The Twelfth Cambridge Conference on Open and Distance Learning

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Interactivity challenges facing online educators

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Abstract
Distance education is experiencing tremendous growth in the United States with over three million students taking at least one online class each year. This rapid growth represents a challenge to administrators and educators who want to effectively serve a rapidly growing student population. Educational organizations must strive to develop vibrant and new educational paradigms that take greater advantage of computer technology. The paper addresses major instructional issues involving interactivity in online classes. Educators are faced with students who vary in their cognitive maturity, communication skills and prior knowledge of the subject matter. This places a heavier burden on teachers to provide an online environment that effectively assists students with a diversity of learning needs. Students want intellectually rich dialogs and they become disillusioned when their classes become wooden and lifeless experiences.

The author has taught over 230 classes for the University of Phoenix across the academic disciplines and with students who are pursuing a variety of degree programs (undergraduate, masters & doctoral level). The paper reflects contemporary interactivity research insights and the author's work in the field of distance education. Educators are given practical instructional suggestions that promote reflective and creative student dialogs and written work. Future interactivity research topics are highlighted, such as critical thinking paradigms for content analysis of discussions.

Introduction

The discussion highlights several distance education trends and concerns about the quality of today's online dialogs. Discussion provides instructional suggestions to improve interactivity. The author will offer recommendations for future interactivity research studies.

Distance Education Growth

Distance education has displayed remarkable growth in student enrolment. The University of Phoenix (UOP) has grown to become the largest private university in the United States, with over 315,000 students who take classes online and at one of their 190 campuses with 22,000 instructors who teach undergraduate through doctoral level classes. UOP has an annual instructional budget close to a billion dollars and invests over 450 million dollars into advertising each year (UOP, 2006). There has been a steady increase in the number of online degree programs and online classes at traditional universities. Technology advances have increased student access to library content through e-journals, e-books and databases. Online education is entering a new phase of development that places a greater emphasis on academic quality in degree programs. Students have definite learning needs as they prepare for jobs and graduate school opportunities. Nichols (2001) highlights six imperatives for educators in the 21st Century:

1. Increased capacity and efficiency - through enabling institutions to cater for the learning of a relatively large number of students at once.

2. Improved effectiveness - by encouraging deep learning approaches and the adaptation of knowledge to the real world.

3. Easy accessibility - by removing distance barriers and catering for a variety of learners' prior educational experience, physical abilities, and time commitments /lifestyles.

4. A competitive mindset - education with the potential to be offered internationally, within industry, and at a distance; providing more choice and convenience for the student.

5. A resource-based emphasis - enabling more student control over what, where, when and how they study and permitting non-linear learning; and

6. The personal touch - with more interaction between students and between individual student and tutor, enabling a degree of customisation and the pursuit of individual students' learning goals in addition to the prescribed course learning outcomes (pp.13-14).

The six imperatives stress a wise and visionary use of technology that will create relevant and accessible knowledge. Distance educators and instructional course designers must continue to explore creative ways to personalize and intellectually enrich the cyber environment. Educational leaders must be willing to invest into technology and teacher training and professional development. The organizations who are hesitant to make prudent long-term financial commitments to online education will risk undermining their academic credibility. Poor financial planning and questionable marketing strategies have already produced several major business failures. The online university known as United Kingdom e-University (UKeU) collaborated with the British government and invested 62 million pounds ($113 million) to develop their commercial venture. The project began in 2000 and collapsed in 2004 (Garrett, 2004). Educational organizations must be impatient with the status quo and strive to develop vibrant and new educational paradigms that take greater advantage of today's multimedia.

There has been steady growth in online education during the past five years. American higher education institutions are making significant financial investments into online education. Seaman & Allen's (2006, p. 1-2) online education study revealed the following trends:

1. Nearly 3.2 million students were taking at least one online course during the fall 2005 term, a substantial increase over the 2.3 million reported the previous year.

2. Online students, like the overall student body, are overwhelmingly undergraduates. The proportion of graduate-level students is slightly higher in online education relative to the overall higher education population.

3. More than 96 percent of the very largest institutions (more than 15,000 total enrolments) have some online offerings, which is more than double the rate observed for the smallest institutions.

4. The proportion of institutions with fully online programs rises steadily as institutional size increases, and about two-thirds of the very largest institutions have fully online programs, compared to only about one-sixth of the smallest institutions.

5. Doctoral/Research institutions have the greatest penetration of offering online programs as well as the highest overall rate (more than 80%) of having some form of online offering (either courses or full programs).

Distance Education Dialog Challenges

The virtual environment lacks the normal face-to-face communication found in the traditional classroom. It places a greater burden on students to use the appropriate educational resources to understand the subject matter. Instructors must focus greater attention on effectively communicating their expectations for assignments and sharing relevant lecture notes. Educational literature contains frequent references to interactivity. Berge and Muilenburg (2005) research affirmed other researchers who have found that students considered the absence of social interaction as being a major barrier to positive online learning experiences.

The online setting holds potential for vibrant interaction and rich dialog. Unfortunately, virtual educational experiences can become quite wooden and lifeless at times, like a boring traditional classroom. Distance educators and their students can become disillusioned with the teaching and learning process when it lacks a dynamic interactive character. The problem involves having a rigid learning environment that fails to acknowledge that learning must be context sensitive (Muirhead, 2007).

Today's students want online classes that are enjoyable places where learning expectations are built upon relevant intellectual activities and discussions. It is interesting to observe teachers who claim to be student-centered in their educational philosophy but actually are quite controlling in their classes. Teachers can dominate online dialogs by posting an excessive number of messages that highlights the instructor's knowledge expertise but undermines communication. Instructors can become threatened by the online setting which has an open-ended quality which causes some individuals to strive for security through greater control. Sadly, students are receiving a less academically rigorous education because they are not challenged to be independent thinkers. Students wonder about the quality of their ideas because the teacher fails to create a legitimate dialog that affirms the worth of their questions and concerns (Muirhead and Murchu, 2005).

Fostering Positive Online Experiences

Meyer (2002) encourages teachers to take responsibility for properly using technology as a communication tool in their classes. Teachers should create email notes and biographical narratives that highlight their personalities. These are simple ways to integrate the teacher's social presence into their classes which stimulates interactivity. Teachers can design biographies that offer informative background comments relating to their academic degrees, professional experiences, personal interests and hobbies. Biographies should be designed to establish the professional credibility of the instructor and affirm the personal dimension of their lives. Instructors can enrich their biographies by using graphics, a personal picture and favorite quotes. It is a useful way to help students become acquainted with their teachers and humanize the virtual classroom (Bender, 2003). Students appreciate having teachers who utilize a university or personal website. The University of Phoenix provides instructors with individual faculty websites to share basic contact information and biographical data. Students can access their instructor's website prior to the start of their course, which helps them feel more comfortable about taking the class (Muirhead, 2004).

Saba (2005) has concerns that commercial learning management systems (e.g. Blackboard) fail to account for students who have varying different types of learning needs:

- prior knowledge of the subject matter
- learning-style preferences
- levels of abstraction in encountering new concepts, and other similar variables (p. 264).

There is financial pressure to create a one-size fits all learning environment to save money. Student expectations have risen because of high-speed Internet services that enable more people to utilize video and other multimedia resources. Students want courses that help them handle the complex technical and specialized competency requirements in their jobs (White, 2005). There are some educators who advocate having students adopt a facilitating role and moderate their own class discussions. A research study by Murphy et al (2005) used teaching assistants who worked with students as coaches and helped them organize discussion questions. The project found student facilitators were more effective than the course instructors in leading vibrant online dialogs. A troubling implication was that teachers could avoid being involved in online dialogs without any apparent negative impact on the quality of the education. The author has taken graduate online classes in cognitive psychology at The Teachers College, Columbia University, using a similar model. Students did facilitate the weekly discussions and presented materials (e.g. PowerPoint presentations). Dialogs rose no higher than student knowledge and experiences. Columbia teachers did not participate in the class discussions and students were deprived of their expertise. This educational model stresses discovery learning and personal knowledge ownership. Yet, the limited teacher's role is troubling at an Ivy League institution that prides itself in promoting academic excellence.

Cognitive maturity will vary among students, which will require having teachers to make creative adaptations to their course plans and activities. Curriculum changes should not reduce the academic quality of the course work. Online degree program

administrators must avoid the temptation to dumb down their curriculum standards to increase their student enrolment numbers. Lowering educational standards can help more students experience a measure of academic success. It represents a patronizing view of people that questions their ability to effectively take on new intellectual challenges and it reflects an ambiguous view of equity. Furedi (2004) relates "… by treating people as weak and vulnerable individuals who are likely to stumble when confronted by intellectual challenge, such cultural attitudes serve to create a culture of low expectations" (p. 138). Distance education administrators, admission personnel and teachers need to work together to uphold high intellectual expectations for their students and uphold the academic integrity of their institutions.

Distance education institutions should examine their curriculum and teaching practices to see whether their classes are too rigidly designed. Online group discussions can be counterproductive due to misinformation, group think attitude, controlling learners who undermine dialog and conflicts with individual learning styles. Perhaps educators have embraced flawed assumptions about their students during the teaching and learning process. Garrison & Anderson (2003) relates, "a problem with many forms of student to student interaction theory is that they nearly always assume that individuals share a content interest within a shared time space" (p. 44).

An excessive focus on planned online student dialog can be counterproductive if students do not have enough time to reflect on the subject matter. Distance educators support a self-directed learning philosophy because it encourages professional growth. Self-directed learning helps create an educational setting or environment that promotes creativity and higher order thinking skills. Online degree program administrators must avoid the temptation to dumb down their curriculum standards to increase their student enrolment numbers (Garrison, 2003).

Distance educators should encourage both formal and informal learning. Teachers can help individuals develop attitudes and study strategies that foster confidence and self-directed skills. Cross (2007, p.77) suggests five ways to empower individual growth:

1. Knowing and choosing the best way to learn (individual, group, debate, or triage, for example) and the best sources of information.
2. Personal knowledge management (capturing and reflecting on one's tool kit).
3. Forming personal relationships (with mentors, colleagues, and information sources).
4. Continuous reflection (double loop, goal of self-improvement).
5. Moving to a reinforcing learning environment.

Students vary in their cognitive maturity and educators must develop a set of flexible techniques and lesson plans that will help them to meet a diversity of student needs (Branford et al, 2000). Teachers should foster a rich intellectual environment built on an assortment of multimedia tools (e.g. web-based simulations). An informal class can encourage independent learning projects built around student interests while promoting creativity, reflective thinking, and self-directed learning. It is important that teachers enable students to have the freedom to ask questions and take intellectual risks in their assignments and class discussions. Teachers can promote lively discussions by creating discussion questions that encourage critical thinking and stimulate student contributions.

Future Interactivity Research Studies

Researchers have found that student social presence is essential pre-requisite to cognitive presence in online dialogs (Garrison & Anderson, 2003). The term social presence involves "the ability of participants in a community of inquiry to project themselves socially and emotionally, as 'real' people (e.g.; their full personality), the medium of communication being used" (Garrison, Anderson, & Archer, 2000, p. 94.). Educators need to study how integrating specific activities can strengthen interpersonal relationships and foster intellectually richer discussions. Beuchot & Bullen (2005) "few studies have examined online communication or group processes over a time period longer than a 1 year. Furthermore, researchers have begun only recently look into the social dimension of online communication and their impact on the quality of interaction" (p. 67).

Examining research studies on student intellectually engaging with the course content contains a multitude of variables. Thurmond (2003) highlights five factors that can influence student perspectives on their capacity to learn course curriculum:

- continuous contact with the content - enables students to gain mastery
- clarity of course design – the structuring of the materials and the manner in which it is sequenced will help make it both accessible and easy to understand
- time – adequate time is needed for students to engage with the materials and discourse and to reflect on their learning
- participation in online discussions – this enables students to learn by constructing meaning and knowledge through dialogue and from other perspectives
- mode of delivering course content – appropriate sequencing of content and learning activities will enhance interactivity and make learning more effective and meaningful.

The list reveals the complex nature of interactivity and how it can impact the student's online experiences. Learning problems are not always technological but involved human issues and the instructor's communication strategies (e.g. sharing expertise in dialogs). Murphy & Ng (2005) encourage more discussion content analysis studies. For instance, cognitive interactions could be examined involving different types of clarifying comments, direct and indirect remarks, cognitive tactics, independent reflections and comments that build on instructor or student contributions. Wickersham & Dooley (2006) examined critical thinking in online discussions in ten areas: "(1) relevance; (2) importance; (3) novelty; (4) outside knowledge or experience being brought to bear on the problem; (5) ambiguities clarified or confused; (6) linking ideas; (7) justification; (8) critical assessment; (9) practical utility (grounding); (10) and width of understanding" (p.10). Their critical thinking model was descriptive which provided limited insights. New paradigms could promote richer studies into the characteristics of deeper reflective thinking.

Conclusion

The discussion has highlighted some of the interactivity research challenges that face distance educators. Whipp (2004, p. 19) warns that "in the current rush to put courses online, often the voices and needs of learners are overlooked." It is time to develop

research methods that examine the quality of interaction and the evolving development of student critical reflection skills. Contemporary instructors must be better equipped to fulfil their vital role in shaping the social and intellectual depth of their online communities (Guldberg & Pilkington, 2007).

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Building footpaths where people walk: the challenges of using a VLE to support international collaborative learning

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Abstract

This work-in-progress shares our observations and reflections on the introduction of a VLE (virtual learning environment) into a distance course on facilitation of learning for staff in an international organisation. We examine how well the VLE supports course goals and organisational goals to build learning communities through collaborative learning. We also consider the compatibility of the VLE with participants' approaches to working with the course, communicating with each other and achieving their individual goals, all while operating in challenging work situations.

Introduction

This preliminary account conveys observations and reflections on the impact of introducing a VLE (Virtual Learning Environment) into a distance course, Facilitation of Learning Programme (FOLP) offered for widely dispersed staff in an international organisation. As facilitators of FOLP for four years and of the VLE pilot in 2007, we noted how the VLE affected the collaborative learning process, interaction among learners, and the capacity to respond to individual learning needs. We also considered the extent to which the VLE design was consistent with course goals, adult learning principles and the approach of the course. The course is intended to model good practice by using interactive learning to focus equally on process and outcomes, and to demonstrate an alternative to more directive models of providing training. We also examined the VLE's accessibility and ease of use, given the wide range of communications infrastructures available to participants.

As facilitators, we focused our enquiry on the question of how well the VLE supported learning approaches that are consistent with the goals of the course. Our prior experience in facilitating FOLP and in using VLEs for other distance courses provided a framework for comparison. We examined the underlying principles of the structure of the VLE, the assumptions behind design choices and the practical realities of functionality and accessibility.

Background

During the past decade, the international humanitarian organisation that offers FOLP for its staff has supported its goal of building a learning organisation by enabling its staff to engage in continuous learning through workplace coaching and mentoring, formal programs, face-to-face sessions, self-study, and distance learning.

FOLP is intended to strengthen the facilitation skills of staff whose role includes planning and supporting learning. Participants in the paced 20-week blended learning

course may provide informal or formal learning programs for the organisation's staff, government officials, non-government organisations or refugees. A typical FOLP cohort comprises two groups of fifteen to twenty participants each: a facilitator supports each group. Most participants work in the field in widely dispersed locations in Asia, Africa, Europe, the Middle East and the Americas: a few are at Geneva headquarters. For most, facilitating learning is one part of their job, rather than their full-time occupation, and many have received limited preparation for this role. All participants have demanding jobs and challenging working conditions, especially those who are in active conflict zones. Most use English as their second or third language.

FOLP is designed to model good practice in facilitating adult learning, enable participants to develop skills and knowledge they need for their facilitation role, and create a supportive cohort of skilled facilitators who can sustain a learning community during and after the course. The course has an initial 12-week distance phase, then a four-day face-to-face seminar and a concluding six-week distance phase. The print course manual contains a course guide with activities, assignments and additional resources. Mutual support and collaborative learning are essential elements: small groups focus on a particular topic and develop a learning activity on their topic that they present during the seminar. Until 2007, email and listservs enabled interaction among the whole group and small groups during the distance phases of the course.

There are indicators that email and listservs have enabled participants to work together quite effectively at a distance. A 2006 evaluation of FOLP noted:

> The FOLP is a moderated distance learning programme that has proven its value to former participants. There is a good balance between distance learning modules and a face-to-face seminar, tutored by a professional and independent facilitator. Participants can practice and experiment their newly developed skills and receive immediate feedback. … In a learning community like this one, exchange of experiences and knowledge is possible and very valuable. The chance to work with other learners with a different cultural background provides rich learning experiences. We can conclude that the blended learning approach is successfully implemented because of the continuous interaction in FOLP (Alberink, 2006).

The evaluation also recommended a strategy for enabling a community of practice:

> Create a Community of Practice (CoP) around participants and graduates from FOLP, starting with participants in the FOLP programme. Throughout the FOLP programme participants develop a community of learners whom they may call for assistance at a later date…to share ideas and experiences (Alberink, 2006).

This goal of creating and supporting a community of practice was a major incentive for adopting a VLE as a more flexible venue for distance interaction. An important practical consideration was that the VLE could provide a communications channel distinct from the busy organisational email highway, potentially making it easier for participants to keep in touch.

In 2007, the organisation's FOLP course coordinator determined it was time to include a VLE as part of the FOLP course. Factors influencing the timing included:

- upgraded technical/communications systems in the organisation's more remote locations;
- the potential of a VLE to contribute to the organisational goal of building virtual communities of facilitators and strengthen the organisational learning culture.

In other words, as long as the technology infrastructure was adequate, a VLE could offer what Salmon (2002) terms "affordances" that enable more strategies for learning and community building than are available through other means.

VLE structure and introduction

The existing course design enabled distance interaction and collaborative learning as integral elements of the course. Theoretically, it was possible to substitute one interactive technology, a VLE, for the existing technology, email. However, as Salmon (2002) and Franklin (1999) point out, no technology is neutral. A VLE is more than a means of enabling interactive learning: it is also a means of managing and monitoring learning. As such, it can serve a wide range of needs of learners, facilitators and administrators. Most VLEs have administrative frameworks for managing learning; for example, setting timelines, monitoring each participant's informal and formal work, and generally providing for more scrutiny of participants than is possible in email interaction. Moreover, a VLE platform is based on a set of assumptions about the learning process.

The VLE platform chosen for FOLP, initially used in primary and secondary schools, is now also used in tertiary institutions and corporations, mainly in northern Europe and the UK. Until its use for the FOLP course, this VLE platform had not been used in contexts with a limited communications infrastructure.

The most visible components of the VLE configured for FOLP are:

- discussion forums for threaded discussions among a whole group of 15 participants;
- discussion rooms providing a learning space for smaller groups to work together;
- hand-in folders where learners can submit activities and assignments for feedback from the facilitator;
- scheduling components that establish start and end dates for contributing to discussion forums and uploading activities to hand-in folders.

(The VLE systems for email, shared whiteboard space and live chat were not enabled for FOLP.)

The monitoring functions available to the site administrator and facilitators included systems to:

- track participants' submission of activities and assignments and facilitators' feedback and assessment;
- track participants' frequency of logins to the VLE but not the duration of their use of the site nor the locations they visited.

Before the course began, participants were encouraged to review a short tutorial on using the VLE and to check the Help file available on the VLE website. During the course, technical help staff were available during Geneva office hours to respond to participants' problems with using the VLE.

When the course started, participants were encouraged to use the VLE for their introductions and discussions, but were also able to use email or a listserv as backup. Some participants continued to use email to contact the facilitator and other members of their small group, especially if they had difficulties accessing the VLE.

Questions we considered

We expanded the broader questions about how well the VLE supported course goals and principles and responded to participants' learning needs, into the following specific questions that guided our inquiry.

To what extent does the VLE accommodate the course goals?
This question explores whether the VLE structure, and implicit and explicit messages embedded in its design and terminology, were consistent with the course goals and messages about facilitating adult learning within this organisational context.

The course goals include accommodating diverse learning needs, enabling communication among learners, and modelling best practice in facilitation by paying equal attention to process and outcomes and taking a less directive and authoritarian approach than is usual in a training model.

The essential messages of the course are:

- the need to consider the characteristics and diversity of adult learners, their individual learning needs, learning style, context and life circumstances, when planning and facilitating learning;
- the differences between delivering training and facilitating learning, especially in regards to process and the degree of learner self-direction;
- the importance of using needs assessment as the basis for planning any learning activity, course or program;
- the value of using a systematic approach to planning, facilitating, assessing and evaluating any learning activity, course or program.

The course models good practice by enabling the learning process to be relevant to participants' needs, role and context. Participants define their own learning needs, develop their specific course goals based on their needs, interests and facilitation role, choose a topic of interest to study with a small group, participate in a collaborative learning project by planning a learning activity with their small group, and apply their learning to their work role by planning a learning activity for their own work context.

Participants are invited to reflect on their own learning processes at each stage and to apply their insights and observations about learning to their practice as facilitators. Participants are also encouraged to reflect on their group's collaborative learning process and to identify the most effective communication, support and learning strategies for their group.

To explore the question of the VLE's consistency with course goals, we examined the VLE's capabilities and the messages embedded in the VLE structure.

To what extent does the structure and function of the VLE support a community of practice?

Adult learning involves observing and reflecting on one's own learning processes, managing new knowledge, testing one's understanding, and sharing understanding with others. Collaborative learning is an essential element of this process of building socially constructed knowledge (MacKeracher, 2004; Merriam and Caffarella, 1998; Nyerere/Kassam, 1994). A VLE should enable learners to collaborate easily so they can engage in reflective practice and knowledge creation.

In addition to maintaining contact with the facilitator, participants need to be able to contribute to their group's discussions and collaborative learning project from any location, so they can discuss their work on each unit, their practical issues, and group plans for the seminar.

We considered this question by exploring whether the VLE offered a comparative advantage in supporting a community of practice by comparing the features, benefits and drawbacks of the VLE with email for small group communication and collaborative learning.

To what extent does the VLE support the strengths of the course?

Participant feedback and previous course evaluations identify flexibility and responsiveness as the key strengths of the course, as shown by:

- open communication among learners and between learners and the facilitator;
- ongoing individualised feedback from the facilitator;
- a supportive context based on small group work and development of a group identity;
- opportunities for participants to apply learning to current projects in their own context.

Franklin (1999) observes that every technology embodies a set of values and assumptions, and defines two different types of technologies. Holistic technologies enable people to make situational decisions by drawing on their previous experience as their work proceeds. By contrast, prescriptive technologies involve a series of predetermined steps that are externally controlled to achieve predictable outcomes. A holistic technology is more compatible with the responsiveness and flexibility of this course than a prescriptive technology. In a practical example, even though FOLP is a paced course, facilitators can respond to an individual learner's needs for flexibility to accommodate unexpected travel, emergencies or family crises. But a VLE technology that sets deadlines and records marks and penalties can convey a different message, of inflexibility and enforcement.

To consider this question, we examined the extent to which the VLE enabled responsiveness to specific learning needs that emerged during the course. As well, we tracked the technical accessibility of the VLE; i.e., participants' ability to access the website at any time, from any location, and the time required to log on to the VLE,

navigate to a specific location, upload and download. We compared affordances and accessibility with those offered by email and listservs.

To what extent does the VLE support best practice in online learning?
For the pilot VLE to serve as a useful prototype for online learning for other programs, the VLE should support best practice in online learning and be consistent with the organisation's goals.

One indicator that a VLE supports best practice is its capacity to enable the type of social interaction that builds communities of learners (Anderson, Garrison, 2003). Anderson (2005) and Salmon (2002) note the importance of social interaction among participants and facilitators in building successful virtual learning spaces. To achieve this, they need a reliable virtual environment conducive to discussion and collaboration. Since FOLP has only one face-to-face meeting later in the course, it is even more important to create a situation that encourages everyone, whether new or experienced online learners, to participate actively from the start.

Best practices in any asynchronous, text-based mediated communication are based on the following principles:

- The learning experience must include three key elements; social presence, cognitive presence and teaching presence (Anderson, Garrison 2003);
- Learners must be fully engaged in order to build knowledge and collaborative communities;
- The design and facilitation process must foster discussions that help learners understand a topic or issue well and encourage critical analyses rather than rote learning from a prescribed repository of information (Ally, 2004).

As well, administrative and monitoring systems in VLE platforms can convey assumptions about learners and learning which may not necessarily be consistent with best practice in online learning. VLE systems for monitoring learners and documenting learning in formal education systems may not be the best fit for non-formal learning, especially if their underlying assumptions conflict with the concept of egalitarian collaborative learning. For example, participants may be more reluctant to share their honest observations about their own learning experiences and context if they know that others in the organisation could read all their messages. Also, even when a VLE is intended to support collaborative learning and community building, it may be hard to resist using built-in monitoring features, especially if they satisfy a natural curiosity about how people are using the system, how often they have logged on, and so on.

To consider this question, we explored how well the VLE structure supported the principles of best practice, and how well technical support enabled participants to engage in learning without being impeded by technical problems.

Observations about the effectiveness of the VLE

We determined that the following capacities of the VLE were relevant to accommodating the goals of FOLP, supporting a community of practice, supporting the strengths of FOLP and modelling best practice in online learning:

- Enabling discussion and interaction among participants;
- Providing a venue and support systems for collaborative learning;
- Serving as an information source about course contents and resources;
- Providing administrative support, including course schedule details and systems for recording participants' work;
- Improving access to other participants and the facilitator.

We also considered technical factors that could support or impede the effectiveness of the VLE: ease of use, availability of technical support, accessibility, and the time required to use, navigate and download materials from the VLE.

The VLE as enabler of discussion and interaction among participants
The VLE provided for several types of interaction; a discussion forum enabling threaded discussions on specific topics, a brainstorming function that enabled participants to contribute very short messages, a question/answer forum, and a debate forum.

As facilitators, we used the discussion forum the most, because it was the simplest and most visible way for participants to comment on each learning activity during the course. We started each week's forum in the VLE by posting an overview of that week's unit and activities and setting up a discussion space for all participants on that week's topic.

The discussion forum worked reasonably well during the first three units of the course, when participants introduced themselves, shared experiences, and identified topics of interest that they wanted to explore with several other participants in a small group. During the first three weeks of the course, all participants checked the facilitators' weekly messages and almost all responded with their contributions. From Unit 4 on, only about two-thirds to one half of participants read the facilitator's weekly message. By this time, participants were working in small groups, and almost all opted to continue their small group discussion through email rather than in the small group discussion rooms set up in the VLE.

After the third week, the VLE discussion forum did not enable continuity for the whole group, possibly because there was less impetus to participate, or possibly because the focus of activity had shifted to small groups. Many participants visited the website quite infrequently after the fourth week of the course. Once participants began checking the VLE less frequently, it became more difficult to use and navigate, because the system could flag only five postings as unread. If there were more than five unread messages, participants had to check every room and discussion space for unread messages, which was time consuming. The fact that participants noted this problem indicated that they were checking the website only once every 10 to 14 days, because there were usually only three or four messages posted for participants each week. The resulting difficulty in catching up to the VLE after an absence contributed to even less use of the VLE.

Venue for support systems for collaborative learning
Until the introduction of the VLE, FOLP's collaborative learning component used email and listservs for group learning projects. Participants in previous courses sometimes found the volume of email frustrating, especially if the message did not seem to affect

them. As a result, participants sometimes did not read important emails intended for them.

Using a VLE promised to alleviate the amount of FOLP-related email that participants received, since participants were expected to post their messages into the VLE. We also hoped that the VLE would be a more hospitable environment than email for discussion and collaborative work.

Observations
The VLE provided for separate learning spaces or "rooms" for the whole group and for each small group. The small group rooms, open only to small group participants, the facilitator and course administrators, enabled participants to discuss their collaborative work and upload their work in progress. Small groups were encouraged to post a weekly summary of their work to the whole group so that everyone was aware of other groups' activities. However, few groups posted these summaries.

Theoretically, creating rooms for small groups was intended to encourage on-line group work and discussion, by making it easier for participants to focus on relevant items in a limited number of messages in their small group space.

In practice, although participants did post occasional messages to their small group's room, there was little evidence that they used this space for collaborative learning. Technical difficulties caused a one-week delay in creating small group rooms after the small groups had formed. Although this delay may have been a factor, participants indicated that workload and technical challenges were the main reasons for their limited use of the VLE.

One small group that collaborated effectively throughout the course used email for all their consultation and sharing of work. Their choice was pragmatic: two of the three group members lacked web access for periods of time, and they could not have worked together within the course schedule if they had used the VLE. They were well motivated to work together and share their varied expertise, experience and contexts. They made an early commitment to share their work in progress, since they were working individually on applying the same topic, planning training budgets, to their own contexts. Each person shared their individual work in progress at each stage and the other two added comments and suggestions. They then developed their completed work into case studies for their seminar activity on how to prepare a training budget. As one group member said, using collaborative learning to work on their individual projects and their group project at the same time was a process that required, "devotion, mutual understanding and support, and prompt reactions."

Source of information about course contents and resources
The printed course manual that provides all the required course resources and activities was not adapted for the VLE pilot, due to time constraints. However, a detailed print course schedule referred to the VLE. We used the VLE discussion forum to refer to the print course materials and to link each current discussion topic with that week's course unit. We also posted additional specialised resources to help small groups working on specific topics. Some participants downloaded the resources, but others seemed to be unaware of the resources or unable to download them.

Observations
It seems that course participants did not consider the VLE as an essential point of reference for the course, given that most did not continue to check the VLE as the course progressed. Their comments in their assignments and emails indicate that they relied mainly on the print course materials: when indicating they would be away from their offices, they usually mentioned that they had the course manual with them. Many indicated that they could not access the VLE when away from their office.

Some participants emailed us for more information about that week's discussion and activities, indicating that they wanted the information available in the VLE, but had not consulted the website to obtain it. As facilitators, we continued to use the VLE for weekly communication and to encourage participants to use the VLE as much as they could, so that the pilot test could provide as much information as possible about the strengths and weaknesses of the system.

Administrative systems for maintaining records of participants' work
Each course unit covers a step in the process of planning, facilitating and evaluating learning, and includes an activity that participants must complete within a one to two week time frame. Although the print course schedule lists each unit's topics and activities, we used the VLE to provide a continuing reminder of current activities, by posting each week's activities on the VLE calendar, setting up weekly discussion forums on the week's topic, and creating a hand-in folder for that week's activity.

The hand-in folder system, designed to track participants' submissions, enabled facilitators to set closing dates for each unit's activity. The hand-in folder, linked to each participant's individual record, allowed us to record when each activity was submitted, whether marking was in progress or complete, and the final assessment. Since FOLP is not an academic course and does not have a numerical marking system, we used the recording system simply to confirm that participants had completed an activity satisfactorily. This information was also available to the course coordinator.

Observations
The time-keeping function of the hand-in folder presented us with a dilemma as facilitators. At the closing date for an assignment, the VLE deactivated the hand-in folder for that assignment, so the participant could no longer submit it via the VLE and had to send it by email. We wanted to provide some flexibility in submission dates, but posting closing dates that went far beyond the actual timeline could convey the message that it was not important to keep to the schedule, while setting tighter timelines could indicate a rigid enforcement approach that was contrary to the principles of the course.

The VLE system for recording participants' marks was not consistent with the intent of the course activities, which were designed to enable learning for participants with very different learning needs and a wide range of facilitation experience. Facilitators' feedback is individualised for each participant, working at their own level. There is no rating or scoring involved in this process, although we may ask participants to rework an incomplete activity.

The VLE scheduling and recording systems might be appropriate for larger formal learning situations serving participants at similar levels and requiring control and

documentation, but these systems were not completely suitable for small groups of diverse participants in a workplace online course on facilitating adult learning.

Improved accessibility to other participants and the facilitator
Using a VLE was intended to enable participants to continue communicating with colleagues and the facilitator even if they were away from the office or had a large volume of work email.

Observations
Email has both the advantage and disadvantage of being hard to avoid. However, it is quite possible to ignore a VLE, because accessing a VLE requires people to be more proactive and to make a conscious choice to load the VLE and check out all the relevant spaces. Theoretically this enables more learner control, as long as it is easy to log on to the VLE. Participants and facilitators noted that it took much more time to access the VLE than to access and respond to email. For one facilitator with high speed internet, accessing the VLE and arriving at the group discussion space took two to three minutes. Several participants observed that it could take between 10 and 20 minutes for the VLE to load to the group space, and some noted that their computers could hang while waiting to load the VLE.

One of us kept track of participants' reported problems in accessing the VLE, and found that from 5 to 8 members of a group of 15 were unable to access the VLE during each of the first 12 weeks of the course. The reasons are typical of staff in international organisations: missions to locations with limited or no internet access, computer system breakdowns in the office, power outages and thunderstorms that disrupt computer use, and so on. In general, participants were more likely to lose access to the VLE than to their email. As a result, participants increasingly used email to remain in contact with their small groups, rather than lose touch with their colleagues.

Participants' response to the VLE

At the seminar and in their final reports, participants commented on their experiences using the VLE. Their observations showed that they understood and appreciated the underlying rationale for using a VLE, because they also identified improvements needed for the VLE to be effective in supporting collaborative learning and learning communities.

Many mentioned technical challenges; time required to load the VLE, limited or no access from field locations, the need for a simple, easy to use system, and the need for more training in using the VLE prior to the course and for ongoing technical support, both live and online, throughout the course.

Participants also recognised the potential benefits of the VLE:

- enabling participants to read a continuous, threaded discussion that links each person's contribution, rather than a series of emails that may not follow a sequence;
- providing the opportunity to chat online with other participants and discuss issues in real time (a feature not enabled for the pilot course);
- creating a space to build a learning community, by sharing ideas, photographs and support;

- developing a situation for more enjoyable learning.

The participants' interest in building community also emerged in comments that they regretted losing touch with their larger group after people formed small groups, when it seemed more difficult to keep in touch with everyone. They missed the continuity and community that they had established in the first three weeks of the course, and that they could not re-establish until they met in person at the seminar. They wanted to see what other small groups were doing, and questioned whether having limited-access rooms for small groups helped to build a learning community.

Final notes and preliminary conclusions

Each FOLP group we have encountered has had its own characteristics and dynamic, so it is somewhat difficult to compare groups before and after the introduction of the VLE.

However, based on our experience of facilitating FOLP for four previous groups, we can identify elements that demonstrate that a group is achieving the course goals. These include:

- indicators of reflective learning, collaboration, and mutual support;
- evidence of communication among participants and commitment to achieving a common goal;
- a level of participation and contribution that supports co-learning, collaboration, and critical thinking.

During the weeks leading up to the seminar, participants focused on their individual learning projects and preparing their small group's learning activity for the seminar. Most small groups in the pilot VLE course were somewhat later in preparing their seminar activity, compared to previous FOLP groups. The groups that were most prepared used email all along to stay in touch. Eventually, all groups succeeded in planning and facilitating an effective learning activity for the seminar, and in the process, showed their understanding of the principles of collaborative learning. It is possible that the challenges of using the VLE made it more difficult to communicate within and between small groups. On the other hand, participants' comments make it clear that they value the collaborative learning process, and their suggestions for improving the VLE indicate that they recognise the potential of a system that could support a genuine learning community.

The organisation, with about 6000 staff, is the size of small town. Despite their daily challenges, FOLP participants have demonstrated that they understand the importance of a supportive community and the value of social learning. This understanding can serve as the basis for developing an appropriate, responsive online learning venue that enables participants to strengthen their facilitation skills in ways that suit their needs and context. The design should be open and flexible rather than prescriptive.

Some years ago, an enlightened university administrator, faced with complaints from groundskeepers that people continually trampled across the lawns instead of using the paved paths, asked the groundskeepers to build paths where people actually walked. In so doing, the administrator recognised the principle that design should follow function, rather than impose it.

Creating an enabling learning environment involves observing how people use resources to achieve what they want to do, and then crafting structures that make it easier for them. It also involves recognising existing and potential communities within any group of learners, and designing a situation that enables learners to build on these communities. Developing a functional VLE involves creating a better footpath for the routes that people show they want to take in their learning. It is a much more promising approach than putting up fences and signs saying "Do not walk across the lawns."

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Individual and group-based online learning: blending the threads and celebrating both

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Introduction

Empire State College, founded in 1971 as a non-traditional college to serve adults, traditionally offered student-centered, guided independent study, occurring one-to-one between student and faculty. Yet as the technology that can link student with student matured over the last ten years, we have blended individualized with group instruction and have matured in our own thinking about what types of opportunities constitute "good," authentic learning experiences for our students. As Eisen states, we have exemplified Merriam's "ever-changing mosaic" metaphor for adult learning, which "fits perfectly with two hallmarks of postmodernism: perpetual change and the blending of diverse ideas….More adult education planners are piecing together varied instructional strategies to develop innovative programs….Growing recognition of adult learners' diverse learning styles has also influenced educators to use multiple methods in an effort to reach every participant through at least some of the learning activities in any given program" (Eisen, 2005).

In this paper, we examine two seemingly opposite instructional strategies and their inherent philosophies: individualized and group learning. We identify the origins of individualized instruction at Empire State College, the move of individualized instruction online, and the resulting introduction of group learning activities and structures that, interestingly enough, lend themselves to an increased individualization while also providing authentic group learning opportunities. We look at course structures and learning objects that blend the individual and the group, and the necessary administrative strategies needed to implement the new technologies that support teaching and learning.

Individualized Learning – Our History

In response to the social turbulence of the 1960s in the U.S. and the rest of the Western hemisphere, citizens questioned the legitimacy of every American educational institution (Bonnabeau, 1996). Educational theorists and practitioners searched for alternatives to existing pedagogies that would be more relevant and responsive to the individual's personal, professional, and spiritual growth and development.

Empire State College was established in 1971with a revolutionary yet simple model that put the individual student at the core of its structure. Instead of attending classes at a set time, students met face-to-face with a mentor at a mutually agreed time in one of the college's regional centers. Instead of a set curriculum, the student in concert with his/her mentor created an individually-designed degree program of studies. Instead of a set course with a predetermined credit amount, student and mentor developed an individualized learning contract that was variable in amount and intensity, depending on their agreement. The learning contract contained certain basic elements: the purpose of the study, including the intended outcome of the substance of learning to be achieved; the learning activities, including reading assignments and dialogical sessions with the mentor; and clearly defined criteria and methods with which the students would be evaluated, not graded.

This model was ideal for the highly motivated student whose self-determination and collaboration with the mentor led to the establishment of clearly defined personal and academic goals. It was also great for the student who possessed a great deal of self-confidence to engage in on-going academic dialogue with a mentor who was more knowledgeable in the subject being discussed. On a more practical level, this highly-individualized mode of study was great for the student who had access to the center and the flexibility of time to make the frequent visits there to meet with a mentor. In short, this model had some time, place, and distance constraints that made the college inaccessible to students who had any or some of these limitations – rural citizens, physically challenged, employees with inconsistent work schedules.

The Center for Distance Learning (CDL) was thus established in 1979 and the physical separation of mentor/tutor and student necessitated some adjustment to the basic regional center model. In the regional centers mentors worked with a specific number of students as advisors, tutors, and learning facilitators. But at CDL, in addition to their advisory role, faculty developed more structured curricula with assigned texts and course guides; they also supervised direct instruction by tutors. This model incorporated the use of basic technology – the telephone for contact and dialogue between student and faculty, and the typewriter for the students to type and send in their assignments in the mail.

The college's initial philosophy – student-centered, student-led, individualized inquiry – was the philosophy that informed the Center for Distance Learning's print-based correspondence courses. Print courses, which evolved in the late 1970s, applied some key characteristics of the Personalized System of Instruction (PSI) codified during that time: "stress on the written word," as they used a study guide that was essentially a running commentary on and explanation of the course reading and major concepts, and "unit mastery requirement," as the courses contained information structured into small units that built upon one another (Grant & Spencer, 2003). Faculty functioned as tutors or guides through the material, and courses incorporated telephone discussions and extensive written faculty feedback on student written work. Unlike the PSI method, print-based courses were not fully self-paced or test-focused, but had a structure that recommended timing and written assignments for faculty evaluation throughout a fifteen-week term. In reality, students took and faculty gave more or less time depending on student need. Although courses were created for use by hundreds of students, instruction was still truly individualized, carried out in a one-to-one format via telephone and written dialogue between student and instructor. Instructors linked

students together only rarely, and students did not expect or request peer group interaction.

One debate in the early and developing years of the college was whether to offer study to groups of students. Some faculty felt that any study involving groups violated the power of one-to-one instruction that grew out of the student's expressed interests, while others acknowledged the importance of students learning from peers in a seminar format. As the college moved into its second decade, both types of learning – fully individualized and group study – started to evolve.

CDL was able to take advantage of technological innovations in communication and information development and processing and offer early computer-based and satellite instruction in group format. In 1987, the Center piloted an electronic seminar using a conferencing software called CAUCUS. It was the first time that a major impediment of the isolation of the student at a distance was bridged by the linking students with their peers and the tutor in an asynchronous way. It also "permitted the student to benefit from the shared experience of a group engaged in the same study and the opportunity to measure his or her ideas against those of others in the group" (Roberts, 1987).

For a brief time in the early 1990s, the college also offered SUNY by Satellite, a televised lecture-based program of bachelor-level business courses using one-way video and two-way audio transmitted from a central location. The satellite connected several down-linked sites in community colleges across New York. Although this option provided some convenience and flexibility to participating students, it faced some of the limitations of a classroom environment, including the tendency for students to be passive rather than active and engaged; it faced the limitations of time and place, and the technology was sometimes uncertain – weather problems, especially in winter, knocked out downlinks, and affected students had to rely on recorded sessions.

These early attempts at group-based interaction were somewhat successful in terms of linking students with one another, but through the mid-90s, both students and faculty still relied more on individualized, one-to-one instruction and dialogue based around a student's individual written work. A very important side benefit of these early group systems, to every participant in the learning process, was the ability to archive the complete record of interactions for later review. By the mid-90s, with students able to access the world wide web, the time was right to move into group-based learning online.

First Attempts at Group-Based Learning

As print courses moved online, we needed to learn how to incorporate student-student dialogue in addition to retaining student-faculty dialogue, to create a richer environment for learning. As Brown, Myers and Roy state:

> There are several attributes of good practice, but perhaps none more prominent and important than interaction—students with students, students with faculty, and students with content. In particular, Taylor and White have found that faculty value interaction with their students—perhaps the most important principle of good practice according to an extensive body of research reviewed

> more prominently by Chickering and Gamson and Chickering and Ehrmann. Faculty-student interaction…is instrumental if instructors are to facilitate student-to-student interaction and student collaboration and thereby help students experience diverse points of view and develop and share a commitment to high expectations" (2003).

Initial online courses were designed retaining the stress on student-faculty interaction through writing assignments which followed the scaffolded modular structure from the print courses. Online, asynchronous discussion spaces were added, along with specific expectations for student discussion of key concepts or case studies. Early courses usually applied the following structure:

Module 1 (weeks 1-3)
- Reading assignment
- Group Discussion
- Writing Assignment

Module 2 (weeks 4-6)
- Reading assignment
- Group Discussion
- Writing Assignment

Etc.

Private Folder – one per student, for private student-instructor interaction

Within this linear structure, instructors interacted with students individually as they responded to writing assignments and private folder discussions, which could be student- or instructor-initiated. Instructors interacted with groups of students in the discussion spaces, with some instructors taking a more traditional evaluative role and some taking a co-discussant role. As online practices developed, as students were surveyed, and as instructors' online discussion practices were evaluated, instructors themselves were taught the components of good discussion facilitation, identified by Shea, Pickett and Pelz as "identifying areas of agreement and disagreement; seeking to reach consensus and understanding; encouraging, acknowledging, and reinforcing student contributions; setting the climate for learning; drawing in participants and prompting discussion; and assessing the efficacy of the process" (2003).

Students rated online courses highly—especially those courses with highly rated instructor presence—in terms of their own satisfaction and perceived learning. In an article published in the *Journal of Asynchronous Learning Networks* in 2000, researchers Frecericksen, Pickett, Pelz and Swan stated that:

> We have learned that an effective learning environment consists of well-organized and complete orientation and syllabus information that begin a course and are essential to help orient the students to the course, the instructor, and to what will be expected. In the design of course materials, faculty need to pay special attention to the tone of their writing and consistency in their module structure, document naming conventions, and instructional cues. Explicit orientations to each module with due dates, time frames, and details about what the module contains, as well as redundant, clear, explicit expectations and instructions are necessary to insure students are at all times well oriented to the

content, activities, and tasks in the course. Faculty should design and create as many possibilities for student interaction as possible, both with the instructor and with others in the class (2000).

It is interesting to note the assumption embedded in these comments about effective courses and student perceptions of effective learning. Student interaction with course content is somewhat student-led in terms of the asynchronous environment, although overall timing of due dates for readings and writings are predetermined. But even with a variety of discussion types, it is assumed that course structure and content should be highly pre-determined. Individualization still occurs in student-instructor private conversations and in formal assignments and feedback, and group and individual activities are quite distinct.

Blending Individual and Group Learning via Course Structures

As we have evolved in our understanding and application of Vygotsky's social constructivist theory to online learning, we have experienced a shift to what Wenger calls communities of practice, which more fully blend group and individual activities. Groups of students and faculty interact not only to answer key questions or discuss key concepts, which are pre-structured, instructor-designed activities. We now more fluidly design discussions to be more authentic, problem-based, and student-led. This move blends the individual and communal as it incorporates students' individual interests as part of the group's investigation.

Another interesting development we are experimenting with is the design of the overall course to be more authentic, problem-based and student-led. A current course might apply the following structures (and these are just two examples of many) that assume students will direct some of their reading, discussion, and coursework:

Readings Module (weeks 1-15)
Discussions Module (weeks 1-15)
    Discussion of readings
    Discussion of ongoing writing
    Reflective discussion
Writing Workshop Module (weeks 1-15)
Writing Assignments (due weeks 4, 7, 10, 14)

Readings Module (weeks 1-15)
    Discussion of Readings (weeks 1-15)
Individual Project Instructions, Negotiation, and Discussions (weeks 1-15)
    Groups evolved from similar interests in individual projects
Posting and Discussion of Individual Projects (weeks 14-15)

We are in the process of learning how to structure discussions and courses to offer ways into content that are more organic to the student as learner as well as to the field of investigation, and that allow students to group themselves into discussion communities based on their individual interests. Zull states that, "rather than explaining ideas or correcting errors, we may find ourselves more able to trust in learning. This means allowing learners to develop their own representations, theories, and actions instead of attempting to transfer our knowledge to them.…What we can give is new experiences.

Skilfully designed experiences whose purpose is to generate new ideas and theories in the learner are very powerful" (2000). As we move in this direction, we are seeing a number of powerful and fluid learning experiences that have been designed.

Blending Individual and Group Learning via Learning Objects and Authentic Learning Experiences

The research on social constructivism, communities of practice, and adult learning theories continues to guide the evolution of our courses into more fluid structures. Adult learners engage when they know why learning is necessary, are able to direct their learning, can contribute their experiences to the learning, are ready to learn when they are in new situations or roles, can apply their learning to their own situations, and have an intrinsic motivation to learn (Knowles, Holton, Swanson, 2005).

Our techniques for engaging students with one another have evolved from a linear approach to discussions in which an instructor posts a question for all students to consider to ones in which there is greater flexibility in students' engagement with other students. These approaches enhance the students' opportunities for sharing experiences and link those experiences to theory and research as appropriate for the discipline. The activities also provide authentic learning experiences for students with direct application to their lives. Studies have linked authentic learning experiences with student acquisition of advanced knowledge (Herrington, Oliver, 2000). Examples include the use of debates, simulations, student-led discussions, research investigations and interview-based projects. These techniques also provide opportunities for students to work in small teams of three to six students, thus providing an opportunity to hone their work in virtual teams and develop skills directly applicable to their actual business environments.

An important expectation of Empire State College's degree guidelines is that students develop and expand their understandings of different cultures. In the business curricula, we address the differences in terms of the impact in the workplace on the local, national, and international level. In part, this theme is addressed through a series of discussions and assignments designed to engage them in sharing experiences, researching topics, discussing different points of view, and reflecting on their learning. For example, to engage students with the literature regarding individual and group differences, students participate in a debate exercise. Students select a relevant topic and then organize into sub-groups to research and develop arguments for use in the debate. Following the debate, students prepare individual assignments further analyzing the information regarding the debate subject and reflecting on their perceptions of the exercise and its effect on their particular viewpoints and behaviours. The purpose is to help students become more aware of their cultural assumptions/biases to provide basis for reflection.

We have also expanded on the use of simulations and role-plays to allow students to engage in realistic individual and group decision-making. These activities provide experiential learning in areas such as decision-making and teamwork to develop knowledge and skills directly applicable to students' work and life experiences. In examining the features of the United States' industrial relations system, students engage in a mock negotiation that requires each student to play a particular role as a representative of the management or the union. As part of the exercise, each student researches a specific aspect of the information needed for the negotiations. The team

then uses the information provided by its members to develop its goals and strategies for the negotiation sessions. Since the issues and industry can vary according to the students' interests and current collective negotiations occurring in various industries, students enter the negotiation sessions with uncertainty as to the issues the other party will emphasize, and without complete knowledge of their opponent's goals. As a result, students face situations requiring them to re-evaluate and modify their strategies and goals as the negotiations progress. Once again, students write post-simulation papers—both a group assignment in which the team evaluates its performance, and an individual assignment in which each student reflects on his/her learning and implications for personal work situations.

The focus on authentic learning experiences is also embedded in approaches to research projects. These assignments are often designed to engage students not only in a research literature review, but also with field experiences to provide opportunities to examine the research in action through observations, interviews, and participation in activities in their local communities and workplaces. They also develop students' skills in conducting primary research. The results of the students' research are shared among their classmates and students have the opportunity to question and comment on the work.

Although our primary focus is on asynchronous delivery, we are using synchronous tools in selected courses to provide students with real-time connections with their instructor and classmates. We have done so carefully to ensure the synchronous activities connect to the course objectives. For example, in our language courses, students engage in synchronous conversations throughout the term to practice and improve their speaking skills. One difficulty we have faced in using synchronous communications is the time constraints faced by our students.

Future development that will more fully blend the individual and the group includes better use of the ANGEL Learning Objects Repository (LOR). The LOR provides a space for individual faculty and students to store information and share it with others. This space provides instructors with the ability to bring information forward from one term to the next and to use it across multiple courses, as appropriate. Students will have the ability to develop a portfolio of work to demonstrate their progress as they move through their program, and to house information useful to their academic and professional work.

Data on Course Outcomes

In looking back over the past 10 years, we have seen significant improvements in student completion rates of their studies as we have progressed from linear, print-based materials to more interactive web-based learning. Across all courses in the Center for Distance Learning, student completion rates over the past 10 years have improved from an average of 60-65% to an average of 85%. In some disciplines, particularly in advanced-level studies, the completion rate is above 90%. We attribute the increase in the completion rates to a combination of course structure, balance between individual and group work, and improved learner supports. The interaction among students and the support they give one another is an equally vital component in course completion. The student surveys also indicate a high level of satisfaction with the learning

experience. The results indicate that the presence of the instructor, in guiding and facilitating, is still an important factor in student's success and perception of learning.

Administrative Strategies

Distance education through Empire State College has promoted a connection with the core value of respecting the learner and his or her engagement in the learning process. The College has also promoted faculty members' ability to create learning spaces in whatever technology is most available to students. So while business faculty members were among the first to experiment with student learning communities and humanities faculty members were the first to actively promote non-linear course design and individualization, these projects have moved throughout the curriculum. In human services courses, faculty members are using community-based projects for internships and practical situations with groups of students working with agencies in local communities and through an intensive project with a single agency. In science courses, students work in tandem with research scientists and with partner museums.

From an administrative perspective, staffing, organizational structures, and competing demands within the institution can present challenges to promoting core values and moving forward with the times. Many institutions face the dilemma of changing delivery methods and evolving faculty and instructional design creativity, while still trying to serve existing student populations. Institutions and leaders of distance learning programs have to make decisions to maintain programs for existing students and to continue to create and evolve to serve new and existing learners in better ways. Resources are generally limited, but there needs to be a sense of confidence in the power of transformation to invest in project development. At several key decision points, Empire State College decided to forge ahead and support conversion or investment projects in short intensive periods, risking concern from some that we were moving too fast. While these projects required large amounts of dedicated work, they also allowed faculty and staff to focus on the mechanics of the conversion or new development, and then to be done with the transition period quickly. The synergies that were created by having all of the department chairs, instructional designers, and technical support staff engaged for a short and focused time allowed for higher levels of engagement in course design and in the improvements of management and technology systems.

Conclusion

As we move to our third generation of courses online, we are researching newer technologies such as virtual realities that allow for individualization within the group in different ways, for example, in terms of persona and the individual's relationship to the group, as well as allowing for individualization in course structure and within authentic group learning activities. Given our roots in individualized student-faculty learning, and our belief in the educational value of the learner-to-learner experience in learning communities, we look forward to further weaving these instructional threads in the next ten years.

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Enhancing the use of ODL self-instructional Science and Technology materials in conventional classrooms

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Abstract

With the various reform attempts by science educators to improve teaching and learning, traditional practices still prevail in most classrooms (Tobin et al, 1990, Ogunsola-Bandele, 2006). But for the science teacher to change in order to provide the best learning experience for the students there is the need to also consider the quality of the learning materials. According to Tobin et al (1990) students in the traditional system are usually required to memorize facts and algorithms from textbooks and are rarely able to synthesize and apply them.

ODL learning materials, on the other hand, are self-instructional materials that consider the interests of the learner.

In this study, the self-instructional material on Laboratory Design and Management developed by the National Open University of Nigeria was used in a conventional university north of Nigeria. This material was used for 15 (Fifteen) Post-Graduate Diploma in Education students in the second semester, after the use of their traditional textbooks in the first semester. The students found the materials to be easy to learn with logical presentations in simple language. The in-built exercises also provided greater interactions in the classroom. Students were not only regular during the second semester lectures of the course, but found the material fascinating!

Introduction/Theoretical Background

The success of teaching and learning situations to a large extent depends on the quality of learning materials the teacher employs during the process of instruction. The quality being defined by both the content of the learning package and the ease with which the process of learning is accomplished (Power et al, 2000).

In the traditional classroom, science teachers rely heavily on textbooks that focus on rote learning, content/work coverage, preparation for the next academic year and transmission of knowledge, rather than on students learning and understanding science concepts (Kao et al, 2002). In line with this, Tobin, Briscoe and Holman's (1990) study on classroom practices concluded that "knowledge is piped from the full container of the teacher's head to the empty vessels of the students' heads' - which makes the teacher in control. In fact, Tobin et al emphasized that the main duty of many teachers has been to prepare students to do well in standardised tests. For these students are usually required to learn facts and logarithms from a textbook, memorize and recall them - but are hardly able to apply and synthesize the taught scientific concepts in practical situations (Tobin, Briscoe & Holman, 1990, Tobin & Espinet, 1989).

However, various reform efforts in science education, which include project 2061 and National Science Education Standards, emphasize using an enquiry-oriented approach to science education. In spite of this trend towards change, many traditional approaches to teaching science still persist, for changes made from traditional approaches in science teaching are not obvious. Many researchers found that the major impediments to change are due to the fact that science teachers' beliefs about the nature of science, science teaching and learning are extremely difficult to change (Miline & Taylor, 1995; Taylor, 1993; Tobin, 1990; Tobin & Gallager, 1987).

Berliner (1986) and Shulman (1986) strongly advocate case studies of expert teachers based on the assumption that we can learn much from exemplary practices. These practices include

- Being good in classroom management
- Emphasising students' understanding
- Creating a favourable learning environment
- Possessing strong content knowledge and
- Encouraging students' participation in activities (Fraser & Tobin, 1989).

These exemplary science teachers always seem to change in order to provide the best learning experiences for their students.

The design and development of modular self-learning packages which takes the learner's interest into consideration has become one of the most important activities of the Open Universities and dual-mode institutions. In fact, design of activities is now regarded to be central in the teaching through self/individualized instruction (Lockwood, 1992b). The package itself may be in the form of print, audio-tapes, video-tapes, CD-ROM or multi-media, or a combination of these.

Individualized learning, however, has its genesis in the pioneering work of behavioural psychology conducted by Skinner in the 1950's. It led to the development of programmed learning materials that can be given to the individual learner in small, logically structured, frames. The structured materials may be in the form of print materials, audio tapes, video cassettes, film strips and computer programmes. With the development of information storage devices like the CD-ROM, the availability of multi-media and growing accessibility of the internet, individualized learning has the potential to become the most popular learning strategy, in both formal and informal education.

In this study, the self-instructional materials on Laboratory Design and Management produced by the National Open University of Nigeria were used to teach in a conventional classroom.

The Learning Materials

The learning materials for ODL are planned taking into cognizance the interests of the learner. In them, a 'body of Knowledge" is provided in the form of information, principles, techniques, data, diagrams and pictures. The text includes a variety of in-text and self-assessment questions (referred to as activities). The idea is to guide the learner along a particular line of thought or argument. Answers are also provided so that the

learner can check and proceed. Learning is assumed to take place while the learner interacts with the learning package.

A major area covered using the ODL materials includes the use of computers in the laboratory and research reports on laboratory organization and design. The students interacted with some computer software in practical chemistry, biology and physics which would become very handy for them in their various schools, especially in schools where laboratory exercises are skipped due to lack of enough chemicals or equipment to go round the students.

Sample and Procedure

15 post-graduate Diploma students registered for the laboratory design and management course participated in the study. These are all graduates or higher diploma holders in various science disciplines admitted to one of the conventional universities in the Northern part of Nigeria for the 2006/07 session. These students, who were taught in the first semester using conventional teaching materials, had a change to the ODL learning materials in the second semester. At the end of the second semester, the students gave some points to express their feelings on the new learning materials. Seven out of the fifteen students' sets of points are outlined below. Others are more or less repetition.

Reactions received from some of the students

Student 1

- It dealt with exercises at the beginning of each topic, brief and well illustrated, and then provides answers that enhance understanding of the major concepts.
- It is good in improving the present situation of learning/instruction and promotes scientific and technological developments.
- It encourages learners' participation through going over the given exercises, followed by their answers.
- It is very fast and easy to understand even though it covered so many topics within a short period.
- It encourages attentiveness of learners since it avoids continuous writing throughout the lectures.
- It is motivating.

Student 2

- It is effective for addressing both cognitive strategies and skills.
- Engages the natural enthusiasm, motivation and inclination to succeed in practical exercises.

Student 3

- Gives the learners opportunity to explore.
- It caters for slow learners.
- The learners learn at ease, with less stress or difficulty.
- It maximizes achievement on the learning task.
- Learning becomes real, concrete and relevant.
- Helps individualized instruction.

- Increases effectiveness for the teacher - as students can retain and recall with ease a greater percentage of what they saw, heard and manipulated.
- It helps capture the attention of learners.

Student 4
- It was nice to see how computers can be used to complement hands on experimentation in the laboratory.
- It makes work easy for both the teacher and learner.
- It is self explanatory.
- The pictures, diagram and flow chart that are used by the author to explain some concepts help the understanding of the materials.
- Allows the students and the lecturer to have fun.

Student 5
- Wide area has been covered within a short time.
- It helps the students to develop the power of imagination, especially in the topic on the modern laboratories.
- The teacher has a complete control over the choice of knowledge taught.
- Makes the students so anxious to attend lectures.
- Increases punctuality and regularity at lectures.

Student 6
- It created greater room for teacher-student interaction.
- It has the advantage of clarity.
- It arouses the interest of the learner.
- It is facilitating.
- It helps retention.
- It is easy to understand because it is written in simple language.

Student 7
- The standard of the material was compatible to the learners - making it easy to understand.
- It encourages discussions among students.
- It has a logical presentation that makes it comprehensible.
- It is effective for illustration.

Discussion and conclusion

From the reactions gained from the students, the use of the learning materials presented itself as a facilitator to learning. Not only were the students punctual at lectures but they found the materials easy to learn with logical presentations in simple language, coupled with in-built self assessment exercises (among other things).

With various reform efforts in science education, traditional approaches should be de-emphasised with more emphasis placed on inquiry oriented approach. The individualised science instruction material by ODL provides “a promising tool”.

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Using knowledge maps applied to open learning to foster thinking skills

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Abstract

The aim of this paper is to discuss the conceptual framework and principles to guide knowledge mapping to foster critical and creative thinking in open content environments. We introduce knowledge mapping techniques and tools and present examples of knowledge maps applied to open learning. Then we present some principles to develop thinking skills, highlighting the importance of mapping techniques to organise knowledge. At the end of this paper, we discuss important issues required to foster critical and creative thinking through open educational resources and knowledge mapping.

Introduction

Some authors argue for a greater study of thinking skills such as creative and critical thinking, mentioning a lower than expected ability to think critically and creatively among academic graduate and post graduate students. They also emphasise the role that critical thinking plays in connecting inquiry, argumentation and inferences in order to facilitate meaningful learning (Carr, 1990; Chaffee, 1998; Halpern, 1989).

In a fast-changing world, the challenge for education is how to move from a system that emphasises content, to one which develops flexible skills (Hedges, 1991; Huitt, 1998). To make sense of contemporary issues, students need to learn how to make sense of information and develop critical and creative thinking. One of the difficulties associated with attempting to develop greater understanding of topical issues among students is the need to capture, structure and make sense of the deluge from search engines, content or research literature. Knowledge mapping techniques and tools can be useful to organise better the whole process of investigation (Okada and Buckingham Shum, 2006).

Due to the open content movement, students can have greater access to a more comprehensive set of resources and high-quality content than ever before. Nowadays, open educational resources, online libraries, public academic journals, freeware tools and collective repositories are part of a larger movement to create a public online space providing open content freely accessible in different formats such as text, image, sound or video (Wiley, 2006; Willinsky, 2006). One of the important challenges in open learning is to provide students and educators with strategies and tools to map relevant information from the oceans of data, concepts and opinion now available.

The literature has shown that simple access to information will not necessarily influence the development of critical thinking or acquisition of knowledge (Rogers, 1995; Golberg, Fishbein & Middlestad, 1997; Salwen & Sacks, 1997). One of the primary requirements for constructing knowledge is higher order thinking which operates beyond mere exposure to factual or theoretical information. Huitt (1998) has pointed out

that critical thinking is a process that may best be improved when students learn to connect their own ideas and knowledge from a specific domain. They can come to pursue their reasoning to some coherent conclusion or outcome.

Mapping concepts, ideas, arguments and references helps students to visualize their reasoning and clarify their understanding. Knowledge maps can be useful to represent argumentative thinking (Yoshimi, 2004) and develop thinking skills (van Gelder, 2003).

Knowledge Mapping tools and techniques

Compendium is a software tool for visual thinking. Students, teachers and researchers can use it to cluster and connect icons linked to ideas, concepts, arguments, websites and documents. They can use it just for personal reflection while they study or work on a problem, or share maps with others. They can create knowledge maps to summarise a topic, or design a learning path through open content learning environments. In Compendium users can drag and drop any kind of document or text from an online course or website and include files from their computers such as: video, text, web pages, figures, tables, graphics and sound.

Compendium (http://www.compendiuminstitute.org) was initially developed by Verizon in 1993 and then by the Open University UK. The purpose of this software is to manage business information, model problems, and map argumentation discussions. It can be used as an individual or group tool to develop new ideas, goals, logical concepts and collaborative scenarios. A key feature of Compendium is its ability to categorize information. It offers a set of different types of "nodes": question, idea, pro, con, reference, note, decision, list and maps views. This node classification allows one to organize better the structure of the map and understand the argument more easily. Moreover, a set of "tags" can be defined and used to establish new classifications and new search processes. This is useful to emphasize diverse elements in different maps.

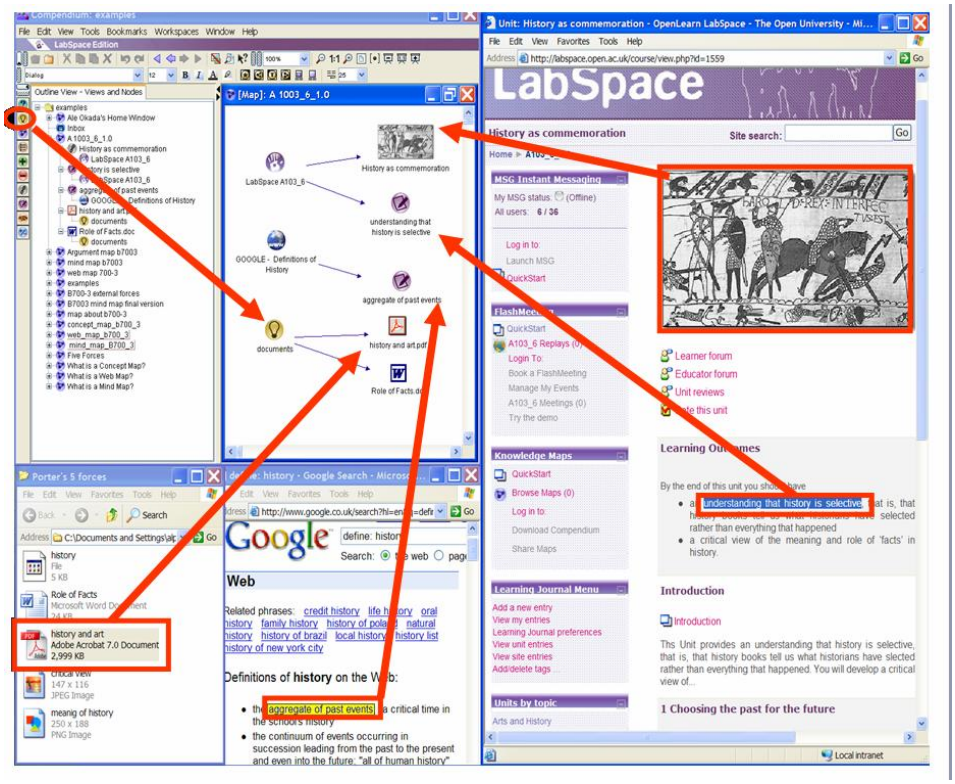

Fig 1. Compendium – you can drag and drop any kind of document or text from the web

There are diverse knowledge mapping techniques useful for developing understanding and consensus within groups, as well as to facilitate individual thinking and learning.

Mind mapping

Mind Map is a graphical representation used to generate new ideas from a main topic. It was developed by Tony Buzan around 1974 when he published his popular book "Use Your Head". Thoughts are often difficult to express in a linear order. Ideas initially come to mind without a logical structure. Mind Mapping allows ideas to be represented non-linearly, using keywords, sentences and pictures in a graphical form. The elements are connected by lines and arrows, with short descriptions. This flexibility helps in eliciting new ideas and is ideal for creative brainstorming.

The guiding principles for creating mind maps are:

- Write down the central idea
- Think up related ideas which radiate out from the centre
- Collect as much information as possible: What? Why? Who? When? Where? How?
- Look for branches out and connections between the ideas generated
- Use lines, colours, arrows and personalize your map with your own symbols to assist in your recall and understanding.

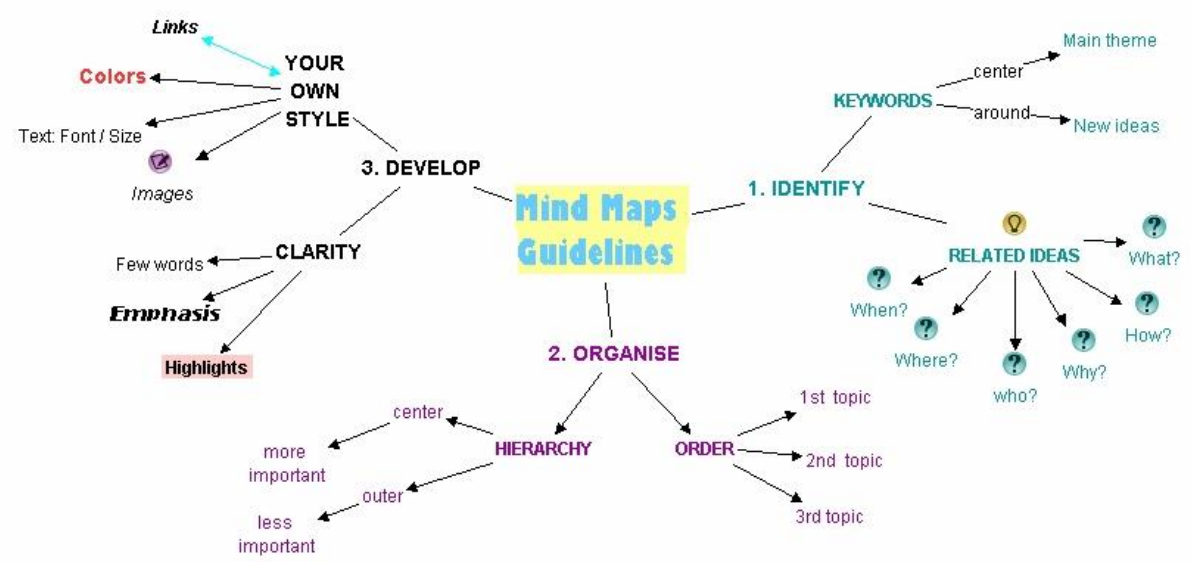

Fig 2. Mind Map about Mind Maps guidelines
http://kmi.open.ac.uk/projects/osc/compendium/mmap/

Concept Mapping
Concept Mapping is a diagram showing the relationships in between concepts through propositions. A concept is a label given to "an idea of a class of things" or "a perceived regularity in phenomena" – often, but not necessarily expressed as a single keyword. A proposition is a statement or assertion comprised of two or more concepts with linking words resulting in a clear and meaningful sentence.
Ex: [concept maps] ---help to organize → [information]

Concept Mapping was developed by Joseph Novak around 1972, based on Ausubel's theory of meaningful learning. This constructivist approach emphasizes that learning with understanding only takes place when new concepts are connected to what is already known. Meaningful learning involves the assimilation of new concepts and propositions into cognitive structures. The associations between prior and new knowledge can be represented through a tree structure with objects and lines, from global to specific concepts.

The guiding principles for creating concept maps are:

- write down a main concept on the top of your mapping area
- identify new concepts related to the topic based on your prior knowledge
- describe general concepts connecting them with specific concepts
- for each connection write a verb or preposition in order to clarify the association
- create new links to data, examples, graphs and images related to the concept
- using different colours for text and background in order to group and classify concepts.

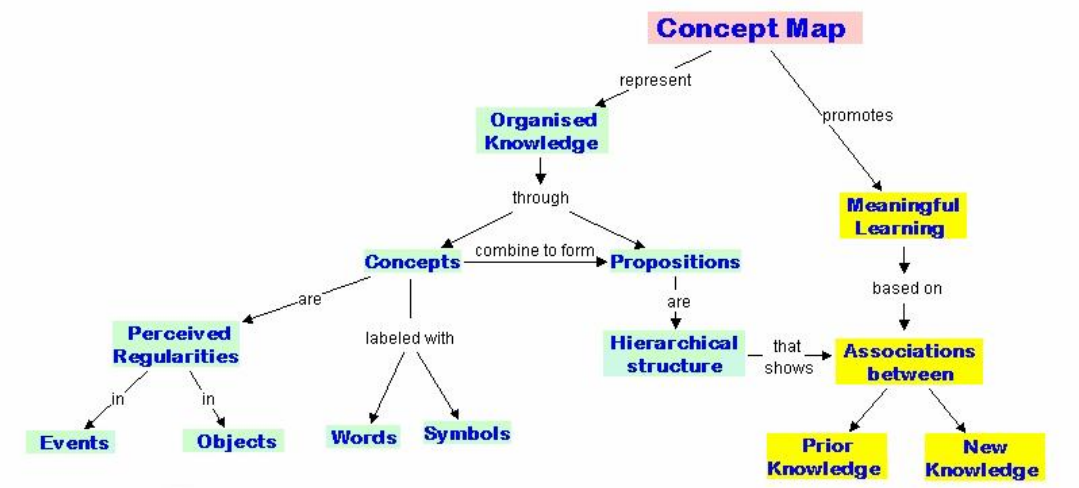

Fig 3. Concept Map about what a Concept Map is
http://kmi.open.ac.uk/projects/osc/compendium/cmap/

Argument Mapping
Argument Mapping is a chart presenting an overview of reasoning. It helps learners to clarify their ideas, organize statements and reach conclusions. This mapping technique was invented by J.H. Wigmore to help in the analysis of legal arguments (Austhink, 2007). This class of technique deconstructs an argument into claims, reasons and objections. Argument maps show the evidence for each claim, and how they are related in the structure of the argument. Students can create dialogue maps individually or collectively (Conklin, 2005) to prepare and present arguments in synchronous and asynchronous debates.

Argument maps also derive from the Issue-based Information System (IBIS) developed by Rittel in the 1970s to solve ill-structured "wicked problems". IBIS is a rhetorical grammar with three core elements: issues, positions and arguments, which can be rendered as textual outlines and graphical maps that grow with the conversation. Argument Mapping is a useful technique to plan, structure and analyse reasoning based on issues, statements, arguments and counterarguments. Learners can create argument maps to organize their critical thinking in a discussion forum, essay or presentation, talks in web videoconferences.

The guiding principles for creating argument maps are:

- Write down the main question
- Think up possible answers to identify your main statements or claims
- Reflect about each statement and identify some arguments “pros” and “cons” or “reasons” and “objections” related to the topics
- Identify new questions and include notes, references and data.
- Pursue until the best conclusion or outcomes are found
- Use lines, colours and arrows to structure your maps and organize the design

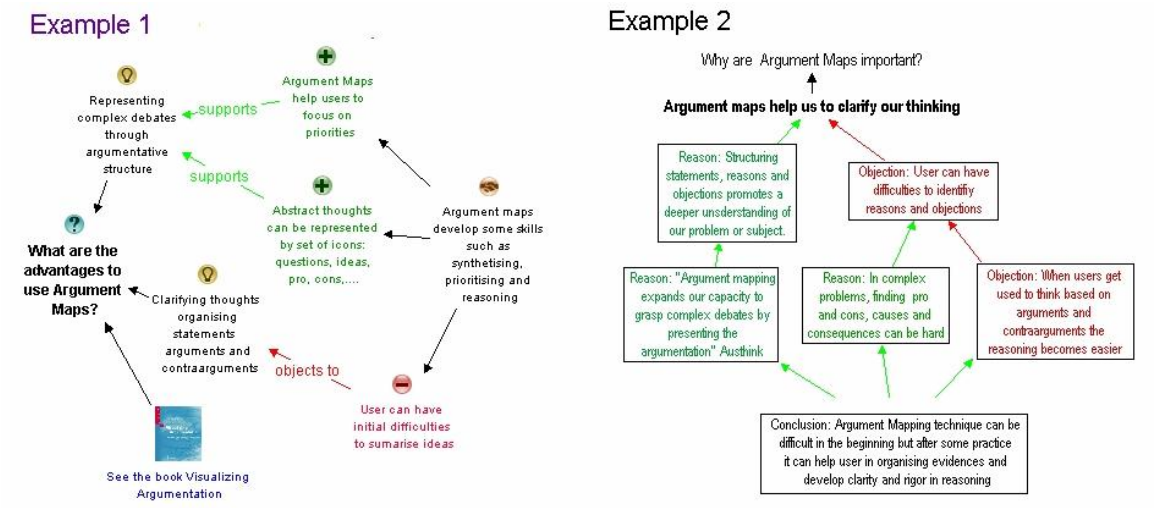

Fig. 4. Two examples of Argument Map
http://kmi.open.ac.uk/projects/osc/compendium/amap/

Web Mapping

Web Mapping is a graphical and hypertextual representation of important websites grouped by categories. Internet users can create webmaps to collect the most significant materials on the web. It appeared recently as a result of the rapid growth of the internet. The huge number of websites and overflow of information can cause users to become lost in cyberspace. Users can record their navigation through maps using icons, hypertext and hyperlinks (Dodge and Kitchin, 2001). Cartography tools let users select what is relevant in cyberspace and index and retrieve hypermedia web material.

The guiding principles for creating argument maps are:

- Write down the main subject
- Use a search tool investigate interesting websites related to this topic
- Drag and drop the urls into Compendium map
- Include information, title and also tags to classify your references
- Organise your map grouping urls by categories
- Use different icons, images and keywords to structure your references

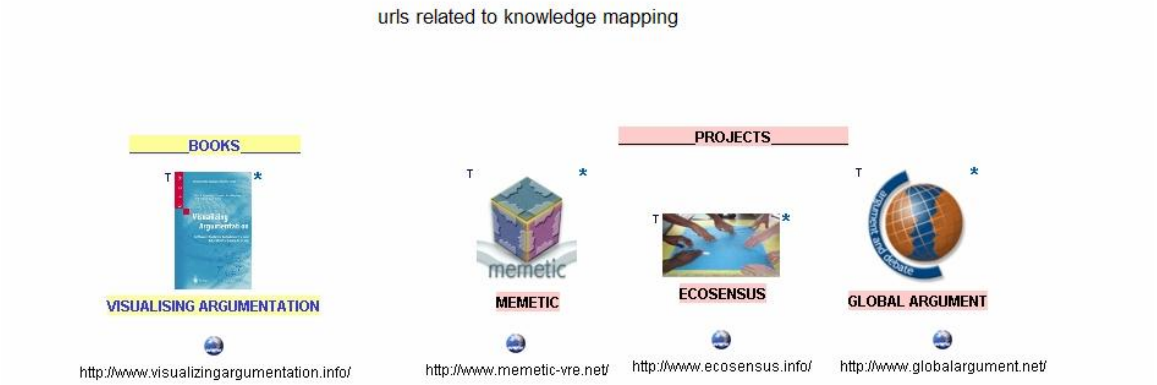

Fig. 5. Web Map about knowledge mapping
http://kmi.open.ac.uk/projects/osc/compendium/wmap/

Critical thinking through knowledge mapping

Critical thinking has been discussed in the learning and research context over the last several decades. There are many definitions of critical thinking and from different perspectives based on Philosophy, Psychology and Education. Jonassen, Carr and Yueh (1998) compiled several definitions to describe critical thinking as a process which is part of complex thinking and it is connected to content basic thinking and creative thinking. Based on The Iowa Department of Education definitions, he describes these four kinds of thinking and illustrates them through a map (Jonassen, 2000).

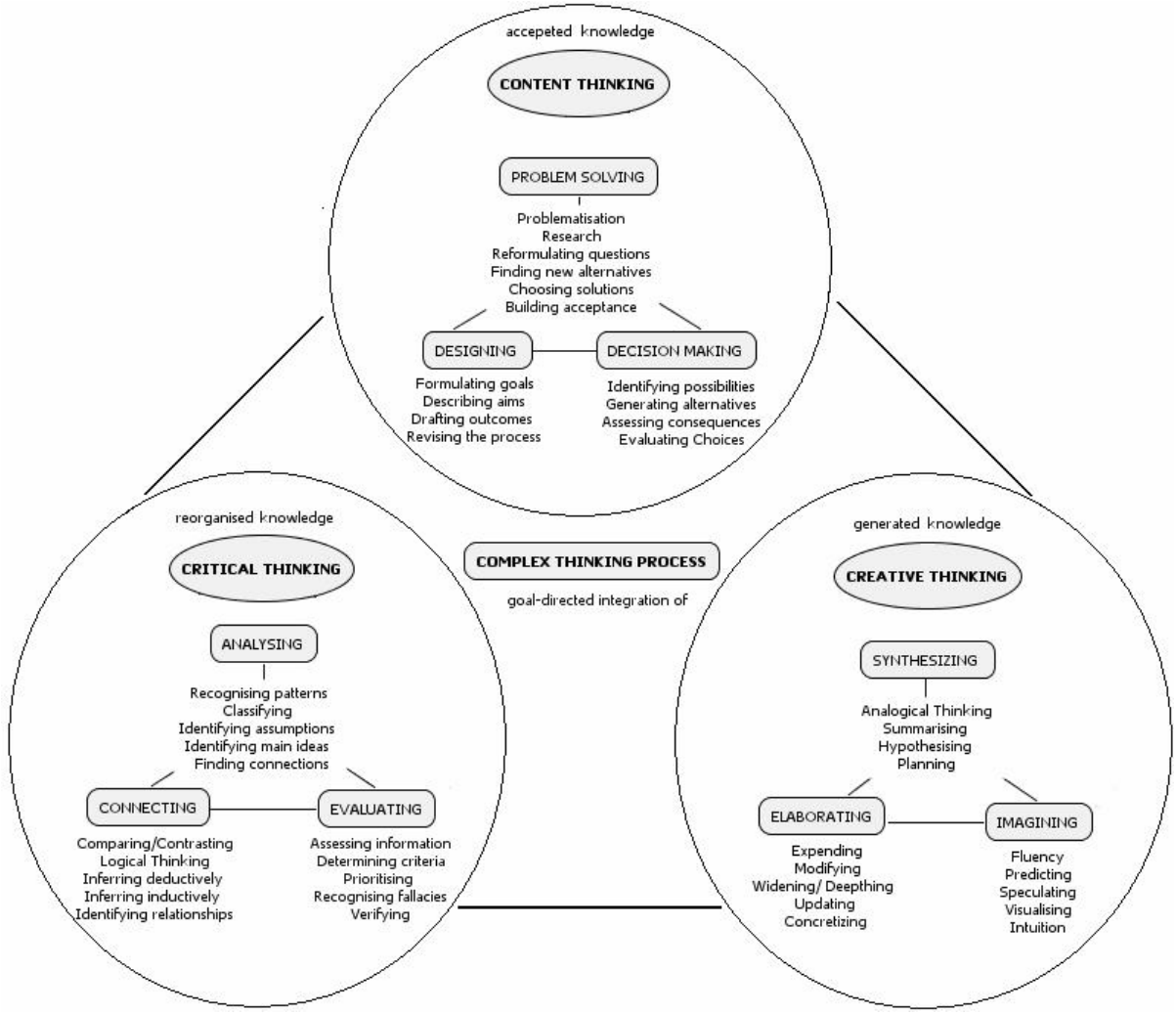

Fig. 6. Critical Thinking and the complex thinking process (Jonassen, 2000)

- *Content/BasicThinking* refers to the skills, attitudes, and dispositions required to learn accepted information, such as basic academic content, general and 'common sense' knowledge. It involves three stages: problem solving, designing and decision making.
- *Critical Thinking* involves three critical skills: analysis, evaluation, and making connections.

- *Creative Thinking* comprises the generation of new knowledge and involves skills such as synthesizing, elaborating, and imagining. Multimedia activities that would fall into this category include scanning objects of family heritage to create a digital video or reflecting on various student projects in a web-based electronic portfolio.

Van Gelder (2003:101) highlights 4 advantages of using maps to develop thinking skills compared to prose:

1. Maps present explicit and precise relationships between statements, avoiding different interpretations. Graphical representations rather than texts show clear diagrams of arguments and connections.
2. Maps offer a rich set of representational resources: colours, automatic links for navigation, non linear structure, icons, tags to classify the statements and numbers to quantify the nodes. All these elements can facilitate analysis and interpretation.
3. Maps can contemplate the non-sequential nature of arguments. Argumentation can be a complex structure of statements, pros, cons, questions, references, comments. Maps as graphical schemes can represent easier juxtapositions of ideas, argumentation, multiple structures and hierarchies.
4. Maps can display metaphors. Diagrams can be used to represent mental schemas. As graphic representations, they allow show structure in different formats and shapes, based in images or symbols. It is possible to make the stronger reasons bigger and highlight group statements using different templates, etc.

Developing critical thinking through Knowledge mapping applied for open learning

Open Content Initiative is a movement whose aim is to make a selection of higher education learning resources freely available on the internet to anyone, anywhere in the world. One example is the project OpenLearn, launched in October 2006, developed by the Open University UK. Its aim is to release 5,000 learning hours of content of the OU's distance learning resources by April 2008. All this content can be freely accessed and modified by any learners and educators under the Creative Commons licence. Through OpenLearn, students can access higher educational materials in their own time from anywhere in the World experiencing informal graduation studies free. They can learn at their own pace, alone or in communities managing their learning process by themselves. Open learning is an opportunity for informal study and collaborative interaction in areas of interest. Participants can assess their own progress by mapping their learning journal, discussions in forums, chat and web conferences and also self assessment exercises.

The OpenLearn project was developed in Moodle platform integrating three knowledge media tools developed by the Knowledge Media Institute at the Open University: MSG Instant Messaging, Flashmeeting web videoconference and Compendium knowledge mapping tool.

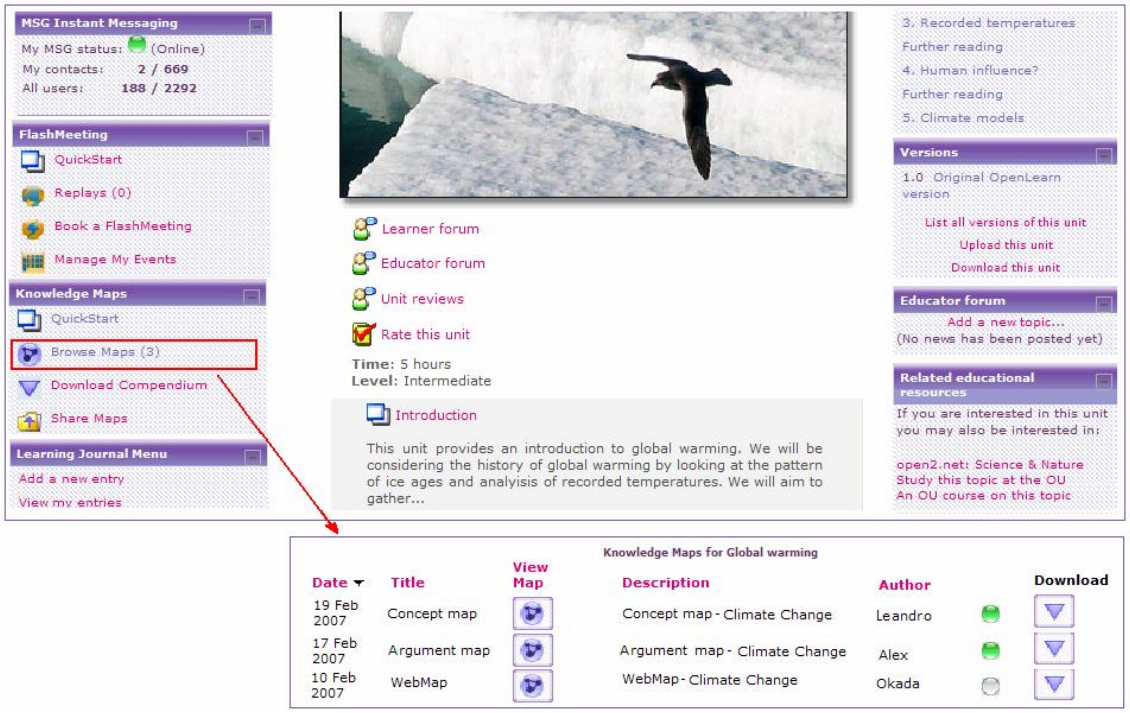

Fig. 7. OpenLearn - Global Warming unit in Moodle integrating a knowledge mapping tool

http://labspace.open.ac.uk/course/view.php?id=1854

OpenLearn users can use these tools for constructing knowledge together. Students can create knowledge maps using Compendium and share in the OpenLearn environment. They can discuss the content using Flashmeeting and all main topics will be automatically mapped in Compendium. They can publish maps about the discussion as well. Any other participant can download these maps, edit and include new information and upload them again.

In order to analyse the application of knowledge maps for open learning to foster critical thinking we selected an unit in the OpenLearn Project about Global Warming.
This first example is a mindmap which shows some issues to be investigated.

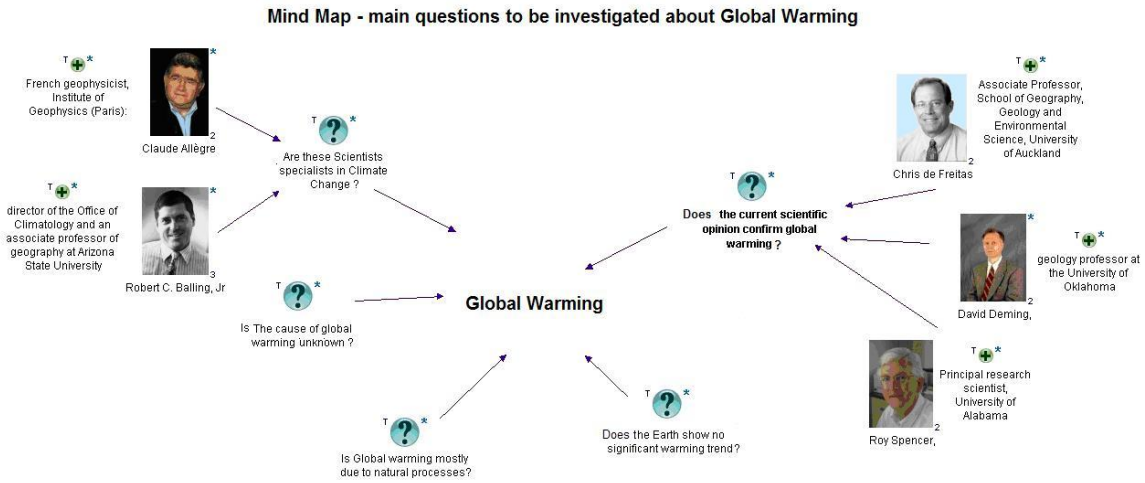

Fig. 8. Mind Map about questions related to Global Warming

Participants can drag and drop questions from the unit “Global Warming” into Compendium and they can add new issues and also their own questions. Through knowledge maps they can organize problem solving, research design and also decision making.

The second example shows a webmap about learning materials related to global warming created to organize references to answer the main questions.

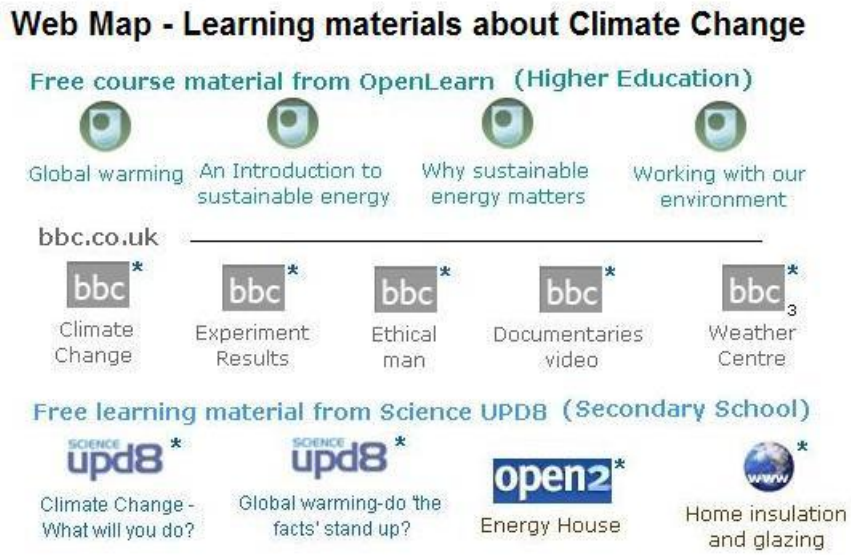

Fig. 9. Web Map about references related to Global Warming

Participants can drag and drop the most interesting web pages from the unit “Global Warming” into Compendium and add new urls from the web. Through knowledge maps they can analyse the content, connecting new references and evaluating their learning path.

The third example is a concept map about key concepts related to global warming based on the content from the webmap.

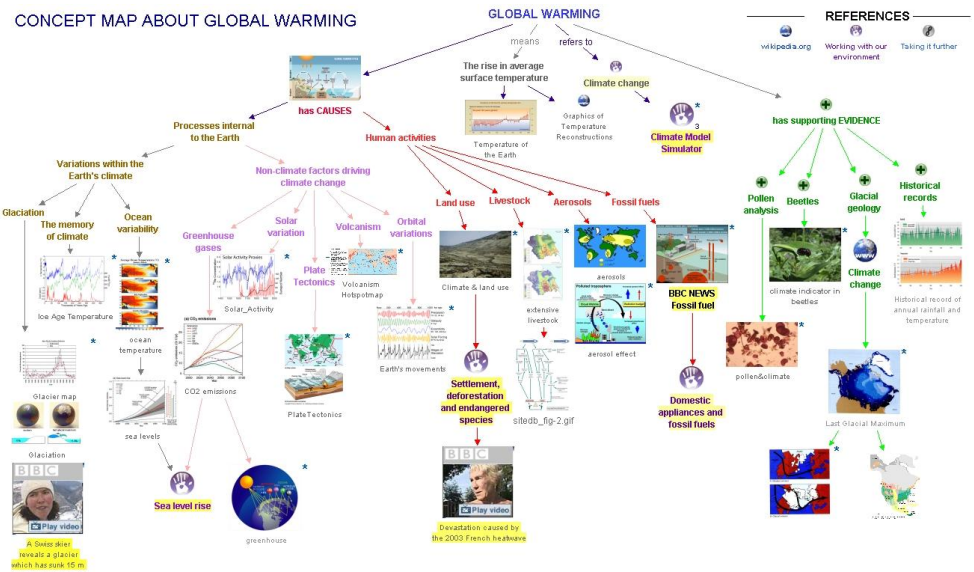

Fig. 10. Concept Map about key concepts related to Global Warming

Participants can drag and drop key concepts from the material selected into Compendium and they can add new keywords based on their existing knowledge. Through knowledge maps they can synthesize their learning, elaborate new products, such as writing an essay or structuring a presentation. They can visualise their imagination through maps.

The fourth example shows an argument map about a global warming web video clip.

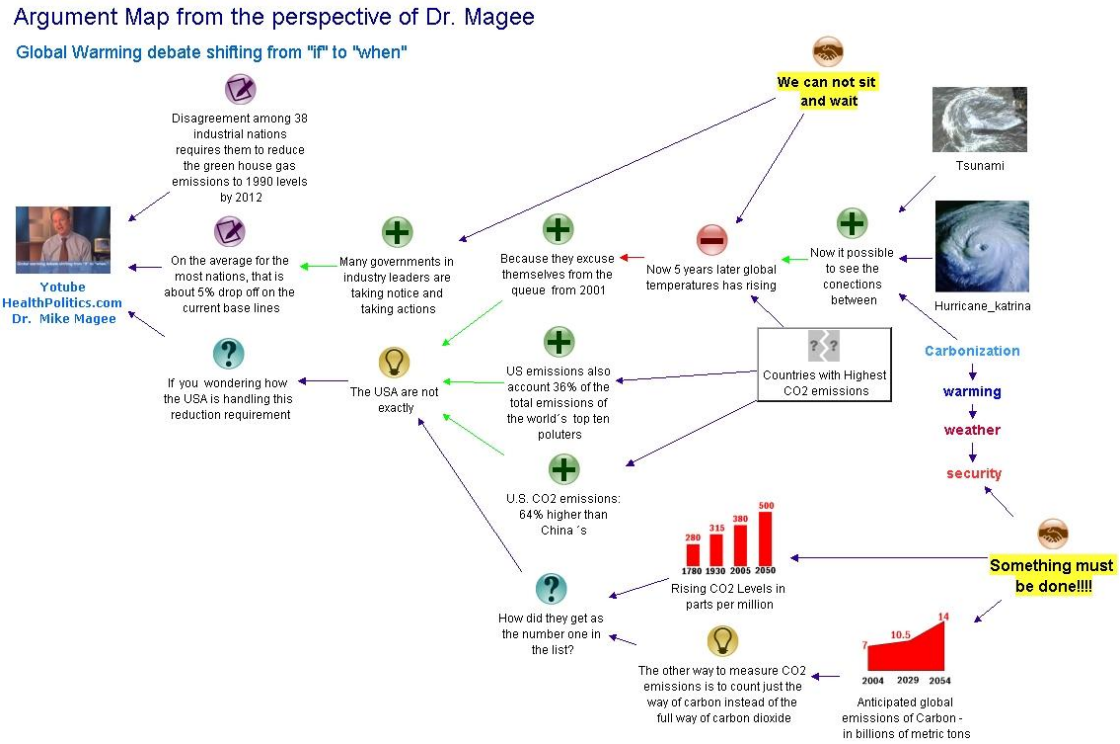

Fig. 11. Argument Map about YouTube video clip related to Global Warming

Argument mapping is very useful in identifying the line of reasoning from any kind of material: video, paper, forum discussion, learning journal, etc. Through Argument maps, students can also structure and visualise their own line of reasoning. From the argument maps they can write an essay or prepare a presentation with clarity and coherence. Participants can drag and drop the main statements: questions, pros, cons and evidence such as facts, data and graphs. Through knowledge maps they can show complex thinking processes which integrate content, basic thinking, critical thinking and creative thinking.

Conclusions

Knowledge mapping is a useful strategy for e-learning and open learning where students can map diverse open educational resources in order to organize their learning. Knowledge maps allow students to recognize their way to represent their thoughts and their process of learning. Participants can identify easily the new concepts and connect them to their prior knowledge. They can visualise others' and their own line of reasoning, developing clear and coherent thinking.

Knowledge Mapping can facilitate meaningful representations and foster critical thinking. Within open learning, knowledge maps can be used in diverse contexts in order to develop thinking skills:

Thinking skills		Knowledge maps techniques
Content/ Basic Thinking	Problem Solving Designing Decision Making	Mind Map of questions to be investigated, new issues and goals
Critical Thinking	Analysing Connecting Evaluating	Web map about the learning path including the most interesting and important references
Creative Thinking	Synthesising Elaborating Imagining	Concept map about the most relevant key concepts and new horizons to be explored
Complex Thinking	Integrating content/basic critical and creative thinking	Argument map show the main line of reasoning which systematize the whole research

Table 1 – knowledge mapping techniques applied to develop thinking skills

Users can publish Compendium maps creating an open content repository of useful information interpreted graphically. Compendium as a sense-making tool helps learners to organise layers of interpretation, linking resources and annotating their own viewpoint about any learning material. Participants of open learning communities can search, analyse and reconstruct maps, spot new connections and find new peers.

Students, educators and researchers can use knowledge maps as a strategic tool to support online learning. Knowledge Mapping facilitates knowledge management and help learners to be active researchers and practitioners.

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Schools in East Africa yet to enter the initiation stage in computer assisted management information systems

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Abstract

Educational management is a critical function in the teaching and learning process. The implementation of teaching and learning programmes therefore requires effective management practices for the intended learning outcomes to be realised. Use of computerised school management information systems is important in the endeavour to manage educational institutions better. Computerised school systems may be used for managing the teaching function through the teaching modules as well as the key function of managing data for decision making.

In this paper I highlight the position that the three East African countries of Kenya, Uganda and Tanzania are yet to enter the initiation stage in the design, development and utilisation of computerised management information systems with particular reference to secondary schools. The ongoing process of development of the national ministry-led education management information systems is reviewed in the three countries. It is clarified that EMIS is mainly for macro level use while schools in East Africa will be required to feed into EMIS with data that is manually presented through paper-based questionnaires and forms. The case for schools to be linked to the central ministerial systems in a phased way through up scaling the systems is suggested as a way forward.

Introduction

The three East African countries, namely Kenya, Uganda and Tanzania, are categorised as developing countries. Prior to 1985 all three countries had a common education system; 7-4-2-3 meaning 7 years of primary education, 4 years of "ordinary" level secondary education and 2 years of "advanced" secondary education and a minimum of 3 years of university education. However, in 1985, Kenya changed her system of education to 8-4-4; thus 8 years of primary education, 4 years of secondary education and 4 years of university education. The other two countries retained the earlier system.

Education in these countries is managed through the ministries of education. The ministry in each state oversees the management of secondary schools through boards of governors. The members of the board of governors therefore make key decisions concerning the development of the school. The school principal, on the other hand, makes the day-to-day decisions concerning administrative, professional and academic affairs of the school.

Secondary schools utilise a lot of information in the management and administrative functions (Kivuva, 2004). Most schools still handle a variety of manually written records, for example, student admissions, boarding details, student performance, and financial records. This data should be managed well right from capture, analysis, retrieval and use. Data management is hence a prerequisite in the management of

schools. This paper argues for the use of management information systems in schools against the current tide in East Africa towards the development of education management information systems for the central ministerial use. Following in the next section is the methodology used in developing this paper.

Methodology

This paper has its background in a study I did whose focus was on building scenarios for the design, development and implementation of computerised school management information systems for secondary schools in Kenya. In the study, apart from presenting the systems used in selected schools in Kenya, I also analysed the systems used in other countries with a view to informing the design process.

Working in the capacity building investment programme of the Kenya education sector support programme (KESSP) exposed me to EMIS development process for Kenya. Later on, working at the Aga Khan University, I became interested in the Ugandan and Tanzania EMIS development through their own education sector programmes and hence the information used was mainly accessed through searching on the internet and the education websites in the three countries. The country reports found on the government websites were particularly informative in this regard.

Review of related literature

I present a brief review of literature on MIS and EMIS. Followed by literature related to the benefits to schools from using MIS is presented. The literature relating to school automation process is briefly reviewed and finally I present a review of literature on the attempts at automating information systems in East Africa.

Benefits likely to accrue from use of MIS

A management information system is essentially a computer program on which all important information concerning learners and other school management details can be found. Visscher (2001) defined a management information system as a system based on one or more computers, consisting of a data bank and one or more computer applications which altogether enable the computer-supported storage, manipulation, retrieval, and distribution of data to support school management.

When using MIS, collection, collation and analysis of data will be done more easily. For example, the data on new learners arriving is processed, updated and activated so that all the relevant departments that need it have access by simply pressing a button on computer. Examples of areas of school life which could be successfully included in MIS are:

- Learners' biodata
- Attendance
- Assessment records
- Timetabling
- Finance
- School property management
- Teaching and learning.

A well-designed and well-maintained MIS allows information to be entered once and used many times in different locations (Onguko, 2004). This will hence:

- Save time for repeated routine tasks.
- Speed up the transfer of information as learners move between schools.
- Improve the quality of information made available, for example, to parents.

An effective MIS should be accessible to all the relevant people who deserve the information. Through the use of e-mail, intranet and internet facilities, a school can greatly benefit from improved internal and external communication hence leading to clear information flow (Onguko, 2004).

Among the aims for design of a managed learning environment which integrates MIS and a virtual learning environment is to decrease the time staff spend on administrative tasks by ensuring that information is entered only once and is then readily available. The other aim is to facilitate the management of teachers' subject, pedagogic and learner knowledge through the provision of tools for storage, classification, sharing, communication and collaboration (Berry, 2006).

Utilisation of computerised management systems has been identified to have efficiency benefits through reduction in monotonous work, for example, when completing the data manually on paper while updating the information. Reduction in such monotonous work is likely to lead to institutional effectiveness (Visscher, 2001). East African countries, however, lag behind in the use of computer assisted systems and therefore are yet to realise these benefits.

Implementation of School automation process

Based on the stages of growth for organisations when automating their data processing, it is apparent that secondary schools in East African are not yet at the initiation stage. The other stages as identified are expansion, integration and stabilisation, in that order (Nolan 1977, 1979 cited in Visscher, 2001). It is apparent that some countries, especially developing ones, are still waiting to enter the initiation stage. Possible causes for this are lack of capable professionals, technical infrastructure and finance (Visscher, 2001).

The Visscher model of variables that matter in the design, development and implementation of school information systems presents block C variables as: clarity of innovation goals, pace of introduction, encouragement on use, amount of training, and sources of help. It is documented that implementation lies at the interface between the intentions of the developers and the way the information systems are actually used. Effective implementation strategies are hence pertinent factors in influencing the extent to which the systems will enhance school administration and management functions (Nolan, Brown & Graves, 2001).

There is research evidence pointing to training as an important variable in the implementation process. It has been found that training is the most relevant variable in MIS implementation. It is suggested that training can motivate the target group for system usage as well as clarify the goals and means of the innovation process (Fung, Visscher, Smith and Wild, 2002). On the other hand, for the school administration management system (SAMS) project in Hong Kong; training was recognised as a major

task in the implementation, which was costly in terms of money as well as time on the part of the trainees (Fung and Ledesma, 2001). For Mersey University School administration by computer (MUSAC) in New Zealand, training was delivered by support agencies using a variety of modes including telephone training, off-site seminars and workshops, one-to-one training on site and consultation (Nolan, Brown & Graves, 2001). Training is hence likely to enhance the level of utilisation of the system and hence its effects to the school administrative and management functions.

Secondary schools are already absorbing increased student numbers resulting from the free primary education initiatives in all the three countries hence it is imperative that they begin to utilise the computer assisted MIS to ease repeated monotonous work. In Kenya for example, enrolment in primary schools increased by 1.3 million pupils in the year 2003 thus leading to a total of 7.2 million after the free primary education policy was implemented (Government of Kenya, 2005).

Uganda, on the other hand, declared free secondary education and phased implementation began in 2007 (MoES, 2007). Uganda has been implementing universal primary education which is its equivalent for free primary education for quite sometime now. Universal secondary education implies more learners streaming into the schools as it aims at equitable provision of quality post-primary education and training to all Ugandan students who have successfully completed primary leaving examination (MoES, 2007).

Tanzania is currently implementing the secondary education development programme (SEDP). In this programme there is a massive process of secondary school construction. This is ongoing in many districts and hence implies more learners will be joining the secondary schools. This process is documented by the government in its commitment to expand access to secondary education and hence address transition from primary to secondary education (MOE, 2004).

Attempts at automating information systems in East Africa

Implementation of the sector wide plan in Uganda has been ongoing since 1999 when the first comprehensive education sector investment plan (ESIP) was formulated (Eilor, 2004). Despite the longer period that the Uganda government has been implementing the sector wide plan, and having completed the first 5year plan 1999-2003, automation of information and knowledge management is yet to take root in schools. The schools still use the paper based data capture using the central annual questionnaire (Wako and Rwezuva, 2006). However, it should be appreciated that the Uganda government has taken steps in the right direction by establishing an EMIS and planning directorate within the ministry of education. This move is likely to spur the development of MIS at school level where the "educational business" is transacted.

In Tanzania, the EMIS initiative is ongoing through the secondary education development programme 2004-2009. In the programme plan, the process is similar to that for Uganda. Its implementation is through the sector wide plan and it is mainly for the central ministerial purposes. The Tanzanian EMIS initiative requires the schools to complete the data forms and forward them to the central management at the headquarters.

In Kenya, one of the investment programmes within the KESSP is the education management information system (EMIS). While there is the ongoing design, development and later on implementation of EMIS, it should be noted that this will be based at the ministerial level and so schools will be required to use paper based questionnaires to capture data which will then be forwarded to the central ministry office as in the two sister countries above. EMIS is therefore for the ministry use and not for schools. However, despite the centralised approach in the three countries, the initiatives are a step in the right direction and hence I briefly turn to EMIS development process next.

EMIS development in the three countries

EMIS development in Tanzania has been planned for the period 2004 to 2009. The plan proposes provision for hardware procurement, by availing a minimum package of two computers and a printer to be installed in districts and regions while EMIS staff will support activities at all levels (MOE, 2004).

Whereas the EMIS plan proposes to provide two computers at district and regional levels, there is the proposal that heads of schools and colleges will be trained on how to properly fill in data forms and analyse data on their own schools to know the status and produce district education reports (MOE, 2004). This immediately presents implementation difficulties since it is implicit in the plan that the heads of schools will be using the manual pen and paper process to fill in forms which will then be entered into the system at a different level.

The planned implementation process provides that:

> In the case of secondary schools and teacher colleges, the data and information is completed annually. The completed forms are sent to the regional office. A trained academic officer at the regional office will input and process the data with the computer system to create regional database. The academic officer at the regional education office utilises the database to develop regional education statistics and send the database to MOE (MOE, 2004).

The schools, therefore, are not going to utilise the MIS in the near future as they still have to complete annual data and then transmit the same to the regional office. While it is a good start, it begs the question; will there be provision for upgrading the EMIS to accommodate schools particularly for using MIS classroom practice in managing the learning environments (Berry, 2006).

In the EMIS development process for Kenya, the areas identified for automation include the automation of the teachers service commission (TSC), which employs about 235,000 teachers in public schools. The automation of the TSC focuses on, among others, the development of an integrated personnel and payroll database, and establishment of an automated records management system. On the other hand, the ministry automation process involves creation of a computerised infrastructure to respond to major needs for office support at the ministry and its affiliated agencies and EMIS capacity building (GOK, 2005).

In addition to the national level EMIS, Kenya envisages having a decentralised approach to data processing at the district level. A district education management system (DEMIS) is therefore under consideration as it will provide the following advantages:

- Enhanced use of information at the district level
- Increased reliability and completeness
- Enhanced sharing of common information at all levels (MOE, 2007).

Considering that there are about 4500 secondary schools in Kenya, the EMIS project has only provided for 580 computers and 164 printers and three servers to support the system. The equipment will be installed at ministry headquarters, the provinces and the districts in a networked environment to support data flow (MOE, 2007). Despite the provision of these facilities up to district level, the scenario still remains complex since it is only mainstreamed within the ministry and not at the school level

For EMIS in Uganda, it is reported that the system enables the ministry of education and sports (MoES) to collect, capture and process data to generate various types of management information for planning for education services and decision making at different levels (Eilor, 2004). The Ugandan EMIS mainly focuses on the data or information capture and processing at the ministry level and not in schools. EMIS in Uganda has four modules designed to handle the following aspects: education statistics, personnel data management, financial management and linking up with Uganda National Education Board (UNEB).

From the foregoing EMIS development process in the three countries, one identifies disjointed and uncoordinated approaches. With the high costs involved in the design, development and implementation of ICT related innovations, participation of other interested partners is inevitable. In Kenya for example, government is working with the private sector alliance in addressing ICT in education (MOE, 2007). However, these different players need to be coordinated since it is very difficult to deal with all the ICT requirements within a small ministry unit. The coordination of the different actors requires an agency that would focus on the work as a full-time task and hence the relevance of schoolnet organisations comes into focus (Naidoo 2003). Unfortunately in East Africa it is only Uganda that has a functional schoolnet.

A schoolnet organisation would be well placed to coordinate ICT activities involving various players drawn from public sector, private sector, development partners and non governmental organisations. The situation in both Kenya and Tanzania needs to be reconsidered since the ICT in education issues are coordinated within small units at the Ministry of Education. Such units lack the capacity to coordinate all the different players most of whom may be ahead of the units in ICT infrastructure and utilisation.

Discussion

EMIS development as stated earlier is for the utilisation of the central education management at ministry level. Schools however, still have to grapple with the use of manual systems within East Africa. Soon, however, there will be more opportunity for schools to utilise MIS as technology penetration within the region is improving very fast. This means then that EMIS should provide for the schools to hook on to the central

ministry systems for quick transmission, processing, retrieval and use of data. Following then are some of the support requirements particularly in training and the challenges for East Africa as we grapple with school management automation.

Training and support is important

Training is beneficial in the attempt to utilise computerised management information systems. Indeed training is an important element in any new innovation or change. Apart from provision of the requisite tools, including software and hardware, training is perhaps the most important component in implementation of management information systems. The results from the research study carried out on the use of school information systems in Hong Kong, the Netherlands and England highlight the impact of the implementation process, particularly the role played by training (Visscher and Fung, 2000).

Capacity building in the utilisation of information communications technologies takes a variety of approaches. Training delivery can be done in number of ways such as one-to-one approach, hands-on in seminar approaches, and workshop approaches, telephone support, as well as through short message texts on mobile phone networks. The involvement of the users from the onset through consultation, sensitisation, briefing and training is critical. The East African countries' approach in development of EMIS has lacked this component in that the ministries have taken the lead with the involvement of consultants but no evident involvement of users such as the district education officials. The approach used is the usual top-down delivery of ready made solutions to the users.

There should be an inbuilt designer/developer – user interface at each level of the design and development process. If the users are involved at each level of the process through meetings, sensitisation workshops and seminars, implementation is likely to be better managed. Effects on the use of systems are likely to be positive as users will already be familiar with the initiative and hence enhanced ownership of the system.

The design, development and implementation approach in East Africa where a technical expert is engaged and provided with funds and requested to deliver a working system is likely to be counter productive. The lack of enough people with the expertise in ICT at the ministries makes the situation even grimmer in implementation of EMIS. Schools therefore have a long way to go before they can utilise MIS from the centralised ministry position. The schools' independent or cluster level initiatives may work well as nationwide school systems will seemingly take long to be provided. This is more so considering the challenges in East Africa, such as lack of resources, unreliable sources of power, low bandwidth and hence poor internet service provision among others.

Conclusion and looking forward

The ministries of education have a responsibility to scale up their EMIS designs to incorporate some schools, particularly those that already have the requisite hardware and software, coupled with provision of the same in a phased manner for all schools. Alternatively, the schools should to take their own initiatives at individual or cluster levels to design, develop and implement the MIS, coupled with standardisation and external quality assurance. They would hence make small but important moves towards the initiation stage and later on expansion, integration and stabilisation will follow.

It is important to integrate the knowledge management modules including virtual learning environments in the design of MIS. The virtual learning environment provides a platform for teaching modules which can be accessed anywhere and any time. It is clear that the education of the future will operate as much within formal schools as in virtual environments, especially with the penetration of ICTs including mobile telephony. East Africa can not afford to remain behind in utilisation of MIS in this respect.

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The planning process for ICT at AKU-IED, EA, a small and upcoming university in sub-Saharan Africa

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Abstract

Education in developing countries generally provides challenges in terms of quality, access, relevance and equity. The Aga Khan Development Network through its agencies and institutions is working in developing countries including in East Africa particularly in the areas of health and education. The Aga Khan University is one such institution with a presence in the three countries of Kenya, Tanzania and Uganda.

The Aga Khan University-Institute for Educational Development, Eastern Africa (AKU-IED, EA) is a newly established institution in Dar es Salaam, Tanzania. The university engages with governments in East Africa specifically Kenya, Uganda and Tanzania to address issues of quality, access, equity, and relevance in education. The university aspires to become a leader in ICT in sub-Saharan Africa by contributing towards solutions in education through use of such technologies. For these aspirations to be achieved there has to be a plan in place for implementation. This paper presents the process the Aga Khan University-Institute for Educational Development is going through in planning for ICT implementation that will hopefully lead to its claiming a place in future as a role model institution in ICT in sub-Saharan Africa.

Background

The Aga Khan University (AKU) was established in Pakistan in 1983 with the aim of addressing the needs of the developing world through health and education. The university establishment in Karachi comprises of a Medical College, a School of Nursing, a University Hospital, and Institute for the Study of Muslim Civilisations, Postgraduate Medical Education, and an Institute for Educational Development. The AKU runs its international programmes through its teaching sites in Pakistan, Afghanistan, Syria, Kenya, Tanzania and Uganda. In London, the Aga Khan University Institute for the Study of Muslim Civilisations is a centre that provides for strengthening research and education for the purpose of enhancing global knowledge of Muslim culture and heritage (AKU, 2007).

The Aga Khan University-Institute for Educational Development, Eastern Africa was established in 2006 and operates in a poor setting in sub-Saharan Africa where the quality of learning environments are generally low (UNICEF, 2000). In the East African setting, for example, some schools barely have classroom buildings from which to operate, while many learners go without three meals a day. This situation is a sharp contrast to that in wealthy countries like the United States where students have near

universal access to internet-connected computers in their schools, classrooms, homes or local libraries (De Lisi, 2006).

The Aga Khan University has over the years been operating through IED in Pakistani to contribute towards improving quality, access and equity in education in East Africa. The target programmes have been delivered to master of education students at AKU-IED, Karachi while the certificate courses were coordinated at the professional development centre (PDC) in Dar es Salaam. The professional development centre has since 2006 been transformed into the Aga Khan University-Institute for Educational Development, Eastern Africa.

AKU's goals and objectives

The goal of the AKU-IED, EA is to assist in improving the quality of education in the three countries of East Africa by creating a centre of excellence in teacher education and professional development and in particular to:

1. Assist East African governments and other educational systems in meeting their Education for All targets by improving access to and quality of education;
2. Enhance the quality and equity of East Africa's education systems through the development of both individuals and institutions in the areas of teaching, research and policy analysis;
3. Establish a centre for scholarly excellence in teacher education and professional development for Sub-Saharan Africa (AKU, 2007).

ICT in academic programmes

The M.Ed course essentially focuses on affording its course participants with an opportunity to engage in independent learning, work collaboratively, enhance reflective practice, develop critical thinking skills and engage in action research. As a newly established institute, the IED in East Africa is still in the process of positioning itself as an ICT role model institution. ICT is used by faculty members in all courses to plan for lessons, facilitate teaching and to enhance student centered educational practice, where learning is focused on collaborative project work. Use of email and online discussion groups is also ongoing between faculty and students for general communication and sharing of ideas.

On the other hand, students use ICT to process, store, retrieve and use information which encourages inquiry based learning and collaboration while facilitating their research work. The students, however, join the university with varying degrees of computer literacy. It has been found necessary to provide training on basic computer literacy skills during the first month of the course. Students are encouraged to aim at being proficient in accessing, evaluating and communicating information. The university acknowledges that information is a vital resource that has conferred strategic advantages on those who are able to make intelligent use of it.

Planning for ICT at AKU

Two approaches were used in developing the ICT plan. One was through involvement of students by incorporating an assessment item in the ICT and education course of the

pioneer master of education class. The other approach was through appointment of a small working party with a wider representation of ICT users drawn from the different categories of university members. The two initiatives are further reported in the following subsection.

Involvement of Students through ICT and education course

An M.Ed elective course on ICT integration in curriculum was introduced at the university. The aim of the course was to enable students develop strategies for integration of ICT in the curriculum. Students related ICT integration in teaching and learning from the developed world to their unique regional context. The 12 students that opted to take the course worked in groups of four students each in designing ICT plans. The plans were presented in seminars with each group presenting for 30 minutes together with discussion of the presentation. During the planning phase, students had the opportunity to consult with the university ICT systems administrator for technical back up. The students worked through the assignment below in planning for ICT at the university:

Assessment item B requires course participants to prepare an ICT plan for the Aga Khan University-IED, EA. The aim of this task will be to develop strategies that lead to implementation of the use of ICT within the university. This assignment will be done in groups of four. The plan should provide for situational analysis of the university (including SWOT or PEST analysis), the resource levels envisaged, the possible constraints, solutions and reflections. The plans will hence consider the above aspects within the framework of the course content, the participants' own experiences and the prevailing AKU environment.

This assignment was criterion referenced hence it was important that the students develop a product that could be implemented at the university. The course therefore incorporated the learn-by-doing approach (Schank, 2002). The students did not operate within a competitive set-up to score high marks against each other but rather they collaboratively developed a plan and in the process satisfied the requirements for the elective course of the university.

ICT working party

The five members of the working party were appointed by the Planning head of the university. Membership was drawn from students, staff and faculty. One member of the working party was appointed to lead the party. The planning head of the university was an ex-officio member of the working party. The first assignment of the working party was to develop their terms of reference which were agreed upon as the follows:

- To analyse the current ICT status of the university;
- To explore possible synergies in ICT with the different units of AKU in the region;
- To develop an ICT strategic plan for AKU-IED, EA.

Members of the working party came up with their operational plan which included a schedule of meetings. It was decided that the meetings would be held fortnightly on Tuesday afternoon. The members attended brief but intensive meetings in which they generally deliberated on issues to be incorporated in the plan. The meetings were

structured as working meetings in which a product would be achieved after every session unlike the familiar resolutions and minute type of meetings. Both the working party and the students did SWOT analyses as reported in the next section.

SWOT analysis: a comparison

The planning process for both initiatives started with situational analysis to establish where the institution was in terms of ICTs. A comparison of the students' findings and the working group findings reveals close similarities and slight differences in their SWOT analysis of the ICT scenario at the university (see table below).

The SWOT analysis results from both the working party and the M.Ed students are generally similar, with minor differences mainly as a result of the different orientations of the two groups. One example of the different orientations is that the M.Ed students felt the admission of the second cohort of M.Ed students in October 2007 would be a threat while the working party considered working with M.Ed students as an opportunity since the second cohort will enable the university improve on provision of and utilisation of its ICT facilities.

Working party SWOT analysis

Strengths

- Networked environment
- Computers: Thin Client (Open source) and Microsoft operating system
- Relative bandwidth
- Some interest and enthusiasm
- Familiarity in use of computers

Weaknesses

- One technical staff
- Inability to attract technical staff
- Bandwidth
- Lack of educational ICT expertise
- Lack of backups and disaster recovery plan (DRP)
- Difficult environment- electricity, water, communications, market, supplies, deliveries, support, quality

Opportunities

- AKU Network + AKDN
- Provide open & distance learning
- Become a role model institution in sub-Saharan Africa
- ICT Working Party
- Under-development of ICT in sub-Saharan Africa
- Working with M.Ed students
- Information networking

Threats

- Costs
- Loss of expertise
- Environment (refer to weaknesses)
- Lack of permanence of physical facilities
- Lack of additional bandwidth

M.Ed Students SWOT analysis

Strengths

- Thin clients-one server with backup)
- Internet wireless (LAN)
- ISP to Campus via Radio Frequency(RF)
- Solaris; on line updates
- System administrator

Weaknesses

- One employee in ICT department
- Low band width
- Computer lab's layout is not user friendly
- ICT course is elective

Opportunities

- Coming of the fiber cable
- ICT course is popular
- Open distance learning
- Visionary leadership
- Visiting experts
- Goodwill from The Aga Khan Development Network
- Alternative power sources (solar)

Threats

- Inadequate infrastructure
- High costs for Internet
- Admission of more students in second cohort
- Lack of space to expand the university
- Insecurity threats

Table: SWOT analysis findings on ICT by working party and M.Ed students

Provision of visionary leadership and ICT enthusiasm across the organisation are two key strengths we highlight since:

> Benefits of educational technology implementation are likely to accrue only when there is leadership around technology that is focused on clear educational goals, there is sustained and intensive professional development, there is adequate resource available, sufficient time is allowed for change to occur, and evaluations are conducted to identify whether educational goals are being met (O'Donnell, 2006, 1).

The factors that are likely to influence the benefits gained from the use of technology highlighted above are likely to be achieved in IED in East Africa. Focused leadership is already in place and there are very clear goals set to be achieved within a region of Africa that still has a lot of opportunity to be exploited in education. The involvement of faculty, students and other staff members in conferences and seminars is an example of sustained and intensive professional development. Another case in point towards professional development is the process of developing the ICT plans for the university by involving the representation of various segments of the university. At this point, a look at earlier initiatives is important as reviewed in the next section.

Building on earlier initiatives

As stated earlier, the AKU-IED, EA looks forward to playing a leading role as a model institution in ICT in education in sub-Saharan Africa. Governments of East Africa through their Sector wide plans in education i.e. the Kenya Education Sector Support Programme (KESSP), Education Sector Investment Plan (ESIP) for Uganda and Secondary Education Development Programme (SEDP) for Tanzania express their desires to integrate ICT in teaching and learning (GoK, 2005; MoES, 2007; MOE, 2004). The AKU is therefore working towards contributing to the achievement of the governments' objectives as presented in their education sector wide plans.

The AKU-IED, EA will build on previous experiences of the AKU Karachi programmes such as the certificate in education programmes that have been hosted in East Africa through distance learning while incorporating an on-line support component. In this case there will be provision for on-line bulletin boards and discussion forums within the intranet environment (see a web page of the online support for East Africa from the AKU Karachi ODL link below).

IED Online

CE: Educational Leadership and Management (East Africa) (CEELMEA)

- Announcements
- Course Information
- Assessment Details
- Discussion Forum
- Search the Forum
- Additional Resources
- Students' Corner
- Library Catalogue (new window)
- Contact Details
- Help
- Change Password
- Log Out
-
- IED-OL Home

http://www.iedolu.net/CEELMEA/announcements.asp

While building on the above lead in utilisation of ICT as provided for East Africa by the AKU Open Learning Unit in Karachi, the IED in East Africa will strive to eventually provide for open-ended technology supported learning environments and greatly expand the range of available inquiry contexts such as simulations, modelling tools, and chat forums to enhance the reflective practice and collaborative endeavours which are embedded within its academic programmes (Hmello-Silver, 2006). Reflective practice will hence be extended beyond the journal-based isolationist approach to new levels with incorporation of ICT tools for collaboration and cooperation both on campus and while the graduates of AKU programmes are operating within their work stations. It should be noted that the AKU does not loose touch with its graduates since they facilitate in the certificate programmes as professional development teachers (PDTs).

ICT Services within the Library

As part of the planning processes for playing a leading role in ICT utilisation in education, the university will host a multi-media section within the library. Teaching and learning has become an interactive venture and traditional teaching methods are gradually and purposefully being complemented with new and more interactive methodologies and learner friendly strategies.

Library rules and regulations

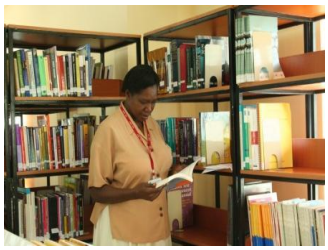
Student membership form

Faculty and staff membership form

Online catalogue

Online resources

Contacts



Library Services

The library is a central part of IED Eastern Africa. It provides resources to support the Institute's work. Though it has been established to mainly serve the faculty and students of the Institute, the library is also selectively open to others.
The library provides a range of resources in print and electronic media to support the teaching, learning and research activities of AKU-IED, EA. The library has over 1500 books and reports. A collection of reference books is also available. The non-print collection includes audio and videocassettes, educational CDs, electronic journals and databases.

The library will have an online catalogue, which provides easy access to materials in the library collection. It has five computers with internet access and multimedia facility for its members.

Membership

The AKU-IED, EA Library recognizes two categories of members: Registered Members and External Members.

A webpage of the library at AKU-IED, EA intranet site http://ieddc1/Library.html

Multimedia unit at IED EA is meant to compliment the other teaching and learning approaches by providing relevant tools and resources to enhance interactivity in learning. It will also provide the learners with opportunity to review teaching sessions, prepare for teaching using a variety of media and hence enhance teaching and learning. Currently the library has 1898 hard copy collection and access to all online journals (see webpage above) and e-books held by four publishers namely, Sage, EBSCOHost, EMERALD and Wiley Interscience through PERI/INASP initiative. There are other freely accessible journal data bases such as DOAJ, AERA, SCRE and THOMSONGALE. Negotiations are ongoing for access to more on-line publications through agreements and paid up subscriptions. In the next section, other highlights of the ICT plan are presented.

Highlights of the plan

The ICT plans developed by the students and the working party eventually informed the institutional ICT plan through bridging the two initiatives into one. This is, however, an ongoing process since the implementation will take quite sometime especially considering the resources required and the long term objective for the institution to be a leader in ICT in sub-Saharan Africa. We highlight some aspects of the plan as presented below.

The IED in East Africa seeks to utilise modern tools such as computer software that support communication in both asynchronous and synchronous formats coupled with provision of high speed access to audio, visual and text-based information on the internet (De Lisi, 2006). However, while looking forward to this eventuality we have to grapple with the problems of bandwidth, especially considering that the countries stretching from Somalia and Sudan to South Africa are the only ones not connected to fibre-optic cable for faster and cheaper internet access. High speed internet connectivity may take over two years to be realised, especially due to the high costs involved, for example currently operating bandwidth of 128 kbps via satellite costs the university $1700 per month ($20,400 per year). It will cost the university $74,400 per annum to access bandwidth of 768 kbps, which is rather high compared to other regions of the world. There are, however, plans - though moving very slowly - to lay the fibre-optic cable to finally complete the global network and hence cut down costs of accessing bandwidth.

All the AKU units within East Africa look forward to establishing a networked environment as well as linking up with the mother university in Karachi. For this to be implemented there will be an initial cost of $30,000 towards updating and upgrading of servers, cabling and satellite capacity, among other costs. This will also entail hiring and training of more personnel to take charge of the expanded roles (including computer technicians and digital experts). There are some short term costs for more hardware and software, for example to procure and install central monitoring software, connect solaris open source system to windows operating system. The short term costs amounts to approximately $65,000. The institution will embark on hiring and professional development of faculty and staff who will be involved in developing programmes for open distance learning which was identified as a key opportunity in SWOT analysis.

Conclusion

The planning process for ICT is still in its initial stages. Since the draft final plan is not yet ready, there is a window of opportunity for further improvement of the plan. There will be further opportunity for research activities to address implementation of the plan and achievement levels of AKU objectives through utilisation of ICT. The challenges of internet access and financial resources will have to be handled through other initiatives both internal to the university and external as they involve many other players. Among the initiatives will be putting in place vigorous fundraising mechanisms to realise the investment in ICT which costs a fortune.

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Approaches to using technology in distance learning

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Abstract

Open and distance learning systems established since the mid 1990s use the capabilities of information and communication technologies to go beyond mere course dissemination and embrace means of communication and interactive features. In France, this is particularly true for teaching of the DAEU (university entrance diploma) on the Pegasus digital campus. While tutors are teachers who are more used to giving lessons in the classroom, and students, who left the educational system many years previously, have little familiarity with autonomous learning, their use of technology tends to diverge from the models developed by those who designed the system. Indeed, interviews conducted with those participating at different levels of the same course (design-administration, tutoring, learning) reveal a diversity of approaches to the use of technology. Although learning practices favoured by tutors and students seem to feed off each other, the correlation link seems stronger with regard to adaptation by tutors to the demands of students. Quite apart from their relationships with tutors, students seem to use tools differently depending on the significance they assign to their course, a significance which is itself closely related to the relationships they have with their immediate entourage.

Since 1995, the European Commission has been promoting the belief that learning or education should not be viewed as an experience reserved for the first phase of life but rather as a never-ending continuum. Hence the development of distance learning systems enabling courses to be followed independently of constraints related to where a person may live or their individual activities. These systems often assign a central role to students who are considered key players in their own learning experience, as well as to those who are referred to as tutors rather than teachers, since they are expected to go beyond the impartation of knowledge to guide students along the learning curve (Chaptal, 2003). So it is that, on the basis of (socio)constructivism principles (Legros and Crinon, 2002), educational models implemented within these distance learning systems view interactions and collaborative work between students as essential building blocks for effective learning. This policy of encouraging students to communicate so as to prevent them dropping out, despite the obstacles encountered, and of favouring extension of their knowledge through exchange, is able to operate effectively, despite the distance factor, thanks to information and communication technologies (ICT). However, given that the learning habits of tutors and students are tied to their own experiences of classroom-based lessons, hailing technological advance as a vehicle for change in practices seems a touch simplistic (Meunier and Peraya, 2004).

Although ICTs can be seen to play an important part in the design of distance learning systems the question arises as to the role in learning practices played by the tools involved.

Since the functions of communication tools are often well known, we intend to focus on the practices and representations of players participating in a distance learning system. Based on the assumption that understanding of technologies varies according to the commitment of players to the system, we intend to focus on the practices declared by three types of players (designers/administrators, tutors and students) participating in the same system. Dubbed *Pegasus*, the facility in question is a distance learning system involving seven French universities. It enables the online preparation of the university entrance diploma (DAEU) which is the equivalent of the French baccalaureate, needed to enrol at a university. Apart from a few classroom meetings, this preparation takes place remotely although there is provision for communication and collaborative work via various tools whose use, although recommended, is not mandatory.

Observation methodology

In order to understand the different ways in which technologies and, in particularly, communication tools are used (Perriault, 1989), we conducted semi-directive interviews with six members whose remit covers institutional, educational and/or technical administration, six tutors and twelve students. As part of a qualitative approach, these various discussions were held in accordance with the “understanding interview procedure” (Kaufmann, 2001) whereby the researcher puts the question grid to one side in order to follow the course of the conversation without hesitating to play an active part in proceedings to get the interviewee to fully participate. They were transcribed word for word as accurately as possible then, for inductive purposes, then read several times and dissected according to the themes identified during the rereading phase. The study presented herein is founded on cross-cutting analysis of the "relationship with technologies and learning practices" theme identified in the various discourses.

Technologies at the service of innovation

Focusing initially on the players having set up the system on the political, educational or institutional levels, we soon identified a view of technological tools as resources contributing to innovation in the field of education. This interest in innovation is described by these players as the factor which led them to participate in the creation of such a system. Whether it concerns technological, educational or institutional innovation, the motivation remains the same: placing information and communication technologies at the service of a new type of learning system. The gradual development of *Pegasus* required a specific platform to be tailored to this type of learning with the aim being to avoid the basic format of an "*online book*" by offering "*interactive situations, with an initial level of interactivity which was automated, a second level achieved via a forum and a third level with tutoring*" explains an educational engineer. Hence the choice of technologies enabling implementation of the selected educational model. In addition to putting courses online in PDF format, the choice of a so-called socioconstructivist model is therefore reflected in the inclusion of tools which foster interactivity and interaction. This led to the placing online of self-assessment tests and

synchronous (chatrooms) and asynchronous (forums) communication zones designed to allow students to build knowledge by communicating with each other or with tutors.

Although this kind of innovation has not come out of nowhere to the extent that preparation for the DAEU is already possible in a classroom format and by correspondence, it does however require a review of existing elements and the setting up of new institutional, technical and educational configurations. These configurations ensure active involvement by the players, each of whom is aware that they alone are responsible for any given part of the creation at their level. Since the practice responds to the source of the commitment, considerable personal satisfaction is all the more justified since the actions undertaken help ensure the proper functioning of the system as it currently stands. However, this satisfaction is not reason enough to explain the commitment shown, since we are not talking about a need which must be satisfied at all costs. Indeed, it is clear that far from being satisfied with the result of a creation achieved at a given point in time, the players continually consider their creation as something which must constantly evolve due to the commercial aspect of a learning system which is viewed as a "*product*" which becomes *"quickly outdated"* and which casts students in the role of customers. Understanding technologies as resources which serve learning leads not only to provisions for renewal of the educational content but also technical upgrades of the system alongside technological innovations.

Communication technologies in a supporting role

Whereas courses in PDF format tend to evoke correspondence courses, the specific feature of online learning made possible by technologies resides above all in the educational follow-up and cognitive and moral support which tutors can provide. The latter, who participate in the system due to an appetite for novelty and/or passion for teaching, are expected to make up for the difficulties arising from the distance separating players in the learning process. Just as they would with a textbook, tutors note any errors and bugs in the online content and then inform students in the same way as, faced with difficulties encountered by students, they set up synchronous or asynchronous exchanges to work with them on specific aspects of the curriculum. Since they enable remote communication, the ICTs therefore emerge as resources which favour tailoring of tutors' approaches to the emerging needs of students as well as tutors asking students to engage in certain activities which could help them progress along the learning curve.

Beyond the exchanges of emails, introduction of chatrooms or classroom meetings - which the tutors offer students without being under any obligation to do so and consequently on a basis which is generally voluntary despite the extra workload - the tutors, like the director of operations, describe themselves as being tuned into students' needs. The director explains, for instance, that he willingly gives his contact details to students thought to be struggling and establishes contact with them. Students then end up contacting him for all sorts of problems: "*Computer problems, loss of motivation, problems with... problems in completing work, administrative problems, papers er, student card er.. in fact, everything ... everything… Because they're sick, er because she's pregnant, because ... for everything. Because their dad's just died ... everything*". Since he is unable to find solutions to everything, like certain tutors, he says that he is always on hand to listen to them. However, the technologies used would seem to differ according to the type of support given. Indeed this process of "tuning in" is described in

two different ways: on the one hand, considerable empathy coupled with a desire to know students better and help them finding solutions to their problems via email or telephone; on the other hand, "tuning in" in the context of the discipline involved and the learning process but marked by a refusal to become a "*social counsellor*". For the latter group, there is no question of allowing students to contact them by telephone (tool not provided for in the learning system). Similarly, with regard to tools included in the platform, although all tutors state that they log on almost daily, whereas the first group go to the zones related to their disciplines as well as the more general Agor zone in order to find out about the students' states of mind, the latter group rarely venture into the general forum which hosts a variety of exchanges between the various players. As regards the literary series in which a few students discuss many points between themselves, on the general forum, the first group describe themselves as witnesses to the continuance of the system which they view positively while the second group, just like tutors for the science DAEU in which students are more restrained, places more emphasis on the lack of participation of students and the difficulty encountered in getting them to participate.

Whereas ICTs provide possibilities for interaction as a communication medium, they seem to be more conducive to reticence than more direct methods of exchange. Thus, after a first year of tutoring, a tutor wonders how to get the students to participate: *"maybe I should reach out to them more. But I don't know how to […] I'm quite happy to do it by phone but... I'm not sure about messages*". As a result, mediatisation of communication appears problematic for certain teachers who are used to classroom situations but are not yet accustomed to online tutoring. For the latter, mediation of communication is perceived both as convenient in terms of the working context (at home, when you want, with students playing the role of initiators) but restrictive in terms of the educational aspect of tutoring. Thus, as indicated by the previous quote, explaining to students or motivating them by electronic messages is considered barely feasible by certain tutors. Whatever the practices concerning tools included in the system, the use of the telephone and the setting up of classroom meetings tends to show that nothing can replace verbal communication as far as tutors are concerned.

The place of technologies in learning practices

In common with tutors, most students tend to present distance learning as convenient to the extent that you can work at your own pace, without having to travel, simply by accessing learning content from home via the Internet. Although there are variants, the most commonly declared use of learning tools and supports is as follows: students access lessons on the platform, download them, print them, read them, usually while adding notes and then they file them. They may also create sheets and use their lessons for course work before sending it back by post or e-mail. Many of them take the self-assessment interactive tests. Some say they print them out while others explain that they have dropped them altogether due to the technical problems frequently encountered.
In terms of communication, their practices echo the difficulties encountered by tutors. While certain tutors report a lack of participation by students which leaves them feeling somewhat powerless, it would appear that students fail to fully use the possibilities of exchange open to them although they report being encouraged to communicate and all complain how hard it is "to learn on your own". Although all students interviewed declare that they contact their tutor directly by e-mail to a single addressee this type of use remains limited. In fact, certain students explain they do not dare do so or that they

have been told that tutors would only reply to a limited number of questions and so prefer to "keep something in reserve" in case of absolute necessity. Other students justify their failure to send messages by the difference between oral and written explanations which leads them to opt for private tuition.

Group communication resources are used even less. Thus, the communication method which seems the least used is the chatroom, in other words synchronous discussion in a virtual room. It therefore appears that beyond an absence of know-how concerning communication in chatrooms the lack of satisfaction related to this communication method is the main argument used against it. Furthermore, a kind of vicious circle operates whereby most students claim they do not use the chat room "because the others don't". In addition, some students also put their reluctance down to technical problems encountered when using the chatroom. However, the malfunctions described do not seem to be the only factor at play. In fact, certain students say they hate using the chatroom since they feel they're too old, and prefer to telephone instead. Although the younger students tend to use the chatroom more, they often do so outside of the learning system on sites which bring internet users together on the basis of personal interests. However, the chatroom is still viewed as a worthwhile learning tool. In fact, although they do not use the chatroom certain students appreciate being able to "print" the chatroom exchanges which have taken place. Similarly, although discussions taking place on the general forum only involve a minority of students, a majority take them into consideration. Thus, although most either leave few messages or none at all, some students say that they read the messages posted and use the answers to questions put by others, turning the (Akrich, 1998) communication function into an information function. They appreciate the drama being played out before them on the forum much as a theatre audience watching a show.

The influence which the significance assigned to learning has on use of technologies

We propose the theory that the difference in understanding of technologies and more especially the means of communication does not simply relate to the role in the system but also the significance which the player assigns to his/her commitment, in other words his/her motivation for enrolling and participating in the learning system. In fact, as we have seen, players having participated in the creation of the system due to an interest in innovation consider the technologies from the viewpoint of their functions which are indicators of their multiple potentials. Although some tutors share this vision, this is not true for all of them and, even for those attracted by the perceived potentials, the difficulty of use requires the role played by technologies in learning to be reconsidered. Representations and practices related to technologies among tutors are thus indivisible from those of students. In fact, whereas non participation in chat sessions proposed by a tutor leads to chatrooms being dropped, in other cases requests on the part of students for chatrooms to be run, encourages the tutor to appropriate use of a tool for the purposes of teaching support. However, here again, the types of activities and the tools selected by tutors depends on the significance which they accord to this learning process.

Thus, the practices of tutors seem to be based on two approaches, in accordance with what some cite as the twin objective of the DAEU being part of a desire to obtain a diploma and a social ambition. Whereas tutors who consider themselves as distance teachers and not social counsellors are thinking in terms of educational support with a

view to a diploma, via the tools included in the platform alone, those highlighting their desire to provide support, not only educational but also moral, adopt an approach based on social considerations of which obtaining a diploma is an integral part. For the latter, it matters little whether or not they are planned for in the system, the means of communication are included to suit the objective to be attained, the fact that verbal communication is perceived as being more conducive to providing moral support implies frequent telephone contacts.

The same goes for the practices of students to the extent that their lesser involvement in the various types of discussion may be related to the restrictive nature of the course which they are taking not so much for the course itself but due to a need to obtain a diploma equating to a baccalaureate in order to qualify for higher education courses, entrance exams or professional activities which they are interested in. Moreover, in addition to this rationale of interiorisation of an external constraint, the "personal reasons" (Boutinet, 1998) legitimising the commitment to learning play on the need to feel that a remote interlocutor exists (Lehman, 2006). Thus, whereas the students who return to education to attain the same educational level of their spouses tend to communicate little with other students whom they feel are barely able to help them educationally; the only student who said she was really active on the general forum explained that a personal crisis had led her to prepare for the DAEU. The general forum enables the exchange of resources, advice, encouragement, jokes and trivial discussions likely to cause the group to reflect (Kreijns, Kirschner and Jochems, 2002), thus helping to end isolation felt both on the learning front and as a single unemployed mother. The influence of other significations on the practices of students, whether it concerns the use of technology or diplomas, remains to be verified on a broader sample. In this respect, it might be worth considering whether students who use communication tools the most are those for whom, independently of any future prospects, obtaining this first diploma is in itself an important step in the construction of their own identity.

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Strategic change management of new technologies in open and distance learning institutions

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Abstract

The fact that technology has become a notable driving force in educational service deliveries is well established. Just as in the business world, where management of technology has joined with the management of capital to define the context of competition for 21st century firms and markets, it is the same scenario in the educational delivery services. The challenge of management of technologies in open and distance learning (ODL) institutions is enormous considering the various dimensions of their deployment and the wide reach of their potential and target clientele, namely students. However, from experiences in most developing countries where the digital divide is yet very obvious, there is need for strategic frameworks to be put in place to initiate and sustain the necessary change that is not negotiable for any ODL institution that aims to survive stiff competition in today's educational delivery services. This paper therefore discusses major mission-critical change management strategies underpinning effective deployment of new technologies in ODL delivery systems.

The paper specifically introduces three fundamental concepts of Technology Management Gap Analysis (TMGA), Technology Utilisation Throughput Analysis (TUTA) and Technology Advocacy & Induction Plan (TAIP) underpinning strategic change management of new technologies in ODL institutions.

Introduction

John Maynard Keynes once submitted that *the trick to progress lies more in escaping old ideas than embracing new ones*. This assertion might be very true for many ODL institutions, especially the growing ones whose many operational structures are yet evolving alongside the challenge of winning the acceptance and credibility tests of their potential students. Thus change management with respect to integration of new technologies in many institutions will include severance from (or revision of) old institutional policies and operations that characterise slow implementation or outright rejection of new technologies. Looking specifically at how the management of ODL institutions should change in order to integrate new technologies, it is in order to critically identify some basic classes new technologies might fall within as presented in the next section.

Classifying New Technologies for ODL Institutional Deployment

The basic classes of new technologies are as follows:

i. Maintenance Technologies
ii. Management Technologies
iii. Migration Technologies

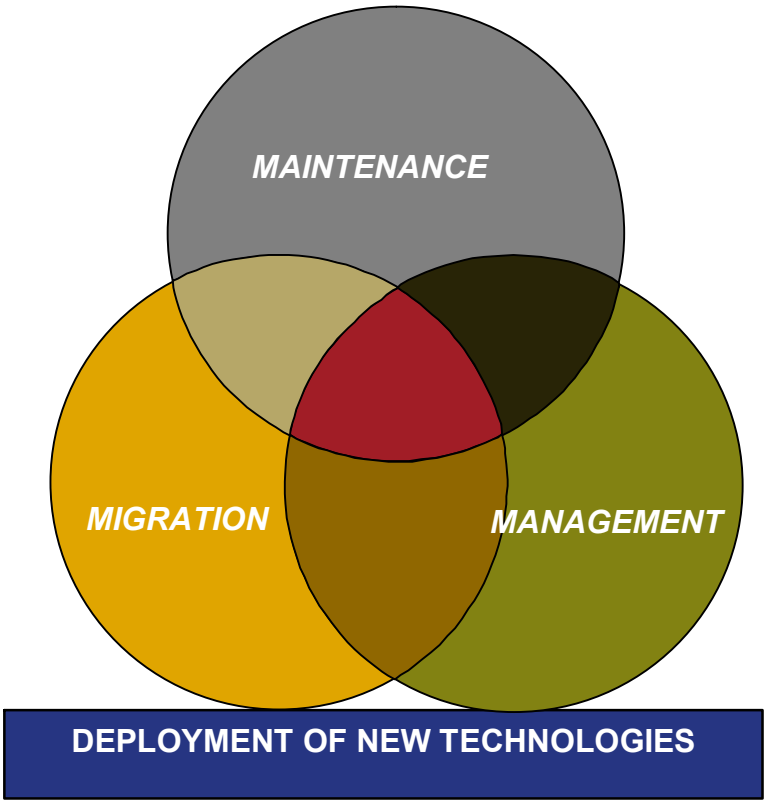


Figure 1: Classes of New Technologies

By *maintenance technologies*, we mean what Clayton Christensen (Christensen, 1997) termed *sustaining technologies* in the business context; that is, in our context, those technologies that promote better educational delivery services to distance learners based on the demands of the students in programmes that attract the highest enrolment. According to Christensen, regardless of whether innovation in the established business products supported by the sustaining technologies is incremental or dramatic, the value proposition surrounding sustaining technologies is more or less clear. To a certain extent, this may not be different in educational services.

However, to my mind, most of the new technologies in an educational institution will fall within *management technologies* – that is, technologies whose most frequent users are decision makers, especially the academic staff who, by right, have higher authorisation user levels. Technology platforms for operations such as students' admission, registration, payments, assessments, tutorial support and staff records systems will fall under this class of technologies. Then we have the *migration technologies*, that is, technologies introduced by institutional policies to have a total discontinuity from an old operational system. Adoption of migration technologies could be due to new trends and new applications of latest theories or principles, new methodologies in particular knowledge areas, poor performance of existing technologies, and a host of other factors. Generally, migration technologies, if much care is not taken in an educational institution, could fall within the classes of what Christensen termed *disruptive technologies* in a business context.

In a business context, according to Price et al (2000), disruptive technologies

> "usually have features that only a few (and generally new) customers value. Products based on disruptive technologies are typically cheaper, simpler, smaller, and more convenient to use, even though they often underperform the mainstream market. They underperform, that is, until an inflection point is reached where they break out of their niche markets and chew upward into established markets with significant cost advantages. It is no surprise, therefore, that the disruptive impact of such technologies lies more in how they upset existing business models than in how they enable new business models."

While most of the features of disruptive technologies as noted above in a business context seem to be what should characterise distance learning material development and deliveries, however, ODL institutions need more critical analysis of the needs of their students before migrating from one technology to another. This is because students are not tied indefinitely to educational services to be supported by new technologies like customers are to business products.

Change Management Process for ODL Institutions

We hereunder present some fundamental strategic procedures underpinning effective change management in integrating new technologies in ODL institutions. These are discussed under the following concepts:

i. Technology Management Gap Analysis (TMGA)
ii. Technology Utilisation Throughput Analysis (TUTA)
iii. Technology Advocacy & Induction Plan (TAIP)

Technology Management Gap Analysis (TMGA): Effective integration of new technologies in an ODL institution should begin with a critical analysis of the gap between the capabilities and features of the institutional technology systems and any potential new model. Integration of every new and latest technology by a distance learning institution may not be attractive for many obvious reasons. An ODL institution as a learner-centered educational system needs to consider the acceptability of such technologies if they integrate the students' portal. This is an essential bottom line consideration. TMGA should include factors such as below:

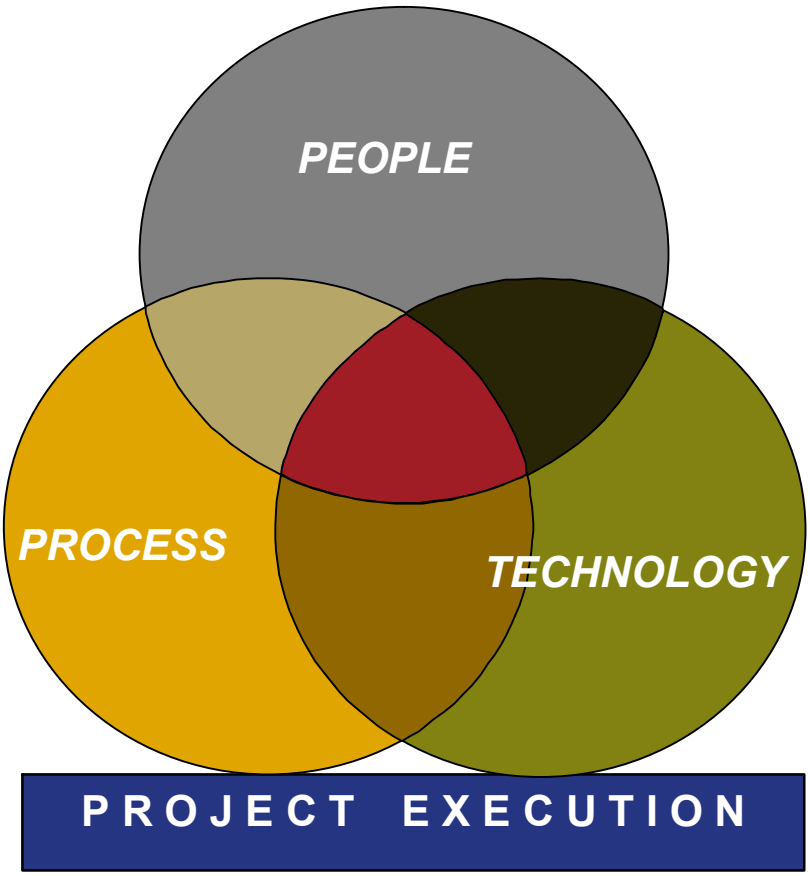
- Deliverability Gap - the gap between the deliverables of the existing technologies and the new models. If the gap is significantly small, more compelling reasons are necessary to justify the adoption of such new technologies.
- Skill Gap - the gap between the required user skills for the new technologies and the user skills for existing institutional systems. If a larger population of student users must undergo skill or competency training before the launch of such new technologies, are they willing to add such training to their present academic load, and who effectively bears the cost?
- Reliability Gap - the gap between the existing and new technologies in terms of fault tolerance and robustness. This analysis is mission-critical for institutional operations such as students' assessments.

Technology Utilisation Throughput Analysis (TUTA): In many developing countries, the level of adoption of technologies in most institutional operations is still very low. As unbelievable this may sound, yet it is true. The submission of John Maynard Keynes

stated in the introduction that, *the trick to progress lies more in escaping old ideas than embracing new ones*, finds its relevance here. An institution whose *technology utilisation throughput* (TUT) is very close to zero has no immediate business in integrating new technologies. By *technology utilisation throughput* (TUT), I mean the amount of usage of technology in various operations of the institution. For example, a situation where only one out of five academic staff accesses the email service of the institution a day is a poor throughput value. A more fundamental change management is necessary in such a scenario before integrating new technologies.

Technology Advocacy and Induction Plan (TAIP): Using Chris Elfick diagram in Figure 2 below, any technology project should have people at the centre. Thus for an ODL institution, integration of new technologies demands a systematic plan for advocacy and induction of users, for both staff and students. Needless to say, the introduction of new technologies should go with developing capacity to sustain the technologies, however, I wish to submit that outsourcing maintenance of new technologies in an ODL institution cannot be a long-term arrangement. A situation where an institution has to consult external support staff for a new technology if there is a problem and wait for an appreciable period of time before a solution is provided, is not acceptable in an ODL system that should respond to students needs almost in real time.

Strong in-house technical support is critical to speed up the expected change an ODL institution should undergo in order to integrate new technologies.



Source: Chris Elfick (*COL-RETRIDAL eLearning Workshop, Lagos Nigeria, August 2005*)

Conclusion

The paper discusses the strategic process involved in effective change management in open and distance learning institutions towards integrating new technologies. Classifying new technologies into three broad groups, it introduces the three mission-critical strategic concepts underpinning new technology deployment, namely, Technology Management Gap Analysis (TMGA), Technology Utilisation Throughput Analysis (TUTA) and Technology Advocacy & Induction Plan (TAIP).

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A l(IT)eracy model of professional development for writing online educational material

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Abstract

The professional development for academics writing subjects online has focused on collaborative pedagogies at the expense of addressing the meaning making impact of online technologies on writing within the discipline. A case study of academic decision making in writing online educational material has revealed that the issues are writing with new technologies as well as writing the content and the pedagogy of the subject. To accommodate the meaning making practices, a l(IT)eracy model of professional development that situates academics within their authentic work is explored. A l(IT)eracy approach acknowledges that literacy has always involved technologies, that the technologies of writing online have greatly expanded and impact on the meaning making practices by amplifying some aspects of communication and reducing others. A modified three dimensional model of l(IT)eracy is proposed that accommodates academic writing the content and pedagogical material within online multimedia technologies.

Introduction

That there is a need for academic professional development to encourage academics to use online technologies is exemplified in a recent study in Australian universities (Alexander, 2005 cited in Hedberg, 2006). Alexander found that of 20,000 students and 800 staff in 'five large technology universities', the use of e-learning was predominantly for information transfer and that e-learning had not changed how people went about their information transfer modes of teaching.

This is disappointing considering that the introduction of technologies focused on pedagogical approaches with the hope that academics would not put online unsatisfactory pedagogical practices (Weaver, 2003 and Wilson & Stacey, 2003). Professional development programs included immersion education (O'Riley and Ellis, 2002) requiring academics to become online students in which the recommended pedagogy was collaborative learning (Goodfellow, 2004; Garrison & Anderson, 2000 and Weaver, 2003). More recently with the connectivist technologies of Web 2.0, principally Wikis and blogging, dialogic pedagogies are being encouraged (Hedberg, 2006; Siemans, 2004 and Knobel and Lankshear, 2006).

My concern is that such professional development programs address only part of the issues facing academics. The focus on pedagogical models, which is the area of vulnerability for academics (Holt and Segrave, 2003), addresses only part of the knowledge source required in the act of teaching. According to Shulman (1986), teaching involves the overlap of pedagogical and content knowledge. Most professional development programs focus on the impact of technologies on the pedagogic knowledge

and not on the content. In this paper I will propose a l(IT)eracy model for professional development that addresses both the pedagogical and content domains of knowledge.

The literacy changes facing academics in writing online study materials involve communicational pedagogies and the challenges academics face in moving from the academic expository genre of writing (Lemke, 1998) to the multimodal, hypertextual and segmented text of online writing (Durrant and Green, 2000; Knobel and Lankshear, 2006 and Kress, 2003). Literacy researchers have characterised the nature of the change of writing as epistemologically different. Kress (2003) characterises the change as moving from meaning based on word, to meaning based on images, from meaning based on the logic of sequence from words, to one based on the logic of simultaneity from images. A group of researchers called The New London Group (2000) describe it as the era of multiliteracies in which grammar is only one of the semiotic systems required to organise meanings. And a group of Australian researchers refer to the new practice of meaning making as l(IT)eracy to emphasise that literacy involves technologies and is multimodal, with l(IT)eracy itself a visual rather than a verbal concept (Durrant and Green, 2000; Green and Bigum, 2003 and Green 1993 and 1999). Following Goodfellow (2004) I will use this third model of l(IT)eracy in this paper.

The 3D model of l(IT)eracy

Literacy is an area in which technology has been viewed more problematically (Green, 1993) than in open and distance education (ODE). The concept metaphor l(IT)eracy positions literacy as always involving technology as part of the act of communication not as separate from it. The technology in l(IT)eracy amplifies certain aspects of communication and reduces others (Green, 1993). The amplification and reduction of technology in distance education is addressed by Nipper (1989) in his much referenced description of the technologies of computer mediated communication (CMC) heralding the third generation of distance education (Thorpe, 2002). Nipper makes the observation that CMC in Danish adult education at the end of the twentieth century, was enabling collaborative pedagogies in distance education that were 'rooted in the rural summer school of the nineteenth century' (1989). As with literacy, distance education and education generally has always been technologised, amplifying some practices and reducing others.

L(IT)eracy is a social literacy that acknowledges that it is not just cognitive knowledge of the language and technology system, but includes knowledge that different social situations and different technologies contribute differently to meaning making. For example, the social situation informs the use of informal communication on forum and in emails and the use of formal communication of assignments becomes confusing for students. The different uses of technologies also impact on the nature of communication particularly at times of internet congestion (Goodfellow, 2004). L(IT)eracy consists of three interlocking, and simultaneously operating dimensions: *operational*, *cultural* and *critical* (Figure 1).

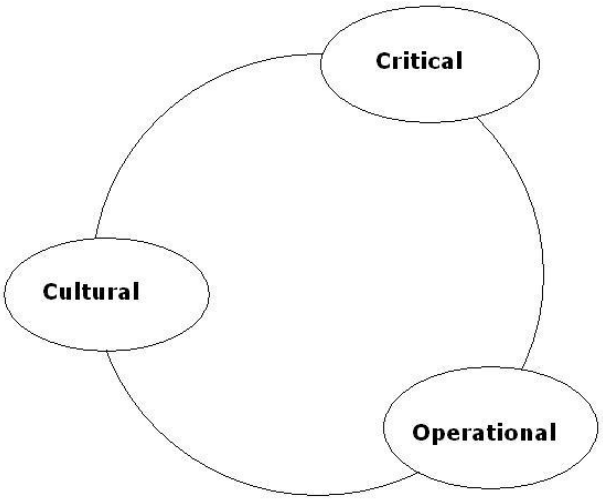

Figure 1: 3D model of l(IT)eracy
Source: Durrant & Green, 2000, p. 98.

The *operational* dimension 'includes but goes beyond' the 'how-to' knowledge to operate the language and technology system 'to make it work for one's meaning-making purposes' (Durrant and Green, 2000, p. 99). It means being able to use language appropriately for the social situation. Writing online ODE material means being able to use coherently multi-semiotic sign systems of writing, audio and audiovisual modes and to construct hypertextual links and to write chunked text recommended for screen reading. Because these competences are located within a social situation, this leads to the next dimension *cultural*.

The *cultural* dimension locates the use of language and technologies in real situations. It means knowing the genres of academic literacy – essayist and report writing for example. It means using email technology for private communication and forums for public communication with students. It means adapting web advice on writing multimodal, hypertextual and chunked online text (Nielsen, 1997) to the academic essayist tradition and pedagogical workbook genre such as in the tutorial-in-print (Rowntree, 1986).

The *critical* dimension means being aware that writing is socially constructed and able to be changed. In the electronic communications it requires analysis of the unfolding communication practices in the use of icons and informal speech practices, being critical of the labyrinth effect of hypertext documents and being able to analyse the multimodal effect of internet. It also means applying and adapting existing practices of face-to-face and ODE practices in creating an acceptable hybrid genre of online educational writing.

The burgeoning online educational writing illustrates the simultaneous functioning of the three dimensions of l(IT)eracy. It functions at the operational dimension in the use of appropriate language and technology in teaching online, such as writing hypertextual documents that are coherent. It functions at the cultural dimension in creating a new

genre of educational writing by adapting the essayist and report writing traditions of academia, with a hybrid print based ODE tutorial-in-print genre with face-to-face educational practices. These simultaneously involve the critical dimension as each academic settles on their own practice which itself is critiqued to develop a new version of their online subject.

The 3D model of l(IT)eracy is a social model of literacy that acknowledges the technologies of communication amplify and reduce the nature of that communication (Green, 1993). An illustration of the social and technological aspect of l(IT)eracy can be found in Rowntree's social framing of the 'tutorial-in-print' model of writing print based self-instructional study material: 'Imagine … you are tutoring one individual…' (1986). Similar social bases of literacy are involved in immersion models of teaching academics to teach online by assuming the role of students (O'Riley & Ellis, 2002). It involves moving from self-instruction to collaboration (Thorpe, 2002) as well as dialogic pedagogies of Web 2.0.

The social model also impacts on academic writing traditions. For example, verbal descriptions of scientific concepts reduce the nature of scientific communication (Lemke, 1998). The concepts of science 'are semiotic *hybrids*, simultaneously and essentially verbal, mathematical, visual-graphic, and action-operational'. The meanings of science are made 'by the *joint co-deployment* of two or more semiotic modalities' (Lemke, 1998). Lemke's argument is that verbal texts cannot construct the same meaning as a picture, a mathematical equation or mathematical graph. The significance is that the communications tradition in print has adapted the multimodal writing with the insertion of illustrations within print even though it was assumed that verbal text carried all of the meaning. More importantly though is that '(a)s computer technologies make multimedia genres more convenient' (Lemke, 1998) multimodal texts such as scientific texts will be amplified by online technologies.

The concentration on pedagogical aspects of online education implies a stability of meaning making within the discipline despite the new writing technologies. The advantage of the l(IT)eracy approach is that it broadens the scope of professional development to the complexity of content and pedagogical meaning making. One characterisation of this builds on the differentiation of teaching as consisting of three domains of knowledge: content, pedagogy and technology. It is the technological, pedagogical content knowledge (TPCK) (Mishra & Koehler, 2006). They similarly build on Shulman's (1986) description that teaching practice take place at the overlapping of the content and pedagogical knowledge (Mishra & Koehler, 1986).

The limitation with this model is that technology is positioned outside of, and separated from, the construction of knowledge of the content and of pedagogy. Such approaches have been critiqued by Green (1993 and 1999) in leading to the 3D model of l(IT)eracy.

The 3D model of l(IT)eracy overcomes this by acknowledging that technologies are part of communication and not added to it as in the Lockean conduit model of language (Green, 1993). The 3D model needs to take into consideration the content knowledge with the pedagogical knowledge that each change with the online l(IT)eracy demands (see Figure 2). Rather than technology being separated from the content and pedagogical knowledge, it is subsumed within the l(IT)eracy practices functioning in the three dimensions of both the content and pedagogy domains of knowledge.

		Domains of knowledge	
		content	pedagogy
Dimensions of l(IT)eracy	operational		
	cultural		
	critical		

Figure 2: Modified 3D model of l(IT)eracy applied to content and pedagogical knowledge domains

The advantage of such a model of professional development is that it positions technology within the possibilities of literacy used in both the content and pedagogical domains of knowledge. It overcomes the problem of the paucity of pedagogical knowledge of academics (Holt and Segrave, 2003) in being able to build on the l(IT)eracy practices of their content knowledge applied to pedagogical knowledge. Finally, it is able to build on the burgeoning understanding of multimodal literacy scholarship to the situated work of academics.

Case studies

To illustrate the decision making process that academics undertake in writing online educational materials I will use two case studies involving two academics, Pauline and John (pseudonyms). The case studies are of academics employed in a dual mode, moving to an online university in Australia. Each academic wrote their own educational material for online offering. John wrote to an online case-based pedagogy template consisting of segmented parts of a case, interspersed by student discussion on an electronic forum like a 'series of funnels' (John's interview). The subject that John was teaching was a science subject that had been offered in print based ODE mode with compulsory residential school. Pauline was rewriting a subject that had already been written online. This subject was offered as an online ODE subject and had been taught by Pauline.

The two case studies were intrinsic case studies with each case conducted separately (Stake, 2005). Interviews were conducted within six months of writing the subjects, after the subjects had been offered. I conducted the interviews and had been in constant communication with the academics during the writing process. I was informed by the field notes from that experience.

The interviews were analysed using the modified 3D model of l(IT)eracy. Because the act of writing and teaching are holistic activities, the classification of the discourses and the dimensions of l(IT)eracy frequently overlap and blur. Green had acknowledged this in stressing 'the interdependence and interaction of these dimensions' (1999). I will use the three dimensions to organise this discussion.

Cultural

John's second year subject was part of a case-based Master's degree. It was best offered as an online, multimedia subject because of the verbal, visual-graphic and action-operational knowledge in the subject and because the forums enabled more substantial discussions than occurred in the classroom. To teach the visual and graphic information in print based ODE required the use of a study guide, a second pictorial textbook and half of the compulsory residential school. In that sense, the online technologies enabled

John to design the subject to be more closely aligned with the face-to-face teaching resources and practices. The forum discussion, however, enabled an improvement of classroom discussions because students could research their responses rather than 'saying the first thing that came into their minds' (John's interview).

John felt that the multimedia resources of the online technologies enabled and improved the ODE (cultural) approaches of teaching. It amplified the scientific content knowledge of the subject which had been reduced by the print technologies of ODE. In contrast the forums improved traditional approaches in enabling more substantial discussions amongst the students because of the asynchronous and publication aspect of forum communication. Both of these operated in the cultural dimension of l(IT)eracy involving simultaneously the technology and the meanings communicated and a hybrid educational and discipline discourse.

Critical

Pauline, an educational academic, comfortably functioned within the three dimensions in both pedagogical and content knowledge. She was a competent reader and teacher of online education material as she had been the lecturer of the online subject she was revising which had been written by a previous academic. However, she had never written online material.

As a Web reader, Pauline was critical of the long pages of the subject: they 'went on and on, so you were just scrolling for ages'. Pauline had been aware that web pages should never be 'more than a page in a screen, and (with) not too much scrolling'. When it came to writing however, she found that she also used academic essayist writing. As a result, her own version of the subject was criticised as having pages that were too long for Web writing. Pauline found that she could not write the subject in chunked text 'because it's too bitty' (Pauline's interview).

Pauline's experience was that writing online was 'a different way of writing' in which 'the argument is constructed differently' because of the technology of writing. The technology of print had enabled expository and workbook - 'tutorial-in-print' - writing. Online writing was different and Pauline concluded that 'it is not as if the technology is just a vehicle, ... it does shape the discourse too' (Pauline's interview).

Both Pauline and John started their revisions in the critical dimension. Pauline had been critical of the long web pages and John had been critical of the case-based pedagogical model used in the course. These practices illustrate that the three dimensions operate simultaneously and that the writing can start within the critical dimension. For both though, they faulted at the operational dimension. For John it was an alternative case-base pedagogy; for Pauline it was the genre of writing.

Operational

Pauline and John had difficulties at the operational dimension. As illustrated, for John this was in the educational discourse in needing a different case-based pedagogy. For Pauline it was learning to reconstruct her arguments in a non-essayist tradition of writing.

For Pauline it also related to the use of hypertext in the writing of the subject. Once the skill aspect of the operational dimension was mastered in being able to make a

hypertextual link to a new page, Pauline made many hypertextual links and new pages until she had created a confusing labyrinth of pages. In looking for a coherence in the whole text (Laurillard, Stratfold, Luckin, Ploughman and Taylor, 2000), Pauline fell back on her systemic functional linguistics background and used links coherently as either elaboration, extension or enhancement (Jones and Relf, 2002) to ensure coherent text.

Conclusion

These cases illustrate the functioning of the three dimensions of l(IT)eracy in both the content and pedagogical knowledge. They illustrate that the technology is not simply added to the meaning making practices, of both the content and pedagogical domains. John's use of multimedia, while seemingly an advance in the use of the technology, could more accurately be seen as a return to face-to-face teaching practices. His use of forums, however, was pedagogically different because the technology enabled a more considered communication. Pauline's awareness of literacy and pedagogy in print enabled her to reflect on the impact that the technology of writing had on her own meaning making, or l(IT)eracy, practices.

The modified 3D model of l(IT)eracy (Figure 2) provides a model that encompassed the full range of meaning made by academics in writing online ODE material. It embeds technology skills to be incorporated as part of the meaning making choices. It enables academics to use their strengths of either pedagogical or content knowledge to influence the meaningful decisions. In doing so it situates the act of professional development as an authentic l(IT)eracy of wr(IT)ing.

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Opportunities and concerns for new technologies and distance education

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Abstract

This paper attempts to address a number of themes of this conference, including the economics of distance education, the 'digital native' or 'homo sapiens', and required changes in faculty development. A look back to the beginning of distance learning is used to highlight the significant and almost exponential growth in the field, and some of this growth is extrapolated forward.

Unquestionably, new technology has had a positive impact on distance learning in terms of provision levels, asynchronous learning, the economics of learning (in part), access levels, open education, and lifelong learning. However, as is often the case with technological progress, there are associated concerns, some inherited from the growth to date, and some anticipated with predicted growth. The purpose of this paper is not to cast a dark cloud across the bright future of distance learning (why should it when the author works in an institution of 60 years' standing in distance education?), but rather to point with a constructive finger to some of the concerns that should be addressed as the new technologies propel distance education into its glorious future.

Without this cautionary approach, the future may not be as bright as it should be.

Where we have come from

Distance learning has a history going back well over 100 years, with the correspondence courses in Europe in the 1800s being early examples (Imel, 1998), although Professor Daniel claims that the Apostle Paul in the first century AD was the first real user of distance learning in his Epistles to the Churches of Asia Minor (Daniel, West and MacIntosh, 2006).

The main changes in distance learning since then have occurred through the development and application of technologies to a pedagogy that has remained relatively unchanged. Examples of these are the application of radio and television (in essence to deliver classroom lectures), followed by audio cassettes, video tapes and, in latter times, CD-Roms. Again, the instructor-centred pedagogy lying behind these changed little.

Visits by the author to large 'online producers' in India in 2004 confirmed the lack of pedagogical shift, when he viewed over 100 people, each in front of a PC, transferring videotapes of PowerPoint presentations by lecturers onto hard disk, and subsequently to CD-Rom.

The emergence of the Internet and compressed video has resulted in a real shift in distance learning, with the opportunity for learning to occur in real time at a distance.

The use of chat rooms and videoconferences is now common in most distance learning programmes.

Unfortunately, in its early days distance learning was seen as promoting education of a lesser standard than that delivered through the 'brick-and-mortar' institutions. This view has not entirely disappeared, as in some countries graduates with qualifications gained through distance education are not accorded the same entry level remuneration as those with qualifications from face-to-face institutions. And yet, in a recent study in the United Kingdom (Hodges, 2005, September 29) the Open University came top of the table of universities from the viewpoint of overall student satisfaction with their course (see Table 1 below).

Table 1: United Kingdom student satisfaction with their course

Ranking (top five)	Institution	Score out of 5
1	Open University	4.5
2	Royal Academy of Music	4.5
3	Conservatiore for Dance and Drama	4.4
4	St Mary's University College	4.4
5	Loughborough University	4.3

(Hodges, 2005, September 29)

Mega-universities (those with more than 100,000 students and delivery by distance only) have mostly been established in the last 20 years in order, in the main, to meet the growing demand for tertiary education from not only school leavers, but also those in employment wishing to improve their education and career prospects. Examples of such mega-universities are shown in Table 2 below.

Table 2: Mega-universities — basic data (Adapted from Daniel, 1996)

						Percentage of Budget From		
Country	**Name of institute**	**Estab-lished**	**Students in degree programs.**	**Graduates per year**	**Budget (US $1m)**	**Student Fees**	**Govt. grants**	**Unit cost**
China	China TV University System	1979	530,000	101,000	1.2	0	75	40
France	Centre National d'Enseignement à Distance	1939	184,614	28,000	56	60	30	50
India	Indira Ghandi National Open University	1985	242,000	9,250	10	42	58	35
Indonesia	Universitas Terbuka	1984	353,000	28,000	21	70	30	15
Iran	Payame Noor University	1987	117,000	7,563	13.3	87	13	25
Korea	Korea National Open University	1982	210,578	11,000	79	64	36	5
South Africa	University of South Africa	1873	130,000	10,000	128	39	60	50
Spain	Universidad Nacional de Educación a Distancia	1972	110,000	2,753	129	60	40	40
Thailand	Sukhothai Thammathirat Open University	1978	216,800	12,583	46	73.5	26.5	30
Turkey	Anadolu University	1982	577,804	26,321	30	76	6	10
United Kingdom	Open University	1969	157,450	18,359	300	31	60	50

The above figures relate to 1994–1996, and almost all have increased considerably since then. Further, the table does not even include the University of Phoenix Online, one of a number of fully virtual universities, which has more than 300,000 students.

It can be said that distance learning has come of age and the emergence of e-learning in its vocabulary holds the promise of great educational impacts. Unfortunately, e-learning failed to live up to its early promise in the late 1990s. Some of the reasons for its failure are highlighted in the work of Zemsky and Massey (2005), Alexander (2005), and Hedberg (2006). Vrasidas and Glass (2005) identified some obstacles to the integration of information and communications technology (ICT) into the face-to-face teaching and learning environment, including:

- Conservative nature of the traditional culture of classroom instruction
- Teachers' resistance to changing their traditional teaching approaches
- Lack of time for teachers to learn how to use and integrate ICT into their teaching
- Lack of technology infrastructure
- Lack of ongoing support
- Lack of release time and incentives for academic innovators
- Incompatibility of traditional teaching with the constructivist framework fostered by ICT
- Need for policy, curriculum and assessment reform. (p. 8)

Alexander's 2005 study of 20,000 students in five large universities in Australia showed that e-learning was essentially a way of providing information, and at best information with random discussion available, often with no clear objective defined.

But e-learning is regaining this lost ground, particularly with the emergence of 'm-learning', using web servers in module telephones.

An interesting interuniversity consortium — the TALAS project — is being undertaken in an attempt to improve the quality of, and innovation in, training processes. It has become clear that:

- Mobile learning is an addendum to learning.
- We now have 'Homo zappiens' (HZ), not 'Homo sapiens' (HS). Zapping is the skill of constructing meaningful solutions/knowledge from discontinuous audio/visual and testral information.

Key differences between the HZ learner and the HS learner are shown in Table 3 below.

Table 3: A comparison of HS and HZ learners

HZ	HS
Multi-task	Mono-task
Iconic skills	Reading skills
Collaborative	Competitive
Active	Passive
Learn by doing and playing	Separates playing from learning

(Adapted from Metcalf, 2006)

We have come a long way through the application of technology, but questions still remain. For instance, has student learning improved? Is the quality of education better? Has cost-effectiveness improved? Is learning more available now? In the years ahead these remain concerns to be addressed.

Where we are going

This conference theme refers to a 10-year perspective. Many of us, the author included, as strategic planners find a 10-year horizon a challenging concept to address because of rapid changes in many areas of life. So, rather than comment on issues in such a defined time frame, they will be discussed in a more organic context.

The previous section implies and acknowledges that distance learning and e-learning will flourish as technology continues to advance, but there will remain concerns about this advancement that require our attention and action if we are to gain the fullest learning benefit from technology applications.

Some of these concerns are summarised and discussed below.

Quality standards

It has been mooted in recent times that the application of technology to distance education will improve the quality of learning. Most educators know that technology

does not teach students — effective teachers do (Palloff and Pratt, 2000). The key is to use technology effectively, at both the design and delivery stages of a programme. Most of what has been achieved to date is an amalgam of web technologies that replicate the face-to-face delivery mechanisms designed for the classroom. The significant work undertaken by the government in South Africa to establish a national set of standards (see the NADEOSA website: www.nadeosa.org.za) has provided a very useful addition to quality literature. This, together with the distance learning standards from the Council for Higher Education Accreditation (CHEA) in the United States and the New Zealand Qualifications Authority (NZQA) standards in New Zealand, provides a ready source for quality assurance.

That in itself is not enough, since quality measures should reflect successful completion rates, as well as the certainty surrounding the origin of student summative assessment material. How do faculty know that the submitted work is that of the enrolled student? On-the-ground summative examinations using webcam observations are possible and provide adequate proctoring, but then the question of whether examinations are good assessment tools arises.

Ethical standards are a significant part of quality standards and plagiarism is a real problem made easier by computer technology but, at the same time, also made easier to detect through web search engines when large chunks have been 'lifted' and reinserted in a new document. The issue will not be solved by more sophisticated technologies of detection, but rather by a shift in personal ethics and morals of the learner.

Intellectual property takes on a whole new aspect when e-learning open-source platforms are operating, just as it does in licensing of materials from a central source provider.

Faculty concerns

Many faculties are concerned about how distance learning, e-learning and technology will change their established role in tertiary education. Some faculty are concerned that if 'their' course material (known as the 'invented here syndrome') is online, it is then no longer in their possession and open to vandalism.

The old conflict in tertiary education between recognition for research and teaching excellence is further exacerbated by distance learning, as there is often no recognition for excellence in distance teaching which, because of its onerous teaching requirements, detracts from time available for academic research.

One of the biggest challenges for faculty is their unwillingness (not all of them by any means) to learn and use new technologies and associated learning styles. The fault does not always lie with faculty alone, as there is much reported comment about lack of staff development and training for e-learning, and certainly there is little evidence of credit being given for learning technology skill acquisitions when promotions, pay rises and so on are considered. The author has worked in universities and polytechnics in six different countries around the world, and in each case it has been evident that any significant change in the institution can only be effected when the teaching faculty accept, approve and apply the changes (Weick, 1976). The work of William Geoghegan (1994), in which he divides faculty involvement and participation into five categories

(Innovators (39%), Early Adapters (Visionaries) (10%), Early Majority (Pragmatics) and Late Majority (Sceptics) (70% total), and finally Laggards (17%)) is enlightening and very relevant today, and in the author's own organisation each category is present and in roughly the same proportions.

The real challenge is to move the Early Majority to the Early Adapters category, because the gap here is large, and to bring them both into the 'business as usual' of the organisation.

Economics of distance learning

Are distance learning programmes actually cost-effective? This question cannot be divorced from the issues of quality, as it is quite possible to offer a cost-effective programme that does not meet the needs of its stakeholders.

It is generally accepted that 'high student numbers have a large impact on whether or not average costs per student are brought down to a level at which distance education is an attractive proposition . . . and it is cheaper to use conventional methods where student numbers are restricted' (Rumble, 1988, p.257 section 3.14).

However, the exact point at which distance learning is cheaper per student unit than face-to-face learning is dependent on many factors, including student demand estimates, student support resources, central infrastructure costs, and programme development costs associated with delivery mechanisms. This economy-of-scale effect is further supported by a study of the California State University System (Carr, 2001), which found that only in really large courses with many sections would cost savings be possible. Courses with in excess of 500 students would benefit from the distance learning set-up, but it was more cost-effective to teach smaller groups in face-to-face settings.

The big problem in determining cost-effectiveness is that of identifying all relevant costs to be included in the exercise, and then some. It is accepted that programme development costs are significantly greater in distance learning than in face-to-face learning. The Open University estimates it distance learning course development costs £1m per 60-point course (from a recent visit by the author to the Open University in the United Kingdom), which is approximately four times a face-to-face course development cost. Support Services are another significant cost component in distance learning, including library support. In the author's institution, some 8% of costs is spent on student support each year.

The economic effectiveness of distance learning will continue to be an issue for the foreseeable future — the jury is still out. What is clear is that there will continue to be increases in the number of programmes delivered by distance learning, using ever-improving technology, which have poorly defined financial grounds.

However, the explosion in distance and e-learning programmes will cause the management of tertiary institutions to find better and more accurate means of allocating and recording costs, since the politicians and others will continue to ask whether anyone can make money out of distance education and e-learning.

Retention rates

Student retention has been actively researched for over seven decades (Berge and Huang, 2004), and research shows that academic standards achieved through open and distance learning (ODL) delivery and through face-to-face contact delivery are fundamentally the same. This is generally accepted internationally, and the results of quality assurance systems now used in ODL bear this out.

However, there is an identifiable difference in the levels of retentions and completions achieved on ODL courses and face-to-face courses taught at 'brick-and-mortar' institutions. While it is difficult to obtain precise figures, it is possible through a study of the research conducted across the world to identify the range of retention level differences between ODL and face-to-face courses.

Historically, the percentage of students who drop out of 'brick-and-mortar' higher education has held constant at between 40–45% for the past 100 years (Tinto, 1982), which indicates retentions of 55–60%, and distance education literature indicates that the completion rates in distance education courses have historically been extremely low, 40–50% at best (Oblinger, Moore and Kearsley, 1996). Results of a study of completion rates at a major New Zealand university show that the extra-mural mode (ODL) completions were 15% lower than the internal mode (on-campus and face-to-face mode) completions (source restricted by request of the university)

The distance learning student profile is known to have an impact on retentions, and in the author's organisation the profile is:

- 74% are >30 years of age (adult students)
- 75% are working full time (aged 25+) and 60% are working full time (aged 20–24)
- 27% have no secondary school qualifications on enrolment (aged 20+)
- 71% have no secondary school qualifications on enrolment (aged <19)
- 34% are studying >one course at a time
- 100% are studying by distance learning.

This student profile almost exactly matches that of a student who is not likely to complete or be retained on a course, as determined from published research in the field, including the New Zealand Ministry of Education's own study (Scott, 2003).

It is possible that the learner (in ODL courses) can begin to feel disconnected and disorientated, and this may contribute to non-completion rates which are 10–20% lower than traditional courses (Carr, 2000; Diaz, 2002; Frankola, 2001). Nearly every distance-education instructor and student has a different explanation for the higher drop-out rate (in distance education), but the explanations generally fall into two camps.

Some believe students leave distance courses for the same reasons they drop out of traditional courses, but that distance education students, who are often older, have more obligations and simply must drop out more frequently. Others say that the fundamental difference between the two modes of instruction explains the statistics — 'Distance-education students tend to leave us because they are very busy, their lives are crammed full of things, and suddenly they find themselves in a situation of having to rethink their priorities,' says Jacquelyn B Tulloch, Executive Dean of Distance Education and

College Services at the LeCroy Centre. 'Very often, for better or for worse, education is the easiest thing to let go of' (cited in Carr, 2000, p.A39).

There are many strategies in place to improve retentions and completions, and this is an area where the new technologies can play a significant role in addressing this ongoing concern.

Student concerns

The relationship between new technologies and distance learning and e-learning is often focused on issues surrounding ICT services, network reliability, and with mobile phones and other techno-educational matters. Unfortunately, the two very significant areas that receive less attention than they deserve are pedagogy (or androgogy) and students (learners). Students (learners) do have concerns about technology in distance learning. Among these are student privacy, lack of a collaborative learning process, absence of 'body language' input in communications with faculty and co-learners, poor organisation of programmes, excessive time commitments over face to face learning, and dealing with technological problems. This latter concern can be very significant when learners' knowledge and access to technology differs widely across the group. In addition, computer network security issues and hardware and software failures add considerably to the stress facing learners studying online.

All of these issues need to be addressed in the future.

As new technologies are developed and applied in distance learning it will become more important to ensure that they are not a hindrance to some learners due to the lack of homogeneity in the learning community.

Summary

There is no question that there are great opportunities for new technologies to enhance and expand educational provision through distance education in the next 10 years. Evidence of this already exists in the developing nations, particularly China, India, and Africa.

But there are attendant concerns that must be addressed as technological progress continues apace. Some of these have been noted in this paper, but there are many more — for example, demographic shifts, cyber psychology, faculty burnout, the digital divide, to name but a few. But this is not meant to be a pessimistic paper, and while these concerns will continue, once recognised and addressed their solutions will add value to a technologically empowered generation of distance and e-learners.

'The challenge is to design cost-effective and educationally effective systems for use in the new millennium of the new technologies that permit for the first time in history (electronic) teaching of students face to face at a distance' (Keegan, 1995, p. 53).

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