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Health Informatics Education - Establishing a Faculty Mindset

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Abstract. Central Queensland University is located in a Regional Centre on the rural coastal area of Queensland, with five regional campuses up to 350 kms apart. The nearest major cities are around 700 kms to the north and south. Though the University is isolated in a geographical sense it provides access to higher education at both the undergraduate and post graduate levels. The University is committed to open learning, the concept of an Integrated Regional University and is an internationally recognised provider of distance education. A variety of innovative educational approaches are used. The vision is for its staff to manage their own information well by effectively accessing and evaluating a variety of external information. The University has and is developing programs that equip its students with information management skills. It is this environment that has ensured the provision of a suitable information and communications technology infrastructure. This paper aims to describe how the University's vision is operationalised through its IT infrastructure and by Faculty and Division initiatives to create a mindset by staff to embrace the use of technology to enhance teaching and learning.

1. Our Faculty Experience

Less than 10 years old, the Faculty of Health Science has been an instrumental motivating factor in stimulating the growth and development of information and communications technology University wide. The faculty was first in providing every academic and general staff member with a computer linked to a local area network, the wider university and internet. This was made possible by a National Priority Reserve Fund grant in 1989. Computer equipment was first installed in 1990. At that time this was the first introduction of this technology for most of the staff who, with the exception of the general support staff had a nursing background. Many became very enthusiastic users and weathered many frustrations when installations did not go as planned or when there were network or equipment failures. (Zelmer 1994 p.168). Other more regular interruptions to network availability were the seasonal result of power failures now overcome with an uninterruptible power supply.

Staff training was somewhat haphazard as teaching responsibilities took precedence. Training sessions took place according to demand and availability of support staff although a technical support person was always available to assist with problem solving as the need arose. The faculty has now developed a distance education package which provides an introduction to computing and health informatics. It is aimed at undergraduate students but staff are strongly encouraged to undertake this unit offered for the first time this year. Over the years there have been several upgrades of both hardware and software so staff are constantly needing to learn new skills. Also one needs to be able to convert material produced using one type of software to suit new software. As a result it is essential that technical support staff are readily available to assist academics so that these staff loose minimal teaching preparation time.

1.1 Computer Assisted Learning

Unlike other industries the use of IT in academe does not as a general rule result in productivity savings. In fact one could argue the opposite, yet our faculty's aim was to use our computer assisted learning (CAL) and computer managed learning (CML) to supplement classroom lectures. In other words small group tutorial sessions which are labour intensive were to be replaced by self directed CAL tutorials. Thus all material developed had to be fully integrated into the curriculum.

Initially HyperCard was used to develop an authoring tool, CAL_Maker and most of the faculty's course ware. This was fairly basic, lacked variety, was mostly text based consisting of tutorial material for review of a topic taught by conventional means. It did however allow academic staff to develop their own teaching aids with limited technical support. Students were expected to schedule themselves into the computer laboratory in their own time to use the material (Zelmer 1994 p.175). Commercial products were not an option at that time as most were North American where an imperial, in place of a metric, system is in use. This was a shoestring approach but served the purpose of acquainting staff with the use of computing technology to support their teaching. It did require them to change their teaching style and challenged their educational philosophies.

From our experience it is necessary for CAL developers to appreciate both the limitations and possibilities of the available computer platforms and additional multimedia. Jelovsek and Adebonojo (1993), in their extensive literature review of randomised clinical trials using computer assisted instruction (CAI), conclude that CAI is a legitimate method of instruction, equal to other usual types of teaching in terms of learning and time involvement. They found that interactive forms of teaching are superior to linear forms, that explanation enhances learning in any sphere, that access to information is itself educational and that repetition in small batches improves mastery. Sinclair (1985) lists some of the advantages of using personalised (CAL) instruction as self paced instruction, active and mastery learning, individualised content through interaction, prompt reinforcement, individual evaluation, entertaining instruction, opportunity for testing ideas safely, privacy in the learning environment, standardised instructional delivery, constant availability and minimal recurrent costs.

We now use Macromedia Director as the authoring software for our CAL and CML development packages and have adopted a standardised format. This is supported by a multimedia infrastructure. That is we have video capture facilities, a colour scanner and a digital camera. Thus we are now able to develop for both Mac and PC platforms. The use of multimedia results in programs which elicit greater interest amongst students. We have documented instructions for such development and the technical support staff are responsible for programming. Instructional design instruction is provided by the University's distance education centre which has a dedicated unit for contract CAL development. These more sophisticated multimedia programs do need more powerful computers to run them, so student computing facilities need to be upgraded annually.

A content reference group of academics is also established for each CAL program. Quality control activities in accordance with the AS9000 series of standards are now in place replacing a style guide previously used which had often resulted in major deficiencies leading to many student and staff frustrations. As a result of staff turnover most academic staff now involved in such development are new to this type of work but the culture of using IT to support teaching and learning has survived.

1.2 Other Use of IT to Support Teaching

Our Faculty actively encourages its staff to use presentation software for the production of overhead transparencies, colour slides, full colour computer based projection and class notes.

Technical support staff plus the University's electronic media services assist with their production. Training sessions for staff are held from time to time. Experience with these media is seen as a precursor to the development of teaching material for delivery via our yet to be installed interactive system wide lecturing which requires the use of video and computer based conferencing to connect the lecturer and students between remote campuses. The faculty has its own computer laboratory for student use with up to 24 hours per day student access. The opening times are computer controlled via the security system. The student computer laboratory has its own fileserver providing access to CAL packages, CD-ROMs, lecture notes and other applications for students to use. We have begun to establish our own web pages and are exploring the possibility of using the web to support teaching across campuses.

1.3 Support Staff

Two computer support staff are employed, one with a focus on student support the other on staff support. They also maintain the network, provide multimedia programming services and run educational sessions as required for staff to demonstrate the use of new equipment or software acquisitions. The employment of such staff is well justified as without them academics would spend too much time on computing basics. Secretarial and office support staff numbers were reduced as academics do more of their own wordprocessing etc., but with the technical support staff the ratio of academic to support staff is maintained. The need for technical support is supported by MacKnight (1995 p.30) who noted that today there is even greater demand for computing support services as more staff and students become interested in computing to support their activities. In addition the technology is becoming increasingly complex requiring time to just keep up. The use of faculty based dedicated computing staff was a university first which has given us the edge over other faculties in the acquisition and upgrading of computing equipment, network facilities, information technology and their usage.

1.4 Health Informatics Education

Notwithstanding this record, optimum usage of the technology is yet to be achieved. One of the first priorities is to improve staff computer literacy. Our curricula will not include the use of health informatics if staff themselves are not familiar with computer and communications functionality and the many applications of these technologies in the healthcare sector. Secondly all staff need to learn how best to use computers to facilitate learning and to provide learning experiences in a cost saving manner (Mikan 1984). According to Ball et al (1988 p.291) the impact of nursing informatics will ultimately be so profound as to change totally the nature of nursing education - and nursing itself. We are in the process of this change.

Until such time as we have more health science lecturers who are capable of teaching informatics we need to rely on academics who are information system (IS) specialists for specific IS teaching. Whymark (1993) stated that "the idea of an industry dependent discipline of information systems, or informatics if you prefer, is a foreign concept to many outside (of) the health industry". Whymark (1993) concluded that the use of general purpose information systems curriculum works because the underlying principles do not depend on the industry in which the application is developed, but that different approaches seem warranted because of the different backgrounds, experience and prior education of health science students compared with students normally undertaking such a course in a business faculty. As a result we use an interdisciplinary collaborative approach.

2. Supporting Infrastructure

Our aim is to provide equal access to information services irrespective of location. This is achieved largely through our networking capabilities, production of videos, computer assisted

learning programs, the use of computer mediated conferencing, tele and video conferencing, electronic mail and remote access library services. Information delivery is seamless, regardless of medium, provided through standardised interfaces. Library staff receive training to a high level of proficiency with these systems so that they are capable of fulfilling their role as educators. They conduct special sessions for academic staff to learn to use the new systems designed for desktop library access.

2.1 External Support

The Queensland State Government has provided the funds to establish 41 Open Learning Centres which provide education and training through communications technologies. They specifically benefit distance education students. In addition the Australian Distance Education Network (ADEnet) has established facilities in large population centres to enable distance education students in these areas to access the universities in which they are enrolled for the cost of a local call. Other students subscribe to commercial network access providers, one of whom provides local call cost access from anywhere in Australia. CMC is seen as crucial to the University in maintaining its position as a leader in the provision of distance education.

The need to constantly learn new skills regarding optimum use of the available technology plus the need to be innovative in using this technology to enhance teaching and learning, can be a big turnoff for many. It is much easier to continue to use previously successful teaching strategies. One of the catalysts towards converting staff to using the technology was electronic mail, the use of which was actively promoted by the Vice-Chancellor and the Dean. This is possible only with a suitably supportive organisation wide infrastructure. Our faculty was one of the first to provide full network services such as printing, internet access, public areas on the fileserver for policies, procedures, minutes of meetings etc. and direct desktop computer to fax. Such usage provides an incentive for staff to become familiar with the technology.

2.2 Distance Education

The university's division of distance education has specialist staff who develop the standards for distance educational material presentation and who work with academics to optimise instructional design. In the last few years this division has branched out towards the production of contract multimedia educational packages, some of which are commissioned by outside organisations. As from 1997 the University will be offering an interdisciplinary course in multimedia instruction.

Computer mediated communication (CMC), which encompasses the use of computer conferencing, audiographic conferencing, electronic mail for staff-student and student-student communication and bulletin boards, is widely used. A University wide committee was established in 1994 to share experiences, to problem solve, to ensure consistency in instructions provided to students via the help desk and handbook, and to enhance the quality of student learning experiences through the promotion of greater and more appropriate use of CMC and related technologies. This was the result of evaluation studies conducted during 1993 which found that up to 70% of students who use CMC experienced difficulties with the documentation and with technical access procedures (Cuskelly and Gregor 1994)

2.3 Video Conferencing and Electronic Classrooms

Interactive system-wide lecturing is currently being introduced and is the result of a successful grant application to the National Priority (Reserve) Fund. It is a key component in the development of a fully integrated regional university. Under this concept lectures may be provided from any campus and simultaneously service other campuses. Such lecture delivery facilitates direct interaction between lecturer and student irrespective of location. It includes

the use of presentation software, and other technologies such as document cameras, audiographics. The communication network which supports this will also be used to improve equity of access to University library holdings and databases for all University staff and students. This has the added advantage of no longer needing to duplicate library holdings between campuses. An implementation committee has been responsible for deciding on the network and hardware technical specifications and for the design of teaching spaces to support this concept. A standard touch screen user interface for the control panel has been designed which includes the control of all audiovisual equipment, lighting, transmission to and from sites and computer usage. A facility to record and play back the lecture is also provided as backup in case the communication system fails. The first link will be operational during the latter part of 1996.

These initiatives have led to the realisation that staff need to change their work practices and students need to change their concept of University education. The preparation of lectures now requires greater planning and students are expected to be more self directed plus use information technology from the moment they begin their studies. Special training and staff support services are being provided.

Conclusion

Not only is our faculty active in promoting the use of technology to support teaching but so is the University as a whole. It is clear that by promoting the use of IT in every day organisational life through an appropriate infrastructure one improves staff familiarity with the technology. This in turn leads to greater success in the integration of health informatics into the curriculum and the use of IT to support teaching and learning. The availability of technical support staff is an integral part of this success. In combination these initiatives have contributed to the establishment of a faculty mindset towards the use of IT.

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