

Education and the Digital Campus

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Abstract

This paper examines the use of digital data in the teaching process at a tertiary institution. After a brief introduction on the relevance of data and content, the potential of institutional intranets and multimedia is outlined in relation to the sorts of activities teachers engage in. The issues of the use of digital resources are then discussed bringing the concept of a knowledge management system and resources together.

Introduction

There is a growing need for education institutions to digitize their content and activities, and adapt their systems to allow teachers to work effectively in a digital environment. The field of education is entering an 'information world' that De Diana and Aroyo (1999) term 'educational infospace' where 'networked education with all related processes is taking place'. It is clear that this 'advance of technology makes constructing new and richer contexts for teaching and learning ever more tenable and more necessary' (Kinnaman in Wellburn, 1996).

A tertiary institution, like any organisation, relies on information for it to work. This is true for staff at all levels including the front line teaching staff. More often than not the institutional information, such as planning and teaching resources, are spread spatially and in a range of formats, not the least of which is the collective mind of the teachers involved.

It seems that research, to date, has focussed on the use of technology for the direct delivery of the curriculum rather than how it could be used for developing the curriculum and supporting the teacher. 'Much has been written about how IT fits into the school curriculum and the role of IT in learning. However, the role of IT in supporting teachers and school managers to manage their work environment has received much less attention as a specific aspect of education gain through IT use' (Visscher and Wild, 1997 p263).

What is apparent is that the digital revolution is in progress and teachers will need to be encouraged to make effective use of digital resources. Teachers will need to be provided with ideas on how digital resources can be used to support them in such a way that the relationship between the information and education is maintained. It has been said that 'learning can only take place effectively given a suitably supportive environment, able to provide both a rich resource and a flexible stimulus (Papanreou and Adamopoulos, 1997, p208). The use of digital resources is able to create that environment.

This article takes a 'first look' at the issues and process relating to the need for this move toward networked digital resources in a way that teachers can provide the education needed in a digital world.

Discussion

Activity, Content and Resources (Data)

To look at the possibilities of a digitized institution requires an investigation into the activity of the teacher, the related content and the data used to support that content [the term teacher is being used to refer to tutors, lecturers, librarians, and others directly involved in delivering education].

In general, teachers are involved in activities relating to planning, facilitating and evaluating (Charles 1976, p124). Within each activity are subsets with related content. The content in turn relies on particular resources or data. Table 1. outlines the typical activity of teaching staff at a tertiary institution. The first column lists the teaching activity under the three headings of planning, facilitating and evaluating. The organisational activity required to maintain the teacher's own development is also included. The second column identifies the content required to achieve the listed activities. The last column lists some of the resources or data that a teacher may use to access or create the content.

Activity	Content	Resources / Data
Planning		
Diagnosing	lesson plans, curriculum, student information, industry contacts	archived data (personal and institutional), policy documents, curriculum documents, email, phone/voicemail, unit standards, peer discussion lists, library, intranet
Selecting Appropriate Methodology	ideas from: books, journals, www, peer suggestions, education theory, other contacts (industry)	internet, library, archived data (personal and institutional), policy documents, curriculum documents, email, phone/voicemail, unit standards, peer discussion lists, technology support people, intranet
Arranging Activities	timetable, guest speakers, peers, institutional activities.	online timetable, phone/voicemail, email, intranet
Selecting Resources	books, journals, web pages, video, CDROM, interactive software	internet, library, archived data (personal and institutional), policy documents, curriculum documents, email, phone/voicemail, unit standards, peer discussion lists, technology support people
Facilitating		
Motivating	multimedia, guests,	internet, computer based presentations, video, video conferencing
Introducing	information, examples, experiments, workshops, video, handouts, computer presentations, guests	internet, computer based presentations, computer applications (presentation and publishing) video, video conferencing
Guiding	tutorials, discussions, mentoring	student information, support documents,
Managing	co-ordinating discussions, scheduling tutorials, understanding health and safety, knowledge of other programmes	email, timetable, personal calendar, prospectus, health and safety regulations,
Disciplining [Mentoring]	policy documents, understanding health and safety, knowledge of other programmes	secure filing system, policy documents
Evaluating		
Appraising	observation, note taking, formative testing, mentoring	tests, result recording system, secure filing system, video player, mentoring documents
Judging	summative testing, curriculum, viewing student's portfolio work	written tests, video, intranet, result recording system, secure filing system
Feedback	reporting results to student and institution	MIS system, computer publishing? red pen
Organisation		
Maintaining Relationship	news, peers, management, internal communication	meetings, phone/voicemail, email, phone lists, employee handbooks, vacancy information
Marketing	programmes offered	internet intranet
Support	helpdesk, supervisor, peers	helpdesk, discussion, email, phone/voicemail
Staff Development	human resources, staff, self paced study, external study	library, computers, workbooks, other institutions, desktop video conferencing
Research	perform research in area of study	research assistants, library, statistical and bibliographic support, internet

Table 1. Teacher activity, the content used in that activity and the resources and data source required to provide the content.

The method used to get hold of the resources in the last column has changed in the last few years. Where most of the data and resources were paper-based, they are already becoming digital. Email and internet/intranet based information services are now being used where letters, facsimiles and the library were used previously. Multimedia and presentation software is replacing overhead transparencies and epidiscopes. The internet is also being used more and more and is now a very useful source of material for teachers. 'The WWW could support teaching and learning in a number of ways' (Stefanov, *et al.* 1998, p309). As data and resources become digital, all of the content and activity potentially becomes more accessible, effective and efficient, particularly when put on an intranet.

Making Use of an Intranet

The intranet within a tertiary institution has the potential to revolutionize the way teachers work. 'Intranets probably will become of great importance for education, not only from the point of view of instructional opportunities, but maybe even more so from the point of view of the organization and management of education' (De Diana and Aroyo, 1999).

Intranets can be used by teachers for efficient document management and information sharing. The document sharing extends beyond the lesson planning and curriculum documents to policy documents and other institution wide information including material stored in databases.

Intranets also allow employees to access information that previously was difficult to locate or not available at all. Information that can be contained on intranets include data like an interactive employee phone directory, employee handbook, job vacancy lists, video clips of presentations, meeting notes, departmental information, newsgroups and access to helpdesk applications (O'Donovan, 1998, p7)

The communication provided by the intranet allows all of the staff to participate where previously only the more outspoken would have a say. Electronic communication offers the ability for people on the periphery of the organisation to reduce their information gap and encourages different minded individuals to communicate much more frequently than they would by other communication channels (O'Donovan, 1998, p4 and p6)

Murray (1997) in De Diana and Aroyo, (1999) suggests that the application of intranet technology will result in better and more effective information access and will stress collaborative work and skills rather than individualistic work and skills. A more collaborative environment has the potential of reducing some workload due to economies of scale. Rather than one resource supporting one teacher, one resource could support several teachers, particularly document resources.

Education is traditionally strongly involved with documents such as text books, manuals and work books. With the intranet most, if not all, of these resources can be made available to all teachers in an institution.

Making Use of Multimedia

According to Negroponte (1995) 'multimedia is both about new content and about looking at old content in new ways' (p63). It is the new ways of looking at resources that creates both the possibilities and some issues for teachers.

Multimedia has a range of meanings but for the teacher it encompasses all of the data involved in the delivery process. Photos, videos, audio, and interactive software along with the previously mentioned document information. Currently the vast majority of this data is kept by the individual teacher in analog format. Staff store videos, texts, and graphic material on shelves in their office space. As the move to digital resourcing continues, this information is likely to become a shared resource stored on the institution's intranet. Such an approach offers rich possibilities for distributing and presenting study materials and other information in any desired format at any desired place (De Diana and Aroyo, 1999).

With all of the information available from any part of the network, the teacher is then able to go deeper into a topic, or branch in a different direction to match the learning readiness of the students. This ability to adapt to meet the needs of students is not new as stated here - 'It falls upon the teacher to constantly recreate the instructional process and offer a variety of choices for approaching information and tasks in order to meet the learner's ever changing, individual needs' (Smith, 1997). What is new is the potential to be able to achieve it.

Negroponte (1995) puts the opportunity this way. 'In the digital world the depth/breadth problem disappears and we can expect readers and authors to move more freely between generalities and specifics. The opportunity of tell-me-more is very much part of multimedia and at the root of hypermedia' (p69). Multimedia in many ways, gives teachers the tools to turn the classroom into a centre of student-directed enquiry (Department of Education Forum, 1995). As Tiffin and Rajasingham (1995) put it 'To be capable of a broad spectrum of instruction, education needs a symbiotic relationship between human and artificial memory that allows for rapid, on-demand access to information in any sensory modality about the knowledge and problems which are the subject of study' (p44).

In a non digital situation the teacher is often only able to take to a class what can be carried there. In an intranet based, digital multimedia environment, the teacher can access and present on any of the stored material on the intranet. Those resources may include video, graphics, simulations or even virtual reality and whole new opportunities arise for delivery providing new learning opportunities in a more active, flexible and more economic way.

Making it Work

According to Negroponte (1995) the distribution of atoms is far more complex than the distribution of [digital] bits (p83). That may be true, but new tools must be developed to support the information needs of teachers and administrators in a digital environment. The first major hurdle is the importance of institutional consistency. For information to be shared effectively the format and form of the resources must be the same across the whole institution. It would be a barrier rather than a stepping stone if each section of an institution stored their lesson plans or resources differently. Imagine being a recently appointed teacher having to learn six or seven formats for each of the numerous pieces of data listed in table 1! The goal needs to be that the educational multimedia applications provide a friendly and consistent user interface to present information in convenient and comprehensible formats allowing the user to create, edit, transmit receive, store, retrieve, compute and delete multiple types of information in an integrated manner (Papanreou and Adamopoulos, 1997, p208/p214).

Another issue for a digital campus is the management of all of the digital data, sometimes referred to as an ITEM system (information technology in education management) (Visscher and Wild, 1997 p266) or an ILS system (Integrated Learning System) (Underwood, 1997, p277).

Data management or knowledge management can become a dominant approach for teaching and is probably necessary as the globalization of education allows new methods of packaging and delivering educational products (Adam, *et al.* 1997). Tertiary education institutions need mechanisms to gather, store, manipulate, and manage knowledge in order to make the most effective use of it. With this change to an almost totally digital resource base there needs to be adequate support to make sure that the content and ultimately the activity of teachers is useful, efficiently and effectively used. De Diana and Aroyo (1999) suggest that 'knowledge management supported by computer tools and techniques may become daily practice as we are involved in building knowledge, storing knowledge, distributing knowledge and using knowledge. They also suggest that 'in a few years though it is expected that the Intranet of a company can come to play such a substantial role for a company, that in way it may come to embody the company itself (De Diana and Aroyo, 1999). For this reason, the initial set up of digital resourcing in the form of templates for lesson planning and formats for data types will have to be thought through very carefully. To establish an unwieldy, unfriendly or difficult environment will have a disastrous effect on the future of the institution. As more information is added to the system it may, in fact, dominate the institution which brings up another issue, that of change management.

The impact of a digital campus may be that 'a reflection of an evolution towards a more machine-dependant information infrastructure will threaten, or at least substantively change, most of our traditional institutions' (Taylor, *et al.* 1997). In many ways, teachers will have to get involved in this process or find that their institutions have left them behind. The need for quality teaching will still be the measure of success and there are many variables involved other than the shared or stored knowledge. The quality of the delivery is affected by factors such as the quality of the information in stored form, the quantity of accumulation of stored information, how well the stored information is converted into to communicable form and how well the information is communicated to the student (Ottenberg, 1994).

It may get to the point that those excluded either through their own technophobia or access problems may feel threatened and cut off from the information necessary to achieve in their positions (O'Donovan, 1998, p8). This is where the support offered to teachers through this process is vital for the survival of the institution as emphasized by Stenerson's comment, for both staff and students, that 'there is seen to be a direct relationship between support and instructional effectiveness' (1998).

There are other issues that need addressing such as the difficulties with copyright that are enormous and unlikely to be resolved easily (Whalley, 1995) and the fact that current computer screens result in reading that is approximately twenty-five percent more difficult than reading from paper (Nielson, 1996). These issues will be solved by the technology in the long run but in the short term will need to be managed carefully.

The essential point is that a digital campus will have advantages that far outweigh the disadvantages. The digital campus can 'go with the flow', easily adapt and evolve with the future directions in tertiary education. Whether an institution becomes more flexible in its delivery style or becomes more global and distance based, if it has taken up the digital challenge then it can provide the resourcing for teachers in almost any delivery format. Research is still needed to establish consistency and appropriate format and forms for effective document and resource sharing across the institution. Going digital is inevitable – doing it well will take a little more planning and a lot of well supported teachers.

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