

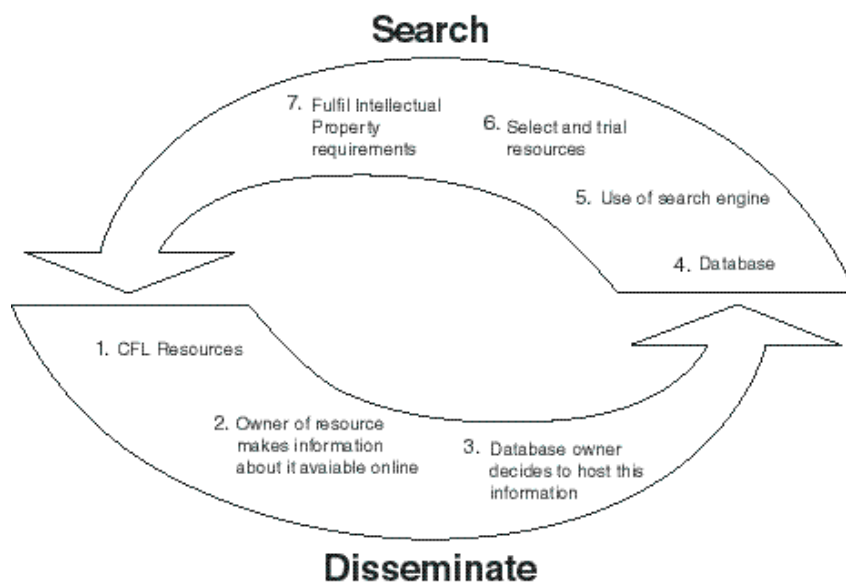
9 Dissemination and databases

9.1 Dissemination and search

In Chapter 5–7, we emphasised the need for policy, culture and support issues to be addressed before effective adoption of CFL can occur. Collaboration was explored in Chapter 8 as enabling development and adoption of CFL. In this chapter we will build on the theme of collaboration by developing a model of distributed databases, based on joint metadata standards. We will examine processes whereby information about CFL resources can be disseminated. Effective dissemination is essential if more widespread adoption of CFL is to occur. The quality of information about CFL resources that is disseminated is critical. In this chapter we will develop criteria, based on academics' perceived needs, about what information should be disseminated. Evaluation evidence features strongly in these criteria.

Dissemination of information about CFL resources via database collections for the purposes of focused information retrieval and as well as general resource discovery are fundamental parts of this study. There is a complementary relationship between searching and disseminating, as illustrated in figure 9.1. Owners of CFL resources may choose to disseminate information about their resources, so that they appear in databases. Databases can be searched for appropriate CFL resources which may be used by an academic as teaching and learning resources. A key challenge, however, is in aggregating the content and value of distributed databases. This chapter investigates the barriers to dissemination and shortcomings of existing databases of CFL resources, and refers to technical issues relating to effective use of databases developed with the latest internet technologies. The chapter concludes with a description of a distributed, interest group-based database design, and discusses a range of policy issues related to a unified database framework.

Figure 9.1: A simple process for the dissemination of, and searches for, information about CFL resources



Let us discuss Figure 9.1 in more detail. The process describes two linkages between resources and databases: dissemination of information about the resource (steps 1 to 4); and searches for information about resources by interrogating a database (steps 5 to 7). The various parts of the diagram are described sequentially in the following steps:

9.1.1 Dissemination

1. The developer of a CFL resource is the resource owner.
2. In order to disseminate information about the resource, the resource owner produces a description of the product.
3. The information describing the resource is sought out by a search database owner.
4. As a result of this dissemination process, the description of the resource becomes part of the database.

9.1.2 Search

5. The user seeking information performs a search of the database with a search engine.

6. The user considers the information returned by the search, and tries out promising resources.
7. In order to use the resource for teaching and learning activities, the user must fulfil the intellectual property requirements of the resource owner.

An example of this process is the EdNA Directory Service which was launched by the Commonwealth of Australia in November 1997, as an attempt to provide for searching and dissemination about CFL materials. It was designed to be an online 'first entry-point' for a wide range of information and resources relevant to education and training in Australia. Development of the Directory Service began in 1995 and has been guided by principles of quality information retrieval and resource discovery together with the provision of networking opportunities to its stakeholders. High-quality catalogued online information resources are made easily accessible, and a wide range of electronic discussion groups are hosted. Further information about EdNA is on p. 154.

An international collection of information about CFL resources is available from the Teaching and Learning Technology Programme (TLTP) in the UK <<http://www.le.ac.uk/tltp/>>. Under this initiative, 108 projects have been funded since 1992. There have three phases with an increasing emphasis on implementation and evaluation, rather than just development, after a 1996 evaluation of the programme (Gilbert 1999). The projects are searchable in several ways at <<http://www.le.ac.uk/tltp/projserv.html>>.

9.2 Dissemination

9.2.1 Dissemination about CFL in general

In general, evidence from the case studies and from the survey indicates that there seems to be an increasing focus on information dissemination about CFL. For example, one university had organised a 'show and tell' expose of CFL, in which approximately 20 percent of academics were actively interested. Anecdotal evidence from other universities indicates that this is a high figure, but it is still too low to show that CFL has reached the phase of mainstream acceptance.

A senior manager at one university reported that the university's approach had been to provide core funding to progress teaching and learning into the IT phase. Funds were used to stimulate staff to use IT, with the implicit notion that those that received central funding would diffuse the outcomes of

that funding elsewhere across the university. The importance of this approach was confirmed by a staff member of the same university:

You need to go around and see the programs and talk to somebody else... I think that sort of organic, person-to-person cross fertilisation is really very important.

Word of mouth was found to be a primary tool of sharing what had been done within another faculty. Regular staff meetings and newsletters were also found to be useful ways of informing people of the latest developments. In the past, this faculty had experienced people not knowing what was going on.

At another institution, one or two people spoke of their role within the school and faculty to disseminate information of good practice or hints. They felt they had a reputation because they were early adopters and were prepared to help out.

9.2.2 External dissemination of information about CFL resources

The strong weight of evidence from the case study data is that little importance is placed on the external dissemination of information about development work on CFL resources.

As one example of the paucity of information about CFL resources, the medical faculty in the study discovered, purely by chance, that a template had been devised by a dental clinical school that was more suitable than the one they were going to build themselves. By choosing to use this template, they were able to put the money into medical case studies. This issue is highlighted by Bryant (1998) who has two and a half years of experience as the Information Officer at the Institute for Interactive Multimedia at the University of Technology Sydney. He assists academic staff to locate existing educational multimedia resources suitable for use and adoption to varying subject area needs as a first stage in the multimedia development process. He has developed methods for carrying out a search using a range of online and print resources from both local and international sources. This type of support is vital at this stage to facilitate efficient search practices.

At another institution, neither project studied was actively marketed. In fact, the leader of one project was wary of having their successful model copied by others. The wariness theme was repeated by another person, who was worried that his project might not work, that it might turn out to be disastrous. This person was unwilling to disclose too much information about the development of this project.

In one case, the success of marketing programs of CFL resources was seen to be fairly low, for a number of reasons:

- Many potential purchasers/users were not sophisticated in the use of computers in teaching (still looking for multiple-choice questions or hyperlinks) and therefore many of faculty's programs would not suit them.
- Everyone is keen to be a seller in the marketplace, but no-one wants to be a buyer.
- Some programs proved to be too difficult to transfer to another context—there were technical, content and remuneration barriers.
- Commercialisation often becomes a dead issue; not many people are interested in pursuing this.

A senior manager from one university felt that his school had not performed well at disseminating and marketing CFL resources which had been developed within the school. Any attempt at dissemination had been done individually, through home pages and word of mouth.

At another university, a few interviewees suggested that they were more than happy to share information and have their resources used more widely. This would be achieved by using, for example, a publishing system under a licensing agreement. One person indicated how proud they would be if they could pass on information. The licensing agreement issue was highlighted in another case study, where several interviewees pointed out that they would be happy for others to use their programs if royalties were paid. The model of AShareNet <<http://www.aesharenet.edu.au/>> mentioned in chapter 5, p. 89 is relevant here.

Dissemination involves telling the stories of good practice and finding mechanisms by which good materials can be used by others; the latter can be difficult. This vignette illustrates some problems of dissemination of student-produced work.

Donna Gibbs teaches Curriculum Studies as a unit in the postgraduate offerings of the **School of Education at Macquarie University**. In 1998 it was delivered online for the first time using WebCT. There were 13 students enrolled—one based in Taree, NSW, one in Seattle, USA, and the other 11 based in Sydney. There were three on-campus sessions which Sydney-based students could attend.

As the content of the unit centres around building understandings of the nature of curriculum and its delivery it was important to present the material in ways that model good practice. A major difficulty was selecting material which would have appeal for students whose curriculum interests ranged from law to nursing to workplace training to school teaching and beyond. To overcome this problem prior knowledge of a typical candidature for the unit was drawn upon in the design and as much choice as possible was built into the modules. Students were encouraged to select what interested them and pursue that at some depth, but at the same time they were encouraged to read through all the options available to them as a way of broadening their understanding of curriculum in its different contexts.

It is not really possible to share the unit as it is designed for Macquarie's fee paying units. Some of the material which arises from the student's work, such as the Resource Packages they develop (and these of course range widely), would be excellent for sharing with others. But as far as I know there is no real mechanism for this. It would be possible of course with the students' permission to develop a web page and store them there for anyone to access. I would really like to do this but haven't attempted to. Some titles from last semester's resource packages include:

- An Educational Interest Group - the History Teachers' Association;
- ATSIIC and Aboriginal Language Curriculum;
- Advancing Nursing Practices;
- Northside Gifted and Talented Network;
- Excellent and Equity since 1989;
- Influences on Curricula at the College of Law;
- NSW Adult Migrant English Service; and
- Enrolled Nurses, TAFE and the Department of Health.

9.2.3 Internal dissemination of information about CFL resources

Dissemination even within a faculty seems to have been problematic. One project caused a furore among faculty staff because details about the project were not disseminated and project members were given time release without the knowledge of colleagues. Various respondents had the view that they did not know what was going on because they did not get reports about what was happening. A side effect of this was that lack of knowledge about initiatives prevented other people from getting involved.

Some projects were perceived quite strongly as internal initiatives, which were never intended to be used beyond the institution; they had been developed for internal students with institutional funding and there really ‘wasn’t any obligation to share it’.

There was evidence that effective dissemination was occurring within the Urban Distance Education University. Senior management in one division reported an increase in the sharing of ideas and approaches between the division and the CFL development unit. A willingness to share seems to be a key feature—a culture of sharing. For example, the CFL development unit is working towards incorporating a feature into a centralised system, based on work done with Lotus Notes by a member of staff within a school in the division. A member of staff of the CFL development unit also commented on how much they were able to learn from the frontrunners in online learning environments, simply because they were a bit later coming into the field. Another online initiative has drawn on ideas and lessons learnt from a virtual learning environment developed for the TAFE sector.

We need to listen carefully to the frustration of staff who try to disseminate their work and meet a wall of indifference, as described in the vignette below. As noted in chapter 8, *Adoption and Collaboration*, evaluation evidence is critically important in engaging colleagues.

Roberta Bencini teaches Animal Science at the University of Western Australia. Her innovation was a computer-simulated animal dissection aimed at facilitating independent student learning, promoting an understanding of the link between structure and function in animals, and reducing the number of animals used in practical classes.

There was very little collaboration with other developers. We had found that most anatomy packages stopped at the anatomy level and did not explore the link between structure and function in animals which was what we wanted to highlight in our package. We believe that only if the function is understood the structure can be learned and remembered, otherwise it could only be learned by rote and consequently forgotten quickly. The Library was not involved, but their databases were consulted.

We have had enquiries from other universities in Western Australia who were given a free copy of the stack, but to our knowledge they did not adopt it.

I have the feeling that when I was away (on sabbatical in 1998) even my own colleagues did not take the stack too seriously. I suspect from students' feedback that students were just told that they had to do it. It seems to me that these developments remain with the developer and are difficult to transfer to other lecturers/courses/units.

9.2.4 The role of the library in dissemination

At one case study university, the library was seen as taking a leadership role in terms of electronic dissemination of information about what others are doing with CFL. This was seen to be driven by the dynamism of the university librarian.

Difficulties were experienced at several universities in finding software packages and CFL resources. Experience to date suggests that it is difficult to have access to people who can make an informed scan of other resources, to know where to look for them and evaluate them usefully. It was felt that libraries could play a role in this, with dedicated staff who spent their time looking for resources.

At another university, it was seen that it was an appropriate role for the library to manage databases. It was felt that they already had the media infrastructure and the knowledge of organising information. There was a perceived lack of critical evaluation of databases and the feeling that academics wasted time in fruitless searches. It was also felt that librarians could help to evaluate different search engines and different resource sites.

9.2.5 Publishing

Several respondents felt that there was insufficient kudos involved in disseminating information about CFL developments. There was a firm belief that people needed to be encouraged to publish findings, but that the avenues for publication were unclear.

The view was expressed that there is more status associated with the production of multimedia than in the evaluation of it. It was felt that evaluation needed to be promoted at an institutional level in a structured way. However, it was felt that more people would be willing to do it if there was something tangible to be gained from it. The view was also expressed that people need to write articles about their experiences—not just the positive, but also the problems; not just the successes, but also the unexpected failures.

In this study, an extensive literature search was carried out of conference proceedings in the educational technology area. The data in these papers is often incomplete—‘idea of the day’ rather than scholarly evidence-based reflection on projects.

In summarising this whole section, it seems that there are few policies, strategies or rewards in place to encourage developers of CFL resources to make them available to the wider academic community. Where this happens it does so by largely by personal contact or recommendations from colleagues. This is the case in the vignette below.

Interactive prosthodontics: learning to design removable partial dentures

In our culture, life without teeth is a social and psychological disaster. Sybille Lechner of the University of Sydney has designed a multimedia program intended to simplify the complex process of designing dentures to replace lost teeth, while at the same time acknowledging the infinite variety of situations encountered in patients needing dentures. The best way to design a denture is to begin by holding models of the mouth in the hands, turning them over and around and relating them to relevant clinical and technical information. None of the many very excellent medical interactive programs on the market could be used, or even modified, to address this aspect of dentistry. The program simulates this by using Quicktime VR. There are also questions and feedback. Evaluation results are positive.

There was little collaboration with colleagues because nobody had enough time to become really involved. However, adoption elsewhere of Interactive Prosthodontics has occurred because of knowledge about the final product. Several dental schools are trialing the package, both in Australia (Universities of Adelaide and Melbourne) and internationally (Anne Arbour, Michigan; Basel, Switzerland; North Carolina, USA; Iowa, USA).

9.3 Searching: the role of databases

The case studies investigated factors relevant to databases of CFL resources across the five participant universities. Findings indicated that databases of CFL materials were not widely used, and that there were shortcomings with existing databases. Nevertheless, it was felt that databases of CFL resources could be useful if designed well. A number of features were identified which could characterise a well-designed teaching and learning database.

9.3.1 Existing teaching and learning databases

There are a number of well-designed and maintained databases in Australia in various discipline areas. A good example is AUSTLIT (Australian Literary Database) <<http://www.lib.adfa.edu.au/austlit.html>>. This is a computerised index of Australian literature which lists creative and critical writing by or about Australian creative authors. The computerised database is a joint product of the School of English and the University College Library at the Australian Defence Force Academy. The database contains records from the 1880s to the current day, with comprehensive coverage from 1988. The current database comprises 230 000+ records for creative and critical works. Approximately 3 000 items are added each month.

The focus in this study is on databases which contains information on resources which can be used in tertiary teaching and learning. A number of teaching and learning databases have been developed in Australia in the last 13 years. Perhaps the first was the Software and Courseware Online Reviews (SCOR) database (Winship 1986; SCOR 1998). In the mid-1990s, five discipline-based clearinghouses of teaching and learning resources were developed with funding from CAUT (Committee for the Advancement of University Teaching). The science clearinghouse, UniServe Science, has remained active with funding from the University of Sydney.

9.3.2 UniServe Science

UniServe Science <<http://science.uniserve.edu.au/>> based at the University of Sydney, offers a range of services to academics in the sciences. In addition to maintaining an elaborate web site consisting of a searchable database of information about teaching software, information about discipline-specific teaching resources and links to other relevant sites, UniServe Science organises and holds a range of workshops, both locally and nationally.

They also publish:

- newsletters, consisting of articles by academics throughout the country and overseas, software reviews and conference reports;
- proceedings of all workshops;
- bibliographies of discipline-specific IT materials for distribution to university departments and secondary schools; and
- QuicKards (a series of handy reference leaflets which inform about the current use of IT materials in Australian university science departments).

UniServe Science also reviews and evaluates IT materials developed inside Australia and overseas, maintains listservs on a discipline-specific basis for academics across the country, and sets up and maintains mirror sites.

UniServe Science maintains a network of contacts with science academics at the University of Sydney, at most science departments in Australia, and overseas, particularly in the UK, e.g. with the science-based centres of the Computers in Teaching Initiative (CTI) <<http://www.cti.ac.uk/>>.

9.3.3 EdNA

Arguably, the most significant database initiative in recent years, in terms of both scale and scope, is that developed by Education Network Australia (EdNA). Known as EdNA Online, this initiative was officially launched in November 1997 (as the EdNA Directory Service). It serves as an online 'first entry-point' for a wide range of information and resources relevant to the whole education and training sector in Australia (involving schools, vocational education and training, and higher education). The database currently holds over 8000 evaluated resources with a further 235 000 linked items available for searching. The higher education component of the Directory currently consists of 1885 'core' indexed items (URLs, or 'uniform resource locators'), approximately 50 for each Australian university. All core items indexed on the Directory are available through the browse function and any one of these links will take a user of the EdNA Directory directly to the referenced page, thus acting as a 'gateway' to the university.

Representatives from each sector contribute to its content and are guided by principles of quality online resource provision and shared responsibility within an environment of distributed administration.

EdNA Online is also significant in terms of its continued evolution and officials are currently engaged in the process of developing formal linkages with owners of other database collections, both nationally and internationally, for the purposes of further aggregated value. Furthermore, just as EdNA is itself a collaboration involving a diversity of stakeholders, EdNA Online also

provides a diversity of services beyond information retrieval and resource discovery. Thus, interactive services such as discussion groups, weekly news digests and noticeboards all figure prominently on the site.

EdNA Online currently disseminates information to users of the service via two main user-selected options—either from browsing an extensive category tree of catalogued, evaluated items, or through using the search function. Within the category tree there is provision for storage and retrieval of items associated with CFL resources, though some categories are better populated with content than others. As yet, there is not a well-developed or promoted mechanism to encourage institutions and individuals to contribute their CFL resources, though the authors are aware of a sophisticated harvesting project which is currently being tested. Probably the main challenge for EdNA Online in populating its database of CFL resources is that there is some dependency upon wide acceptance and deployment of metadata to enable harvesting and cataloguing of new resources.

9.3.4 National teaching and learning database

More recently, the New Technologies in Teaching and Learning (NeTTL) group at the University of Sydney has been funded by DETYA to produce a collaborative National Teaching and Learning Database (NTLD) which aims to be a repository of learning resource ‘objects’, of a finer granularity than resources held by EdNA Online (Koppi, Chaloupka, Llewellyn, Cheney, Clark & Fenton-Kerr 1998). These objects can include images or even parts of images and accompanying text describing three-dimensional materials used in teaching. The current scope of the items held in the National Teaching and Learning Database is very much limited to the medical field.

In some ways the naming of the NTLD has caused some confusion within the higher education sector and it is perceived as a competitive option to the aggregation of resources on EdNA Online. Competition between database providers is discussed later in this chapter.

A small number of universities are developing their own internal databases of CFL materials. Six of the 24 survey respondents to the Library section stated that they maintain a catalogue of CFL resource materials, but few details were provided. The embryonic RMIT Clearinghouse is described in chapter 3, pp. 53–55.

9.3.5 Case study results

Overall, the study revealed a fairly low level of database use by staff for furthering their knowledge of teaching and learning approaches broadly, and

CFL and online resources in particular. Staff, however, are familiar with using databases for research within their own discipline or knowledge domain.

One case study university has two small databases that are used in its CFL work: a central database of university grants and projects; and a small faculty database containing web sites, CD-Roms, stand-alone tutorial resources, reviews, summaries, licence conditions and so on.

Participants from a Law Faculty reported that electronic databases are very important in the legal field, for rulings, and cases studies, but do not seem to have much use or standing in relation to finding out about CFL resources or broader pedagogical approaches. There is relatively little CFL material available in Law and the vast majority of interviewees at this university were ignorant of any useful databases, although they reported using publishers' databases.

There was a general response by the 81 participants in the case studies that existing databases were not particularly helpful in promoting or assisting those looking to adopt or make better use of CFL. The following section looks at some of the reasons put forward by respondents.

9.3.6 Reasons for low usage of databases

Most of those interviewed who had used databases reported that they found the CAUT/CUTSD clearinghouse concept didn't work well. There was a sense that the potential value that might accrue from databases was overrated. Several indicated that they certainly would not use a clearinghouse deliberately. Many existing databases were found to be not useful, containing lists of programs described according to the developer's idea of their value. One person's experience with submitting material to the Law clearinghouse was that it was too technically difficult to use. The ease of submitting and retrieving data was a particular concern.

An issue of considerable concern was the tension between collaboration and competition, in that databases are designed to disseminate resources and ideas, and a number of staff felt that this might compromise the competitive advantage of the university or their course.

The issue is—I've got resources but am I prepared to allow my resources, or my institution's resources, to be used by other universities—it's the idea of competitive advantage.

Intellectual property was also an issue, in that some people might not want their material to be used by others. Lack of customisability was also an issue. A related concern was that material might be located on a database, but turn

out to be too expensive to purchase. On the other hand, there was also concern about disclosing too much information about a teaching initiative, in case it did not meet its specifications when finally developed.

Other staff suggested that using databases would be another ‘add-on’ to an overloaded schedule, unless it could be proven that they had immediate impact and use. Some people also reported a lack of time to browse through database materials.

Two final comments are quite illuminating. It was felt that unless there was a clear motive to use databases, and an incentive for doing so, then they would not be used widely. It was also felt that the volume of material could be daunting, unless it was well organised, with useful abstracts.

9.3.7 Factors in favour of databases of CFL resources

A number of interviewees, however, suggested that the notion of a database was a good idea: to avoid re-inventing the wheel, and to update existing knowledge of suitable resources. Several managers argued that databases offered a useful strategy to find out what was going on beyond the faculty and the university, and that it was essential that staff have access to this information. It was also felt that the database concept was particularly useful for staff located in small, regionally-based universities, with limited resources.

Online databases are important in a small regionally dispersed university, with limited resources. If there is any resource out there which I can look up, if I find it useful, I'll apply it.

A number of those interviewed gave in-principle support for the concept of databases, but acknowledged that there were practical problems with respect to maintaining their usefulness. A large number of interviewees had suggestions about how to design a useful database of CFL resources.

9.3.8 Desirable features of a CFL database

There was a strong response that an ideal CFL database had to be well designed, easily accessible and simple to use, unlike a publisher's web site about which a person reported:

I don't want something which takes a whole lot of hours of investment of my time to learn it—then two years later you have to learn something different.

Data should be able to be submitted and retrieved with a minimum of effort. The database should include up-to-date information about copyright, and

credit (staff rewards and recognition) should be given to producers submitting their information to a database.

The ongoing support and maintenance of databases was felt to be a serious issue. Respondents were aware of databases which began with a grand management statement, but which were not resourced sufficiently beyond the initial start-up phase. Databases needed to be institutionalised with ongoing funding and infrastructure to support and maintain them. For databases to be useful, they have to remain up-to-date.

There were mixed responses on the issue of whether the database should be discipline-specific. Some people preferred a discipline-based approach, because access by topic was a logical first point of entry. The National Library of Australia site at <<http://www.nla.gov.au/libraries/resource/gateways.html>> provides subject gateways to a variety of disciplines: aboriginal studies, agriculture, biology, business, chemistry, education (EdNA), engineering, environmental issues and spatial data. However, several interviewees favoured a more holistic approach, wanting to get a wider perspective from other disciplines. They favoured multiple ways of entering and interrogating the database—by discipline or pedagogical approach. At a different level, one respondent wanted to see a faculty level clearinghouse as a way of sharing who is doing what, who has applied for grants, etc.

9.3.8.1 Human issues

It was felt that the human factor was important in determining the success of a database. One respondent felt that the real issue appears to be not so much the value or efficacy of the database, but how one addresses the motivations people have for using or not using them. Another interviewee wanted to see databases with a human touch, for example by including photos, quotes and personal gems rather than impersonal abstracts.

I just think there is a place for preserving the human in this technology

It was felt that databases might become more widely accepted if they were promoted to university staff by people who were advocates for the database. The implication was that databases must be 'owned' by academics, so that a critical mass of people become involved and provide the impetus to keep it going.

For a database to be successful, users must be able to determine the worth of the material in it. It was felt that someone with CFL experience would be the best person to make judgements about the worth of a resource. It was suggested that a database must be 'more than a catalogue' and the ultimate value of a database depends on one having enough experience to know

‘where and how to look’. It was felt that there is a role for expert reviewers of CFL materials, rather than just the originators of the materials submitting their own information about the CFL resource.

What was envisaged was something analogous to the search part of the Amazon.com web site, which makes extensive use of the reviews and comments supplied by its readers. The reviews and comments are stored on the Amazon.com server and linked to the resource being reviewed. This indeed was a key idea of the CAUT clearinghouses. It is important that any new initiatives build on past experience.

It was evident from a range of responses that people saw value in associating discourse about a CFL resource with part of the database entry. The database entry would then be a dynamic entity, as people added more information about how they used the resource. Such a database should demonstrate what other people are doing, rather than products. It should highlight the different ways in which material may be used, and present information about evaluation of different approaches.

I'd love to use a database to know precisely what others are doing with their students, how they are helping the interactive learning process—whether it is dominated by multiple-choice questions and so on. To discover how the online learning is facilitating the learning process.

It was suggested that a new type of database could be designed. This database would act as a resource bank similar to a university library, but would have a distributed nature so that everyone could access it. It would be contributed to by all (participating) universities so that all parties involved would have a vested interest in maintaining it. The proposed database would become a central and core resource for all universities, and its distributed nature would minimise the likelihood that the prejudices of an individual database owner would adversely affect its usefulness. Such a database would provide huge cooperative possibilities, according to case study participants.

The desirable features of a CFL database envisaged by the case study participants are summarised below. A range of technical and policy issues needs to be addressed before this ‘ideal’ CFL database can be realised.

- 1 Have a simplified data submission and retrieval process
- 2 Have a distributed nature
- 3 Be maintained in an ongoing sense
- 4 Be owned by academics
- 5 Have resources submitted by people with expertise in CFL and knowledge of the discipline, following a scholarly review process
- 6 Resource submission should not be by the developer of the resource
- 7 Contain contextual information about the resource:
 - a full description of the product;
 - the rationale behind its development;
 - its unique characteristics;
 - the pedagogical approach used;
 - intellectual property details, and how it might be obtained; and
 - evaluation data.
- 8 Contain a range of experiential information on how the resource was used in a real-life teaching context, both by the developer and others
- 9 Return the appropriate level of information to the queries submitted by users
- 10 Resources successfully submitted to the database would attract scholarly recognition

9.3.9 Technical aspects of web-based searches for resources

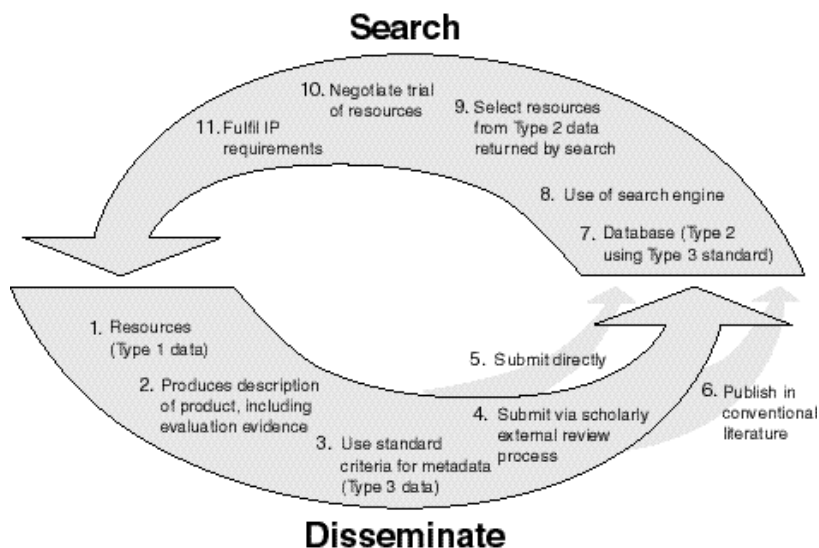
Appendix 2 introduces the concepts of Resource Sites, Search Sites, and Type 1, Type 2 and Type 3 data. Resource Sites are analogous to online library holdings, containing what we characterise as Type 1 data. A Search Site is analogous to an online library catalogue. The catalogue is characterised as Type 2 data, while the Dewey Decimal classification which defines the catalogue is analogous to Type 3 data. One online manifestation of Type 3 data is a metadata standard, such as the emergent IMS and Dublin Core standards. Metadata is data about data. Metadata describes how and when and by whom a particular set of data was collected, and how the data is formatted. Metadata is essential for understanding information stored in data warehouses.

9.3.10 Implementing an ideal database

The simple process for the dissemination of, and search for, information about CFL resources illustrated in figure 9.1 can be expanded, based on the

information provided by case study participants, and the technical aspects of web searches described in appendix 2.

Figure 9.2 An expanded process for the dissemination of, and search for, information about CFL resources



The expanded process is shown in Figure 9.2. The model attempts to take account of the range of features of an ideal database, summarised in the list above. As before, the model describes two linkages between resources and databases: dissemination of information about the resource (steps 1 to 7); and search for information about resources by interrogating a database (steps 8 to 11). The various parts of the diagram are described sequentially in the following steps.

Dissemination

1. The developer of a CFL resource is the owner of the Type 1 data.
2. In order to disseminate information about the resource, she or he will have to produce a description of the product, including evaluation evidence (point 7 in the list above).
3. The information describing the resource will be described as metadata, using a particular metadata standard (Type 3 data).
4. In some cases, the metadata may be submitted directly to the database, either by the use of metatags, or to a Search Site which does not utilise a refereeing process.

5. In the scenario favoured by case study participants, the information about the resource is submitted to an external scholarly review process (point 5 in the list above). If the resource is judged to be acceptable, the resource description, together with the referee's report, is entered into the database.
6. As a result of the reviewing process, a scholarly paper about the resource may be submitted to the literature. The paper, and discussion about the paper, can be added to the resource's metadata description. Discussion by other academics of their use of the resource is also relevant here (point 8 in the list above).
7. As a result of this dissemination process, the Type 2 data description of the resource becomes part of the database.

Search

8. The user seeking information performs a search of the database with a search engine.
9. The user makes a considered selection of the Type 2 data returned by the search, based on its metadata.
10. In order to make a final decision about the worth of the resource, the user negotiates a trial of the resource with its owner.
11. In order to use the resource for teaching and learning activities, the user must fulfil the intellectual property requirements of the resource owner.

9.3.11 The ASCILITE Links database

The ASCILITE Links database is a prototype system allowing for distributed maintenance of hypertext links within the system. Loosely based upon a Yahoo-style system, the Links database will allow ASCILITE members to moderate categories of which they have an interest or expertise. Any person can submit useful links to a particular category and even recommend a sub-category; the moderator for this area is then notified via email of links awaiting approval. The moderator provides a third-party, quality assurance role that adds value to the resources maintained within the database. Moderators for particular categories are added by the Links database administrator through a password-protected web interface.

As part of the links submission process, a user would need to complete various fields including metadata fields that will allow the resources within the ASCILITE Links database to be available from other databases such as EdNA Online. The moderator for this particular resource would be able to edit any of the fields before approving the entry for addition to the public Links database.

Maintenance of the ASCILITE Links database will be further enhanced by a automatic link checking application that will report broken or otherwise unavailable links on a regular basis to the appropriate moderator and overall system administrator. Also the total number of links for the entire system and by category and sub-category will be automatically updated and displayed providing the user with a useful overview of the resources listed within the system.

The net result of this prototype Links database is to create a searchable resource that is interoperable with other Search sites and is sustainable and credible. Lists of hypertext links to related sites are normally quite labour intensive to maintain and this hurdle can be lowered by the use of a database system described above that distributes the responsibility for maintenance across a group of enthusiasts or experts and also uses software tools to automate functions such as link checking, searching, etc. The use of third parties in managing Link categories adds to the credibility and perceived usefulness of the resources. Moderators are identified for each category within the system and their role is recognised by the Society thus providing some public kudos for their efforts.

9.3.12 Collaboration and competition

Even given the innovative design of the ASCILITE Links database, there is no reason to think that it is necessary to have only one database of CFL resources in Australia. There is already a range of databases (Search Sites) serving the sector to a greater or lesser extent. These databases, and new databases which are developed, can meet the needs of different users in different disciplines. Some institutions maintain their own databases of CFL resources.

It is healthy to have such a competition between Search Sites. Search Sites can create their own market niche, and serve a well-defined clientele. The competitive nature of the Search Sites will hinder free exchange of Type 2 data between Search Sites. However, it is obviously a waste of a scarce resource if the owners of these databases continually re-invent the wheel, and host data which is incompatible with other sites.

Search Sites can benefit from collaborating on the adoption of standards which allow interoperability between result sets. Thus, there needs to be standardisation of Type 3 data, and promotion of the adoption of metadata at a national level, in order to improve the effectiveness of Search Sites. Given that the creation of metadata will be labour intensive, it is sound business practice for Search Sites to use metadata standards which maximise the ability of people to locate their resources.

It is difficult to achieve collaboration between owners of resource databases (Search Sites) because of the apparent tension between collaboration and competition. Serving Australian education (and higher education in particular) seems to be a common goal of databases, and there seems to be a genuine goodwill to collaborate from the database owners with whom the project team has been in contact. However, there is also an element of competition between the resource database owners. This is particularly true when considering collaboration between funded activities. Because the nature of the funding is based on competitive bidding (even though the sources of funding may all ultimately derive from DETYA), the opportunities for collaboration have been highly reduced.

Our view is that competition should be about the provision of the best possible educational outcomes achievable with the funding provided by DETYA. Any behaviour which tries to block competition (educational effectiveness) by locking users into proprietary software, standards and/or practices should be discouraged. Collaboration should be sought for creating a national standard set of Type 3 data so that resources are categorised in ways that are interoperable, and which reduce the burden on Resource Sites owners when they define metadata for their resources.

9.3.13 Domain-specific issues

All subject domains have their own specific requirements and it is unlikely that any semantic standardisation can meet all the needs of every domain. In other words, domain-specific efforts in standardising metadata must remain within the domain-specific community, which is why some Dublin Core elements are extensible by additional qualifiers.

The common elements of teaching and learning databases are about 'education' and 'pedagogy', and standards for these categories will most probably be based on the IMS schema. However, there is a need to capture the domain-specific issues in the Type 2 data as well. If a teaching and learning resource database is devoted to only one subject domain, it can use a subject-specific extension to the metadata standard, such as the MetaChem standard for chemistry. The knowledge and experience of the domain-specific database owner in creating metadata may well add value the database in the view of its users. However, the domain specificity of the metadata standard may compromise the ability of the database to be searched by other sites. There is a conflict between the specificity of the data, and the need for interoperability between sites, so that, for example, a biochemist could find valuable information from a chemistry site.

Any collaborative framework must recognise this apparent contradiction and work creatively to enable a solution. One suggestion may be that the collaborative framework specifies *the standard of expressing* domain-specific semantics, so that cross-domain searches may be done without the search engine really understanding the semantics. In other words, such a megasearch engine would not need to understand domain-specific semantics, it would only need to be able to pass queries from users in standard format, depending on the extensive knowledge in domain-specific Search Sites to perform the domain-specific part of the search.

9.3.14 Policy implications

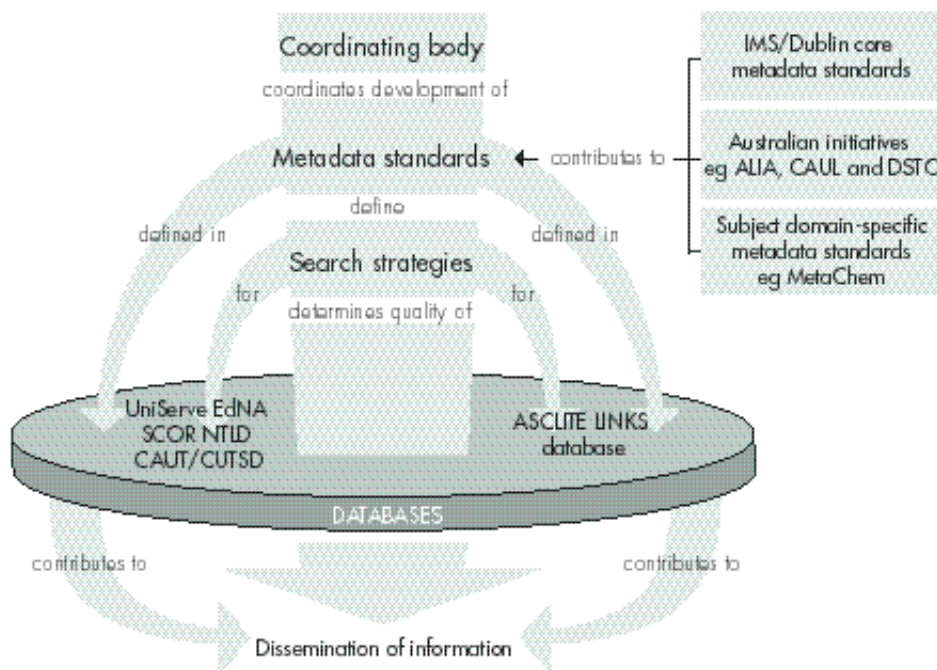
The web is aptly named, given that it is an ever-expanding web of interconnectedness, of networks and nodes, and rich in information resources and communications opportunities. New online initiatives are launched almost daily and, with increasing frequency, such initiatives are associated with the policies of governments. The 'information society' has arrived and is setting the scene for social, economic and cultural re-configuration for the new millennium. The proposed strategy of establishing a collaboration framework needs to leverage upon both the creative use of information resources and the creative use of the communication opportunities. This strategy is in line with a Commonwealth report *A strategic framework for the information economy* released in December 1998, which states on p. 9 that:

The private sector is driving, and will continue to drive, the transition to the information economy.

This sentence is taken out of the context of 'the role of governments to provide an environment conducive to investment in new technology, to the formation and growth of new enterprises, and to the acquisition of information technology skills and knowledge', but we believe the underlying principle is valid for a national strategy for enabling collaboration and competition of the provision of 'teaching and learning resource databases'.

9.3.15 Proposed collaborative framework

Figure 9.3 Proposed collaborative framework for the development of interoperable online databases in Australia



The framework we are proposing for the development of a unified, Australia-wide collaborative framework for interoperable online databases is shown in diagrammatic form in figure 9.3. While our considerations have been mainly directed towards databases of CFL materials, we believe that this framework has a wider applicability. The framework is certainly beyond the scope of this report, and it will need to be supported by policy from government.

To be successful, the development of the framework needs to be a national initiative, funded appropriately, and coordinated through a suitable coordinating body. The coordinating body will need to develop standards for metadata and other Type 3 data, by leveraging off the Dublin Core and IMS standards, and working closely with other Australian interest groups, such as the Australian Library and Information Association (ALIA), the Committee of Australian University Librarians (CAUL) and the Distributed Systems Technology Centre (DSTC).

The developed standards will need to be disseminated to Search Site owners, so that they adopt the standard for their own metadata. Once standards have been adopted, Search Sites can continue to compete in the value they add to

their metadata, and in the metasearch/ megasearch strategies which they develop. Roszkowski and Lukas (1998) describe an approach for linking geographically distributed collections of metadata so that they are searchable as a single collection.

The ASCILITE Links database is just one example of a database which seeks to provide a more effective dissemination of information about CFL materials, in the way identified by participants in this study.

This report recommends that DETYA support the development of the high level technical framework which

- is implementable;
- encourages open discussion with the various Search Sites owners (teaching and learning resource database owners in particular) to strive to achieve interoperability between their sites;
- develops standards of Type 3 data to ensure inter-exchange of metadata between different domain-specific teaching and learning Resource Databases, by working with the various domain communities;
- works with other DETYA or ANTA-funded bodies (e.g. Propagate Institute <<http://www.propogate.net>>; AEShareNet_ <<http://www.aesharenet.edu.au>>) to establish standards and encourage adoption of such standards for resolving intellectual property issues, with the aim of creating of a market for learning artifacts; and
- ensures that all standards are interoperable with emerging international standards.

Professional organisations, such as ASCILITE, can also participate in this national framework of collaboration in areas such as:

- educating the academic community about the need to provide metadata;
- providing pedagogical and educational design advice in the formulation of standards;
- providing a testbed for the implementation of the standards; and
- evaluating the effectiveness of the standards and the impact of the standards on the quality of education.

DETYA could also initiate research to investigate the feasibility of a market for teaching and learning resources, the effect of such a learning artifact market on the cost of production of education content and the quality of education content so produced how to seed such a market (if desirable).

The report recommends that DETYA address intellectual property issues associated with the emergent use of metadata and metadata standards. These include the ownership of the metadata and compilations of metadata, as well

as ownership of Type 3 data associated with metadata, fair use exception clauses and moral rights.

It is our belief that the concept of collaboration can enhance the diversity of the Australian higher education sector and their ability to compete for Australian and international markets. It is this collaborative aspect that we believe can ensure the success of a distributed database model when the development of individual databases has had limited success.

9.4 Conclusion

We have presented a theoretical framework which identifies Type 2 data as the primary asset of any teaching and learning resource database. Any collaborative framework which compromises the ownership of such assets is not likely to be accepted by database owners. We have also recognized the useful purpose these databases serve in promoting the digital transformation of education in the information age and improving the quality of education.

The size of the Australian education sector does not allow the continual re-invention of the wheel. A collaborative approach to the development of national metadata standards and web-based search strategies is needed. Only through this synergy will competitive use be able to be made of CFL resources developed at great expense within the sector.

We have recommended that DETYA consider the proposed collaborative framework. It is not pre-emptive, but serves to illustrate that a solution does exist to meet the challenge of apparent dichotomy of collaboration and competition. An open, continual dialogue between the government, the ASCILITE executive, EdNA's community, various teaching and learning resource database owners and the broader education community will provide an innovative solution to meet the challenges ahead.

