

Chapter 12. Evaluation of an Information Research Skills Tutorial

Participants: Anne Douglas, Lynn Murdoch

Mentor: Carmel McNaught

RMIT University

1. Introduction

This project forms part of the ASCILITE CUTSD project “Staff Development in Evaluation of Technology-based Teaching Development Projects: An Action Inquiry Approach”. The computer-facilitated learning innovation evaluated in this project was the Postgraduate Information Research Skills tutorial. The Learning-centred Evaluation (LCE) framework, as detailed in the Handbook (Phillips, 2000), was used to focus the evaluation on student learning outcomes, to provide the structure for the evaluation and to inform the definition of the reference questions. An action inquiry process was used throughout the evaluation for continuous improvement.

2. The Postgraduate Information Research Skills Tutorial

This is a web-based interactive tutorial, available at <http://bastian.lib.rmit.edu.au/ch700/>. There are currently three units to the tutorial which cover: developing a search strategy; database searching, including evaluating and amending a search strategy; and locating the full-text of references.

The Postgraduate Information Research Skills Tutorial is used with a number of formal postgraduate Research Methods courses (subjects). The students taking these courses range across both level and discipline – from PhD to Masters coursework students and from Physics to Computer Systems Engineering to Social Sciences to Architecture. For some of these courses, the library component (in which the tutorial is used) is a formal part of the academic program, with assessment towards the final mark for the course. With other courses, the library component is an adjunct – delivered during formal class time but with no formal assessment component. In these

situations the students are referred to the tutorial as a backup to material covered in the session. The tutorial is also publicly available on the Library web site.

The reasons for developing the web-based tutorial were based on the results of previous evaluations. They were to provide a backup to class contact (especially for classes with a large number of international students or students returning to study); to deliver some content independently of classes and so free up some class time or cover material that had to be omitted from classes because of time constraints; as a resource for students to use without class contact when they recognise they have a need for assistance; and in the context of increased flexible delivery within the University.

The evaluation team examined the development process of the tutorial in the context of the LCE framework. The background of decisions made during the analysis and design phase regarding the purpose and content of the new tutorial were identified. Also identified were areas where evaluation had not taken place during the development phase of the innovation.

2.1 Initial design consideration

The tutorial was designed with a linear structure, with later sections building on earlier, to be worked through sequentially and to be inward-focussed with minimal links out of the tutorial to avoid “losing” students to externally linked sites. However a site map, search function, and contents list were provided to facilitate revision and quick look-up of a remembered section.

Part of the technical design brief was to minimize access problems. The interactivity built into the tutorial is constrained by the requirement that quizzes should operate without the need to download plug-in software.

There is no login procedure as the tutorial is freely available to all visitors to the website. Because there is no mechanism for checking or ensuring that students undertaking library classes are using the tutorial, it was decided that the design should link the tutorial with the assessment for the course. Therefore, in the initial design, when the tutorial was to be used as part of one academic course, the assessment had to be retrieved from the end of each section of the tutorial. Now that it is used with a range of courses, this design has had to be altered and students can pick up the assignment without having to work down through the content of the tutorial.

2.2 Previous Evaluation

Evaluation of library classes for postgraduate students had been undertaken prior to the use of the CFL innovation. The tools used in evaluation were questionnaires administered after the final library class seeking feedback on student perceptions of the value of the classes and other resources used in conjunction with the classes, feedback gathered from academic staff, and information from library staff teaching the classes and marking assignments. The teaching teams used a quality cycle approach with pre-class meetings to restructure the classes based on previous feedback and post-class debriefing meetings.

When the web-based tutorial was introduced into the teaching (semester 1, 1999), evaluation was expanded to include a questionnaire administered three-plus months after the library contact. This questionnaire again asked for students' perception of the usefulness of the contact (classes + tutorial + resource book), and also asked them to judge their skill levels before and after the contact.

3. The Evaluation

Past evaluation and the development process for the tutorial were examined in the context of the LCE framework. The project team decided to include some formative evaluation that had not been undertaken during the development phase of the tutorial. This formative evaluation was to examine the learning environment. Past evaluation had looked at student perceptions of their learning and feedback from the teaching teams about the conduct of the classes. While student perception was considered important, the

project would also try to look at the learning process throughout the use of the tutorial and verifiable improvements in skill levels (learning outcomes).

Various stakeholders were consulted during the formulation of the reference questions. The librarians teaching information research skills classes, who used the tutorial either as part of, or backup to, the content of their sessions, wanted some information about the impact of the innovation on students' long-term learning – whether students perceived the tutorial as useful and would return to it when they recognized a need in the future, and whether they applied the principles to other research situations after the immediate context.

The developers of the tutorial (who are also the evaluation project team) were interested in the long-term effect on students' information searching behaviour, but were also concerned with the immediate learning outcomes and how well students transferred the skills/knowledge to their individual research topics (the immediate context). But in addition, as the tutorial was still under development, evaluation of the learning environment – functionality, attractiveness, clarity – and its impact on students' interaction with the tutorial, and therefore the likelihood that they would use it again when they perceived they had a need, were included as part of the evaluation project.

While the evaluation of the tutorial was intended to be summative, when the stakeholders' needs for information were examined in the context of the LCE evaluation framework, it was clear that the project would incorporate formative, summative and impact evaluation. For example, "monitoring of the learning environment", which was not undertaken during initial development, would inform future development and address the issue of student engagement with the tutorial; a focus on student learning outcomes would examine students' ability to translate the skills covered to their immediate application; and "impact evaluation" would look at the long-term impact of the tutorial on student learning. The focus of the evaluation was now planned to span the development, implementation and institutionalisation phases of the project (Phillips, 2000, p2.1) as detailed in Table 12.1 below.

3.1 Reference Questions for the Evaluation Project

The reference questions were designed around the two major stakeholders' interests.

The evaluation was undertaken in second semester 2000 to address the following reference questions.

1. Actual use and degree of engagement

Is the tutorial used, and if so, how? What measurable interaction do students have with the tutorial? How do students react to the tutorial?

- 1.1 Usage - students' account of their use
- measurable interaction (volume of usage & degree of interaction)

Which of the audience groups are using the tutorial? Are there return visits to the tutorial, or is it a one-off experience? Do students work through the tutorial or just access their assignments? Do students undertake the exercises or skip over them? When presented with the opportunity, do students undertake additional subject-specific exercises? How do students report that they have used the tutorial? Are students coming back to the tutorial when they identify a need?

1.2 Perceptions

Do students perceive that the exercises in the tutorial are challenging/ interesting/ relevant? Do students perceive that the tutorial is useful? Are the assignments perceived as relevant to their learning need?

2. Transferability & sustainability of learning

What evidence is there that students effectively translate the skills to their immediate subject context? What evidence is there that the learning is sustained - that skills are used in the long-term and/ or perceived to be of long-term benefit?

2.1 Confidence

Do students feel they already have adequate information searching skills? What is their perception of their level of expertise? Do students feel differently about their skills after completing the tutorial?

2.2 Competence levels

Do students already have good information searching skills? What is their level of competence? Does student performance change after using the tutorial?

Table 12.1. Reference questions in the context of the LCE evaluation framework.

Reference question	Evaluation phase (LCE framework)
1. Actual use and degree of engagement	
1.1 Usage - students' account of their use - measurable interaction (volume of usage & degree of interaction)	Development - Formative monitoring of the learning environment Implementation - Summative evaluation of learning process
1.2 Perceptions	Development - Formative monitoring of the learning environment Implementation - Summative evaluation of learning process
2. Transferability & sustainability of learning	Institutionalisation - Impact evaluation
2.1 Confidence	Implementation - Summative evaluation of learning outcome Institutionalisation - Impact evaluation
2.2 Competence levels	Implementation - Summative evaluation of learning outcome Institutionalisation - Impact evaluation

3.2 Participants

There were six groups listed in the initial Evaluation Plan as participants in the evaluation. However a number of these courses did not run in second semester and so were omitted. Two groups were using the tutorial in second semester 2000 and would be included as participants in the evaluation project. A third group was able to be included after negotiation with the supervising lecturer. This group did not normally have an information research skills component in their course, and no additional contact time was available.

The three groups were:

- Research level (+ class) group – 37 students Master by Research and PhD students in Applied Science and Engineering undertaking a Research Methods course. For the library module of this course, students attend 2x2 hour classes, use the tutorial as a backup to class content, and access their assignments via the tutorial. In second semester, there were 37 students in this group although some of them started after the library classes had commenced. A team of librarians teaches the library module of this course; one member of the evaluation project team participated in the teaching team.
- Coursework (+class) group – 14 students These are Masters Coursework students in a field of Engineering. The group comprised 14 students (one joined the classes part way through the program). They attended 3x2 hour classes; used the first unit of the tutorial in a supervised laboratory; used the tutorial as a backup to class content; and accessed their assignments via the tutorial.

The contact librarian for this group of students was a member of the evaluation project team.

- Coursework (no class) group – 23 students This group of Masters Coursework (Engineering) students had no class contact. There was a formal meeting at the beginning of the semester at which they were instructed to use the tutorial and complete the assignments as part of their research methods course. They used the tutorial independently and accessed their assignments via the tutorial. The contact

librarian for this group of students was a member of the evaluation project team.

In addition, there is a group described as “visitors to the site”. This was intended to be the fourth group of participants in the project. The group includes other postgraduate students referred to the tutorial by liaison librarians but who do not have to complete any assessment and unknown visitors to the Library website who accessed the tutorial. This was a reasonably sized group – 34.2% of first time users of the tutorial were not students from the three participating groups. During the evaluation of data, it became clear that very little information had been gathered about this group and they were not included in the final analysis.

3.3 Data Collection Instruments

A number of instruments were designed to gather data for each reference question – to address the different contexts for each group and to provide triangulation of data. These are shown in Table 12.2.

The pre-tutorial questionnaire was administered to all groups prior to the start of any contact (class or tutorial). The librarians teaching each group administered it. For the Coursework (no class) group, this was their only contact until their assignments had been marked and returned. The questionnaire had been pre-tested using experienced librarians and one PhD student. However the project team quickly identified problems when it was administered to the first group. This questionnaire went through continuous redesign in response to problems identified with each group.

User tracking consisted of

- data collected from an entry survey that all users to the website had to complete before accessing the tutorial;
- page hits on each page of the tutorial; and
- students’ reported use of the tutorial.

This data was to provide information on how deep into the tutorial students delved, looking at actual as well as reported use. The project team was aware however (Cann, 1999) that page-hit data does not indicate use or amount of time spent on the page.

Table 12.2. Instruments used with evaluation groups to gather information relating to each reference question.

Reference Q.	Q1.1 Usage	Q1.2 Perceptions	Q2.1 Confidence	Q2.2 Competence
<i>Instrument</i>				
<i>Questionnaire Pre-tutorial use</i>	-	-	student groups	student groups
<i>User tracking</i>	student groups + visitors	-	-	-
<i>Performance in tutorial exercises</i>	-	-	-	student groups + visitors
<i>Embedded questions</i>	-	student groups + visitors	-	student groups + visitors
<i>Questionnaire Post-tutorial</i>	student groups ¹	student groups ¹	student groups ¹	-
<i>Focus group</i>	-	CW (no class)	-	-
<i>Assignments</i>	-	-	-	student groups
<i>Questionnaire 3 months later</i>	student groups	student groups	student groups	-

Note 1: Initially it was intended to administer this questionnaire to only two groups and to use a focus group with the third group. The third group was a class of international students and more talkative males in the class dominated the focus group. To ensure that information was gathered from as many students in the third group as possible, the questionnaire was administered at the end of the focus group.

Performance in tutorial exercises. It was intended that data from the tutorial exercises would provide information on student engagement (did they take the time to do the exercises?), as well as a picture of student capabilities that could be measured against answers to questions in the pre-tutorial questionnaire. Performance data was to be gathered each time an exercise was undertaken.

Prior to the evaluation in second semester, additional interactive exercises were incorporated into the tutorial. These were designed to give students the opportunity to repeat an exercise using a topic from their subject area (rather than the general topic used in the tutorial). Whether students chose to go on to these additional exercises provided data on their engagement with the content of the tutorial. This could not be linked directly to particular groups of students as there was no login procedure for using the tutorial, but the subject area chosen indicated their group.

However, the design of the data collection was faulty and performance data was only collected for those students who elected to give feedback by answering the embedded questions.

Embedded questions in the tutorial were designed to elicit student feedback on their perception of their own performance and on the clarity of the questions and their perception

of the usefulness of various techniques covered. These questions were incorporated when the tutorial was redesigned prior to semester two.

The post-tutorial questionnaire was administered in the final class for the two groups with class contact. For the non-class contact group, it was administered at the end of the focus group. The librarians teaching each group administered it. The questionnaire was based on a questionnaire that had been used in previous years, but was redesigned to focus on the tutorial part of the intervention, rather than the classes. The questionnaire asked students to indicate how much of the tutorial they had completed and then to rate each unit for usefulness. They were also presented with a set of statements about the interactive exercises and asked to rank their agreement on a five-point scale. Then they were asked to describe their reaction to this type of delivery method and to rank their skills and confidence. For the group without class contact, the questionnaire was altered to omit questions to be covered in the focus group discussion.

A focus group was used with the non-class group and was conducted by the evaluation project team. It was held after the students had received the results of their assignments. The purpose was to encourage the students to talk about their experience of using the online tutorial and to try to determine the reason for

their poor performance in the literature search section of the assignments.

The assignments contributed to the final mark for two of the groups (the groups with classes) and were a hurdle task for the non-class group. The assignments were in three parts and were accessed via the tutorial. These should be a significant source of information about learning outcomes. The pass/fail rate is no guide however as a failure is only given for non-completion of the assessment tasks. Unsatisfactory performance is resolved through meetings with the student to work through the areas of difficulty until a pass is achieved. Therefore it was the opinions of the librarians marking the assignments as to the grasp of the concepts displayed by the students that were collected rather than a straightforward mark. The librarians were asked to complete a tally sheet for each group of students.

The three-month questionnaire is distributed via email three months after the students have completed assignments. This questionnaire was developed and used in 1999, but was revised for this evaluation project to provide more direct comparison with questions in the pre-tutorial questionnaire. In previous years the response rate has been low, but often provided very interesting feedback. Responses came from students with a strong point of view, positive and negative, and after students had the opportunity to apply the skills and knowledge. There was a very poor response rate to this questionnaire from all groups participating in the evaluation project.

4. Description of Data and Analysis

This section provides highlights of some of the data. It became apparent when comparing data that some students showed a tendency to “just tick options” and their responses were contradicted by their own responses to other questions. However this had been anticipated, and different instruments were used to collect the same data in different ways – to provide

triangulation.

The usage and performance data collected could not be directly attributed to the groups participating in the evaluation because the tutorial is freely available on the Library website. Again, the project team was aware of this problem. The plotting of usage against a time chart of class activity and due dates for assignments has correlated this data with the activity of the participating groups.

1. *Actual use and degree of engagement*
Is the tutorial used, and if so, how? What measurable interaction do students have with the tutorial? How do students' react to the tutorial?

1.1 *Usage*
Which of the audience groups are using the tutorial? Are there return visits to the tutorial, or is it a one-off experience? Do students work through the tutorial or just access their assignments? Do students undertake the exercises or skip over them? When presented with the opportunity, do students undertake additional subject-specific exercises? How do students report that they have used the tutorial? Are students coming back to the tutorial when they identify a need?

Statistics collected from the entry survey suggest that all students in the three student groups accessed the tutorial. The frequency of access (return visits), based on completion of the entry survey, ranged from 2.9 visits per student for one of the groups to 6.9 visits per student for another.

The evaluation project team was concerned about whether students accessed the tutorial just to pick up their assignments. The ‘completion of tutorial’ data (Table 12.3) suggests that there is reasonable use of the tutorial.

This pattern of usage from page hits is matched by data from the post-tutorial

Table 12.3. Completion of tutorial.

Unit	Total hits on first page	Total hits on last page	Completion rate
1. Developing a search strategy	188	133	70.7%
2. Database searching	240	115	47.9%
3. Locating the full text	163	95	58.2%

questionnaire where students in the participating groups were asked which of the units they had worked through.

The completion rate for Unit 2 is a concern as it covers applying the skills from Unit 1 and examining reasons for poor return rates in databases.

There is also a correlation with student ranking of the units (Table 12.4), although the response rates here are very low. Students were asked to rank the usefulness of the units on a five-point scale ranging from 'not useful' to 'very useful'. A moderate to high rank, 4 or 5 on the scale, was assigned.

Unit 2 had a low completion rate according to the usage data and did not receive a good response on the usefulness ranking data. This low ranking comes mainly from the Coursework (no class) group, who also performed badly on the database searching section of their assignments and indicated in the focus group that they attached more importance to information that they located on the Web than to information in databases.

However, later in the post-tutorial questionnaire, students were again asked about Unit 2, and while the response was general agreement that the screen captures in Unit 2 clearly illustrated problems with searching, the responses were in the 3-4 area of the five point scale rather than the 4-5 area. The project team feels that the approach used in this Unit needs to be re-examined.

An examination of student completion of the interactive exercises is difficult. As

performance data was not consistently collected it is difficult to establish whether students undertook the exercises or just skipped to the answers. It was felt that page hits on the exercise page and the answer page did not provide any clear information.

In addition to the main topic running through the tutorial, students were given the opportunity to access examples from other subject areas. Page hit data for these examples was good, but performance data was poor, both in quantity (the number of students completing the exercises) and quality (how well they did in the exercises) (Table 12.5). However, 35% of all students who completed the post-tutorial questionnaire claim they did all the subject exercises and a further 46% claim they did some of them.

When students were asked to best describe their reaction to working via a web-based tutorial, the statement "I like the tutorial online as it lets me go back over the material a second time" rated highly.

1.2 Perceptions

Do students perceive that the exercises in the tutorial are challenging/ interesting/ relevant? Do students perceive that the tutorial is useful? Are the assignments perceived as relevant to their learning need?

Student ranking of the units in the tutorial has been covered earlier (Table 12.4). Students were also asked for feedback on the interactive exercises in the tutorial. Most comments indicated that the explanations accompanying the exercises were clear. This was irrespective

Table 12.4. Usefulness of units in tutorial.

Unit	Moderate to high rank (4 or 5 on scale)	Response rate
1. Developing a search strategy	81.5%	36.5%
2. Database searching	77.3%	29.7%
3. Locating the full text	88.2%	23%

Table 12.5. Follow-up subject exercises.

Subject areas	Total hits on 'keyword' page	Total hits on answers page	No. attempting keyword exercise	No. with at least 75% correct keywords
Computing	57	58		
Chemistry/ environment	94	43		
Physics	35	17		
Architecture	19	3		
Total	205	121	27*	43.4%

* We believe that this figure is reliable.

of how the student had actually performed in the exercise.

Of the two groups with class contact, 65% responded in the post-tutorial questionnaire that they enjoyed the exercises in the tutorial and 78% that the exercises assisted their understanding of the concepts (however there was a very low response rate of only 27% on these questions). Only 50% of these respondents had found it was useful to do the exercises a second time using the other subject areas supplied. However, from table 5 above, it is clear that not many actually did the exercises a second time, although a reasonable number checked the answers.

Information relating to the relevance of the assignments was to have been collected by the 3-month questionnaire. The low response rate on this instrument meant that no useful information is available on this question. Feedback from the focus group was that the assignments were not relevant because the students had already passed that stage in their research project. They felt they were being asked to go over ground that they had already covered and there was a subsequent low completion rate on sections of their assignments. However this group of students also performed badly in the database searching section of their assignments. They did not demonstrate that they were familiar or competent with database searching techniques.

The overall reactions to learning via a web-based tutorial are summarized below for each group. Again there is a fairly low response rate for some groups, and this is indicated in brackets.

Students from the Research (+class) group (18.9% response rate) indicated that they liked learning through a web-based tutorial because they could learn at their own pace. Other reactions that rated highly for this group were “I was better able to juggle my other course commitments” and “I like to have some class contact, as well as the online tutorial”.

For the Coursework (+class) group (57.1% response rate), the majority reaction to learning through a web-based tutorial was “I like to have some class contact, as well as the online tutorial”. Other reactions that rated highly were “I was able to learn at my own pace” and

“I like the tutorial online as it lets me go back over the material a second time”.

The reaction of the Coursework (no class) group (52.2% response rate) to learning through a web-based tutorial was “I was able to learn at my own pace”. Other reactions that rated highly were “I found it difficult to put aside the time to do the tutorial”, “I like the tutorial online as it lets me go back over the material a second time”, and “I like to have some class contact, as well as the online tutorial”.

For the groups combined, the three reactions to learning via a web-based tutorial which rated the highest were “I was able to learn at my own pace”, “I like to have some class contact, as well as the online tutorial” and “I like the tutorial online as it lets me go back over the material a second time”.

Comments from the focus group about the usefulness of the tutorial were not based on their evaluation of the content of the tutorial, but on their perception of the importance of a literature review to their project and their final assessment.

2. *Transferability & sustainability of learning*

What evidence is there that students effectively translate the skills to their immediate subject context? What evidence is there that the learning is sustained - that skills are used in the long-term and/ or perceived to be of long-term benefit?

2.1 *Confidence*

Do students feel they already have adequate information searching skills? What is their perception of their level of expertise? Do students feel differently about their skills after completing the tutorial?

For the Coursework (no class) students, there was little shift in their perception of their level of expertise before and after the tutorial. Their confidence in undertaking a literature search did not change after completing the tutorial, most felt relatively confident in undertaking a literature search before and after. In their reaction to the tutorial, 50% of students from this group who responded felt they already knew most or all of what was covered in the tutorial. This is interesting when compared

with their performance in the assignments, which was poor when it came to applying information research skills to a real-life context, that is, their research topic.

For the Coursework (+class) students there was no shift in their perception of their level of expertise after completing the tutorial - half felt their skills were basic, the other half felt their skills were good. There was an increase in their confidence to undertake a literature search after they had completed the tutorial. Half the students felt they understood most of what was covered in the tutorial and could apply it to further research and the majority of the other half (38%) understood some of what was covered and would need help from time to time.

For the Research (+class) students, there was a shift in the perception of their level of expertise from basic to good after completing the tutorial. Their confidence in undertaking a literature search underwent a marked shift - after completing the tutorial the majority of this group felt very confident in undertaking a literature search (but there was only a 19% response rate for this question). Prior to completing the tutorial this group was evenly distributed across feeling "some what confident" to a few feeling "very confident." Half the students indicated they understood most of what the tutorial covered and think they would be able to apply it and the other half felt they already knew most of what was covered already but picked up a few tips.

For two groups, Research (+class) and

Coursework (no class) there are problems in comparing the pre-tutorial use and the post-tutorial use data due to the low response rates for the post-tutorial questionnaire. The above analyses can only be indicative of trends.

2.2 Competence

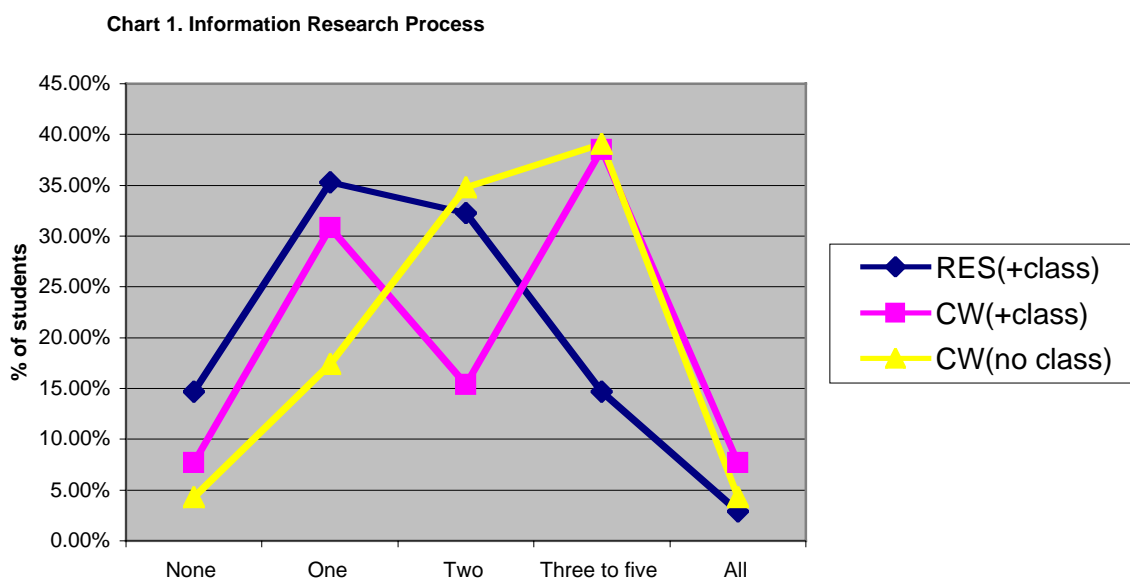
Do students already have good information searching skills? What is their level of competence? Does student performance change after using the tutorial?

As expected, the Research (+class) students reported less difficulty than other groups with aspects of the information research process prior to class contact (see Chart 1). The majority (67.6%) stated that they had difficulty with only one or two areas of information research.

The Coursework (+class) students were more evenly spread across the spectrum, but 38.5% ticked three to five areas of difficulty.

In comparison, the Coursework (no class) students generally indicated that they had more difficulties. 39.1% indicating three to five areas of difficulty, and the remainder of the students clumped towards greater difficulty. The Research (+class) group usually rated slightly better than the other groups on pre-intervention competence questions.

The importance the students attached to different information research tools is a concern, although not unexpected. From the list of options presented to students,



bibliographic databases should be ranked as 'important' for research at this level. The fact that less useful information research tools (such as Internet search engines) are rated more highly is an ongoing concern.

65.2% of the Research (+class) students rank Internet search engines as 'very important' (1 or 2 on a 5 point scale). This puts them slightly below the average of 75.9% for the groups combined. The percentage is significantly higher for the Coursework groups. 83.9% (+class and no class combined) ranked Internet search engines as their 1st or 2nd information research tool. This perhaps reflects a lower awareness of the value of other tools/sources.

The Library catalogue ranked more highly, for all groups, than bibliographic databases. This may reflect lack of familiarity with the terminology used. However the description of bibliographic databases was lengthy to try to overcome this possible problem. We therefore think it would be fair to interpret this data to mean that students are not familiar with bibliographic databases.

The students' reported use of bibliographic databases in the pre-tutorial questionnaire mirrors this importance ranking data. 41.4% of all students reported no use of bibliographic databases. Even in the Research (+class) group, 35.3% reported no use. The Coursework (no class) group was the most significant group, at 52.2%, indicating no knowledge/use of databases.

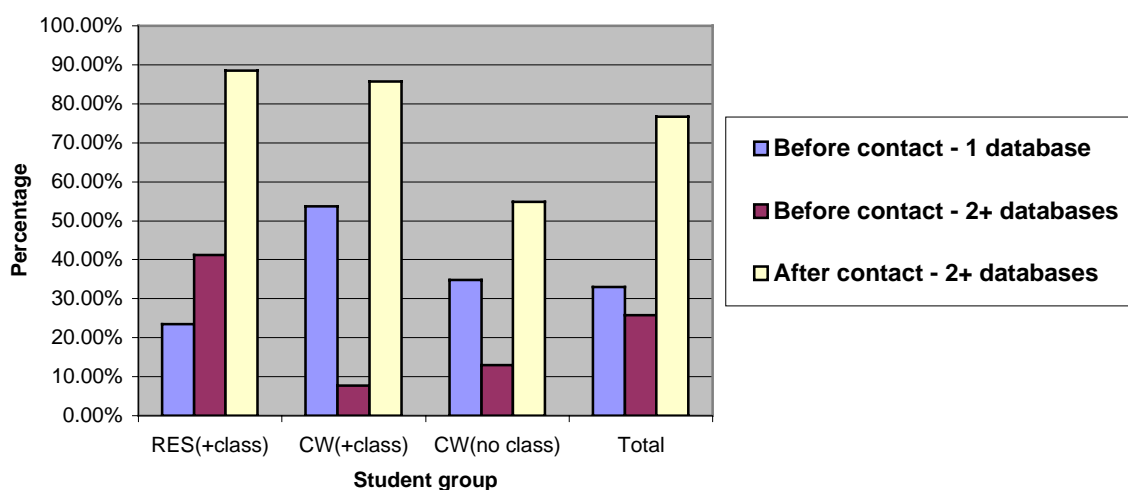
Post-contact data, from the assignments, shows that student knowledge of bibliographic databases had improved (Chart 2).

The BEFORE and AFTER contact questions required the student to identify bibliographic databases (indexes and abstracts). In the pre-tutorial questionnaire, the student only needs to indicate a knowledge of bibliographic databases (indexes and abstracts), without necessarily being able to name any. The question in the assignment has told the student what information research tool is needed (ie. bibliographic databases), and their task is to investigate the available databases and list a few they think would be useful.

The BEFORE bars indicate that the vast majority of students had not made a strong mental link between searching for journal articles on a topic and bibliographic databases. This is across all groups, with the order of knowledge/skill as in previous questions – Research (+class) level, Coursework (+class), Coursework (no class).

The AFTER bar, with data from the assignment, shows a marked improvement in the first two groups in their awareness of appropriate bibliographic databases. The third group, Coursework (no class), demonstrates an improvement in awareness but it is still at a low level. This is an extension of the low value that they had placed on them in the pre-tutorial questionnaire when they rated the importance of sources of information, and is reinforced by feedback from the focus group.

Chart 2. Knowledge of bibliographic databases



When specific skills in structuring a search statement are examined (Chart 3), based on information gathered in the pre-tutorial questionnaire and the assignments, there is generally an improvement. The Coursework (+class) group however performed badly in identifying the important concepts of their topics. There is substantial improvement for all groups in supplying keywords. All groups were much more successful at this exercise in their assignments, using their own topics. This may indicate that we need to re-think how we test this in a pre-tutorial situation.

Performance in the keyword exercises within the tutorial shows poor performance here as well, although this data is incomplete.

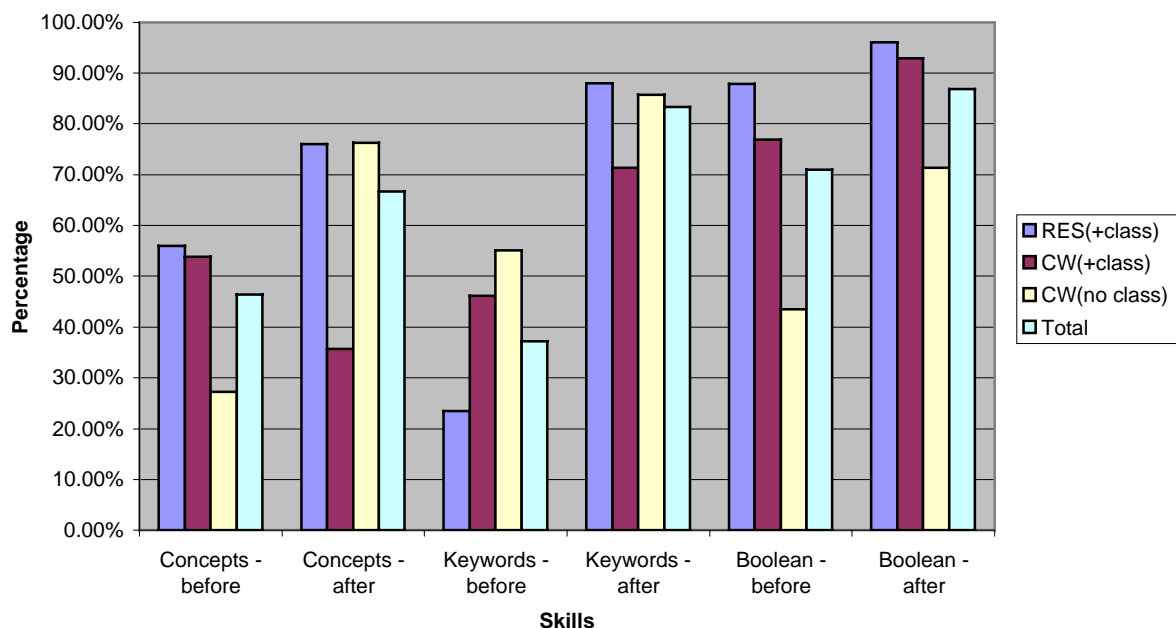
In the assignments, students were then asked to use this increased knowledge of databases and improved ability to structure a search in an actual search context. The feedback from the team teaching and marking assignments for the Research (+class) group was that students from some discipline areas within the Research (+class) group performed better than in the past, but this was not consistent for all students in the group. There was a small improvement in the Coursework (+class) group, but a large number of students in the Coursework (no class) group did not adequately complete this exercise and appeared not to be able to complete this exercise.

5. Key Findings

The evaluation design attempted to find a balance between quantitative and qualitative data. Previous evaluations had concentrated on feedback from students – feedback about perceived value and usefulness and “what they felt they learnt”. With this design, we were looking to provide verification of student comment and perception by gathering quantitative data on usage and performance in quizzes, and information from the librarians marking the assignments about student performance in assignments. Gathering data from a number of sources and perspectives should provide the verification required. It also, however, provided a mountain of data to sift through.

While much data analysis has been undertaken, further work needs to be done where contradictions between reference question areas have been identified. While the evaluation project team was aware of the trap of collecting too much data, we still fell into it. Part of this is attributed to the desire to “fill in the gaps” of evaluation not undertaken during the design and development phases of the tutorial - this evaluation project gathered data to address some formative evaluation questions. Also, a high degree of crosschecking or triangulation of data was built into the evaluation which meant a lot of additional data was collected.

Chart 3. Skills - before and after contact



For some instruments the response rate was very low - so low that the team could only draw inferences or indicate that the data showed a particular trend. This low response rate raised questions about the validity of comparing data between groups and especially with comparing data collected prior to students' use of the tutorial with that collected after. It was hoped that data from the three-month questionnaire might improve the situation, but there was a very low response rate for all groups on this instrument. That can be attributed to the timing of the evaluation. Undertaking the evaluation in second semester allowed the project team time to redesign areas of the tutorial, design embedded questions for feedback and student reflection, and design questionnaires. But it turned out to be a bad time of year for collecting follow-up data from students as many had completed their course.

For two of the evaluation groups, the content of the tutorial was also covered in their class contact. Changes in performance cannot be attributed solely to the tutorial. The project team was conscious of this during the evaluation planning, and this is one of the reasons why feedback questions were embedded in the tutorial and the collection of performance data in the interactive exercises in the tutorial was considered important. It was therefore felt to be highly problematic that this data was not collected consistently.

Learning environment

There was a reasonable completion of the Units in the tutorial. The design of Units 2 and 3 will be re-examined. These had lower completion rates, which may be due to design factors or to the fact that they are not as closely integrated into the classes as is Unit 1.

There was insufficient data gathered on usage and performance in the interactive exercises. Some information is available however from feedback gathered from within the tutorial and in the post-tutorial questionnaires. The comments from students are positive. No firm conclusions can be drawn about how useful they are in engaging students and as a learning tool.

The majority of students indicated that they wanted class contact with the web-based tutorial. This is usually because the class provides the opportunity for individual feedback during laboratory sessions. Further

investigation needs to be done to establish the specific aspects of the class contact that students value and if there is any way of replicating these elements electronically.

The tutorial has met some of its aims in trying to meet the needs of the students who require extra help and tuition in understanding and applying the concepts of information research. The tutorial provides students with the opportunity to work at their own pace and to revise. (Data gathered from previous evaluations indicated that many of the international students and students returning to study after a break from studying needed extra help and tuition when undertaking the information research skills classes).

Learning processes

Students were not using sections of the tutorial as had been intended. When given the opportunity to apply skills to their own subject areas, they chose not to undertake the exercises but just to check the answers to the exercise. The follow-up interactive exercises will be re-examined. Rather than asking the students to do exactly the same exercise but with a different topic, we will investigate alternative exercises that test the same skills in a different way.

Given the paucity of data collected on the use of the interactive exercises, it is not possible to tell if learning is occurring as students use the tutorial. However the embedded feedback, where students were asked for feedback after the completion of major exercises, was positive with some suggestions from students for improvements.

Even with this positive feedback, the usage data suggests that Units 2 and 3 need reassessment. The present interactive elements and screen captures may not be the best ways of demonstrating problems with search strategies. The structure of Unit 2, which diverges from the initial design intention of a linear pathway, will also be examined. The unit splits into two streams and the completion rate of one of the streams was very low.

Learning outcome

The feedback from the librarians marking the assignments was that there was a marginal improvement in skills areas and a small improvement in the quality of the assignments

over previous years, but that this was not an across-the-board improvement for all groups.

Discussions need to take place with academic staff as to whether they perceive any improvement over previous years, or even if the students achieve the level expected of them.

Future data from the three-month questionnaire should provide information about what students perceive as the learning outcomes for them, ie. have they been applying the skills to other areas of research.

Context

The usage data and feedback in the focus group suggest that a significant proportion of the Coursework (no class) group just accessed their assignments without working through the tutorial. This reflected the placement/timing of the activity in their course workload and therefore the perceived value of a thorough literature search.

“Context” is an important variable that has had a significant impact on the data collected. This is often a problem for library information research skills training when it is not well integrated into a course workload. The value students place on the tutorial is influenced by the value perceived to be placed on it by academics/supervisors and this is evidenced by how it is structured into the academic program. The context, that is the placement and timing of the tutorial within the academic program, is important for maximising the value that students’ assign the tutorial and its subsequent use. Integrating information research skills sessions into students’ academic programs ensures that sessions are timely and relevant. This provides the context in which students most benefit.

For the Coursework (no class) group, the context affected the completion rates of the tutorial and reduced the availability of data. Data from the focus group indicated strongly that students felt they had passed the stage of a literature review and that the tutorial was going back over ground they felt they had already covered. Many in this group gave no indication of having attempted a literature review and their responses in the assignments indicated a very low skill level in this area, both in knowledge of appropriate resources and effective use of these resources.

Impact

The ability to address this area rested heavily on the data collected from the three-month questionnaire. As indicated, the response rate on this instrument was extremely low. However this instrument will be used with future groups and the evaluation team hopes that this question will be addressed with longitudinal data.

Although the project was not looking at maintenance evaluation, the data collected indicates liaison librarians in other discipline areas are using the tutorial. The tutorial was intended to be generic and seems successful given the usage by other subject areas. This has also brought additional liaison librarians into the development team and increased awareness and use of this method of delivery.

6. Outcomes of the ASCILITE project

The project has provided benefits not only for the evaluation team, but also for the development of the tutorial, for ongoing monitoring of student performance, and for the integration of the tutorial into academic programs. The evaluation project has been discussed at seminars for professional librarians involved in information research skills and generated a good deal of interest.

Some of the data collection instruments performed quite well. The “pre-tutorial use questionnaire” underwent a cycle of improvement during the evaluation project. This is a valuable outcome from the evaluation project. A number of the instruments will be used with future groups. The pre-tutorial questionnaire, the three-month questionnaire and the embedded questions in the tutorial are all undergoing another process of redesign, based on their performance in this project. The librarians using the tutorial intend to continue to examine data on student skills and knowledge levels before the library intervention, student impressions of the tutorial and search techniques as they use the tutorial, and students’ longer-term opinions or reflections. Feedback from the assignments will be fed into the cycle at the pre- and post-intervention planning and debriefing meetings. This continued monitoring will be useful as more units are developed, especially in the context of offshore delivery.

A beneficial spin-off has been that there is data that answers questions that were not part of the reference questions, but which are interesting nonetheless, for example the 'context' issues.

Data collected on the Coursework (no class) group will be used to generate a discussion with the academic department about their expectations for student research, what needs the students exhibit (as indicated by the data collected) and what library intervention might best meet these needs.

7. References

Cann, A. J. (1999). Approaches to the evaluation of online learning materials. Innovations in Education and Training International, 30(1), 44-51.

Phillips, R., Bain, J., McNaught, C., Rice, M. and Tripp, D. (2000). Handbook for Learning-centred Evaluation of Computer-facilitated Learning Projects in Higher Education. Committee for University Teaching and Staff Development Project. Available: <http://cleo.murdoch.edu.au/projects/cutsd99/handbook/handbook.htm>.