Objectives: In order to be successful technical professionals, you will need to know about research and developments within your own industry. This section will discuss information gathering, research principles and acquiring information literacy. By the end of this section, you should have a sound understanding of:

- information literacy skills;
- research skills; and
- why information literacy is important in technology-oriented professions.
What is information literacy?

We have discussed social and cultural literacy. Information literacy is an additional skill that is equally as important in business, particularly in dynamic, progressive technically-based industries.

Information literacy can be defined as “the ability to know when there is a need for information, to be able to identify, locate, and effectively use that information for the issue or problem at hand” (National Forum on Information Literacy, http://www.infolit.org/). If you are information literate, you will be able to acquire relevant and timely information, and critically evaluate and analyse this information.

As a professional, information literacy is important because it will enable you to research to obtain information to help develop your own projects, and you will be able to keep abreast of current developments in your field. Information literacy can help you:

- become a knowledge expert in your specialist area;
- be innovative by developing new and exciting products that you know have not been ‘done before’; and
- identify funding opportunities to finance your developments.

Methods of information gathering

Regardless of how and where you are going to use your research, there are two categories of research methods. These are:

- Primary - new information, direct action undertaken by researcher; and
- Secondary - information gathered initially by someone else and used to inform argument.

In a technology-oriented environment, examples of primary research in action are:

- gathering user requirements, market research, gap analysis - interviews, focus groups, meetings;
- product development - experiments, prototypes, user testing;
- product analysis - observation, interviews, questionnaires.

Files and institutional records are also a primary source of important information, particularly in relation to design review. Professional associations are also useful primary sources, as they are often the meeting point for industry contacts.

Examples of secondary research are:

- literature searches - industry journals; conference or research papers;
- web-based searches - product information; access to journals and library databases, as well as opinion and discussion boards.
The growth of the internet and the increasing sophistication of information systems, including database management, has enhanced our ability to conduct secondary research ‘remotely’ - that is from our home or office desktop. Subject to subscription and access fees, the world of information is at your fingertips. The downside of this growth is the sheer amount of information that you may have to sift through in order to find data that is relevant!

If you are involved in product development, you will probably be engaged in research of your own, in order to produce something that is new and ‘better than the competition’. Your own work should be informed by work that has previously been done.

An example: You are designing a new type of material to be used as a building product that can withstand cyclonic winds. You need to be sure that you are not ‘reinventing the wheel’ and have a thorough understanding of what has already been done in this area. What type of research would be most effective? In this case, you would need to:

• have a complete knowledge of current building materials and products used in tropical areas;
• understand any problems associated with current building products;
• be aware of materials used in other industries that may be applicable to your needs.

The above points are your research goals. Consider for a moment how you would achieve these. It’s not a small task, is it? Once you have gathered this information, you are then able to proceed confidently with your own development.

Where to start?

The world of information has become increasingly global with the growth of the internet, and one of the main challenges for us is to identify information that meets our research needs. It is easy to spend hours and hours surfing the net trying to find information, to come up with very little that is of real interest.

You should aim to keep yourself generally informed within your industry. You should identify relevant journals and databases relevant to your industry - subscribe to as many as you can afford, and READ them. You can also subscribe to relevant e-mail lists or groups - this will link you to people with common problems, and they can often lead you in the right direction if you have questions. Set aside some time each day or week to read and keep yourself up-to-date.

When dealing with a specific research problem, you need to define your topic. For example, a team may have been formed to identify why a specific software is not being adopted by rural consumers, as opposed to their urban counterparts, and develop appropriate solutions. You will need to conduct primary research (talk to potential rural customers, or purchasers of rival software) as well as conduct secondary research (purchasing trends in rural areas, uptake of technology in rural areas) and so on. Your results will normally be recorded in the form of a report, which will be guided by your purpose statement, which in this case would be: To
identify factors resulting in the lack of uptake of software in regional areas. A thesis statement could be: That lack of support services is leading to lack of uptake of software in regional areas. The difference is that the purpose statement is more open ended, where the thesis statement relies on finding information to support it.

If you are employed in a formal research and development (R&D) capacity, you will be expected to have a thorough understanding of relevant research methodology, and your study will be conducted in a more formal capacity than if you are working in a testing or design area. It is important to recognise that research in a professional environment is not necessarily the same as that in an academic environment. That is, you do not have to set a thesis and then try to prove or disprove it. A more chaotic approach is sometimes more productive in a scientific/technical environment, particularly in the design phase. However, a thesis is important if you are trying to solve a specific problem (eg. that the use of X oil in two stroke engines causes undue stress when used at temperatures above X degrees). It refines the study and focus.

Gathering information in a commercial setting will often be restricted by budget, time, and the fact that many developments may be commercial-in-confidence (not in the public domain). Make the most of what is available to you. You should:

- have a thorough understanding of your problem - “What do I need to know before I start, or in order to proceed?”;
- establish your time frame, and set yourself limits (it is easy to surf the net for hours and hours and not achieve anything);
- develop a network of knowledge experts who are able to be contacted to discuss relevant issues (within a commercial-in-confidence framework);
- use appropriate keywords when searching library or web-based databases.

It is extremely important to manage your time and remain focussed on your key problem.

In all cases of study, you must reference your sources accurately. Information literacy means an understanding of appropriate citations and notations.

In academia, we call reproduction of another’s work as your own plagiarism.

In business, it is stealing.

Are you already a researcher? For example, if you need a new car, would you know how to go about finding the best car for you, and then the best price? What would be your research goal?

Reflect on your last ‘research’ - was it to come to this university? What were your goals? How difficult was it to find information? Could you have been more focussed? The process of research is generally similar - it is the scope that differs.
Utilise institutional knowledge

You are a new employee and are tasked to participate in a project where you will be responsible for identifying new market opportunities.

Before you start looking outside the organisation, it is appropriate to examine whether this issue has been raised and researched previously within the organisation. Large organisations often have information management systems, and the best information is sometimes close at hand. As previously mentioned, files and records are a very important source of information, so before scheduling time to research externally, find out what has already been done inside your own company or business. One of your colleagues may have been collecting journals for years, or there may be an organisational library which contains many relevant sources.

Knowledge management is becoming increasingly important in modern business, and we will discuss this in detail in our next lesson.

You should now refer to your reading and exercise in order to complete this lesson.
Exercise 9

Identify five articles (national or international) that are relevant to your particular area of technological interest. Write one sentence that summarises the main point of the article, and note the key words used in your search to find the article.

Each article should be listed using correct (Harvard) referencing style.

You must use the PROQUEST database (available via the CQU Library website at http://www.library.cqu.edu.au).

This should be submitted on one page.

Internal students should submit this exercise to their tutor in class. External students should submit this with Assignment 2 in Week 12.

Note that at this stage, punctuation and grammar is increasingly important, and your submissions will be failed/discounted if they do not meet basic grammatical standards. If you are having problems, you should contact your tutor (internal students) or the Course Coordinator (external students).

Visit the WWW Site

You should now visit the course website to access web-based links and readings, and to discuss any thoughts you have on this lesson. The website address is in your course profile, or can be accessed via http://e-courses.cqu.edu.au