

INFORMATION LITERACIES ONLINE: UNANTICIPATED BENEFITS OF ASSISTING HIGHER EDUCATION STUDENTS TO MEET BASIC INFORMATION LITERACIES SKILLS

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ABSTRACT

This paper reports the implementation and evaluation of an introductory compulsory basic information literacies program at the University of Wollongong. The program was designed to integrate basic information and computer literacy skills and to introduce students to the University's information environment. The University's information literacies policy and procedures underpinned the development of the program and all newly enrolled students were required to:

- *activate their computer account;*
- *complete an information literacy workshop or the self-paced option in the Library; and*
- *complete and submit a web-based assignment.*

This program was supported by the production of information sheets and a video that were distributed across campus. A database of students who successfully submitted the web assignment was established and matched against student records. Evaluation of the processes involved in the program highlighted the importance of these support materials to the successful operation of the program. The introductory program has already resulted in more extensive student use of the computer system.

The program's implementation was a tortuous process for some students and staff. The experience of these students and staff provided a wealth of information and tips for computer systems managers and service providers on how to approach and manage the introduction of information literacies across a campus. Key areas of learning were in the brokering of relationships between front of house service providers, technical divisions and students needs so that needs and resources were matched. The simple message is: if it can go wrong it will, and the attitudes we adopt in the brokerage process are critical to matching needs with resources so that issues become opportunities for future development well beyond the existing program.

KEY WORDS

Information literacies, evaluation, web-based assessment, brokerage, organisational learning.

1. INTRODUCTION

Like Richard Branson of Virgin Enterprises who claims that his best customers are those who complain because he learns most from them, we came to realise that we could learn a lot from students who experienced the most problems completing a system-wide introductory information literacy program. Their experiences serve to highlight the importance of considering the organisational environment in which the program is to be implemented. Our story is drawn from our experiences of implementing an innovative program that had two main purposes. Firstly, to introduce beginning undergraduates to the information environment of the University and secondly to provide students with a mechanism for achieving a basic level of connectivity and information literacy.

The introductory program, called the Information Literacies Policy Introductory Program (ILPIP), is innovative and its development was the result of a concerted team effort involving staff from the Library, Information Technology Services (ITS), and educational development. This year McCann et al (1998) identified 40% student connectivity with a computer account on a server as high and yet this university instituted ILPIP to achieve 100% connectivity. Not surprisingly, the introduction of this program placed extra demands on the system and brought to the fore ongoing issues associated with service and organisational practices. We realise that the program's success with all students depends very much on the context in which the program is situated. Russell Gluck, a Lecturer with the Aboriginal Education Centre (AEC), introduced a brokerage process between students and resources which provided a rich source of material about information systems issues. The difficulties experienced by students focussed our attention on the interface between Administrative Information Systems (AIS), ITS Client Services and Student Administration during and immediately after enrolment.

2. THE EVOLUTION OF THE INFORMATION LITERACIES POLICY INTRODUCTORY PROGRAM (ILPIP)

In 1997, the University of Wollongong approved the adoption of an information literacies policy. In the policy, information literacy, computer literacy and statistical literacy were identified as components of information literacies (University of Wollongong, 1997). The policy document was designed to bring together the computer literacy and library literacy practices and procedures of the University. It reinforced the need for all courses and programs to implement an integrated approach to the development of skills associated with information, computer and statistical literacy. According to Candy, Crebert and O'Leary (1994) and Tinkler, Lepani and Mitchell (1996), higher level thinking skills are dependant on the development of the information literacies skills identified in the University of Wollongong's Information Literacies Policy (McGurk, 1997). Clanchy and Ballard (1995) argue that higher level thinking skills can be grouped into three categories: thinking, research and communication. The development of these skills requires students to develop introductory skills in areas such as information, computing and statistics early in their higher education experiences.

3. THE STRUCTURE AND IMPLEMENTATION OF ILPIP

During a preliminary meeting with members of the Library, ITS and educational development the idea for a web-based assignment was raised. According to Elizabeth Peisley, a Librarian, students come to university from diverse backgrounds, having had varying experiences with the current information environment and with technology. The Introductory Program aims to ensure all new students, specifically undergraduates, have attained a minimum level of information literacies skills, to ensure that when they commence their first assignment they are not completely overwhelmed by the wide range of resources available. The Program introduces students to the University's information environment within the first few weeks of session. It is designed to encourage students' active learning and to promote greater interaction

between students as they develop basic concepts and skills in information literacies. Students are informed of the requirements of ILPIP through the student diary, enrolment information and sessions during orientation. The Information Literacies Policy Introductory Program required students to:

3.1 ACTIVATE THEIR UNIX COMPUTER ACCOUNT

Newly enrolling undergraduates are required to activate their computer accounts so that they can gain access to the web-based assignment. Activating their UNIX account requires students to identify available computer laboratories both public and in faculties. A video called *Getting Connected* and associated information sheets were developed to take students, step-by-step, through the process of activating their account and changing their password.

3.2 COMPLETE AN INFORMATION LITERACY PROGRAM AT THE LIBRARY EITHER AS A SELF-PACED OPTION OR IN A WORKSHOP

Students had been required to complete a literacy program through the Library for a number of years. In 1996 the Library introduced a revised information literacy program. Library staff was kept informed of proposed changes including the fact that a web-based assignment was to replace a previous paper-based version that had been monitored by Library staff. Library staff was inserviced on navigating from the University home page to the assignment site. Information sheets that were distributed to students incorporated instructions on accessing the web-based assignment and the navigation was demonstrated as part of each workshop. During the workshop the video, *Getting Connected*, was promoted and students could borrow it from the Library if they wished. The workshop was designed to introduce students to basic information literacy skills and to the resources available from the Library.

3.3 COMPLETE AND SUBMIT A WEB-BASED ASSIGNMENT DEVELOPED AROUND THEIR ACTIVITIES IN THE INFORMATION LITERACY SESSION

A copy of the web-based assignment was distributed to students during the information literacy session organised by the Library. ITS organised student seminars on the Internet and use of the computer laboratories so that students would feel more confident using the Web to access the assignment. The assignment consisted of questions related to information literacy and Library resources and services. Many of the answers were structured as pull-down menus in order for the assignment to be marked electronically. This allowed students who submitted the assignment to be informed immediately of their success or failure. Students who had not answered the questions correctly were advised to check their responses to specific questions and had the option of resubmitting again or of coming back at another time. The name and student number of successful students was to be recorded on a database. The database of student names could then be transferred to the administration file server and their student records updated. Previously this had been an arduous manual task performed by Library staff. As a result, reminder letters would be generated and sent to students who had not completed ILPIP.

3.4 EXPERIENCES WITHIN THE PROGRAM

From an administrative perspective, the transition to ILPIP was achieved relatively smoothly. Of course, this is not to say that everything went really well. Some students had few computer skills and virtually no experience of the Internet so the assignment represented their initial contact. The assignment used frames, which meant that it could not be accessed in faculty laboratories that were still using Netscape 1. The Library developed a memo on Frequently Asked Questions to which staff could refer in order to assist students who were experiencing difficulties submitting the assignment.

4. THE PROCESS OF EVALUATING ILPIP

As Tertiary Literacies Co-ordinator, one of Catherine Milne's responsibilities was to monitor the operation of the program and the resulting database. Her interest was in evaluating the program in terms of whether more students than last year had activated their account and

completed the information literacy workshops at the Library. As a measure of the activation and completion rate the number of successful assignment respondents was collected from the database. It was planned also that the Program be evaluated using an approach informed by the theoretical framework of Guba and Lincoln (1989). This involved awareness of the existence of multiple perspectives about the effectiveness of the program based on the context of experience of the students and staff involved. The methodology was based on cluster evaluation in which students and staff are asked to provide their thoughts about the program and its implementation, an account is constructed based on their comments and then the participants are asked to read the accounts and to modify them where necessary (Sanders, 1993).

4.1 STUDENT AND STAFF RESPONSES TO ILPIP

From the data collected a picture was forming of student completion and satisfaction with the program. All the students to whom Catherine spoke responded positively when they were asked about the program. Although some tended to describe it using metaphors in which the program sounded like medicine that was good for you. One student commented, "I think that it is good for us to be expected to do because you can build on it in your classes." Some commented that the assignment was too long for other students that they had observed; and on the lack of computer awareness of their colleagues. Their comments, and those of staff, led the team who developed the Program to think about making the links between the skills and the questions on the assignment more transparent. This would allow the assignment results to form a basis for students developing their own skills matrix of their undergraduate experience in future years.

As a result of staff debriefing and student focus groups, it was realised that there was a need to examine the interaction that occurred in the Information Literacy workshops and to modify some of the information sheets that were presented to students. For example, the information sheet on activating computer accounts implied students could change their password as soon as they had activated their account. However, once hundreds of students were activating the system they often experienced time delays of 30 minutes or more before they could attempt the next specific computer task. As a result, the handout was modified.

The Library evaluation indicated that ILPIP had resulted in more sophisticated library users with students making more effective use of library resources and with a reduction in 'basic' questions at the Information Desk.

4.1.1 Successful and Unsuccessful Completions

As Catherine looked at the database of successful completions growing steadily before her eyes she felt a warm inner glow. To date over 78% of students who began their studies at the University this year have completed the Program. Already the University had exceeded the graduate level of connectivity observed in previous years. However, a concerned telephone call from Russell brought to the surface a whole range of issues that might not have emerged without the demands of the introduction of ILPIP and brought Catherine, somewhat, to earth.

Russell had met with a group of students from the AEC who were experiencing difficulties activating their computer accounts. He contacted Catherine who set off with the aim of solving their problems. For some of the students, greater experience with the Program was all that was required for them to get 'on-line' and prepared to attempt the web-based assignment. However, for other students their difficulties were not associated with the computer and information literacy requirements of the Program but with the linkages needed between their enrolment data and the activation of their computer accounts. Their problems serve to highlight issues that constitute the unanticipated benefits resulting from the introduction of this Program. Terena, a student with the AEC, reflected on her experience for this paper and her thoughts are presented in the following section of the paper. Her comments establish an appreciation of the frustration that she experienced in accessing the system. Her experience is probably a 'worse case scenario' and it leads us to ask the following questions. Why did some students have such difficulty activating their computer account and completing the requirements of the program? What can

we learn from their experiences? How did Aboriginal students' learning needs become key resources for the reconfiguration of the system for the benefit of all?

5. EVALUATION AND BROKERAGE

The AEC's specialist orientation program emphasises learning relationships and the safety to learn. In the orientation program Aboriginal students learn that it is appropriate and 'safe' for them to ask questions if they do not understand something or if something is not working. This emphasis was crucial to Aboriginal students becoming identifiers of issues in mainstream information and administrative systems that affect the ILPIP because students had the confidence to persist when it might have been easier for them to abandon their efforts. As Terena claims, "Without this introduction to safety I would have got dirty 'cranky' and I would have just said "stick your ID card" and just left Uni." The students brought the difficulties that they were experiencing in activating their accounts to the attention of the staff at the AEC who, in their attempts to assist the students, instituted a brokering process.

5.1 IDENTIFYING BROKERAGE

Russell describes brokerage as a method for bringing participants and resources within the system together in a 'no blame' situation which, in this case, enabled an exploration of the interface between administrative and information systems. Brokerage provides a basis for simultaneously exploring means of resolving participants' immediate issues and attempting to ensure that the solutions are structural and systemic. As a process of evaluation, brokerage requires the following steps:

1. Examining the issues that participants are experiencing.

To achieve this the broker requires a thorough knowledge of both the systems and groups involved. The broker needs to be acceptable to all parties and have a workable relationship with them. However, the broker will not be able to achieve positive outcomes for their client or systemic change if relationships between the clients and the systems are not established (Kelly & Sewell, 1988).

2. Engaging the system/service providers who provide the resources.

This requires acceptance by the service providers that the issue is related to systems in place. A knowledge of organisational defensive behaviours of the different service providers that make up the differing cultures of service is essential for this (Egan, 1994).

3. Establishing a collaborative environment that focuses on systemic change.

The primary focus is on establishing relationships between groups so that clients' needs are connected with resources and issues are resolved. Brokerage results in resolutions being simultaneously incorporated into systemic change. As soon as the structural changes are in place the broker 'backs off' because the changes have become part of the structure (Gluck & Draisma, 1997).

For example, with the implementation of ILPIP Russell learned that some Aboriginal students had experienced difficulty activating their accounts. He sought to communicate with someone who could assist these students to gain access to the resource, in this case, a computer account working at a systemic level. Once this was achieved for these students, it was important to ensure that the change that was applied was instituted systemically. The brokerage process (Gluck & Draisma, 1997; Sewell & Kelly, 1988) highlighted the value of listening to learners and using what they had to say to enhance the service culture of administrative and information systems for the benefit of all members of the University.

Scriven argues that, "evaluation inherently involves advocacy, so the important question is advocacy for whom," (1994, p. 1). Brokerage is an attempt to move beyond advocacy to a situation where structural and systemic change is achieved through continuous evaluation (Kelly & Sewell, 1988). It provides a methodology for formative evaluation as it attempts to bring together participants and systems so that the participants can gain access to the necessary

resources. Brokerage is a useful notion for evaluators because it allows them to be more than objective recorders or advocates. It provides a process by which evaluators can promote systemic change.

5.2 EXAMINING THE ISSUES AFFECTING PARTICIPANTS

It was the experiences of students from the AEC and concerned comments from the Library staff, which alerted us to the issues that were affecting some student's successful completion of all steps of ILPIP. Some of the difficulties included:

1. Students were not able to activate their computer account because their enrolment data had not been entered correctly.
2. About 10% of newly enrolling students could not activate their computer account because student enrolment and student number could not be linked in the main database where User Names and User IDs were generated. Students had a student card but the system would not let them activate their accounts because the system had run out of User ID numbers. This issue affected in excess of 150 students.

We had ID numbers. ITS had put us on the system but us, as the students, couldn't get to the identification numbers because ITS had got us into the system but we were really not on the system. ITS had opened accounts but we had no passwords to get in and use the accounts. (Terena's comments, 1998)

3. Students with the same last name who had enrolled had their student numbers and User IDs swapped within the system.
4. About 5% of students experienced difficulties submitting the web-based assignment.

Our frustration boiled over when the library program frequently 'crashed' as we were entering data. It also refused to print verification of successful library tests and marked correct answers wrong. (Terena's comments, 1998)

5. Students who were unable to activate their computer accounts were sent recursively from one service to another because the systems problems were not identified.

When we had been round the circle of trying to log on and the ITS help desk many times they started to palm us off to admin. We spent at least six hours in the queues. So I would go all the way to admin. You can imagine what admin was like at the beginning of session. The queues! You would just wait and wait and wait and then they would say "it is an ITS problem;" and so I was getting frustrated I just wanted my card fixed up so I could get into this stupid computer system. But after all it wasn't the computer was it? It was a hick-up in the system. A costly one you know, like it took three weeks to fix up.

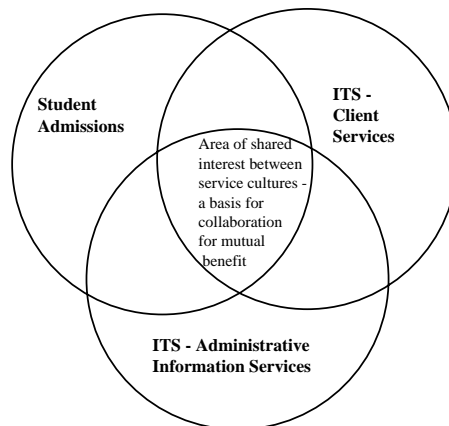
ITS and admin. weren't really listening to us. How would I say this? They were hearing what we were saying but they weren't really listening. There is a difference. (Terena's comments, 1998)

5.3 ENGAGING THE SERVICE PROVIDERS

Russell approached the computer engineer and his superior to find out why students from AEC were having such problems getting connected to the system and why students were being sent recursively from one service to another. He believed that this interaction could be a catalyst for achieving organisational change and for connecting students with the necessary resources, that is, they would be able to activate their computer accounts. However, he also wanted to know why these issues had occurred and what could be done so that this situation did not happen again in the future (Argyris, 1990). This was not a simple process because there was a need to learn about the issues that were affecting so many students and also to bring together

representatives from different service groups. As a result of the meetings between Cath, Russell and the engineer a map was drawn. Figure 1 illustrates the intersection of organisational cultures where solutions were proposed to prevent these issues re-emerging.

Figure 1 Intersection of Organisational Service Cultures where Solutions Can Be Proposed to Prevent These Issues from Reemerging



5.3.1 *Espoused and Practiced Modes of Service*

During the process of investigation and analysis of some of the issues that students had experienced, it began to emerge that perhaps part of the solution lay in considering how the notion of 'service' is practiced in work cultures of service providers that make up the University. Across structures, there are groups of service providers who have different perceptions of service and consequently different modes of operation (O Byrne & Levy, 1997). However, if communication and social relationships were established between service cultures and between service cultures and participants then structural networks of communication could be established. As a result, social relationships could become an integral aspect of service cultures.

If people who were working in a service role listened more closely to students, then the identification of students' difficulty with activating their computer account as a possible systems problem might have occurred sooner. This could have led a service provider to initiate contact with an engineer who could have investigated immediately the students' difficulties rather than the situation that occurred where students were sent individually from one service provider to another. Perhaps we need to look more closely at the 'theories in use' of service rather than the 'theory of service espoused' by service units (Argyris, 1990). For example there are two kinds of theories of action/service. The first is espoused theory consisting of beliefs, values and attitudes - the students learning needs come first. The second is theory in use - designed to produce defensive consequences and therefore requires defensive reasoning. Examples include; '... the student hasn't followed the instructions,' '... they want to be spoon fed,' and '... it's the students fault not the technology or the system.' The espoused values of service providers do not always coincide with the actions of service delivery. Expediency often leads providers to compromise their values and to justify the need for these compromises with reasons (Egan, 1994). Terlaga's (1994) direction on the crucial role of the help desk in quality management of service to clients might be useful in helping us to resolve the dichotomy between espoused theories of service and actual service. His direction also provides a focus for the development of a collaborative space to explore and to redefine how students and staff can readily access relationships that can contribute to the resolution of user issues (Gluck & Draisma, 1997).

5.4 ESTABLISHING A COLLABORATIVE SPACE

The process of the Aboriginal Education Centre working with Administration Information Systems was equivalent to having the participants/students and the computer engineer working together. It resulted in an elimination of the 'next desk' syndrome as a factor in service (Barabba, 1996). As a computer engineer investigated the issue, a further hundred and fifty students were

found to have student numbers that were not linked to User ID numbers. The overwhelming majority of those students were first year international students. The engineer instituted a short-term solution to this problem by increasing the number of 5 digit ID numbers. Throughout this whole process the engineer openly communicated concern that the students were being disadvantaged. He empathised with the students' frustration and expressed the hope that none would pull out of their course because of the experience. Also, the engineer admitted a longer-term solution needed to be found. The process of getting the students connected to the computer system took up to three weeks.

During the mapping process it became clear that a re-arrangement of the enrolling student, data entry clerk and the computer screen could allow students to verify their enrolment data as it was being entered into the computer. He proposed that the problem that Terena experienced, in which the system matched her student number with another student's enrolment data, could be alleviated by the writing of a short program which checks for invalid accounts at the system level. The meetings with the engineer seemed to be very productive and we were hopeful of maintaining this interaction so that these changes could be implemented over time.

Another collaborative space was established between Library staff who had initially identified the difficulties that students experienced submitting the assignment, computer programmer and ILPIP co-ordinator. As a result, the computer programmer who was responsible for putting the assignment, and its underlying database, on the web examined and tested the program extensively. He could not find any significant problem with the program but he introduced a file that recorded students who were unsuccessful in their initial attempts to complete the assignment. This meant that we could track their progress more clearly. He also suggested that we could use unique identifiers in the database next year to improve the security of the program so that students could not simply change the User Name and password at the top of the assignment and resubmit the assignment under another name.

5.4.1 Developing and Maintaining Change

We envisaged that the engineer and the programmer would be available to work with other members of the ILPIP implementation team to introduce the changes they had suggested and to establish systems that allowed the database underpinning the web-based assignment to communicate directly with the student database. However, Russell noted that, by the start of the midyear intake of students, the rearrangement of desk and computer screens that had been proposed by the engineer had not occurred. Both the engineer and the programmer had left the University. We believe that within a service culture there could be mechanisms in place that ensure this valuable information and tacit knowledge gained during the process of interaction with students is immediately included within the system to ensure its perpetuation (Johansson & Nonaka 1996; Nonaka & Takeuchi, 1995).

6. CONCLUSION

The experience of ILPIP for the vast majority of students and staff involved has been a positive one. It has been a very successful program and there are procedures in place to improve the communication of the requirements to students and the transparency of the assessment items. It has achieved its aims of increasing connectivity, introducing students to the information environment of the University and assisting students to develop some basic information literacies skills. However, the multiplicity of problems experienced by some Aboriginal students provided key indicators of the mainstream needs and directions for the investment of resources that can benefit the total learning environment of the University.

Brokerage provided an evaluation methodology for examining the experiences of a number of students as they strove to become connected to the system and for examining the influence of the organisational context on the implementation of the program. Within this context, issues were raised that are of significance to other learning organisations. Brokerage takes evaluation beyond advocacy (Gluck & Draisma, 1997; Stake, 1997). If these students had not persisted in their attempts to complete the requirements through the brokering process then it is possible

that these issues would not have been thrown into relief and addressed in a manner that led to such positive outcomes and systemic change. The issues raised in this paper might encourage other members of learning organisations to begin to reflect on the relationship between espoused service and practiced service and on processes that can be implemented to value and retain the intellectual property of its members. Processes for the management of knowledge need to be developed so that valuable information or tacit knowledge gained during the process of servicing participants is made explicit and incorporated into the system.

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