the dynamic changes in organisational effectiveness that occur over time. His empirical study concludes that the impact of an IS on an individual precedes that of the impact on the organisation. Discernible benefits will therefore vary at any given time of study indicating that longitudinal studies, although time consuming and costly, are more effective. This agrees with Smithson and Hirschheim's (1998) view that evaluation covers the whole lifecycle of an IS and that the nature of the evaluation changes over time.

The context of the organisation will also change over time, particularly in the dynamic environment of the e-marketplace. Longitudinal evaluation must therefore take account of the impact and changes relating to the individual, the organisation and the micro and macro environment.

PROPOSED EVALUATION MODEL

The drawing together of all the factors affecting evaluation of an e-marketplace, identified from IS evaluation literature, enables an evaluation model to be proposed (Figure 1).
The continuing development of the electronic marketplace environment and the different levels of individual organisations' participation require that the model remains sufficiently adaptable for a broad range of situations. The proposed model shows the inter-relationship between the three essential facets of an IS evaluation: the importance of the process of evaluation, the identification of benefits and the need for a longitudinal approach. Consideration of each of these three facets enables issues that are relevant to an evaluation to be identified, although the individual circumstances of an organisation will affect the extent to which these issues are applicable. For example, an organisation that participates only in the transaction mechanisms of an e-marketplace is unlikely to gain the range of organisational and strategic benefits available to an organisation using a wide range of value-add facilities. Similarly, an organisation undertaking the feasibility stage of the IS lifecycle will not be able to identify some of the benefits they will realise at a later stage. However, consideration of the model will enable recognition of this and will positively contribute to the evaluation process further along the lifecycle.

Taking a holistic approach to the whole range of issues in the content and process of an evaluation over time allows for both tangible and intangible benefits to be identified for an organisation. The literature emphasises the holistic approach by highlighting the need to set these issues within the context of the micro and macro environments. This is particularly important in the dynamic electronic...
environment where organisational, industrial, governmental and global impacts can affect the marketplace and the benefits they offer.

The multiple considerations of the evaluation process indicate that an interpretive approach would render the most successful outcome, if all the factors are to be taken into account. This requires that adherence to the more traditional, mechanistic forms of evaluation be discarded in favour of the more holistic approach advocated in the proposed model.

SUMMARY

In the complex and dynamic environment of networked interorganisational systems such as electronic marketplaces, effective evaluation is both extremely important and extremely difficult to achieve. A greater appreciation of the change in focus from the technical aspects of IS to the perception of information systems as social entities calls for a broader range of issues to be taken into account in IS evaluations. There is a growing body of IS literature that reflects the changes in evaluation focus, and this has been used to develop a model for evaluating e-marketplaces, as one example of contemporary information systems. The proposed model facilitates the move towards more effective evaluation by setting out the interlinking factors, identified from the literature, that need to be considered in throughout the evaluation processes.

The identification of benefits is shown to be a complex area with several issues to be considered if tangible and intangible benefits are to be recognised at organisational and strategic levels. That the benefits of an information system change over time is recognised by the longitudinal facet of the model, which supports the 'lifecycle' approach that encompasses evaluation of an IS from feasibility to post-implementation. Clarity of purpose, the recognition of stakeholders with their differing agendas, and the role of the evaluator are central issues contributing to the complexities of the process of evaluation. To achieve a truly holistic approach that give a more realistic picture of the benefits, the micro and macro contexts within which an organisation functions must also be taken into account. While this more encompassing approach gives rise to greater complexity in the evaluation process, it will result in a better appreciation of the impact of an IS on an organisation.

LIMITATIONS

The range of literature on evaluation is extensive and reflects the very real problems that prevail in this area. The authors believe that the proposed model requires validation in two directions. Firstly, the literature review requires a broader understanding of evaluation literature in other disciplines such as education, where the evaluation process has been under discussion for over a century. Secondly, extensive empirical evidence is required not only to test this model, but across the whole spectrum of IS evaluation. This will enable a greater appreciation of how practitioners are addressing this intricate process in an increasingly complex business environment.

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Promoting Industry Links in Higher Education to Enhance Teaching and Learning: A Case Study

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ABSTRACT

This case study examines a range of options that were used to deliver an E-commerce unit at Edith Cowan University, using strategies to directly involve industry. These included using industry tutors, students designing and developing real industry projects, designing tutorial activities based on industry-relevant tasks and negotiating funding with the Department of Commerce of Trade for a presentation night that was attended by many industry representatives.

Keywords: Industry, Authentic Assessment, Higher Education, Cooperation

INTRODUCTION

While university-industry links have existed for some time, their relationship has intensified over the past decade, and is becoming more critical to both parties. More than ever universities are promoting research activities, training and consultancies with government and industry bodies. This comes at a time when universities are being forced to be less reliant on federal funding, while at the same time industry is becoming more aware of the benefits of forming relationships with universities. Within this context, how can faculty staff promote and develop the drive towards a university-industry nexus to promote teaching, learning, research and consultancies?

Universities have been recognised as being critical contributors to the creation, distribution and use of knowledge that is vital for the growth of industry (Hart, 1999). Also, there has been a substantial growth in industry related and commercial operations carried out by universities through their business units and commercial arms. Income from sources other than the Commonwealth has nearly doubled from 1992 to 1998, an increase of $1.3 billion dollars over this period (Kemp, 2001). This has encouraged many universities to strengthen their business operations, employing staff with entrepreneurial skills, and inviting industry leaders to sit on university council.
At the same time there has been a growing concern about the role of higher education institutions and how they are meeting the needs of employers. Increasingly, higher education institutions are being asked by industry, government and higher education funding bodies to produce graduates with versatile workplace skills, as well as subject-specific knowledge and skills (Australian National Training Authority, 1998; Bennett, Dunne, & Carre, 1999; Candy, Crebert, & O'Leary, 1994; Dearing, 1997; Mayer, 1992).

How can academics design courses that integrate these demands, involve industry, teach students the required content, motivate students and also promote the development of generic skills? This paper considers a range of strategic options that were used to involve industry in the delivery of a business unit.

**CONTEXT & BACKGROUND**

There is an acknowledgement in the university and industry communities that it is necessary to bridge the gap between what was historically a general university education and the industry expectations of graduates (Goldsworthy, 1999). The idea of linking industry and university in terms of research and development and educational programs is not new (Zhao, 2000). Japan and the United States have been consistently improving and developing close partnerships with industry (Hane, 1999) and Australia “has a long and evolutionary history of the development of university-industry cooperative linkages” (Aylward, Garrett-Jones, & Johnston, 1996). The focus of this paper is not on developing research links, but providing strategies to develop educational and pedagogical strategies to help promote authentic teaching and learning practices.

Our students need to develop work place problem solving, and transferable skills, which will provide the basis for developing contextual practice and further education. Changes in the work place, demand that workers continue to update their skills, especially technological skills, and increase their level of education and training. To address this higher education needs to equip students with the competencies, and abilities, to enter into the work force as confident, enthusiastic, flexible learners, who have the necessary skills to become dependable multi-skilled employees (Carmichael, 1993; O'Brien & Hart, 1999).

Graduate attributes, industry expectations, new technology, and workplace demands need to be addressed in university courses. It is essential that the university system reflect the needs of students and society, including industry demands and expectations. What this means for universities are vital changes to pedagogical philosophies, curriculum content and direction, development of pragmatic learning environments reflecting current industry trends and innovation as well as integrating information communication technologies (including online learning), to provide students with technological literacy skills. Employers will continue to see many young, disadvantaged job seekers, if educational change does not reflect industry demands (Hart, 1999).

In the political arena, a report from the Commonwealth Department of Education Science and Training titled “Higher education at the crossroads: an overview paper” identifies that higher education, specifically, university education as having the greatest influence and impact on Australia’s future generations (Nelson, 2002). The purpose of higher education, specifically university education is not just to provide job training but is regarded as “contributing to the fulfilment of human and societal potential, the advancement of knowledge and social and economic progress. The main purposes of Australian higher education is to:

1. Inspire and enable individuals to develop their capabilities to the highest potential;
2. Enable individuals to learn throughout their lives (for personal growth and fulfilment, for effective participation in the workforce and for constructive contributions to society);
3. Advance knowledge and understanding;
4. Aid the application of knowledge and understanding to the benefit of the economy and society;
5. Enable individuals to adapt and learn, consistent with the needs of an adaptable knowledge-based economy at local, regional and national levels; and
6. Contribute to a democratic, civilised society and promote the tolerance and debate that underpins it" (Nelson, 2002, p. 1).

This has lead to the identification of eleven principles of for higher education including: value adding, learner-centred, high quality, equitable, responsive, diverse, innovative, flexible, cost-effective, publicly accountable and socially responsible.

LEARNER-CENTRED FOCUS

Education and training needs to shift its focus to customise and develop a range of programs and opportunities to meet the needs of students and expectations of industry (Scollay, 1999).

Innovative teaching and learning environments, based on constructivist pedagogy, are also enhanced by creating strong, mutually benefiting industry links. Being responsive to community needs, client and industry stakeholders are integral to fostering industry-university collaboration.

This case study was designed in a learner-centred mode where students were encouraged to work independently and interdependently on collaborative, real world projects. The design of the unit, including its authentic activities, was based upon research that included student-centred or learner-centred pedagogical principles.

A focus of the following case study has been to engage with industry to enhance our students’ competitive edge and employability. It has provided opportunities for industry to have a significant input into the delivery of the unit that fosters a more active engagement between the interactive multimedia course and industry clients. Creating links with the community and industry should be considered part of the “core business, seen as being academically relevant and recognised as an important contribution to the overall role of the university” (Nelson, 2002, p. 23). There are concerns that expectations for universities to contribute to the growth of the economy may be unrealistic, and the “distortion of traditional academic values arising from links to industry” (Kodama & Branscomb, 1999, p. 3) and “university commercialisation efforts threaten traditional research and scientific values, and accepted norms of academic life including academic freedom” (Harman, 2001, p. 245). Universities are exploring and determining what their relationship with industry actually is even though many universities have over a number of years developed expertise and strong links with specific local industries especially in industrialized countries such as the United States, Germany and Japan (Kodama & Branscomb, 1999).

University-industry collaboration can be somewhat difficult to create and sustain as industry partners are constrained by time, economic and productivity factors (Brace-Govan, Farrelly, Joy, Luxton, & Davey, 2001). The following case study attempts to involve industry in all aspects of delivery.

CASE STUDY

These principles were applied in the development of a final year unit at Edith Cowan University, ‘IMM 3329 Multimedia Business Solutions’. This unit covers the general fundamentals of e-business principles, and applies them to the specifics of the multimedia industry, and in turn the wider industry that the multimedia industry serves.
Industry Tutors

Creating successful university-industry links requires both stakeholders to have a strong desire to improve educational outcomes. Edith Cowan University has a strong presence in the provision of training and collaborative activities with the service industries such as hospitals, police, entertainment and tourism. As this e-business unit has evolved over the last three years, opportunities have emerged with industry groups to widen the sourcing of industry tutors for the teaching unit.

After locating appropriate industry tutors and links, the final selection of industry tutors was based upon developing a ‘win-win’ strategy. The e-business unit, because of the nature of the subject matter, required tutors that were innovative, enterprising, motivated and willing to interact with students in a collaborative manner. Tutors would sometimes change classes for a few minutes, to share their different backgrounds and knowledge within different classes. The tutors held positions in the industry as:

- The e-commerce manager of a major international resort complex;
- The owner-manager of two multimedia businesses;
- A consultant in enterprise-wide e-business systems from a major international consulting group;
- The e-procurement manager of a major international resource company; and
- The commercial manager (with significant SAP experience), of a mining company.

Occasionally, tutors would present part of the lecture on a relevant topic, to incorporate their knowledge and experience. In addition, guest lecturers from other industries, when available, were invited to present to the class.

The general criteria that was used to help make decisions about selecting tutors for this unit include:

- Tutors require current experience in the field;
- Their company is innovative, aims for best practice or leader in the field;
- The tutor has a desire to mentor and share professional knowledge with students;
- The tutor sees value to their own personal growth and knowledge acquisition in being involved in an academic role;
- The tutors see the benefit in contributing and enhancing students opportunities for employment, work experience, and cadetships;
- Having an open and flexible approach to the teaching environment, in which they are receptive to the students’ ideas and feedback i.e. having appropriate interpersonal skills; and
- Desire to be involved in course design and influencing the industry relevance of the unit.

Authentic weekly activities

Each week the activities included an authentic business case study that provided an exemplar of an e-business issue. A discussion session at the end of each lecture reviewed whether the relevant issues were resolved in the real world business case presented, and importantly, how these were resolved. Each weekly lecture was followed by a two-hour laboratory tutorial. The laboratory tutorial exercises utilised real world e-business examples specifically selected to illustrate key concepts, and in particular, to illustrate the processes involved with planning, starting, and marketing a new e-business. For example:

"Investigate the process used by Jeff Bezos in founding Amazon.com and discuss why after 10 years he is extremely successful, even though he has never made a profit".
Students were given one hour to research this, and produce a one-page summary of the topic. The general criteria that was used to help integrate current industry knowledge and skills in the design and delivery of authentic weekly activities:

- These represent regular assessment points that are submitted at the end of each tutorial, and over the semester represent 20% of the total marks. The tutor (industry) performs the assessment.
- All the weekly activities reflect industry practice – case studies. Is a case study where students search for information and synthesise into a solution.
- Students need to see the industry relevance – must be proved. Must be authentic to the students.
- Current and relevant activities that support interaction between the students i.e. can discuss ideas while preparing a solution. In the following week, the tutor discusses the results and gives feedback.

**Authentic projects**

The projects were designed to reflect industry practice, and provide an authentic context to enable students to see the real world relevance of the project. The students worked in project teams to produce business plans for industry clients. The deliverables included:

- An e-business plan, using an international template, enhanced by the specific suggestions of the industry tutors;
- A prototype web site that showed how to integrate B2B or B2C to the business; and
- A formal public presentation to industry in a competitive environment with students from the School of Management Information Systems.

The general criteria that was used to help integrate current industry knowledge and skills in the design and delivery of authentic projects are:

- Provide authentic projects from the industry and government, to allow students to experience real world practice;
- Select clients that understand the scope of academic projects and provide the required support and content for students;
- Select projects that meet the assessment requirements of the unit;
- Provide appropriate scaffolding such as legal templates, professional interaction skills, time management, project management, and budgeting; and
- Make contacts through “cold calling”, professional associations and networking.

Examples of authentic projects included:

- Smart-E-party
- e-Pies
- e-Dinner
- e-Drilling Quotes
- On Line Debt Collection
- Perth Short Term Property Rentals
- MyNurse.com
- e-Funerals (pick-a-box)
- Aqua Eco
- Entertainment on line
- Possibilities..... (e-Hookers)
- BillDoctor.com
- OzThings.com
Presentation night

A presentation night was facilitated by a $10,000 grant from the Department of Commerce and Trade. Approximately 400 representatives attended the event that showcased student e-business enterprise, and entrepreneurial skills. Sponsors were selected to give prizes to the best project teams with the best e-business plans. To create a successful presentation night incorporating industry support and opportunities for networking and collaboration required that the university:

- Obtain funding for advertising from government and industry to host the presentation night;
- Provide opportunities for employers to view student projects and meet potential recruits;
- Have wide industry representation on the presentation night;
- Use industry representatives to adjudicate the presentations;
- Provide a social session as part of the presentation to allow attendees to meet presenters with some light refreshments; and
- Provide industry-sponsored prizes for the best products.

FEEDBACK

An evaluation questionnaire was administered at the end of the presentation night. Students were asked to comment on their perceived validity and usefulness of the unit. An analysis of student responses provided consensus that the unit was useful for:

- Enhancing employment opportunities;
- Generating business ideas for own business; and
- Providing an understanding of business expectations from potential employers and clients

Some sample comments from students included:

- “Hey! I got a job offer from those “suit – people” at the end of the presentations!”
- “This is the most useful subject I’ve ever done!”
- “We should do this earlier in the course, it would help us immensely!”

CONCLUSION

As the requirements for industry-university collaboration increases it is necessary to develop and maintain effective mutual relationships. This paper aims to provide some strategies to help academics integrate industry practice in the design, development and delivery of units in higher education as follows:

- **Industry tutors** – require current and relevant experience to the unit, be part of an innovative company and be a leader in their field. The tutor sees the mutual benefits of being involved with the university and also has a disposition to teaching and learning and interpersonal skills;

- **Authentic weekly activities** – designed around weekly assessment points, which are case studies that clearly reflect industry practice. Students are required to individually research information and discuss with their peers, and submit a one-page summary by the end of the tutorial that reflects industry practice. These are assessed by the tutor and discussed in the following week, relating back to an industry context;

- **Authentic projects** – selected from clients that understand the scope of academic projects and requirements of the unit, and also provide students with real world experience; and

- **Presentation night** – if possible obtain funding to advertise the event widely. Encourage as many industry representatives as possible to attend, and provide sponsorship for prizes. Also,
use industry representatives to adjudicate the presentations, and provide opportunities to socialise and make contacts during the night.

REFERENCES


Personality Type and e-Learning: The Use of MBTI in the Design of e-Learning Environments

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ABSTRACT

Participants the study used the results of the Myers-Briggs Type Indicator (MBTI) to assist in the design and development of web-based Individual Learning Environments (ILEs). Student reflections and type results are considered in terms of the design process. They are also used to consider participants’ metacognitive awareness of their own personality factors and learning styles. It is suggested that the use of MBTI in this manner will help to produce interfaces and environments more suited to the learning requirements of each individual.

Keywords: e-learning environment, autonomous learner, personality type

INTRODUCTION

The emergence of the independent or autonomous learner (Goodyear, 2000a) is one of the features of developments in higher education that parallel developments in environments for e-learning. However, a gap has emerged between the model of student learning in higher education being proposed (active, resource-based, student-driven learning) and the experience of many students and lecturers. A continuing problem with the current scenario in higher education is that while there has been a much expanded student intake and a move to a mass system, many of the processes and practices in use are those developed for an instruction-based elite system. While many of the processes and practices developed are and will remain useful and relevant, we have to ensure that those in use are suitable for functioning effectively within the resources and constraints of a mass system. Some central processes and practices (forms of assessment, tutorials which functioned effectively with eight participants but struggle with sixteen to twenty, personal tutoring) are increasingly under-resourced and under strain.

In addition, a perception has developed, especially amongst higher education managers, that the provision of information and communication technologies will, by themselves, provide useful and cost saving solutions. This approach often misses the point that the learning systems we are concerned with are social systems of which technology is only one aspect, often acting simply as an information carrier or interaction enabler. Consequently, when we consider environments for e-learning, it is necessary to consider the role of the learner in that system. Facets of user-centred design and student-centred learning can be merged in the form of e-learning environments developed in conjunction with the student and informed by the individual characteristics of each user.

Aims of the Study

The aims of this study were as follows. First of all, to ask students to reflect on their own learning characteristics and resources as identified by the Myers Briggs Type Indicator (MBTI) personality type. A second aim was to investigate the effects of awareness of personality type on the design and development of a personal e-learning environment. The latter was to be operationalised via a piece of
assessed work requiring the participants to comment on the design and development of a website with reference to their MBTI type. The website would also be designed to help support e-learning. For the purposes of this paper, the following definition of e-learning has been adopted:

> 'eLearning is the systematic use of networked multimedia computer technologies to empower learners, improve learning, connect learners to people and resources supportive of their needs, and to integrate learning with performance and individual with organisational goals.' (Goodyear, 2000b).

**Metacognition and the Autonomous Learner**

Several writers (Tait & Knight, 1996; Goodyear, 2000a) have discussed the concept of independent learning and the emergence of the autonomous learner. Goodyear in particular concerns himself with the question of 'How we should approach the design of learning environments that are consistent with the needs of autonomous life long learners' (Goodyear, 2000a). This quotation also indicates the need to consider all students as potential life long learners. The autonomous learner needs to be metacognitively aware in order to be able to make the best use of his or her personal learning resources. Phelps et al (2001) suggest this by making the connection between metacognition and the concept of the expert learner. While metacognition can be described as thinking about thinking, a more comprehensive definition was provided by Flavell (1976), who suggested that:

> 'Metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them, e.g. the learner-related properties of information or data. For example, I am engaging in metacognition if I notice that I am having more trouble learning A than B, if it strikes me that I should double check C before accepting it as fact.'

In a study concerning the potential role of reflective learning and metacognitive processes in the development of capable and competent computer users, the authors came to the conclusion that 'Reflection and metacognition is central to the development of 'expert learners' and thus can be seen to provide a sound framework for the development of 'capable' computer users.' (Phelps et al, 2001).

The development of an individual e-learning environment, plus the necessary use of metacognitive skills in reflecting on personality related learning were considered useful in the development the autonomous learner.

**METHODOLOGY**

Personality factors and the Myers-Briggs Type Indicator (MBTI) have a long association with systems development, human computer interaction and interface design (Weinberg, 1971; Shneiderman, 1980, 1998; Buie, 1988). In terms of e-learning, a recent study (Dewar & Whittington, 2000) has looked at the effect of MBTI type on strategies for online learning. Hulme (1994) considered the role of MBTI and cognitive preferences in diverse learning environments. In addition, MBTI has been used as a measure of both learning style (Kerr & Matta, 1987; Scholl, 1999) and cognitive style (Jones, 1994), the first and last of these in studies looking at educational computer use. Other studies have attempted to look at the relationship between cognitive style and the format of learning materials for computer-assisted instruction or web-based learning (Pillay, 1998, Boles and Pillay, 1999, McKay, 1999).

**Quantitative and Qualitative Data**

Although much work has been done on the nature of cognitive and learning styles, the application of styles to interface design and learning has proved more problematic. The above studies and others often reflected a continuing problem with the quasi-experimental and quantitative approaches used in that the results often found no significant relationship between the material presentation/interface style

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and learning. Several authors have commented on the need for qualitative research concerning the ways in which individuals interact with web-based e-learning environments (Summerville, 1999, Chen, 2000).

In an attempt to provide an alternative approach to exploring this area, a different and more process and qualitatively based methodology was developed. One of the main aims was to involve the students in the design and development of the interface while at the same time getting each student to reflect and comment on aspects of his or her personality profile and e-learning environment design and development process.

Myers-Briggs Type Indicator (MBTI)

The MBTI (Myers et al., 1999) is a well known management and educational tool for classifying personality type and which can also be used to measure cognitive style and learning style. Although there has been and continues to be a debate on the reliability of the MBTI (Nowak, 1996), its widespread use in HE studies and close connection to measures of learning and cognitive style (Scholl, 1999) led to it being adopted.

The MBTI is developed from the work of C. G. Jung and his theory of psychological types (Jung, 1923). Myers suggested 16 basic personality types which were created by the combinations of the elements of the four main scales (Myers and Myers, 1980):

- Extraversion (E) and Introversion (I)
- Sensing (S) and Intuition (N)
- Thinking (T) and Feeling (F)
- Judging (J) and Perceiving (P)

The results of an individual's MBTI assessment give a provisional type such as ENTJ, ISFP or ESFJ - i.e. the type is composed of one element from each of these pairs of preferences. This measure is widely used in educational and managerial research (Hammer, 1996).

Method

The self-report test for the MBTI was administered to a group of 64 students participating in a Human Computer Interaction unit. The tests and data collection procedures were an agreed part of the course content of a human computer interaction unit. The assessment procedures were designed to allow further data collection via reflective journals and the development and documentation of the Individual Learning Environment. In addition, the participants were asked to complete a questionnaire to report their reactions to various aspects of the study. The personality profile and MBTI results were used as part of the process of user modelling for HCI, e-learning environment development and interface design. This work was part of a wider study that also considered different measures of cognitive and learning style, but it was considered that personality type, as reported by the MBTI, could also be considered separately.

The Individual Learning Environment

The process of designing and implementing an Individual Learning Environment had two purposes:

- it gave the student experience of the cognitive aspects of Human Computer Interaction via the cognitive profiles
- it allowed the students to work on a system and develop a set of interfaces in a particularly well known area for the group (education) - a functional context application.

The following definition of an ILE was provided:
An Individual Learning Environment (ILE) is a system which is designed to support the information retrieval, information handling and learning support needs of the individual student. In its entirety, the ILE is a hardware and software system which is set up to replicate as many of the Learning Resource Centre functions as possible. These functions can include: Learning Support; Study Skills; Media Services; I.T. Support (Administrative); I.T. Support (Academic); Learning Resources and Career Services. The ILE should allow the student to store, retrieve and manipulate information from internal sources (storage, scanner etc.) and external sources (Internet, WWW etc.).

The functions of the ILE were to be organised around a series of web pages which would contain URL’s and processes relevant to that function. The majority of the functional processes (file/open/save/delete etc.) would be provided by the operating system and browser.

The assessment criteria requested that the system should be structured around the student's current and future units and any learning resources he or she wished to include. For example, resources for a particular unit could include URL's to articles, newsgroups or even the websites of similar units at other institutions. Other learning resources could include, for example, links to information on graduate courses the student might be considering or URL's to information considered useful to studies and learning in general.

In terms of systems development methodologies, students were asked to use Vora's methodology for designing web sites (Vora, 1998) for guidance on the design and development of the overall web site. For the interface aspects of the ILE, the user interface development procedures of the HUFIT (Human Factors in Information Technology) toolset (HUSAT, 1990) were followed. The elements and details of both of these procedures were covered in the unit lectures and tutorials.

RESULTS

The MBTI 'dichotomous frequencies' indicate the distribution of the 64 participants on each of the four main dimensions outlined above.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extroversion(E)-Introversion(I)</td>
<td>30(E) - 34(I)</td>
<td>47%(E) - 53%(I)</td>
</tr>
<tr>
<td>Sensing(S)-Intuition(N)</td>
<td>35 – 29</td>
<td>55% - 45%</td>
</tr>
<tr>
<td>Thinking(T)-Feeling(F)</td>
<td>49 – 15</td>
<td>77% - 23%</td>
</tr>
<tr>
<td>Judging(J)-Perceiving(P)</td>
<td>29 – 35</td>
<td>45% - 55%</td>
</tr>
</tbody>
</table>

The dichotomous frequencies for the MBTI, which indicate the overall distribution of the population along each main dimension, show that for three of the categories - E/I, S/N and J/P - the distributions are almost even. The remaining category, T/F shows a strikingly different pattern with almost four out of every five student taking the unit being classified in the thinking category rather than the feeling category. This may well reflect the nature of the subject area and its perception by the student body.

STUDENT COMMENTS

Reflective journals were used to facilitate reflection on each individual's personality type. Interface documentation described the design and development process of the ILE and again related it to elements of the personality type. Some journal reflections are first presented, followed by descriptions of how the type and individual dichotomies might have impacted on the design process for the ILE.
Reflection

Students were often familiar with the measure, several having taken the test previously. In those cases, there tended to be a greater metacognitive awareness of their attitudes to learning and studying. Several had made successful attempts to overcome what they saw as shortfalls in their learning practices and studying techniques.

The initials following each example represent the different types, the numbers their strength on scales of between 1 and 67.

E - Extroversion, I - Introversion
S - Sensing, N - Intuition
T - Thinking, F - Feeling
J - Judging, P - Perceiving

The first student in the reflective section makes an interesting transition from the explanation of the information-seeking habits of ‘perceiving’ students to the ILE design. It is on the basis of a marginal score (5) and thus illustrates the potential problem of literal adoption of general classifications. However, in this case, the student’s comments suggest that it is a reasonable interpretation.

‘I agree with the part about perceptive people, that ‘They start many tasks, want to know everything about each task.’ When learning, feedback is important to me. And yes, I tend to leave things to the last minute, to ‘seek information to the very last minute’, emmm...okay.’

This is later linked to the ILE design in a rather innovative way:

‘Structuring the navigation so that the resource pages would open in separate windows was so that I could have all the information in front of me at one time. . . . . . . . the MBTI results confirm that in one of my dimensions I am constantly looking for information before making a decision. Therefore, I would rather have 5 windows open showing all the possible information to learn from, than just one to concentrate on.’ (INFP - 5, 27, 5, 5)

Another student, encountering the MBTI for the first time, expressed surprise at the accuracy of the measure.

‘I was not expecting to say this, but the Myers-Briggs Test has actually explained to me some of my habits that I could never fully understand. This is sort of frustrating, as I never thought that a test could understand me better than myself. But I’ll look on it as more of a guideline,’

Again, the commentator was able to draw on the MBTI profile to inform the ILE design, if in a somewhat abstract way:

‘This preference tells us how people charge their batteries. ‘Introverts find energy in the inner world of ideas, concepts, and abstractions.’ (Brightman, H.J.)...This aspect influenced significantly the design of the interface metaphor(s). On the main page, I used the sketch of the ‘Proportioned Man’ by Leonardo Da Vinci as the main image, it is very symbolic to me.’ (INTJ - 1, 9, 37, 27)

ILE development

Several students made the point that, while they found the MBTI to be accurate, they could not see how a personality measure could affect either the form or content of the ILE design. Others could make a connection and recognised that their personalities very much affected how they approached
learning. Translating this into design aspects was still a problem but, as the following comments illustrate, this was achieved on a more abstract and conceptual level.

'The MBTI results also influenced the purpose of my ILE because it made me think about how my personality affects the way I tackle assignments and prepare for exams. I am organised with my assignments and work throughout the semester but when it comes to exams I always (used to???) leave the preparation for the last minute. The comment about relying on the ability to improvise instead of preparing in advance applies to the way I study.' (ENFP - 19, 13, 3, 19)

'In this test I was classified as an ESTP....This description of me is very accurate....All this has contributed mainly to the layout and appearance of my ILE. I have used strong and dominant colours, such as the blue theme throughout the entire web site. The brushes and blocks of white captioning around the icons contrasted this....All these factors also combined together to form a simple, clear, and manageable style. It lacks clutter, and the icons do an extremely good job of controlling the flow of information throughout the site.' (ESTP - 9, 19, 49, 27)

The last example makes the valid point that the characteristics identified as part of the overall type would, by definition, have an impact on the ILE design. This is because they describe ‘areas of my own cognition that have specific needs.’ However, the observer also points out a potentially negative aspect of the process in commenting on the E-I dimension.

My reported type after taking the test (extended questionnaire that at first glance has a dubious intent) was of the type Introverted, Intuitive, Thinking and Perceiving. The report form assists in understanding the scores by stating that the four dimensions each have their relevant uses:

- ‘Where you like to focus your attention – E or I;
- The way you like to look at things – S or N;
- The way you like to go about deciding things – T or F;
- How you deal with the outer world – J or P.’

These points provide valuable information in the subsequent design of my ILE in that I have specific areas of my own cognition that have specific needs. The report form also states that ‘everyone uses each of the preferences at different times; your Reported Type shows which you are likely to prefer the most and probably use most often’.

'It must be stated that I respect the validity of the MBTI tests and think that it is a valuable resource – to those who believe it. But in any other case, something telling me that I am hugely introspective causes me to enter a spiral of introspective emotion that delves into emotions and feelings about that introspective comment (in my own view).’ INTP[51, 13, 11, 11]

CONCLUSIONS

Although the use of the MBTI was primarily to enable respondents to reflect of their personality type and use the elements to inform the ILE design, studies using the indicator as a measure of cognitive or learning style suggest that its use could be broadened in future research. This would allow consideration of the effects of individual cognitive profiles - cognitive style, learning style in addition to personality type - (Webster, 2002) whilst using only the one measure. A simple adaptive mechanism could be used where each of the MBTI categories produced a specific type of interface design. Each design would be relevant to the MBTI type and cognitive style identified. For example, students with a strong judging score on the judging/perceiving dimension would have information presented in a well-structured and ordered format (Scholl, 1999). A student at the other end of this dimension could be presented with an interface which allowed the multiple source scanning suggested by the INFP student above, while encouraging closure to counter-balance the desire to continually
pursue alternative information sources. The system would ask for the result of the MBTI test and present a suitable interface. A rule-based system would work here.

The use of both quantitative and qualitative measures increased the complexity of the data analysis. Student responses to their increased involvement in the development process through consideration of individual personality type varied considerably. When considering an approach where the participants are more fully involved in the research process and that process involves aspects of an assessed unit, one must be aware of several potential pitfalls. Because the work was assessed, it is possible that students might over emphasise the positive aspects of the process in documents such as the reflective journal, ILE documentation and the feedback survey. To counter this, the research design allowed for the cross-checking of comments and opinions. Some inconsistencies were discovered and excluded from further analysis.

The study and results indicate that individual students were able to reflect on their personality type and use the characteristics to inform the development of a personal e-learning resource. The MBTI provided personal learning and information preference details that were informative and had relevance to the learning process. These details could then be either integrated into the ‘look and feel’ of the ILE or used more directly to suggest the inclusion of specific learning related features. Further research could investigate the development of adaptive interfaces that could attempt to offer a suitable match between learner and learning resources.

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ABSTRACT
The term reflective practice, which recently has been gaining ground, refers to the means of developing professional expertise. Very Little evidence exists, however, about the effectiveness of such an approach to Information Systems research. Donald Schon outlines a theory of professional knowledge and its development through “reflection” whereby he argues that reflective practice, the ability to practise reflectively, distinguishes the expert from the merely competent professional. Thus the central question for this paper is the value of developing reflective practice skills and processes for the role of an academic IS researcher. Drawing on the evidence of studying a doctoral course over the last two and half years, the author argues that such development enhances doctoral students’ ability to develop reflective skills and habits. The paper also identifies, however, that there were, and still are, unanswered questions about the transferability of the skills and processes learned as the author progresses into the vocational stage of IS research and the early years of practice as an IS researcher.

Keywords: Information Systems research, Reflective Practice, On-line Information Systems education, Information Systems professional development.

INTRODUCTION
The main aim of this paper is to examine the role of Donald Schon’s work on reflective professional practice. It discusses the role of developing reflective skill and processes employed in conducting critical Information Systems (IS) research. In recent years there has been an increase interest in the nature of critical IS research and the development of methodologies to explore this subject. One area of controversy between critical IS research and the traditional IS research is the role of “reflective practice”, which still remains under-developed. In this paper the importance of reflective practice as a means of developing expert research methods will be explored.

Although the issues of reflective practice are becoming a major subject involving both the academic and the professional IS consultant, it is important that we do not undervalue the power of employing
"reflective practitioner practice". This is argued by the author's supervisor, Williams (2000), a leading critical scholar of the reflective practice paradigm,

"The notion of reflective practice describes a completely different way of thinking about professional knowledge and professional education from traditional one. It is about creating a different kind of knowledge from the rule-based knowledge, which is created and transmitted in the doctorate level of research education. It involves a challenge to both the skills and knowledge together with academic and vocational divides." (Personal interview, Feb 2002)

In a similar vein to Schon's philosophy, Williams (2000) commented that in employing the reflective practitioner practice one need to construct professional knowledge through integrating his or her rule-based knowledge with "know-how", which draw from a range of personalised skills, strategies and values acquired through experience. He agreed with the Schon ideal that such techniques and skills couldn't be developed through a "technical-rational" education (Schon 1983, 1987). He further mention that Reflective practice is a process with which increasing numbers of professionals are engaging in order to better understand, take full ownership of, and enhance the work that they do. It expresses the thoughts and reflections from a personal point of view. As Williams (2001) stated:

The Reflective Practitioner style of writing was firstly introduced by Donald Schon in 1983 and others have built on his work (e.g. Pribbenow, 2000; Overmeer et al, 1998). This style has been widely accepted and there are even University Courses specifically dealing with the Reflective Practitioner style (Griffith University, 2001; George Mason University. 2001).

The question that arises in this paper is how to explore the behavior of a "real" reflective practitioner, that is, how they think and act, and consequently about how this 'state of being' might be created in others. From this, the focus of this paper will be a part of the educational development of reflective practice where the author perceives that the principles underlying reflective practice can be stated as follows:

1. That professional expertise is developed through processes of reflective practice.
2. The development of reflective practice capability at the doctoral level will enable those students who conduct their research reflectively to rapidly become proficient, confident and effective reflective researchers.

The first section of this paper introduces the literature of reflective practice, which defines what constitutes a reflective practitioner, some ideas on creating the reflective practitioner and then a problem scenario employed in "novice and expert" approach. The next section provides the discussion of reflection-in-action versus the traditional technical rationality approach. The third section discusses a case study of reflection-in-action employing Schon's philosophy of reflective practice while the last section identifies areas for future research.

LITERATURE REVIEW

What is a Reflective Practitioner?

Schon (1984) and Moon (2000) describes that the reflective practitioner as someone who is simply thoughtful about his or her own practice. In fact, reflective practice involves the mental process of reflecting, which may or may not be characterised by what we have called "being reflective". For example, the authors speak of the reflective practitioner as a person with a self-image as a facilitator, for whom there is important recognition of the uncertainty within the profession, as one who has the knowledge base of a member of his/her profession and, is also aware of the problems that need to be resolved in a professional practice. The reflective practitioner copes with this uncertainty by putting
the relationship with their clients at the centre of his/her professional practice with an attempt to develop reflectively negotiated shared meanings and understandings as a joint process.

Proctor (1993) takes a similar view, stating that reflective practice is the process of looking back in a critical way at what has occurred and then using the results of this process, together with professional knowledge (with technical and ethical aspects), to tackle new situations. Critical elements have been widely associated with reflective practice and are often taken to be the main purpose of reflection (Smyth, 1989). In similar vein to Smyth's ideology, Williams (2001) states that in a reflective professional education, the activities of teaching often need to be set in their historical, political, theoretical and moral context as not considering them turns reflective teaching into a technical process. Reflection is the “active and militant” tool that enables that contextualisation (Smyth, 1989). In this regard, the “technical-rational" education fails to provide the elements necessary to enable the doctoral students to develop the heuristics needed to deal with the unpredictability and chaos of real world issues.

According to Williams (2001), action research professional practice and reflective practitioner research is usually written in distinctive reflective practitioner styles, as individuals evolving as the action researchers find their own voice and distinctive authorial style. This evolution occurred in the writing style used by Donald Schón from 1983 (Schón, 1983 & 1987). Dewey (1933) who wrote about the function of reflective thought in learning from experience first alluded to this concept of reflective practice. He further indicates that the researcher’s notes and reflections and insights are integrated with the empirical data from interviews with colleagues, supervisors, mentors, and clients is usually analysed using reflective practitioner methodology as identified by Schon (1983), with additional ideas gained from Overmeer et al (1998). This research method allows the researcher to give an account of how they applied knowledge in their workplaces. It encourages them to reflect on their experiences and then comment on what they believed the learning’s of those experiences were (Williams, 2001).

Creating the Reflective Practitioner

Donald Schon (1983, 1987) has argued that reflective practice requires diagnosis, testing, and belief in personal causation. He describes diagnosis as the ability to frame or make sense of problem through use of professional knowledge, past experience, the uniqueness of the setting and people involved, and expectations held by others. He further stresses that once framed, it requires the practitioner to engage in on-the-spot experimentation and reflection to test for alternative solutions. In this manner, the practitioner needs to accept responsibility for their actions, as this provides them with the courage to act under uncertain conditions.

Schon (1987) distinguishes between two reflective processes: (1) reflection-on-action and, (2) reflection-in-action. Reflection-on-action refers to the form of reflection that occurs after an action takes place and relates, via verbalised or non-verbalised thought, to the actions that the practitioner has taken. In other words, it describes the process of reflection, which takes place after the event where the practitioner makes explicit their knowledge and evaluations of the theories of action used to solve a problem. On the other hand, reflection-in-action occurs in association with an action and guides the process of action via the knowledge then in use, which is derived from theory. According to Schon, reflection-in-action describes interaction with a ‘lived' research situation as it unfolds. Thus, the capacity of reflection-in-action assumes that the practitioner has the capacity to bring to the surface their ‘knowing-in-action', which is the hidden or tacit knowledge that s/he uses to deal with particular tasks. In a situation that does not involve elements of uncertainty or surprise the practitioner will tend deal with the situation spontaneously on the basic of his/her tacit knowledge. In a situation where it does involve with elements of uncertainty or value conflict, Schon suggests that the practitioner must confront his/her tacit knowledge with the underlying values of the conflict before they can re-frame the problem and then reflect to test alternative solutions. Schon terms such process as ‘the reflective conversation'.
The concept of reflection-in-action is one of the cornerstones of Schon’s theory, whereby the process integrates theory, intuition, and action in situations of uncertainty. In this paper, it is asserted that reflection-in-action would provide the principal focus of analysis and critique in the regard to the author’s findings. In discussing the creativity process of the purpose of reflective practitioner practise, Reason (2001) is quoted by Williams (2001) as claiming that:

*the purpose of reflective action research is "to increase people's involvement in the creation and application of knowledge about them and about their worlds" and through this experience "challenge us, moment to moment in our professional and personal lives, to realize these qualities in action". Newman (2000) notes that there are many different ways to approach action research and thus that there is no one 'right' way of critical reflection.*

**Scenario Solving through Novice and Expert Approach.**

Employing reflective practice in analysing problems involves the study of cognitive processes. According to Hamm (1999), in order to solve a problem, the practitioner needs to draw on both analytical thought and the levels of his/her professional experience. Schon suggests that how practitioners think about solving problems largely depends not only on what type of problem is presented but also how it is presented. Therefore, well-defined problems are generally resolvable by analytical, or ‘technical rational’ problem solving techniques, where as ill defined, or ‘swamp; problems require a form of reasoning that is far more intuitive.

In another school of thought, Dreyfus (1986) suggests that the level of a practitioner’s professional expertise could determine the nature of the problem solving process. In essence, he argued that experts are necessarily intuitive and stylist in solving a problem as they tend to have developed such defined characteristics, while, novices, by contrast, use more analytical forms of reasoning. The important of the heuristics context in developing in the expert approach seems to becoming increasingly active in the postmodern era of research paradigm. In this context, scenario-solving concepts through reflective practice can be seen as the “cognitive model” to apply in developing critical thinking in Information Systems research. In the experience of the author over the last two and a half years as a doctoral student, many traditional Information Systems researchers have doubts as to whether reflective practice can be applied to problem solving. They tend to believe that all problem solving can be tackled by employing traditional rational techniques, and they can be easily grounded through analytical reasoning and do not need intuitive processing from the ‘expert’, the practitioner. From this a concern arises about whether reflection-in-action is an over-ambitious process for developing the novice. However, the author’s supervisor, Dr. Williams, is in accord with the author in suggesting that the novice may encounter the same major difficulties concerning a new experience, as does a professional academic researcher. Similar views can be asserted from Schon’s and Dreyfus’ works. In discussing different experience a novice or expert may have in scenario solving, Williams (2001) states:

*Professional practitioners operate as a form of practice-based research and resource. While they may not be doing professional practice research degrees or papers, as Winter, Griffiths and Green comment "there is a clear link with industry, professions, and other workplaces. In addition, the focus on particular contexts of practice means that the concepts of 'reliable', 'useful', 'good', and 'wise' are all tightly bound to the context in which the practitioner is producing knowledge. A claim to practice-based knowledge is an obvious example of a claim to knowledge which is context-bound, and in which the subjectivity of the producer of the knowledge cannot be eliminated. Thus, practice-based research is more than a way of bringing about cooperation between higher education and other sectors, and they are more than a manifestation of a bridge between economic activities and academic learning."

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What is a Novice?

In this section, the author outlines what he means when reference is made to the “novice”. Novices are doctoral students in the later years of a doctorate degree. Most have no experience as professional researchers, although a small minority may have worked as contract Information Systems consultants. There are those doctoral students who have little knowledge of substantive research education and have little experience of an academic professional researcher. Also, there are those who have valuable practical experience as consultants, and there are those who bring with them a wealth of knowledge and experience from other backgrounds, and who are able to transfer the values of that experience into a research context. Then again, there are those who would be regarded as experts in another field.

The Novice in the Swamp (Reflection-in-Action vs the Traditional Technical Rationality Approach)

The major issues in this section are concerned with the degree to which novices effectively operate in conditions of uncertainty and unpredictability. While focusing on the assertion that the novice faces a greater degree of uncertainty than the expert does, the expert is likely to be sure of the substantive research education aspects of his or her work. His or her experience will give him/her much more confidence to act in the contexts of academic research. He/she has very likely had time to reflect on, clarify his/her personal values, and integrate these with the ethical requirements of his/her profession. The novice has none of these advantages. What is completely routine and run of the mill to an expert can give rise to uncertainty and anxiety for the novice.

In the experience of the author over the last two and a half years as a doctoral student, many doctoral courses still employ the technical rational of traditional research approach, both to the teaching of information systems research and to the teaching of skills. This approach, it is suggested, can be a barrier to developing expertise if it is not accompanied by encouragement to reflect in and on the learning that takes place. Information systems research in an academic context may only be superficial. Students frequently lack deep, contextual academic research understanding and are thus unable to make sense of their knowledge in the research context.

The key feature of reflection-in-action is that it enables the novice to bring to the surface implicit theories-of-action as a situation unfolds. By understanding that he/she is using theoretical knowledge of the situation, this determines how he or she will act to resolve the situation, is in itself a useful developmental experience for the novice.

The following section illustrates a pilot study on doctoral students (ie. the novices) in investigating the possibility that reflective practice approach in IS research may be a catalyst to developing expertise.

Reflection on a Reflection-in-Action Case Study

The author perceived a dominating technical-rational action approach in the information systems seminar conducted in his doctorate program. The doctoral students are asked to think about how they, and others, might react in various scenarios during the seminar. This approach is used because it has been observed that students tend to feel more comfortable with a learning environment and method they are used to. As stated by Kolb (1984), the lecture or seminar method tends to develop and reinforce those learning styles and preferences, which are associated with technical rationality (eg. the positivist paradigm). Learners with these styles like to carry out methodical and detached analysis of concepts, rules, and systems. They may feel uncomfortable with open-ended, experiential learning activities, distrust intuition, or situations involving significant inconsistent reasoning. When these novices are put into an unfamiliar learning environment such as conducting an assignment as an academic researcher for an organisation, some feel anxious and threatened. Such projects can fail because of an overly technical approach taken during the doctorate program.
Afterwards, the author and his supervisor conducted another experiment in which the novices were introduced to Schon's concepts of reflection-in-action (personal case study, April 2002). Each student was placed in a scenario in which they are asked to work through their reflective conversations to try to identify the reasoning processes they used when facing with something unexpected. This exercise introduced the experiential learning perspective, and it opens the door to reflective learning (Maughan, 1996). Initially, there was dissatisfaction with the quality of reflection demonstrated by the students. It was as though that the students had not engaged in any deep reflection of their own. However, over several practice sessions, progress was shown. Students became aware that the Schon’s model of reflection indeed helped them to identify their strengths and weakness as learners and they were able to use these new experiences to modify and refine their action plans.

As mentioned by Schon (1987) and Argyris (1989), reflection-in-action involves uncovering processes of discrepant reasoning. This occurs when our action plans are in conflict so that we act inconsistently with our professed beliefs and values (Schon, 1987; Argyris 1989). They further comment that action plans underlying our behavior are usually tacit and happen in situations of unpredictability and value conflict. For example, when a researcher is asked to explain why she had spent over an hour going round in circles in an attempt to reach an agreement with the interviewees, a negotiator might put it down to lack of time, rather than reflecting on the use she and her interviewees made of the available time. In discussing different approaches used by doctoral students in conducting their research Williams (2001) identified:

The researcher's notes and reflections and insights are integrated with the empirical data from interviews with colleagues, supervisors, mentors, and clients usually being analysed using reflective practitioner methodology as identified by Schon (1983), with additional ideas gained from Overmeer et al (1998). This research method allows the researcher to give an account of how they applied knowledge in their workplaces. It encourages them to reflect on their experiences and then comment on what they believed what learning was contained in those experiences. In essence, it describes a process of understanding the thought and decision-making processes that underpins the actions of a manager or practitioner including the practice of a university educator. This approach validates the experience or art of management or professional practice as an action research tool.

Maughan (1996) a leading researcher in reflective practice in legal education, states that novices can be encouraged to begin to develop awareness of these discrepant reasoning processes through constructing experiential learning exercises which involve reflection-in-action processes. He even commented in his book that most “five star” law schools in the world adopts such systems. They produced the finest and most highly skilled lawyers.

Conclusion

Like all skills, those of reflection need constantly to be practiced. As Maughan (1996) said, developing the novice’s capacity for problem solving through their reflection-in-action would seem to be an appropriate approach to set them on the road towards expertise. As Williams (2001) mentioned:

Reflective practice is "making tacit knowledge explicit" (Hall, 1998). Freidman (1998) took it one step further, using reflective practice as a diagnostic tool for those situations where "automatic, skilled reasoning and behaviour" gets managers into trouble. Reflective practice is underpinned by participatory action research methodology (Ellis & Kiely, 2000). This allows the participants to "create their own knowledge and theory relevant to their own specific situation". Freidman (1998) pointed out that the challenge in this process is to balance the disturbance in equilibrium necessary to enable change with the psychological safety essential to a learning environment.
Consequently, students become much more aware of their own learning processes. They begin to develop their individual approaches to framing and solving research problems and feel more confident when taking up a research assignment with the public at large. Another positive gift from reflective practice approach is the shorter time needed for a doctoral student to complete his or her thesis. On the other hand, there are still many academics who are not convinced of the value of the reflective approach to developing students in IS research, and who consider that the shortened time frame is "over ambitious".

Limitation of the study

The limitation of this pilot study pertains to the information gathered through the interviews with the novices. The veracity of the data gathered rests solely on the integrity and knowledge of the interviewed participants.

Future research

The following issue may be worthy of further investigation:

· To what extent are the skills and processes of reflective practice, if taught at the undergraduate level, transferable to the post-graduate stage and early professional life?

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Web-based e-Commerce in Australian Small and Medium Enterprises

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ABSTRACT

This paper mainly contributes our proposed web-based solutions to web-based e-commerce in Australian small and medium enterprises (SMEs). It helps to locate the SMEs' current position in web-based e-commerce applications. Through the analysis of more than 60000 Australian SMEs, we found that only a small portion of SMEs implement their web-based e-commerce. Through a small survey, we tracked down four main concerns among these SMEs. Then we put forward suggested solutions to handle these concerns. We believe after these SMEs realize that their concerns can be solved, they will be more actively involved in web-based e-commerce.

Keywords: e-commerce, Internet applications, Web-based e-commerce, SME

INTRODUCTION

Significant number of research papers and projects about Web-based e-commerce can be found in various journals, newspapers and government and organisation reports. Some address purely technical issues, some deal with policy issues, and some discuss enterprise strategies. There are many successful applications among large organizations/companies, which have built their complex information systems to conduct web-based business transactions. Through their advanced information systems, these large enterprises successfully implement their web-based e-commerce strategies and enhance the growth of their revenue. Behind these successful cases, web-based e-commerce, especially with late 1990s, has activated the modern economy, gradually formed new business models [Gordijn and Ackermans 2001, Barua et al 2001, Feldman 2000] and transformed from the traditional market to the e-market, including the transition of business, government, education, health care, and so on. During this transition period, the large organizations can use their resources (e.g. technology, personnel, and money) to capture their web-based e-commerce procurement. But for those small and medium enterprises (SMEs), they are being put into a disadvantageous situation. Traditionally EDI (Whiteley 2000) is mostly implemented by large organizations because SMEs cannot afford to maintain their own EDI systems. With the help of the Internet technology, HTTP (http://www.w3.org/Protocols/), XML (http://www.w3.org/XML/), etc, these SMEs can find their own places in the web-based e-commerce environment. Even though these SMEs still face many difficulties, our concern is how to help these SMEs to implement their web-based e-commerce strategies.
POSITION OF WEB-BASED E-COMMERCE IN AUSTRALIAN SMES

All the large companies/organizations have demonstrated themselves very well over the Internet. But what is the situation of SMEs in the currently booming web-based e-commerce environment? When we are talking about web-based e-commerce these days, we concern more about these SMEs. Before most SMEs successfully implement their web-based e-commerce solutions, we cannot really establish an overall global electronic market. As for the characteristics of Australian enterprises, there are more than 1 million SMEs. They are vitally important to Australia’s economic and social prosperity. In September 2001 the government announced a $6.5 million initiative to accelerate the uptake of e-commerce by SMEs to facilitate online access to government purchasing for two years (http://www.noie.gov.au/Projects/-ecommerce/SME/index.htm). How to help these SMEs to efficiently build their web-based e-commerce systems has become the highest priority of not only government but also all IT/IS researchers. In order to find a good solution to this concern, we have conducted a research from the Citysearch (http://www.citysearch.com.au). Through this research, we hope we can know what the current situation is for these SMEs in Australia. We select ten cities/area, Adelaide (Adl), Brisbane (Brs), Cains (Cns), Canberra (Cbr), Gold Coast (Get), Melbourne (Mel), Perth (Pth), Sydney (Sdy), Tasmania (Tsm) and Townsville (Twv), to conduct our research. We choose industry sectors, where there may have many SMEs. There are building contractors (BC), chemists-pharmaceuticals (PH), auto parts recyclers (PC), Taxation consultants (TC), motor mechanics & repairers (MR), driving schools (DS), florists-retail (FR), restaurants (RT), motels (MT), newsagents (NA), liquor stores -retailers (LR), furniture removals & storage (FS), real estate agent (RE), and doctors-medical &/or clinics (MC). Through an analysis, we represent our collected data in a table (Appendix 1). Total number of enterprises selected from the Citysearch is 63541. There are 2792 enterprises (4.4%), which have web pages in the Citysearch. There are 3529 enterprises (5.6%), which have email accounts or web pages in the Citysearch. There are 737 enterprises (1.2%), which only have email accounts in the Citysearch.

In order to show the results clearly, we transfer appendix 1 to chart 1 and chart 2 to demonstrate the usage rate of web pages. Vertical axis shows the percentage of the web usage over all selected enterprises.

![Chart 1](image-url)
From charts 1&2, we can find there are no big differences between large metropolitans and medium or small cities/area when we are talking about web-based e-commerce. The only one sector, real estate agents, which are in metropolitans, more likes to have their web pages. In these fourteen selected sectors, only real estate agents, florist-retail and motels can reach 10% or above. They more frequently use Internet than other sectors. Doctors-medical &/or clinics and newsagents use the Internet much less. From these analysed results, we can know that Australian SMEs are not very actively participating in web-based e-commerce at least at the current stage. In order to prove what we have got from the Citysearch, we used a similar method to analyse the Australian yellow pages (http://www.yellowpages.com.au). The interesting thing is that we got very similar results as we got from the Citysearch. This is the current situation, where Australian SMEs are. What are the problems with these SMEs? We will address the details in the next section.

CONCERNS ABOUT SMES

In order to know the reason why so many SMEs are not interested in web-based e-commerce, we conducted a small telephone survey among these ten cities/areas. We chose randomly ten SMEs, which employed more than 5 employees and less than 199 employees, from each sector, which we conducted the research from the Citysearch in the previous section. We only asked two questions, “does your company have computing capacities and facilities accessing the Internet?” and “what is your most concern of Web-based e-commerce?”

The answers to the first question were 100% “YESs”. This result is not surprising to us because around 67 percent of households in Australia either own or lease a PC and 52 percent of Australian households are connected to the Internet according to a new study conducted in late April 2002 by Australian National Office for the Information Economy (http://www.noie.gov.au/Projects/information_economy/research&analysis/ie_stats/CSOP_April2002/CSOP_April2002.pdf).

It can fully show that in Australia the information infrastructure can definitely support these SMEs to go for online e-commerce, and these SMEs already have enough computing capacities to connect to the Internet.

The answers to the second question were quite different. We gave five options to this question, the benefit, the security, the bandwidth of infrastructure, the knowledge of their employees, and other. There are 45% answers going to the benefit concern, 26% to the security concern, 15% to the infrastructure concern, 12% to the fourth and only 2% to the other.
The first major concern is that SMEs cannot get more benefits from the implementation of online applications, even worse, they thought it would enlarge their expenditure, especially recently that so many "com"s crashed. Some of SMEs lost money because of these crashes. Thus most SMEs have lost interests in having web sites to conduct their business transactions. Instead of facilitating online transactions, more and more SMEs are interested in having web pages to provide information for their customers and business partners.

The second major concern is the security issue. These SMEs worry about the security vulnerabilities if they have their business online. In order to avoid this happening, they choose not to develop their online system or to delay their online plan.

The third major concern is the bandwidth. These SMEs worry about the telecommunications infrastructure. They are not quite sure whether their computers can get enough bandwidth to run their online transactions through their traditional telephone lines.

The fourth major concern is their skills. These SMEs also worry about whether their existing employees can have certain knowledge to conduct online business. They do not want to spend much money for training their employees to acquire these required e-skills.

In our selected 100 SMEs, we also had two SMEs, which expressed no interesting in online business at all. They never thought about online business and would not regard online business as part of their future plan.

After we know these concerns, what we will do is to deal with these concerns. We will address these concerns in the next section.

CHALLENGING SMES’ CONCERNS

Indeed, these SMEs are located at an unprivileged position when they are competing with their bigger opponents, especially in absorbing new technologies to innovate their business. We will address how to handle their concerns and let them find their own places in the web-based e-commerce environment in the following subsections.

How to Help SMEs to Benefit from Web-based E-commerce

First, the governments, including federal, state and local, should implement the overall framework and strategic plan for the online business infrastructure. They should sponsor various independent agents to help these SMEs to develop and host their own Web sites. For example, Governments can give some subsidies to some agents, like Citysearch and yellow pages. Through these agents, SMEs can get very cheap or even free web sites. Like the Internet, it was funded by the U.S. Department of Defence, then by the U.S. National Science Foundation, before it was fully commercialized. Through this method, all the SMEs can be attracted by this online strategy. After most SMEs already become effective online players, the governments can begin to gradually withdraw their subsidies. At that time, the ongoing cost of online transactions will be reduced significantly because of large amount of participants. These SMEs will know if they do not participate in online transactions they will be isolated by other e-players and the aftermath, which they know, is that they will become losers in this new environment. Thus they would be quite willing to put their budget to maintain their online systems.

Second, these SMEs need to be helped to overcome their psychological barriers, especially at this stage a lot of "com"s crashed. In the long run, any significant invention has its journey from its birth to the wide usage, like electricity, telephone, they all invented a hundred year ago. But only in recently decades they are used by almost everyone in the world. While the Internet just started from
ARPANET in 1969, only from early 1990s, the Internet has been stepping into the commercial usage. After the current difficult period, the Internet-based e-commerce will more deeply penetrate the entire society. The future of Internet-based e-commerce is still very promising. SMEs should plan their Internet-based e-commerce strategy in their current or future budget.

**How to Establish a Security Mechanism for SMEs**

First, the governments must put a high priority in e-commerce security legislation and let SMEs know when they conduct their business online it is as safe as they do it in a traditional way.

Second, the governments should help to establish hierarchical organisations in charge of these security issues. For example, we need some organizations, such as a government appointed agent, to manage cryptological keys. We also need some organizations, such as the Australian post offices, to have the authority to publish keys and authenticate the real entity, which use its key to conduct business transactions.

Third, there are already a huge amount of transactions being conducted on the Internet. All the security breaches related to online transactions are not worse than our traditional e-commerce, such as EDI, EFTPOS (Electronic Funds Transfer Point of Sale). There are various security technologies, SSL, SET, to ensure secure transactions through the Internet. Most of these security technologies already use 128 or more bits encryption keys, which without proper key the ciphertext almost cannot be decrypted using “brutal force” according to the modern computing capacity, to encrypt sensitive data. With the proper promotion, SMEs may not worry about the security too much.

**How to Manage Telecommunications Infrastructure**

Telecommunications facilities are the most important parts of e-commerce. Hence, the evolution of telecommunications can reflect the change of e-commerce. With any rapid progress of telecommunications, e-commerce is upgraded into new life phases. At the initial stage of e-commerce, enterprises tried to use limited telecommunication capacity to conduct their business, such as using telephone to monitor their business activities and fax to order goods in order to accelerate their business transactions. Although all sorts of standards were made to facilitate e-commerce, people were not satisfied with their efforts. EDI was a quite important application in the e-commerce history. A lot of large organizations and companies have adopted EDI in their routine business activities for many years. But for those SMEs, they could not afford to use EDI because of either the cost or technical complexity. The real e-commerce revolution comes from data communications, especially the Internet. Since the early 1990s, the Internet has been led to commercialisation. Year by year the commercial traffic grows exponentially over the Internet. Although the current networking market is facing a sluggish movement or even a deep negative mood, the Internet has definitely become the vital infrastructure of future economy. E-commerce will deploy widely with the Internet support. All the enterprises, including large, medium and small sizes, can become players in this situation. The Internet has become the essential part of enterprises, which want to implement their e-commerce strategies.

How do enterprises interact with the infrastructure (Internet) and build their e-commerce systems? Physically any e-commerce system consists of three parts: internal network, access network and the Internet as depicted in Figure 1 (below).

An internal network is normally an Intranet, including PCs, all sorts of servers, LAN, etc. Sometimes an internal network can be just one or only several computers. Sometimes, for a large enterprise, an internal network is more complex, may including thousands of computers, many different LANs and BNs (Backbone Networks). Its function can be related to all business activities and be in charge of the internal information flow and resource management. However, for e-commerce, it is a product provider, for example using a Web server to publish its product catalogues and service information.
With help of an access network described below, outside customers can reach its products according to its own security policy.

![E-commerce networking infrastructure](image)

**Figure 1.** E-commerce networking infrastructure

An access network is a bridge between an internal network and the Internet. Normally it supplies connection services. It negotiates with an internal network to decide how an enterprise connects to the Internet and what resources can be visible to the outside users. For some large enterprises, they operate their own access network. However, for most of SMEs, they do not directly operate their access networks. They often buy services from ISPs or other agents, who operate access networks. Thus, access networks become the Internet gateways for many SMEs.

Since the Internet was initially built, it has been over three decades. No one knows exactly how big the Internet is now. What we can say is that the Internet has an exponentially growth, especially from the early 1990s and we also know it has become an infrastructure of modern economy and the carrier of e-commerce.

With the development of the technology of next generation Internet, IPv6 (http://www.ipv6.org/), the Internet penetrates into all aspects of the modern society, especially profit-oriented enterprises. Through all sorts of agents, who work at a range of access networks, the Internet becomes more reachable to SMEs, though large enterprises still are big players in the market. After the Internet becomes a very important infrastructure, the biggest challenge is how to effectively integrate these heterogeneous applications and systems. In order to solve this problem, we address the ontology and its repositories for seamless information exchange.

**How to improve employees’ skills in SMEs**

First, from the technical point of view, IT vendors supply intelligent terminals, such as “plug and play”, for SMEs’ employees to use.

Second, the governments can sponsor the public media, including TV, newspapers, which can frequently introduce some general knowledge about web-based technologies and usages.

Third, host stations, which can get subsidies from the governments, can take the responsibility to train relevant SME’s employees. We do not think SMEs’ skills will hinder the progress of Internet-based e-commerce.

**CONCLUSIONS**

In this paper, we have discussed the current situation of web-based e-commerce in Australian small and medium enterprises (SMEs). Through the Citysearch, we analysed more than sixty thousand Australian SMEs in ten different cities/areas. We have found that Australian SMEs are not very active in web-based e-commerce. In order to know what these SMEs are concerning about their online transactions, we conducted a small survey, which demonstrated an image of SMEs’ concerns on benefits, security, telecommunications infrastructure, and skills. After these main concerns were
identified, we contributed our ideas and suggestions to deal with these concerns. We believe that the Australian SMEs will have a very promising future in web-base e-commerce. We hope that they can become excellent players in the era of e-economy. In the future we will continue to conduct further research on web-based e-commerce for Australian SMEs.

ACKNOWLEDGEMENT

This work is partly supported by Swinburne Vice Chancellor’s Strategic Research Initiative Fund 2002-4.

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| EN| 5   | 4   | 1   | 0   | 14  | 2   | 13  | 0   | 0   | 39  |
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| EP| 3%  | 1%  | 3%  | 0%  | 0%  | 3%  | 1%  | 2%  | 0%  | 0%  |

|   | TN  | 96  | 243 | 33  | 69  | 100 | 352 | 212 | 393 | 22  | 30  | 1550 |
| WN| 14  | 27  | 4   | 7   | 13  | 23  | 17  | 39  | 0   | 5   | 149  |
| EN| 17  | 36  | 6   | 7   | 14  | 29  | 23  | 43  | 0   | 5   | 180  |
| WP| 15% | 11% | 12% | 10% | 13% | 7%  | 8%  | 10% | 0%  | 17% |
| EP| 18% | 15% | 18% | 10% | 14% | 8%  | 11% | 11% | 0%  | 17% |

|   | TN  | 533 | 807 | 141 | 136 | 356 | 1544 | 1001 | 2323 | 82  | 92  | 7015 |
| WN| 8   | 52  | 6   | 9   | 12  | 172 | 37   | 427  | 12   | 5   | 740  |
| EN| 17  | 54  | 6   | 10  | 19  | 174 | 427  | 12   | 5   | 766  |
| WP| 2%  | 6%  | 4%  | 7%  | 3%  | 11% | 4%   | 18%  | 0%   | 5%  |
| EP| 3%  | 7%  | 4%  | 7%  | 5%  | 11% | 4%   | 18%  | 0%   | 5%  |

|   | TN  | 2415 | 3110 | 236 | 516 | 747 | 6171 | 2361 | 6995 | 480 | 231 | 23262 |
| WN| 4   | 13   | 1    | 4   | 8   | 30  | 1    | 15   | 0    | 2   | 78   |
| EN| 10  | 15   | 3    | 5   | 10  | 43  | 2    | 22   | 0    | 2   | 112  |
| WP| 0%  | 0%   | 0%   | 1%  | 1%  | 0%  | 0%   | 0%   | 0%   | 1%  |
| EP| 0%  | 0%   | 1%   | 1%  | 1%  | 0%  | 0%   | 0%   | 0%   | 1%  |

TN: total number of enterprise in Citysearch
WN: the number of enterprises in Citysearch which have web pages
EN: the number of enterprises in Citysearch which have their email account
WP: percentage of WN out of TN
EP: percentage of EN out of TN
Australian SMEs in the online classroom – developing a framework for the alignment of e-business strategies and consultant engagement practices

Shirley Bode
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ABSTRACT

Having an e-business presence is fast becoming a requirement for the Australian SME business sector. However, simply having an e-business presence does not guarantee that it will bring about any benefits in terms of increased sales or an expanded customer base, two common goals identified by SMEs in the study. Many SMEs still lack the strategic planning skills required to clearly identify what is required from an e-business website and therefore tend to outsource their business strategies alongside technical and design strategies. To assist SMEs in best practice e-business an online training course (CEOTC) was developed as a precursor to outsourcing e-business and website design.

INTRODUCTION

It has been suggested that up to 20% of Australian SMEs will fail if they do not adopt electronic commerce practices and integrate these practices into their business strategies and planning processes[DCITA, 2000 #293]. As SMEs are integral to the Australian economy and employment growth a 20% failure rate would have a serious negative impact on the fiscal health of the nation. This 20% failure rate is in addition to the current 8% of all small businesses and 5% of medium businesses that fail (Bickerdyke, Lattimore, & Madge, 2000). The impact on employment rates of business failure based on the current failure rates causes up to 160,000 employees per annum to lose their jobs (Bickerdyke et al., 2000 p.38). When multiplied by a possible additional 20% SME business failures, unemployment rates could increase exponentially. An outcome that would have a detrimental effect on the Australian economy.

This study seeks to address how Australian SMEs can maintain and enhance both profitability and efficiency by successfully adopting and engaging in electronic commerce practices.

Research has found there has been strong growth in SMEs initiating electronic business processes. In 2001 60% of Australian SMEs had a dedicated homepage, a growth of 19% over the previous 12 months (SBI, 2001). The majority of SMEs do not employ IT Managers or specialists. Consequently, many SMEs tend to rely on external consultants to design and implement websites and in so doing often outsource their e-business strategy. In an attempt to address these issues this paper presents the design, development and initial trial of a consultant engagement online training course (CEOTC) for SMEs seeking to outsource their website design and e-business strategy.

The Small Business Index (2001) stated that SMEs have not yet fully established the connection between use of the Internet and transacting business on the Internet. This confirmed a recent ABS survey, when it was found that only 6% of SMEs surveyed used the Internet to actually buy or sell...
products (ABS, 2000b). Of all Australian online businesses, 14% offered online ordering yet only 3% used shopping cart technology and only 5% offered online payment facilities (ABS, 2000b).

The above statistics suggest that SMEs using the Internet are e-business ready and in need of further information and assistance to make the transition to online trading. With further research on business to consumer electronic commerce opportunities, barriers and strategies, SMEs may gain the necessary knowledge to make the leap from e-business readiness to e-business enabled.

SMES AND CONSULTANT ENGAGEMENT

The majority of SMEs do not have either the internal expertise or financial resources to enable the in-house development of e-business. [Bode, 2002 #217; Hunter, 2002 #349; Hunter, 2002 #348; SBI, 2001 #313]. Lack of internal e-business expertise may also impact on the SME sector's ability to design, develop and promote websites. Just as SMEs may employ an accountant for their financial expertise, when considering electronic commerce implementation it has increasingly become standard practice for an SME to engage the services of a website design consultant.

There are a number of issues that impact on the success or failure of a SME engaging a website design consultant. Firstly, it may be the SMEs first attempt at engaging an external consultant and the SME may lack the relevant knowledge and experience required for successful engagement. Secondly, website design consultants are often SMEs themselves, and in the current climate of accelerating growth in the electronic commerce area, website design consultants are often business start-ups and consequently, may lack experience in negotiating successful contracts. Finally, consultants tend to view SMEs as one-off jobs and may consequently lack commitment to the project:

small firms were viewed as one-shot opportunities, offering no potential for establishing a long-term relationship. Consultants...would sell the small firms software and hardware, put together a network, and move on to the next company (McCollum, 1999, p.46).

Thong and Yap's (1996) research examined external expertise for the implementation of Information Systems in small business. Their findings suggest that high quality external expertise is a critical factor for successful IS implementation in the small business sector. It can be argued that high quality external expertise is also a critical factor in SMEs successful implementation of e-business strategies and procedures.

SMES AND E-BUSINESS

Bode and Burn [Bode, 2002 #217] found that the majority of SMEs do not strategically align their website development with their e-business strategies and, in fact, generally did not have an e-business strategy in the first place. This failure to align strategy led to many SMEs engaging website design consultants and by default, outsourcing their e-business strategies. Thirty SMEs were interviewed Australia wide to gauge their experiences in having engaged an external consultant and the resulting impact on e-business and consultant engagement success were analysed.

Initially the SMEs were asked for their definition of electronic commerce success and 70% of the participants indicated that they measured success economically. Typical comments included:

"ROI - return on investment, without a return on investment then it's a waste of time. Without the potential for a return on investment forget it, it won't work";

"Economics, it's all about money isn't it? If a website isn't bringing in some income, then you have to seriously think, well is it working? What's gone wrong? If nothing comes in after six months it really has to be seriously looked at";
"A successful website is one that makes money - end of story";

"Number of sales, number of hits that have eventuated in sales you can measure with ratios";

"By how much extra profit the site pulls in, you don't always see a return immediately, but bottom line is there has to be profit".

The participants were then asked two questions relating to electronic commerce success. One focused on the perceived success of their electronic commerce implementation and the other question related to how the SMEs measured success.

In terms of project success 18 of the 30 SMEs (60%) stated that their websites were unsuccessful. Ten SMEs (30%) indicated that their websites were successful to some degree, the remainder felt undecided on the issue and had adopted a "wait and see" attitude. The level of success was defined by the SMEs and related to their original aims and objectives for their websites or expectations of the possibilities of electronic commerce. The participants were also asked to assess their electronic commerce success on a five point Likert scale, with 1 representing 'very successful', to 5 representing 'failure'. As can be seen in Table 5.24 below:

<table>
<thead>
<tr>
<th>Question</th>
<th>Successful</th>
<th>Slightly Successful</th>
<th>Undecided</th>
<th>Unsuccessful</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Would you rate your website as successful</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>2. Would you rate your website as economically successful</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

Many of the SMEs had quite simplistic reasons for success, whilst others were quite distressed when making comments about website failure. Examples of SMEs comments on the success or lack of success of their websites illustrate these quite diametrically opposed views:

"People find my site and can look up my products from anywhere in the world - they know I'm here..."

"Well, it's very minimal at the moment not really any response, but that might change"

"We've actually sold a few things, not actually from the site but through people who've inquired through the site a couple of high priced items versus the small bits and pieces. So, if we didn't have the site they wouldn't have sold"

"We haven't sold anything in the 12 months the site has been up, I just hope we can make something out of it. The first sale we make there'll be a bottle of champagne opened in the office"

"it's bitterly unsuccessful at the moment"

"I'm at a point now where I'm going broke because of the website, so I have to decide either to continue with the website side of the business or just the shop. And I think I'll have to get rid of the website and just go with the shop. I needed to know how to get it known out there - you know?"
"To start with I had a few customers buying things for family, say from England and a couple from Singapore, but that didn't take off and the local market maybe one or two sales. Not real successful I'd say seeing as though it's been going for three years"

"It's a complete disaster"

"Well, there is absolutely no success, so there's nothing to measure is there?"

Although the above results indicate that primarily the electronic commerce implementation was not successful, 66% of the SMEs had achieved some measure of economic success from their sites, ranging from a 3% to 30% increase in sales turnover. This contradiction in the results tends to support Kumar et al's (1999) findings that a project, even if complete, may still be considered unsuccessful if the client/consultant relationship is perceived as negative.

CLIENT/CONSULTANT RELATIONSHIP

A problem area identified by the study and supported by the research was the issue of the client/consultant relationship. (Kumar, et al 1999; Murphy, 1999; Thong & Yap, 1996; Gable, 1991) all indicated that client expectations and communication play a critical role in the success of the client/consultant relationship. The study found that the SMEs expectations of the client/consultant relationship were unrealistic and their perception of what occurred as opposed to what actually occurred was also problematic. The SME expectations and perceptions may have been affected by faulty memory, negative or positive experiences of the engagement process and lack of objectivity.

For example, the project timelines set by the SMEs when engaging the consultants, were based on expectations rather than explicit agreement between the client and the consultant on project completion times. Over 95% of the SMEs did not state a completion time for the project and surprisingly all of the consultants were equally vague on expected completion times.

The SMEs in the study were questioned on their perception of consultant expertise in strategic management, website design skills and consultant experience. 98% of the SMEs in the study felt that their consultant lacked either the appropriate expertise in website design, electronic commerce and strategic management and/or lacked experience as a consultant. Hunter (2002a) in his case study on Song Book Music found that the consultant was lacking in knowledge and experience required for the successful outcome of the client consultant relationship. He further suggests that although the project was completed, it was considered 'unsuccessful' by the SME as it was essentially faulty (Hunter 2002a pp58-61). Hunter's findings are reflected quite strongly in the results of the study.

The client/consultant relationship was a major factor in SME disappointment in the consultant engagement process. It is interesting to note that 85% of the SMEs in the study felt that the client/consultant relationship process needed improvement and indicated that communication between the parties was often considered non-existent or of a low quality. In addition to this, 80% of the SMEs in the study rated their relationship with the consultant as poor or very poor. The results of the study indicated that the majority of the SMEs were extremely dissatisfied with their client/consultant relationship, and 97% of the SMEs had, or were in the process of, severing the client/consultant relationship.

The results of the study indicated that prior to consultant engagement, a SME needed to have a clear idea of their Internet goals and the strategies required for achieving those goals. However, none of the SMEs appeared aware of this concept. Although the SMEs could identify their primary, secondary and content goals verbally, they tended to rely on ideas, memory and hopes for the future success of their online venture.
Only seven of the SMEs had allocated an ongoing budget for future maintenance and development of the sites. None of them had clearly articulated or formalized future aims, identified timeframes or developed clear strategies for achieving their objectives.

CONSULTANT ENGAGEMENT ONLINE TRAINING COURSE

Based on the results of the study, the design of an online training course (CEOTC) for SMEs considering consultant engagement and Internet strategy was developed and tested on a small sample population of SMEs to gauge its usefulness to this sector. The aim of the course was to produce guidelines for SMEs considering electronic commerce initiatives and using external expertise.

LEARNING OUTCOMES

The intended learning outcomes of the Online Training Course was to provide SMEs with the ability to plan the implementation of electronic commerce and to select the most appropriate website design consultant for the project. The objectives of the course included: understanding consultants; business planning; Internet strategic planning; consultant engagement; contract management and project evaluation and assessment.

The CEOTC encompassed not only an easy to navigate and understand format, but also the theoretical framework required in order to make careful and appropriate planning and consultant selection decisions. This allowed the SMEs to gain the knowledge to confidently approach and engage a suitable consultant for their project. The course was designed to include Ellington’s (1998) systems approach to course development. These include the two preliminary stages in the systems approach (target population examination and analysis of existing skills and knowledge), and itself forms the starting point of the cyclical process by which the course or curriculum is designed, implemented, evaluated and refined (Ellington & Earl, 1998, p.2). Figure 1 below shows the process of identifying the learning objectives and intended learning outcomes:

The online training course also needed to include cognitive strategies to help the SMEs remember the information from each module. In order to achieve this objective a short quiz was designed to follow each module and to assist SME memory retention.

The site was designed for learners with a limited background in computing and was designed and presented in a linear and logical fashion, whereby each learning session was followed by a question and answer session, followed by the next learning session. It was possible to skip a module by moving to the end of a session and clicking the "proceed to next section" arrow.

The CEOTC was trialed by seventeen SMEs and one consultant. The consultant had, since the original interviews, ceased the website design side of the consultancy yet was still able to give valuable feedback on the CEOTC. Of the other consultancies in the original cohort, one had ceased business, two had refocused their consultancies away from website design and two were unable, due to time constraints, to participate further in this research project. Nine of the sample SMES had not yet engaged a consultant for their website development, but were considering hiring a consultant in the near future, and eight SMEs from the original interview cohort. The object of the trial of the CEOTC was to gain high-quality feedback from the participants and to evaluate the usefulness of the course for the SME sector.
TRIAL AND EVALUATION OF THE ONLINE TRAINING COURSE

This section discusses the results of the trial and evaluation of the Consultant Engagement Online Training Course (CEOTC) for SMEs, noting both its successes and shortcomings. The evaluation was developed to gauge the usefulness of the course as a learning tool for the SME community and to highlight any problems with the course, including technical and learning aspects.

The SMEs were sent an email that explained the structure of the course and the procedure for the trial. Each SME was instructed to begin the course by reading the information on the homepage of the CEOTC, they were then instructed to work their way through each module and answer each quiz in whichever order they preferred. Each SME was also asked to fill in the feedback form at the end of quiz five and email the answers to the researcher. The suggested time allocated for the trial was between two and three hours. This was to ensure the SMEs had enough time to read and respond to each section of the CEOTC. The participants were also given the option of completing the course at one sitting or doing the course over several days to fit in with other time and work commitments.

To gain a clear understanding of the data and the nature of the sample population, descriptive statistics were collected. In addition, a brief questionnaire was administered to the participants in order to consolidate the information from the feedback forms. The questionnaire was designed to gauge the SMEs response to the CEOTC as an instructional tool and to evaluate the site in terms of functionality, ease of navigation, structure and design. All of the participants returned the questionnaire. The
construction of the questionnaire was based on a five point Likert scale and the results presented as a table.

A questionnaire was emailed to the SMEs involved in the trial and all participants were willing to fill in the questionnaire. The questionnaire included questions on ease of navigation, overall appeal of the site and quality of content. The number of questions was limited to 12. The construction of the questionnaire was based on a five point Likert scale, ranging from Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree. The following table (2, below) presents the results of the questionnaire:

<table>
<thead>
<tr>
<th>Question</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, are you satisfied with the Consultant Engagement Online Training Course</td>
<td>15</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. The site took too long to download</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>3. The site was easy to navigate</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. The module headings were appropriately named</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5. It was easy to locate sections that you were interested in</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. The instructions were easy to follow</td>
<td>16</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7. The colour scheme and layout was attractive</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8. The quizzes helped me retain the information</td>
<td>5</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9. The content of the site was relevant and useful</td>
<td>16</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10. The links to other sites were useful</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11. Using the CEOTC was enjoyable and informative</td>
<td>14</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12. I would like to participate in further online training courses</td>
<td>11</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Overall it was found that all of the participants agreed or strongly agreed that they were satisfied with the CEOTC as an instructional tool. 95% of the SMEs either strongly agreed or agreed that the site was easy to navigate. 100% strongly agreed that the module headings were appropriately named and 89% found it easy to locate sections within the website. The colour scheme was considered attractive with 22% of respondents indicating a neutral response, but none disagreeing. 100% of the SMEs either strongly agreed or agreed that the content of the site was useful and relevant to them and this is supported in the comments section. All respondents were positive about the general format of the course and all agreed that the training course was enjoyable and informative. 78% indicated they would be willing to participate in future online training courses of a similar nature. The next stage of the evaluation process was an analysis of the results from the feedback form.

FEEDBACK FORM RESULTS

All of the participants who evaluated the CEOTC sent in a feedback form with their comments regarding the course. The feedback from the participants generally fell into five distinct categories: 1) usefulness of the site; 2) navigation of the site; 3) appeal of the site; 4) overall satisfaction with the site; 5) technical aspects of the site.
Usefulness of the site

All of the participants indicated that they found the course to be useful as a learning tool and instructional aid. Overall the participants stated that the course gave them invaluable information regardless of whether they had engaged a consultant or were considering engaging a consultant.

Navigation of the site

The majority of the participants found the site easy to navigate, but several noted that it would have been useful to have a button that allowed one to skip a particular quiz and continue with the modules. There was a comment given that by not having such a ‘skip to next module’ button, participants were coerced into answering the quizzes in order. It would be quite possible to include an option to skip the quizzes and include at the end of each quiz page an option to continue to the next module.

Appeal of the site

No suggestions were given on improving the design or interface of the course, although four were ambivalent about the colour scheme. The majority of the respondents indicated that the overall design was appealing and well set out.

Overall satisfaction with the site:

The response from the participants was overwhelmingly positive in regard to overall satisfaction with the site. There were no negative comments received and participants indicated they were grateful to have the opportunity to make use of the course and several participants requested permission to allow the site to be accessed by colleagues. One Industry Association invited the researcher to address a meeting of SME owner/operators and give a demonstration of the website to members.

Technical aspects of the site

The majority of the respondents were satisfied with the technical aspects of the site. One concern raised was that links to other sites from the course were slow to load for three of the respondents and one respondent had difficulty with downloading and using the acrobat reader in order to gain access to the print version of the contents of the site. The site was designed for cross-platform compatibility, but it was found that the site worked more efficiently within the Internet Explorer browser.

CONCLUSION AND FUTURE RESEARCH

The results presented in this study highlight the usefulness of an online training course for Australian SMEs. The intended learning outcomes of the CEOTC was to provide SMEs with the ability to plan the implementation of -business and to select the most appropriate website design consultant for the project. The objectives of the course included: understanding consultants; business planning; Internet strategic planning; consultant engagement; contract management and project evaluation and assessment.

The development of an online learning tool as opposed to a more traditional text based option was a deliberate choice. SMEs have varied skill levels in regard to computers and the Internet and it was felt that using the CEOTC would enhance the skill levels of SMEs and de-mystify online learning for those with limited computing skills. Thus creating a more successful client/outsourcing relationship and impact on the future success of the SMEs foray into e-business initiatives.
REFERENCES


The Features of Selected Australian Web Sites

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ABSTRACT

Although the Internet has had an enormous impact on the way that Australian companies now conduct their businesses, the reasons behind separate interest groups having different features on their web sites has not been looked at. This study presents the results of an examination of 165 Australian web sites. The study revealed examples of businesses that are trying to sell their products direct to customers online, that are using the Web to provide extra support for their products and services, that are using specific features to attract customers to their web sites, that make special offers over the Internet, and so forth. Some features, such as the provision of contact details and web site navigation tools, seem to be 'minimum requirements' for the majority of the web sites. Other features will be provided according to the distinct characteristics and aims of the organisations concerned. Preliminary findings indicate that the industry area and types of products or services offered by the business are determinants of the features that the business will ultimately incorporate into their site.

INTRODUCTION

While larger businesses and individuals have by now accepted the Internet as an integral part of the web of life, many small to medium sized enterprises still view it predominately as an information mechanism (Eduard 2001). The National Office for the Information Economy (NOIE) with Ernst and Young (2001) found that in the minds of small business owners, e-commerce was somewhere between a risk worth taking and a compelling business case.

Should such businesses be concerned with having a web presence? In the September 2001 quarter alone there were 1,201 million megabytes of data downloaded by Internet subscribers in Australia. This represents an increase on the same period for the previous year. Household subscribers accounted for 54% of the data downloaded, while business and government made up the remainder (ABS 2001). It is reasonable to assume that a significant portion of this traffic was business related.

There have been many studies related to the use of web sites by businesses. The studies tend to concentrate upon issues such as web site design, web site usability, who is responsible for designing, building and maintaining web sites, and so forth. Few studies have examined the features of web sites, and why different interest groups would have different features on their sites. The purpose of this
paper is to report on a study conducted by the Electronic Commerce Research Unit at Victoria University on the features of 165 Australian web sites. By allowing businesses the insight to why certain features should be adopted over others, they are given the opportunity to design and implement web sites that will provide current or potential customers with what they require from the business’ site.

BACKGROUND

The Purpose of Web Sites

McGovern (2000) suggests that the purpose of web sites is to deliver quality content to target readers, such as existing and potential customers, prospective employees, partners, investors and the general public. As such, they should contain content that will:

- Help to sell more products;
- Help to support products;
- Encourage prospective employees to join the company; and
- Make investors feel confident that you are doing a good job.

The level of emphasis placed upon these areas will differ according to the type of organisation building the web site and the type of product or service being offered. This will, in turn, affect the type of features that will be suitable for a web site.

Industries and Web Site Features

It is reasonable to state that web site content will differ across industry areas. Some examples follow.

The newspaper industry has been affected by the popularity of the Internet. As a delivery medium, the Internet can now be used to deliver news stories within minutes of the news breaking. Features used to do this are initially short text articles, followed by full text articles, photographs and commentary (Pack 2001). Technologies that allow online access to audio and video files come into play here.

In health care, the selection of available features to put on a web site ranges from medical information for patients to physician services (Turisco and Kilbridge, 2000). In fact, most web sites targeted towards ‘patients’ have been limited in their content. The majority of these web sites only provide general information and/or directions and maps on how to reach service providers. Other features, such as ‘virtual’ hospital or clinic tours, referral requests and medical advice are offered on a few sites (O’Dell and McGoldrick, 2001). A study of the web sites of 33 Australian General Practices (Burgess and Trethowan, 2002) revealed that most sites contained basic features such as location and contact details. A few web sites contained external links to extra information, medical advice, appointment facilities and so forth.

Wineries provide an interesting contrast. In a study of 105 Australian winery web sites (Wenn, Selliitto and Burgess, 2001) it was determined that the smaller the winery, the more innovative it is likely to be and the more likely it is to offer a wider range of Internet features for the consumer, such as information provision, online ordering, and community participation. This is almost the opposite of the general trend in Australia where the smaller the business the less innovative it is likely to be on the Internet. In the case of wineries, many of the larger ones have deals with third party distributors and have no need (nor desire) to sell through their own web sites.

Retail web sites attempt to attract customers by offering greater overall utility relative to traditional shopping formats (Kolesar and Galbraith, 2000). Griffith and Krampf (1998) examined the features offered on the web sites of the top 100 US retailers. The most common features were extra customer service, product information, information for the public (press releases, financial reports and so forth)
and advertising. Less popular features were online selling, pricing information and sales promotions. Other features that retail sites may offer include a product search facility and a service delivery capability (Kolesar and Galbraith, 2000). It is reasonable to expect that online shoppers will expect all of these features in the future, plus the online retailer to ‘recognise’ who they are and how they like to be contacted (Mathwick, Malhotra and Rigdon, 2001).

The travel industry has been affected by information technology for a few years. Initially, this was through applications such as computer reservations systems. Nowadays, Internet-based applications allow consumers to find travel information, book accommodation and transport online and compare prices (Raymond, 2001).

Governments are beginning to realise the importance of the Internet as a medium for communication and transactions. There has been little empirical analysis of the use of these sites to improve governance. Local government in particular is involved in the provision of goods and services to households and businesses, often for a fee. A study of 270 US local government web sites in 1997 revealed that they primarily provided information about services (culture and leisure, parks, transportation, businesses, tourism and so forth). They also provided links to other business or tourism sites, and various types of contact details (primarily telephone, facsimile and/or email address) (Musso, Weare and Hale, 2000).

In a study of the users of 60 web sites across different industries conducted by Bell and Tang (1998), the standard of content and navigation facilities throughout all industries was judged by the users as ‘acceptable’. The industries more likely to offer online transactions were retailing, travel and tourism and electronic commerce. Less likely to offer online transactions were the entertainment and leisure, and (more surprisingly) financial and banking services and information services. This, perhaps, reflects a study conducted in 1998.

In summary, there are indications that different industry areas will adopt different web site features to suit their needs.

THE STUDY

This study examines the features of web sites of a number of different areas of Australian public and private institutions. The areas relate to the interests of a number of staff members in the School of Information Systems at Victoria University. The Electronic Commerce Research Unit, of the Faculty of Business and Law, funded the study. Many staff members within the School have research interests that are centred on aspects of electronic commerce. In December 2001, they were invited to submit the web site addresses of 20 Australian institutions within their interest area. Nine responses were received from Information Systems staff; with the number of web site addresses received varying from 12 to 73. Where the number of web site addresses for a particular interest area exceeded 20 by too great a margin, a random sample of web site addresses was selected. The details of the interest areas, the number of web sites evaluated and a brief description of the methods used to identify the web sites for the study are presented in Table 1. There were some overlaps in relation to the interest areas of staff (such as wineries), but there were no overlaps in relation to the web sites that were investigated (for instance, no winery web site fell into more than one category).
### Table 1: Interest Areas for web site Investigation

<table>
<thead>
<tr>
<th>Interest Area</th>
<th>Web sites Evaluated</th>
<th>Method of web site selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries in Victoria – early adopters of the Internet</td>
<td>17</td>
<td>Web sites chosen from early adopters of email or web sites in Victoria between 1995 and 2000. Half of the 41 identified early adopters were used.</td>
</tr>
<tr>
<td>Boutique Wineries</td>
<td>12</td>
<td>Staff member has researched these for many years.</td>
</tr>
<tr>
<td>Couriers</td>
<td>23</td>
<td>Compiled by a staff member in December 2001</td>
</tr>
<tr>
<td>Bookshops</td>
<td>10</td>
<td>Taken from the Melbourne Yellow Pages Directory 2000 under the category Bookshops – Secondhand &amp;/or Antiquarian. Sites included listed a Web address.</td>
</tr>
<tr>
<td>Travel Agents</td>
<td>20</td>
<td>Selected on the basis of every second site from <a href="http://www.yahoo.com.au">www.yahoo.com.au</a>. After a search was done for 'Travel Agents'.</td>
</tr>
<tr>
<td>Small Retail Businesses</td>
<td>19</td>
<td>Compiled by a staff member in December 2001</td>
</tr>
<tr>
<td>web sites for Older persons (55+)</td>
<td>20</td>
<td>A staff member has been researching the use of the Internet by older persons as part of his PhD studies.</td>
</tr>
<tr>
<td>Local Government</td>
<td>20</td>
<td>Selected on the basis of every third site from <a href="http://www.mav.asn.au">www.mav.asn.au</a>.</td>
</tr>
</tbody>
</table>

In all, the content of 165 web sites was evaluated in December 2001 according to a web site feature matrix that had already been developed and used within the School (refer Burgess and Schauder, 1999). In the study, a web site was given a score of ‘1’ if it had fully implemented a feature, or a reduced score (say ‘0.5’) if the feature was partly implemented. The ‘score’ for each feature was totalled and then divided against the total number of web sites in the interest area. For example, if 8.5 out of 10 web sites had implemented a particular feature, it would be given a content rating of 85% for that particular interest area.

The aim of this paper is to compare and contrast each of the nine interest areas by the categories identified in the feature matrix. These categories are:

- Product and service details;
- Transaction details;
- Product and service support;
- Sense of community;
- Basic information and contact details.

These categories will be discussed further with the results of the study in the following sections.

### Product/Service Details

A business web site usually contains some description of that business’ products or services. This generally takes the form of a generic listing of the types of products and/or services that are offered by the business, and/or a listing of products or services (catalogue). McGovern (2000) and Baker and Baker (2000) suggest that product information must be timely and relevant.

Refer to Table 2 for the level of product and service detail on web sites for businesses in this study.
Table 2: Product/Service Details by Interest Area

<table>
<thead>
<tr>
<th>Interest Area</th>
<th>General details of products or services offered (%)</th>
<th>Product or Service Catalogue (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries in Victoria – early adopters of the Internet</td>
<td>88</td>
<td>76</td>
</tr>
<tr>
<td>Boutique Wineries</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Couriers</td>
<td>100</td>
<td>74</td>
</tr>
<tr>
<td>Bookshops</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Tourist Resorts</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Travel Agents</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Small Retail Businesses</td>
<td>89</td>
<td>63</td>
</tr>
<tr>
<td>web sites for Older persons (55+)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Local Government</td>
<td>90</td>
<td>80</td>
</tr>
</tbody>
</table>

Most web sites across the range of sites in the study offered at least general details about the types of products or services offered. This was less for the boutique wineries, which were generally wineries at the ‘smaller’ end of the scale.

The proportions of web sites offering ‘catalogues’, detailing specific products or services on offer were generally slightly less across the range of interest areas. The only area where this differed significantly was in web sites targeted towards older persons. In most instances the services offered on these sites were easy enough to find, but not as part of a dedicated catalogue. Also, 40% of older persons web sites had a general search capability for ‘keywords’ over the entire site. The only other interest area where this feature was also prominent was local government (60%). This will be discussed further in a later section.

Some interest areas had different ways of finding out about products that were specific to the area:

- 70% of bookshops provided a search engine for finding specific book titles or authors;
- 20% of travel agents provided maps of tourist destinations; and
- 8% of tourist resorts provided a ‘virtual tour’ of the resort.

Transaction Details

This section covers the transaction handling involved in placing orders for products and services and paying for them. Some web sites offer an ordering facility where the customer orders the product or service by email. Typically, the customer has to wait for a response from a salesperson, although some email responders can generate an automatic email confirmation of receipt of the order. At the next level, an ordering facility is offered where the customer orders a product or makes an appointment through a form on a Web page. The order or appointment is then sent to a database. Confirmation of the order or appointment usually comes immediately. Payment facilities usually require an online credit card payment approval system. ‘Shopping cart’ facilities allow users to browse through a catalogue and add a number of products to a particular order that they are compiling online. This is particularly common where users are likely to purchase more than one product at a time.

When included, these types of features, including ordering and payment, should be available to customers at all times (Baker and Baker, 2000).
A feature that became apparent during the study, but was not initially included, were instances where businesses provide the chance for customers to send an email or fill in a form relating to a quote or a specific product or service enquiry.

Table 3 shows transaction details by interest area.

<table>
<thead>
<tr>
<th>Interest Area</th>
<th>Online ordering by email (%)</th>
<th>Interactive ordering (%)</th>
<th>Email/ form for quote or enquiry (%)</th>
<th>Online payment (%)</th>
<th>Shopping Cart Facility (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries in Victoria – early adopters of the Internet</td>
<td>29</td>
<td>44</td>
<td>0</td>
<td>44</td>
<td>38</td>
</tr>
<tr>
<td>Boutique Wineries</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Couriers</td>
<td>4</td>
<td>54</td>
<td>26</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bookshops</td>
<td>20</td>
<td>50</td>
<td>0</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Tourist Resorts</td>
<td>13</td>
<td>0</td>
<td>67</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Travel Agents</td>
<td>20</td>
<td>15</td>
<td>50</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Small Retail Businesses</td>
<td>21</td>
<td>21</td>
<td>0</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>web sites for Older persons (55+)</td>
<td>5</td>
<td>15</td>
<td>0</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Local Government</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>0</td>
</tr>
</tbody>
</table>

Two factors seem to influence the level of adoption of transaction features. Firstly, in relation to wineries, it appears that the early adopters are more likely to adopt these features. Secondly, online ordering (by email or interactive) seems to be adopted by those interest areas where the products or services are easily definable and deliverable (that is, wine, some courier services and books). For those products or services that may require further investigation or explanation (tourist resorts, travel agents and more complex courier services) an email service or form may be provided for a quote or further enquiry. Not surprisingly, books and wine are suited for online payment facilities as they allow for instant shipping. Interestingly, some local government sites allow direct online payment. As indicated earlier, shopping cart facilities are more likely to be provided where orders for more than one product are likely to be placed.

Product/ Service Support

This section covers any product support offered on a web site that is in addition to that provided at the time of purchase. A listing of typical questions that have been asked a number of times by customers, otherwise known as Frequently Asked Questions is quite common. These usually provide usually common product or service ‘fixes’. Searchable product or service support is usually linked to a database of product or service details. It is often a combination of typical problem solutions, technical papers, directions on product use and so forth. Directions on using the product or service can provide further instructions or hints on how to best the product or service. Some businesses offer a facility that allows customers to email product support requests to the business. This often only ‘operates’ effectively during business hours, otherwise the customer must wait for a response.

Table 4 shows the results for this category.
Table 4: Product/Service Support by Interest Area

<table>
<thead>
<tr>
<th>Interest Area</th>
<th>Frequently Asked Questions (%)</th>
<th>Searchable Product/Service Support (%)</th>
<th>Directions For Use</th>
<th>Email Based Support (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries in Victoria – early adopters of the Internet</td>
<td>6</td>
<td>0</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>Boutique Wineries</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Couriers</td>
<td>13</td>
<td>4</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>Bookshops</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tourist Resorts</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Travel Agents</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Small Retail Businesses</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>web sites for Older persons (55+)</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Local Government</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The provision of answers for ‘commonly asked questions’ was provided on some sites, mainly older persons, local government, small retail sites and couriers to a lesser extent. The ‘early adopter’ wineries were more likely to provide answers to common questions about their product than other interest areas. Some local government sites offered email based support for constituents with queries.

A service support feature offered by 33% of couriers (and not listed above) was the ability to track the progress of parcels and similar items automatically over the Internet.

**Sense of Community**

A feeling of belonging or ‘community’ is an important marketing tool for businesses (Baker and Baker, 2000). Setting up online relationships with customers may become easier as consumers’ values regarding Internet relationships change and they become more comfortable developing relationships using features such as chat groups and electronic mail (Kolesar and Galbraith, 2000).

This type of feature on a web site can prompt a number of responses from customers. They may visit the web site of the business because it is entertaining, or provides a social experience for them. On top of that, they are able to contact ‘like minded’ people (other customers) who can share experiences (perhaps about the business’ products or services). A bulletin board operates in a similar manner to email. A customer can ‘post’ a message to the web site and other customers can reply to it. In some instances, an employee of a business may reply to a technical question. The bulletin board may also be ‘moderated’ by an employee, filtering out irrelevant or abusive messages before they are posted. A chat group is an online, real time, discussion group. A customer can log on and type messages that can be read and responded to by other customers that have logged on. This facility is usually not moderated. A ‘special members club’ may exist for active customers or even just for people that have supplied their email address. The clubs often provide extra access to community or entertainment features, further product support, and so forth. Games can be played either on the web site (as a means to attract visitors) or may be downloaded as a reward for some customer information. A newsletter is similar to a what’s new page (refer to a later section) when published as a Web page. An enhancement would be to email the newsletter to existing or potential customers.

Features such as newsletters allow the business to provide information that is targetted and most useful to customers, rather than just advertising material (Baker and Baker, 2000).
Table 5 shows the results for this category.

<table>
<thead>
<tr>
<th>Interest Area</th>
<th>Bulletin Board (%)</th>
<th>Chat Group (%)</th>
<th>Special Club (%)</th>
<th>Games (%)</th>
<th>Newsletter (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wineries in Victoria—early adopters of the Internet</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Boutique Wineries</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Couriers</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bookshops</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Tourist Resorts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Travel Agents</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Small Retail Businesses</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Web sites for Older persons (55+)</td>
<td>25</td>
<td>23</td>
<td>35</td>
<td>10</td>
<td>55</td>
</tr>
<tr>
<td>Local Government</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Web sites for older persons were by far the greater users of features providing a sense of community, leading in each category. This may be because of the perceived needs of their target user group. A number of bookshops and travel agents provided newsletters and special clubs for customers, as did small retail businesses to a lesser extent. Some wineries also offered special member clubs for their clientele.

**Basic Information and Contact Details**

Most interest areas provided general information about the business and the address of the business. Forty two percent of small retail businesses provided general information about themselves. Only 25% of web sites for older persons provided a physical address. For many of these sites there was no physical address for users to purchase a product or service. In relation to information provided about individuals, local government sites provided information about the Mayor and other council employees and wineries typically listed information about winemakers. Other sites listed information about the business owner on occasion. Some wineries, web sites for older persons and local government web sites listed information about upcoming events. One in five web sites offered a "What's New?" feature. Location maps were provided by a majority of tourist resorts (holiday destinations) and local government web sites.

It is reasonable to expect that most web sites will provide a means to contact the business. Most of the web sites examined provided all three types of contact details, but some provided a combination.

Interestingly, the developers of the web sites for older persons are encouraging their users to deal with them online. Only a small portion of these web sites offers telephone and fax contact details. A quick look back at the Basic Information section will also show that few of them provide details of a physical address either.

**COMMENTS ON THE STUDY**

It is unrealistic to claim that this study is representative of all web site development given the method used to select the web sites - those relating to a number of different interest areas of staff of the School.
of Information Systems at Victoria University. It does, however, seem reasonable to draw a number of preliminary conclusions, based upon the number of web sites analysed (165). Web site content will be (and is) different according to a number of different factors. These factors obviously include the industry area and the types of products and services being offered by the business. It is reasonable to surmise that other factors, such as the size of the business, the expertise available within the business, the amount the business is willing to allocate to the web site and what the business wants the web site to do will also determine web site content, but these cannot be established from this study.

CONCLUSION

This study has revealed examples of businesses that are trying to sell their products direct to customers online, that are using the Web to provide extra support for their products and services, that are using specific features (such as 'sense of community' features) to attract customers to their web sites, that make special offers over the Internet, and so forth. What is interesting about this study is the amount of divergence between the identified areas. Some features, such as the provision of contact details and web site navigation tools, seem to be 'minimum requirements' for the majority of the web sites. Other features will be provided according to the distinct characteristics and aims of the organisations concerned.

Armed with this data, businesses can design and implement web sites that closer provide the information current or potential customers require from their sites, adopting certain features as is appropriate for their particular interest area.

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