Teaching and Learning Information Organisation: the Queensland University of Technology Experience

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Introduction

The curriculum for library and information studies courses has been debated at length, with recent emphasis being on a revisit of the divergence versus convergence issue (Galvin, 1995). This is the unresolved matter of whether to specialise in a course in order to direct graduates towards a particular information discipline, or whether to generalise it, bringing together a medley of viewpoints on information management with the aspiration of producing adaptable information professionals who may be employed in a variety of environments.

There are many elements within the debate. Among those factors that have the most influence are:

- The information science paradigm

  Educators normally like to develop an understanding of a field within a prevailing paradigm. The interdisciplinary nature of information management means that principles have been drawn from areas as diverse as linguistics, telecommunications and documentation without unification into a common framework that enables easy generalisation.

  This leads to difficulties such as the problems of shared understanding faced by specialists dealing with the same material at different levels of abstraction: for example 'classification' as understood by librarians, philosophers, or developers of knowledge-based systems.

- The information professions

  Research on information within economies, such as that of Bell and Porat has been followed by analyses of information professions which documents the range of specialisations existing in the workforce (see, for example, Debons *et al* 1981).

  These specialisations are represented by a range of professional associations each of which has staked claims to represent specialists dealing with information. Comparison of the ambit of a number of these associations at an international level may be made by

reference to their Internet Web sites (Middleton, 1996). The range of professions that make a claim to represent information management interests continues to broaden, with disciplines such as ergonomics and accountancy also addressing the area.

- Business imperatives

  A growing realisation that in addition to information technology, information itself must be managed for the effective development of business enterprises, has led to the treatment of information as a resource.

  The management of this resource may be carried out at different levels within an organisation: an operational level through processes such as data administration and cataloguing, an analytical level such as systems analysis and information resources analysis, and a planning level such as strategic provision and utilisation of information (Diener, 1992). Different functional areas within an enterprise: libraries, records and information centres, business analysis, archives, data administration and strategic intelligence units, may be seen as similar information resource entities with consequent diffusion of professional boundaries.

- Codification of competencies

  There has been recent endeavour to document the competencies required of information professionals and the extent to which professional and paraprofessional roles may be distinguished. This has been directed particularly with employers in mind, but there have been reservations about a competency-based approach in the higher education community. In Australia the approach has been embraced by the library information professionals (Arts Training Australia, 1995), but questioned by computing information professionals (Goldsworthy, 1993).

Information organisation and the curriculum

The environmental issues mentioned above, influence the scope and extent of information organisation in the curriculum as do factors that are more specific to information organisation itself, such as:

- Data administration

  The term data administration has been used in information systems for some time to refer to the control of terminology and use of data elements in computer databases. It is conceptually similar to authority file control. The pivotal role played by databases in information provision means that there is a need for information professionals to comprehend data administration as encompassing the variety of approaches to dealing with metainformation. It is reasonable to expect beginning information professionals to be conversant with the principles and applications of these information organisation procedures such as data element and vocabulary control.

- Standards

The standards development authorities have for some time been promulgating a variety of standards for information organisation that are similar in structure but which differ in application. For example the (ISO 2709, 1981) standard and its associated MARC formats for bibliographic description, are similar to the EDIFACT standard (ISO 9735, 1990) for electronic data interchange (EDI). They each provide computer-based structures and data element definitions for descriptive information.

We consider that the understanding of the principles and general structure of such standards is important for beginning professionals, but that the ongoing application of the rules as embodied in such standards is a paraprofessional role.

- Markup languages

  The increasing amount of electronic document creation has given greater prominence to the role being played by markup languages and in particular Standard Generalized Markup Language (ISO 8879, 1986) and Hypertext Markup Language (HTML) in document description at source. Markup makes possible self-organising documents, thereby providing another avenue for metainformation.

  We see the task of intermediation by design and maintenance of network or electronic text interfaces to be a growing role for information professionals.

Background

Within the framework provided by the University's mission and by the objectives of our own course, we have structured our course to follow the convergent approach in order to provide a generalised education. The exigencies of a one year graduate diploma course allow little avenue for specialisation, although students proceeding to the linked Masters Course have much more freedom to be 'divergent'.

Two units in library and information studies courses of the School of Information Systems focus on information organisation. Information Organisation I (ITP327) is a core unit in the Graduate Diploma Library and Information Studies, and Information Organisation II (ITN352) is an elective unit in the LIS strand of the Master of Information Technology. These units, as the result of recent changes in the school's programs, have moved from a traditional cataloguing and classification orientation to a broader information organisation orientation.

The remainder of this article deals with the problems and issues that have confronted the authors as educators in the design and implementation of the subjects, the content and teaching processes selected in an attempt to address these problems and issues, and the response of students and the professional community to the units.

Challenges associated with subject design and implementation

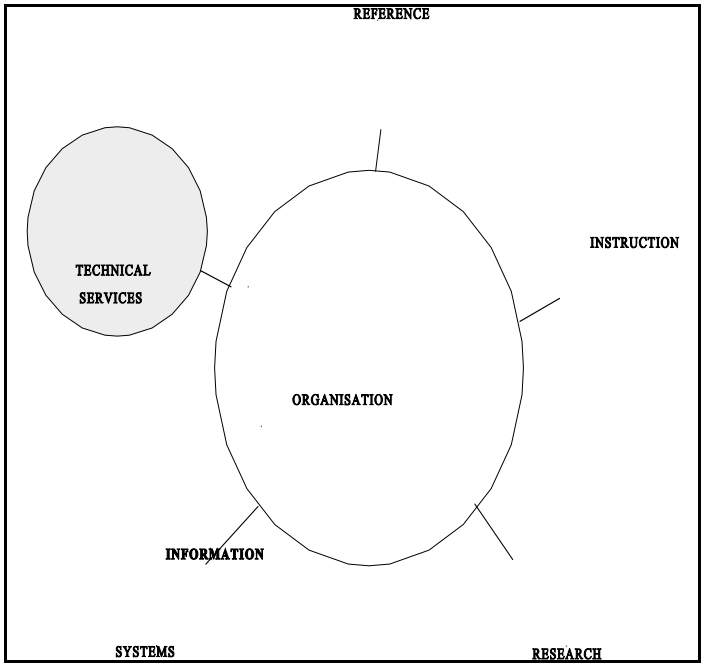
When making decisions about what needed to be taught, and how, we were conscious of a number of issues that we needed to confront in designing the information organisation units.

How were we to:

- help students confront continuous change in information technology?;
- encourage students to adopt a client/user driven approach to information organisation in the broader context of a myriad of standards and rules?;
- prepare students for changes in practice, to be able to deal with new approaches and eventually to take leadership roles in devising and implementing such approaches?;
- prepare students to use the understandings gained in a wide range of beginning professional roles?;
- introduce students to the context of information as a whole and present all modes of organisation in various sectors of the information profession? (Jeng 1993, p.125);
- help students meet the challenge of information technology and the wide variety of traditional and non-traditional media? (Jeng 1993, p.125);
- allow for the coexistence of cataloguing and other forms of information organisation? (Jeng 1993, p. 124);

In order to meet the challenges we made the following decisions.

1. The level at which the unit was to operate was clarified. The theory of information organisation is considered to be central. Understanding this theory and its application to a range of professional contexts is the student's primary goal. The unit is no longer primarily a training ground for prospective library cataloguers. In relation to the library sector this role for the unit is displayed in Figure 1.



2. The need to balance content and process was affirmed. Clearly, rapid changes in technology and the techniques of information organisation, together with growth in the sheer quantity of potentially relevant knowledge, require that students be empowered to continue to learn in the subject area. Also, as with other units in the course, students need the opportunity to further develop communication and teamwork skills. This is achieved through the use of group assignments and an emphasis on action learning and critical thinking processes, which are discussed below.

3. The need to address elements of library cataloguing knowledge and skill alongside the many other competing objectives of the units was established. One of the major problems we face is that broadening of the content base means that less 'learning time' is dedicated to the conventional areas of cataloguing and classification. We had to broach the question: What level of skill with codes such as AACR2, MARC and Classification schedules is it appropriate to expect students to achieve given that the units' aim to provide such a broad education? As

educators we expect that students will develop sufficient understanding of the principles of information organisation and sufficient understanding of the structure and content of important tools to be able confidently to learn to use, or indeed develop, a range of appropriate tools if, and when, they are confronted with the need.

Unit objectives for Information Organisation I and II

The main intentions of the subject matter for the two units are summarised in their statements of unit objectives. They appear in Table 1 below.

Table 1. Unit Objectives for Information Organisation I and II

Information Organisation I		**Information Organisation II**	
Theory Students will demonstrate understanding of	**Practice** Students will be able to:	**Theory** Students will demonstrate understanding of	**Practice** Students will be able to:
1. the nature of information 2. principles of bibliographic database construction 3. the importance of a client oriented approach to knowledge organisation 4. contemporary issues in the organisation of information	1. construct a bibliographic database using appropriate software 2. critically evaluate bibliographic databases 3. identify and research contemporary issues 4. ensure that bibliographic records conform to standards	1 standards and strategies for establishing subject control of the contents of bibliographic databases 2 standards and strategies for describing and classifying electronic documents 3. research questions related to information organisation	1. develop and maintain a thesaurus 2. develop and implement a classification scheme for the organisation of Internet resources 3. review the literature in an area related to contemporary issues/problems in information organisation

Essentially, Information Organisation II allows students to focus on, and explore in more depth areas that have been introduced in Information Organisation I. Students in both units are expected to become familiar with the day to day use of communications technology, for example e-mail, newsgroups, websites, gophers, telnetting to and searching library catalogues, that is a routine part of professional practice. The idea of 'principles of bibliographic database construction' in the above table includes:

a) basic strategies of information organisation; description, indexing and classification; and
b) the major forms of bibliographic databases: library catalogues and indexing and abstracting services.

Drawing together content and process- the instructional design framework

Balancing the relative importance of learning 'content' with learning-to-learn is of considerable importance in a graduate subject educating information professionals. In an information technology context knowledge and skills need to be updated at least annually. It is clearly not enough to 'teach' students what is important, they need to be helped to learn in such a way that they can continue to update their knowledge and discover the previously unfamiliar without being dependent upon formal training and education. Candy, Crebert and O'Leary (1994, p.66) recommend that 'lifelong learning skills should form *part of the core* of any and every undergraduate degree..' (emphasis ours). In postgraduate programs their importance is enhanced

rather than diminished, therefore in these information organisation units, students are encouraged to learn 'content' through engaging in a range of processes which enable autonomous learning. Working towards achieving the curriculum goals established above has led to a synthesis of content (the 'what' of learning), and process (the 'how' of learning). Each of these aspects is described below.

The 'what' of teaching and learning information organisation

The basic content that students are expected to learn about in these two units is set out in Table 2 below.

Table 2. The content of learning

Information Organisation I	Information Organisation II
Description standards for meta-information: AACR2 and ISBD, SGML, HTML, VRML, MARC. Concepts of author, title etc	Indexing processes, writing abstracts, types of abstracts
Different approaches to the nature of information, the concept of 'relevance', the importance of a client-driven approach to information organisation	Thesaurus standards, creating thesauruses, maintaining thesauruses, thesaurus software
Subject analysis - the nature of 'subject', approaches to subject analysis, forms of indexing, types of indexing vocabularies, thesaurii and lists of subject headings	Citation indexing, Science Citation Index, Social Science Citation Index, Arts and Humanities Citation Indexes, Uses of citation indexes.
Establishing systems- defining databases, data dictionaries, authority files, validation, generating reports, defining the user interface	Internet Organisation, creating home pages, HTML, Evaluating net resources,
Types of bibliographic databases: library catalogues, indexing and abstracting services. History and future of OPAC; evaluating bibliographic databases	Designing classification schemes, Internet classification
Subject analysis- classification schemes, comparative classification schemes, historical classification schemes, enumerative vs faceted schemes, Internet classification	Information organisation research, recent research reported in the literature, major issues in information organisation research, types of research
Organisational issues - the role and impact of the Internet, library networking	
Identifying current developments in information organisation- identifying listservs and 'What's new?' sites, identifying key journals, bibliographic databases, professional associations etc.	

One of the characteristics of the 'content' outlined above, is that, in both units, students are encouraged to discern contemporary developments or issues through the use of current awareness processes. So what do students choose to focus on? A selection of student choices of 'topics' to address in 1996 is listed in Table 3.

Table 3. Issues and developments selected by students in 1996

World One - information management module	Organising information using multi-media
Internet Search Engines	Organising information for the disabled
Problems associated with naming objects and concepts for retrieval	'Learning Catalogues' - the next generation

Cataloguing in the online environment	Cataloguing Internet resources
Information literacy - teaching information organisation to clients	Issues in library design- physical organisation of information sources
The virtual library - what will be the librarian's role?	The future of online public access catalogues
Electronic journals	Electronic Dewey

The 'how' of teaching and learning information organisation

In each of the two units, students complete three assignments. These assignments are designed to ensure that students have acquired a range of relevant conceptual knowledge and skills. The assignments are listed in Table 4. It will be seen that each assignment corresponds with learning objectives and content areas listed above. Content is learned mainly through engaging in the assignments using the processes outlined below.

Table 4. Assignments completed by students

Information Organisation I	Information Organisation II
Assignment One: **Creating a bibliographic database** Students design and implement a bibliographic database using Inmagic software. The database contains traditional library materials and non-traditional formats such as journal articles and Internet resources.	**Assignment One**: **Creating a thesaurus** Students develop a 'mini-thesaurus', using thesaurus construction software, for a field of their choosing. A range of resources, including Internet materials are indexed to supply terms for the thesaurus.
Assignment Two: Issues and development in information organisation Students use a range of current awareness strategies to identify issues and developments and design an 'active learning' strategy for familiarising their peers with that issue.	**Assignment Two**: **Developing a Web page** Students design a classification scheme for a field of their choosing. They use the scheme to organise relevant internet materials on a world wide web page.
Assignment Three: **Evaluating online catalogues** Students select two or three catalogues and critically analyse its elements, including the bibliographic records, the user interface, access points and search capabilities.	**Assignment Three**: **Writing a literature review** Students review the literature in an area of information organisation that is of interest to them. Focus on current developments and research activity is expected.

Our interest in helping students manage, or at least cope with change in the library and information profession has led to an emphasis on 'learning-to-learn', via various forms of reflective practice. Our goal is to give students the skills to engage in lifelong learning, and to contribute to the culture of learning organisations. Details of how this has been attempted across some units in QUT's GDLIS, and students' reactions, are available in Bruce (in press) and Tilley (in press). A summary of strategies implemented in Information Organisation I and II is presented here.

In both Information Organisation I and II, learning is facilitated primarily through the use of *action learning*. [For a literature review on action learning see Ballantyne, Bruce and Packer, 1993] Students are given tasks, akin to those they might face in a beginning professional context, and are encouraged to use the processes of action learning to complete their work. Action

learning provides a framework that allows students to learn problem-solving skills and information skills, whilst enhancing their reflective capacities. The main processes involve addressing, as a group, and on a regular basis, key questions such as: What is the task we are required to do? What do we need to learn to be able to do it? What do we already know? How can we find out what we do not know? What resources do we have? etc. Students share learning tasks and contribute their discoveries to the group. They are encouraged to critique each others' work, thus learning to use the *questioning insight*, a reflective behaviour crucial to effective action learning. Engaging in both self and peer assessment helps them learn to identify strengths and weaknesses in their own performance and that of others. Overall, group learning processes are emphasised more in the core unit, with three or more students working on the same project. Independent learning is emphasised more in the advanced elective unit, with learners working on individual projects and sharing their learning with peers along the way.

The second major strategy used is providing a framework to help students 'learn-to-learn about technology' . Rather than encourage independent learning in one aspect of study and then provide 'training' in the use of technology, self-direction and reflection is encouraged in this area as well. We see the library profession as being convergent with other information intermediation professions and sharing with them the fact that new technology must be utilised on a regular basis. Librarians have to learn to use it as well as teach it to colleagues and clients. Often librarians are expected to take a leadership role in relation to the rest of the organisation. What we do is to provide students with basic information about how to connect to relevant hosts, and other system specific material, together with basic conceptual information about the nature of the technology they are using, and how to 'get started' with it. They are then expected to learn to identify the major functions of software of various kinds, and use manuals, online help, peers and other available material to assist them.

For example, in learning to create an Inmagic database, students were asked by their tutor to determine: What aspect of the software will your group explore this week? Students are expected to spend dedicated time each week exploring the software, and then come together to discuss it, and any problems they were having. In creating Internet Web pages using HTML, students are also expected to take an exploratory approach. They examine existing pages to identify how particular features are achieved, using Internet and print materials to obtain information about HTML. It is clear that students find this approach easier as they progress through the course as a whole, and develop familiarity with technology and the learning processes. Not surprisingly many find it very difficult in the early stages of Information Organisation I. Once they enter the elective they are depending more upon each other - as would workplace colleagues - than on the 'teacher'. This is evident in students helping each other in laboratory sessions, discovering new ideas and techniques and bringing them to class etc. As has been noted in this discipline (Rowley, 1994), we are always teaching something new, with which we are not as familiar as we would like.

The Internet is in fact used as a teaching tool as well as a learning tool. Study guides, assignments, class notes and other resources are made available electronically (see, for example, Bruce 1996) Links to resources, supplemented by those discovered by students, are also included. Students are encouraged to discover and learn from Internet resources and their various assignments require them to locate and search library catalogues, electronic journals, listservs, and websites.

Finally, in both units students use current awareness techniques of various kinds to identify or

research contemporary issues and developments. Browsing professional journals, surfing the Internet, monitoring web sites, scanning indexing and abstracting services are some of the approaches they are encouraged to use. In addition to identifying current issues they develop the skills to stay abreast of new developments in future professional practice.

Reactions from the professional community

Informal discussions with colleagues in the professional community has revealed three categories of response to these units. Interestingly, at this stage interest revolves around the needs of that branch of the profession which has previously been the main target of units styled as 'information organisation'. Although some enthusiasm has been expressed by reference librarians, themselves struggling with or enjoying various forms of information organisation, the greater interest has been in relation to the needs of technical services.

Endorsement of direction Some colleagues are sympathetic with the new approaches to teaching information organisation. This is usually based on a recognition of ongoing changes to practice and a recognition that similar trends are being established elsewhere in Australia and internationally, as indicated in our introduction. They endorse the idea that students need an education in the problems, concepts and principles of information organisation, together with a minimal training in procedures. After completing their education students are expected to be ready to learn on the job practices and begin to seriously familiarise themselves with the application of standards in practical situations.

Willingness to adapt Some technical services librarians have expressed surprise at the move away from teaching traditional cataloguing skills, but recognise that a broader approach will serve the profession well in the long term. They are concerned about the possible reduction in skill with traditional tools such as AACR2 and classification schemes at the entry level, but recognise their responsibility as employers to provide training for new graduates and other employees to assist them in learning the *craft* aspects of their profession. They accept the need to continue, and enhance in-house training programs for graduates entering this branch of the profession.

Continued emphasis on cataloguing skill A third group of colleagues would clearly prefer information organisation to continue to be concerned with the development of cataloguing skill. These employers do not wish to, or find it extremely difficult given resource constraints, to assume responsibility for training new graduates as they enter the profession. Lack of cataloguing skill appears to be of most concern to special librarians, probably because of their comparative inability to resource training. This emphasis sometimes also comes from other library educators, for example through encouragement to purchase products designed to develop cataloguing skills. It should also be noted that, in Australia, training of paraprofessionals is able to devote more time to library cataloguing and that the competency standards encourage this.

Reactions from students

Students reactions to the units are more concerned with the processes of learning than with the content. The extended focus on construction of a bibliographic database, and the use of standard tools such as AACR2, LCSH and various classification schemes appears to have forestalled most undue anxiety about being inadequately prepared for a cataloguing role. Moreover students have been encouraged to accept that, for most of them, they would be applying their knowledge of the

principles and tools in a wide range of information professional roles.

Anecdotal evidence and informal feedback points towards areas which warrant obtaining formal feedback, and even research into aspects of student learning. Students seemed to appreciate an 'active learning' environment, and some took considerable interest in the processes of 'action learning'. Generally, students reported feeling as though they had been 'thrown in the deep end', at the start of the semester, and gaining confidence in their own ability and the learning approach as the semester progressed. However, discussions with classes suggested that the experience of group problem solving, in the first semester, is not necessarily sufficient to give them the confidence that they could do so again in relation to a different problem. It seems difficult for some students to break through the barrier of 'I have to know how to do it' and adopt the stance of 'I have to be able to learn how to solve problems'. Consequently these students appear to have difficulty envisioning transferring their learning to novel situations.

This is particularly noticeable in the area of 'learning to learn' about new technology. There appears, amongst many students, to be a greater desire for detailed guidance, even towards the end of the semester, and a reluctance to learn from manuals, on-line help and through drawing on a conceptual understanding of the product. For example, students commented in class discussion that having learned how to use Winmagic (the most recent release of Inmagic, running under windows) was not going to be of any value to them, as libraries 'out there' were still using earlier DOS based versions. This seemed to reveal a tension between the need to be 'up-to-date' and the need to be 'relevant', which could be bridged by students in recognising that they had acquired the ability to master previously unfamiliar software.

There were varying responses to use of technology for alternative delivery of materials. Some students enjoy and use materials provided via the Web, resources linked etc. Others clearly have difficulty reading their e-mail regularly and are not 'happy' when directed to the Web for information. For example, one student preferred to wait to receive a paper copy of a set assignment, having misplaced the original, rather than obtaining the required information from the appropriate Web page.

For some students, it is not until they have repeated this experience, in the same subject domain, ie 'information organisation', that they seem to develop confidence in the problem-solving processes and in themselves. For this reason, as well as for 'content-based' reasons, Information Organisation I and II must be regarded as a pair of units; both should be taken if students are going to benefit fully from the content and the learning processes selected. At present, because Information Organisation II is an elective outside the ALIA recognised graduate diploma, it is not possible to predict what proportion of students will choose to take advantage of the pair.

Conclusions

According to Cronin (1995, p.47) 'libraries are but one domain in which generic information science/information management concepts, principles and skills can be applied.' Similarly cataloguing is only one domain within the information profession in which the theory and practice of information organisation may be applied. Students completing Information Organisation I and II should sufficiently understand relevant principles and concepts in order to be able to apply them to a range of contexts. Just as importantly, the units should have fostered their confidence in their ability to problem solve and learn - both in groups and independently, to

discern issues, to propose solutions and to think in a client-oriented fashion. Observation suggests that students gain at different levels from this approach. Some take their first tentative steps towards autonomous learning in the professional context, whilst others leap forward.

Where does this leave employers seeking cataloguers? As educators we observe that the role of librarians in information organisation is undergoing a change. We expect that fewer librarians will be employed for 'library cataloguing', and that these will be innovators and managers, rather than producers of cataloguing copy. We also consider that the skills of information description are more generic in application, so that employers from non-library environments will seek graduates who have this more flexible approach. We have seen some evidence of this in our undergraduate information management course, although it is taught with much less library content.

We also expect that our students will need to learn on the job, in this as in other areas of the profession that they may choose to enter. It may be that employers looking for new employees immediately capable of 'library cataloguing' ought to consider expanding the role of library technicians in their organisation, as courses for paraprofessionals are designed to provide for this skill.

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