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Collaboration in using ICT for education & development

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About the journal

The International Journal of Education and Development using Information and Communication Technology (IJEDICT) is an e-journal that provides free and open access to all of its content.

Regional economies and communities are facing increasing economic, social and cultural hardship in many parts of the world as economies adjust to the demands of the new orders of commerce and governance. A part of this is the paradox that regional economies and communities can be either enhanced or disadvantaged by information and communication technologies (ICT) products and services. The potential enhancement comes from the increased social, economic and cultural capital that comes from harnessing ICT products and services in a community sense. The disadvantage comes from the power that ICT products and services have in centralizing commerce, service provision and governance away from the regional community.

Unless we get a greater level of access AND adoption of information and communication technology (ICT) for education and development at community level, we will miss the opportunity to turn the "digital divide into a digital opportunity for all, particularly for those who risk being left behind and being further marginalised" ("Declaration of Principles", WSIS-03/Geneva/Doc/4-E, Principle 10). The International Journal of Education and Development using Information and Communication Technology (IJEDICT) is an e-journal, with free and open access, that seeks to address this issue.

IJEDICT aims to strengthen links between research and practice in ICT in education and development in hitherto less developed parts of the world, e.g., developing countries (especially small states), and rural and remote regions of developed countries. The emphasis is on providing a space for researchers, practitioners and theoreticians to jointly explore ideas using an eclectic mix of research methods and disciplines. It brings together research, action research and case studies in order to assist in the transfer of best practice, the development of policy and the creation of theory. Thus, IJEDICT is of interest to a wide-ranging audience of researchers, policy-makers, practitioners, government officers and other professionals involved in education or development in communities throughout the world.

Coverage

IJEDICT has a major emphasis on the use of ICT in education and development in hitherto less developed parts of the world. The journal includes descriptive case studies about ICT projects in developing countries and in rural and remote regions of developed countries, as well research articles evaluating such projects, developing policy or creating theory. Topics covered include, but are not limited to, the following areas:

Community informatics and development in remote, rural and regional areas;
Developing regional industries (e.g., agriculture, tourism) with ICT;
E-Commerce and Business in remote, rural and regional areas;
ICT for micro, small and medium enterprises;
ICT in local governance;
E-Democracy;
ICT and social marketing;
ICT enabled healthcare for remote, rural and regional consumers;
Social epidemiology and virtual communities;
Education: distance, e-learning, flexible learning and delivery, open learning, e-literacy.

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Call for Papers/Articles

IJEDICT comprises: a "research articles" section for academic, peer-reviewed articles; a "studies from the field" section for edited (but not peer reviewed) case studies; a "project sheets" section for brief descriptions of relevant projects; a "notes from the field" section for working papers, and other commentaries on relevant topics; and, a "book/media review" section for book, software and other media reviews.

The Editors welcome submissions at: http://ijedict.dec.uwi.edu/submissions.php

Section Policies

Refereed Articles

This section contains articles that have been reviewed by at least two academic peers in a process that ensures that authors and reviewers remain unknown to one another. To be included in this section, articles must be based on research and scholarship, and contribute "new" and significant knowledge to the field of ICT for education and/or development. Reviewers for research articles are selected from the Editorial Board, the Review Board and the Peer Review Panel.

Book/Media Reviews

This section contains (but not peer reviewed) reviews of books that are relevant to the use of ICT in education and/or development.

From the Field

This section includes edited (but not peer reviewed) case studies (2000-5000 words) of the use of ICT in education and/or development.

Invited Articles

As the name suggests, "Invited Articles" are ones specially requested by the Editors. Generally, they are not peer reviewed.

Project Sheets

This section includes brief descriptions (500-1000 words) of education and development projects that utilise ICT.

Notes from the Field

This section contains short comments or notes that are useful for practitioners working in the field of ICT in education and/or development.

Editorial

This section contains the editorial written by the editors for the specific issue.

Submission of Articles

Authors can upload their papers, as well as data sets, research instruments, and source documents through the journal's Submissions section. They can submit their papers, figures, and appendices in a variety of file formats, including Microsoft Word, WordPerfect, or RTF (Rich Text Format).

Registration and login are required to submit items online and to check the status of current submissions.

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General Information

- Submissions are invited for all sections of this journal. Refereed articles should be between 3,500 and 6000 words in length. Project descriptions for the "Project Sheets" section should be between 500-1000 words in length. Submissions for other sections of the journal can be any length.
- Submissions can be in Microsoft Word, Rich Text Format (RTF), equivalent Open Source document file format, or HTML format.
- Please use Arial 12-point font for the Title, which should be in bold "title" (upper and lower) case.
- Use Arial 10-point font for the remainder of your article.
- First level headings should be in bold uppercase, and second level headings in bold "title" (upper and lower) case.
- No footnotes please - instead use endnotes.
- Photographs, maps, diagrams and other audio-visual aids are encouraged. Please include these in the text where and as they should appear. Please provide images in gif or jpeg formats.

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Please provide an abstract of approximately 100 words. The abstract should be included with the rest of your article in the submission file, but it should also be copied into the appropriate text box during the on-line submission process.

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Please supply a short (100 word) biography for each author. This should include the name, rank, institution, institutional address, and email address. Do not place the biography in your submission file but copy it into the appropriate text box during the on-line submission process.

Style

Submitted manuscripts must be written in the Harvard editorial style:

- References should relate only to material cited within the manuscript and be listed in alphabetical order, including the author's name, complete title of the cited work, title of the source, volume, issue, year of publication, and pages cited. See the following examples:

  Marshall, S. (1991), "A genre-based approach to the teaching of report-writing". English for Specific Purposes, vol. 10, no.1, pp. 3-13.

  Taylor, W. & Marshall, S. (2002), "Collaboration: the Key to Establishing Community Networks in Regional Australia", Informing Science, vol. 5, pp. 155-162.

  Marshall, S., Taylor, W., & Yu, X. (eds.) (2003), Closing the Digital Divide: Transforming Regional Economies and Communities with Information Technology, Greenwood Publishing, Westport CT.

- Citations in the text should include the author's name and year of publication where you use the source in the text, as in the following examples:

  In this way, information technology can be seen to effect and influence changes in organisational structure (Orlikowski & Robey 1991).

  Edwards (1995, p.250) views the globalising of distance education as "invested with the uniform cultural messages of modernity - of mastery, progress and moral superiority through the development of reason".

  Globalisation, especially in relation to open and distance education, will reduce the tolerance of difference and so "how can local issues and contexts be addressed?" (Evans 1995, p.314).

- Further information about the Harvard editorial style can be found at:

  http://lisweb.curtin.edu.au/referencing/harvard.html
  http://www.library.uwa.edu.au/guides/citingsources/harvard.html

Submission Preparation Checklist (all items required)

- The submission has not been previously published nor is it before another journal for consideration; or an explanation has been provided in Comments to the Editor.
- The submission file is in Microsoft Word, Rich Text Format (RTF), equivalent Open Source document file format, or HTML format.
- For documents in Microsoft Word, Rich Text Format (RTF) or equivalent Open Source document file format, URL addresses (e.g., http://pkp.ubc.ca) are NOT activated in the text or reference list. (These will be activated by the Layout Editor when creating the HTML version.) For documents in HTML format, all URL addresses are activated and ready to click.
- The text is single-spaced; uses Arial 10-point font; employs italics, rather than underlining (except with URL addresses in HTML documents); with figures and tables placed within the text, rather than at the end.
- A 100 word abstract has been prepared and included in the submission file.
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Editorial: Collaboration as a critical success factor in using ICT for capacity building and community development

Stewart Marshall
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Welcome to the first issue of the International Journal of Education and Development using Information and Communication Technology (IJEDICT) - an e-journal that provides free and open access to all of its content.

Regional economies and communities are facing increasing economic, social and cultural hardship in many parts of the world as economies adjust to the demands of the new orders of commerce and governance. A part of this is the paradox that regional economies and communities can be either enhanced or disadvantaged by information and communication technologies (ICT) products and services. The potential enhancement comes from the increased social, economic and cultural capital that comes from harnessing ICT products and services in a community sense. The disadvantage comes from the power that ICT products and services have in centralizing commerce, service provision and governance away from the regional community.

Unless we get a greater level of access AND adoption of ICT for education and development at community level, we will miss the opportunity to turn the "digital divide into a digital opportunity for all, particularly for those who risk being left behind and being further marginalised" ("Declaration of Principles", WSIS-03/Geneva/Doc/4-E, Principle 10). IJEDICT provides a forum for those who seek to address this issue. In particular, IJEDICT aims to strengthen links between research and practice in ICT in education and development in hitherto less developed parts of the world, e.g., developing countries (especially small states), and rural and remote regions of developed countries. The emphasis is on providing a space for researchers, practitioners and theoreticians to jointly explore ideas using an eclectic mix of research methods and disciplines. It brings together research, action research and case studies in order to assist in the transfer of best practice, the development of policy and the creation of theory. Thus, IJEDICT is of interest to a wide-ranging audience of researchers, policy-makers, practitioners, government officers and other professionals involved in education or development in communities throughout the world.

Despite the huge potential of ICT to assist communities to increase their overall well-being through community development, there are relatively few examples of sustained community networks built around ICT when compared to commercial applications, even in the developed countries where the technology has been increasingly available for up to 20 years. Researchers report a wide range of potential success factors and impediments. Pre-eminent amongst these is that collaborative partnerships, social network strategies and the building of social capital at the local level are key issues for the successful adoption of ICT for development.

IJEDICT emphasises collaboration across disciplines, across professions, across institutions, across sectors, and across continents in an attempt to freely share and promote best practice and best research. The journal is itself an example of the usefulness of such an approach, being the result of collaboration between two institutions, one in the Caribbean and the other in Cape Town, South Africa. Indeed, the second issue of IJEDICT will emphasise and broaden this linkage by

looking at "ICT for Education and Development in Southern Africa", this issue being edited by Guest Editors Laura Czerniewicz and Tony Carr from yet another institution in Cape Town, South Africa.

The first issue of IJEDICT also deals with the Caribbean–African linkage in the invited article by the Marshall and Taylor. This article on “Facilitating the use of ICT for community development through collaborative partnerships between universities, governments and communities” describes two successful community ICT projects whose success depended on the use of a collaborative methodology involving universities, governments and communities. The authors contend that researchers in universities can play a crucial role in facilitating this collaborative approach, and have set out to facilitate similar projects in South Africa and in the small island developing states of the Caribbean.

Continuing the theme of collaboration and the Caribbean–African linkage, Lee, Thurab-Nkhosi and Giannini-Gachago describe a case study “Using informal collaboration to develop quality assurance processes for eLearning in developing countries: The case of the University of Botswana and The University of the West Indies Distance Education Centre”. The authors share the informal collaborative model used to develop a quality assurance tool for eLearning and compare approaches in eLearning course development and quality assurance procedures at both institutions.

In their article “Designing for learning through multimodal production: Film narrative and spectatorship in Director's Cut”, set in the context of a South African university, Deacon, Morrison and Stadler describe the evolving learning design of a computer-based exercise called Director's Cut that challenges students to create their own video sequence from a set of clips.

In his article - “Building ICT4D Capacity in African Universities” - Colle continues the themes of collaboration, the role of universities in developing community capacity, and ICT in Africa. Using the nomenclature of the New Partnership for African Development, the author examines the mutual benefits that universities and telecenters could gain from a stronger relationship, and lays out the kinds of steps that might be taken to build a partnership.

Ifinedo’s article - “Measuring Africa’s E-readiness in the Global Networked Economy: A Nine-Country Data Analysis” – continues the African theme by computing the e-readiness for nine African countries. The author finds that Sub-Saharan Africa (SSA) - with the exception of South Africa and its neighbors - has a poor e-readiness score; on the other hand, North African countries fared better than those in SSA. The author highlights areas of relative strengths where policy makers in the region could exploit as efforts are made towards integrating Africa into the global networked economy.

The article “Evolving Spaces in Landscape Management: Linking Spatial Information for Effective Decision-Making” by Ravindranath and Singh, discusses a participatory Geographic Information System (GIS) with community forest management groups in India and the importance of ‘putting people before technology’ in order to make GIS a truly participatory process in landscape management. The process of dialogue can lead to better information and more transparency about community needs, strategies and the problems at stake.

Burn and Thongprasert, in their article “A Culture-Based Model for Strategic Implementation of Virtual Education Delivery”, examine the critical success factors for implementing Virtual Education Delivery (VED) in Thailand, and identify ways to facilitate such adoption and lead to effective outcomes. Their study incorporated an analysis of three specific factors related to Thai culture: high power distance “Bhun Khun”, uncertainty avoidance “Kreng Jai” and, collectivism

"Kam Lang Jai". They propose a strategic framework for successful VED implementation that can be modified for any cultural environment.

The "education" part of the title of IJEDICT is to be broadly conceived, i.e., it is not just formal education that is included, but also informal education or capacity building of any sort. And the "development" part of the title not only refers to developing countries, but also to rural and remote regions of developed countries, that are also at risk of being left behind and further marginalised by the digital divide. In their article - "Building Community Capacities in Evaluating Rural IT Projects: Success Strategies from the LEARNERS Project" - Lennie, Hearn, Simpson and Kimber present the outcomes of a project that aimed to build capacities of people in two Australian rural communities. Based on their critical reflections, the authors present strategies for successful community capacity building projects and sustainable C&IT initiatives in rural areas.

This first issue of IJEDICT also contains two "Project Sheets":

- "The Caribbean Universities Project for Integrated Distance Education (CUPIDE)" - designed to develop the human resources within the region through enabling each of the five participating universities to develop and deliver quality distance education programmes using ICT;

- "E-Link Americas" - a project with a social mandate to provide affordable, high speed satellite Internet connectivity for social and community development in Latin America and the Caribbean.

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IJEDICT seeks to support the community of researchers and practitioners involved in ICT for education and development, and we welcome feedback and suggestions as to how the journal can better serve this community.

Stewart Marshall and Wal Taylor

Chief Editors, IJEDICT

Original article at: http://ijedict.dec.uwi.edu//viewarticle.php?id=35&layout=html

International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2005, Vol. 1, Issue I, pp. 5-12.

Facilitating the use of ICT for community development through collaborative partnerships between universities, governments and communities

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ABSTRACT

Despite the huge potential of information and communication technology (ICT) to assist communities to increase their overall well-being through community development, there are relatively few examples of sustained community networks built around ICT when compared to commercial applications, even in the developed countries where the technology has been increasingly available for up to 20 years. Researchers report a wide range of potential success factors and impediments. Pre-eminent amongst these is that collaborative partnerships, social network strategies and the building of social capital at the local level are key issues for the successful adoption of ICT for development.

In this paper, the authors describe two successful community ICT projects whose success depended on the use of a collaborative methodology involving universities, governments and communities. Central to this approach is the involvement of the community in all parts of the project. By using such an approach, we acknowledge the rich creativity that exists in each local community and that this creativity can be harnessed in the creation of a community network, which in turn empowers the community. Researchers in universities can play a crucial role in facilitating this collaborative approach. Can the authors now facilitate similar projects with equal success in South Africa and in the small island developing states of the Caribbean?

Key words: *community engagement; community informatics systems; community networks; inside out; social capital.*

PARTICIPATION IN THE INFORMATION SOCIETY

> *ICT is an increasingly powerful tool for participating in global markets; promoting political accountability; improving the delivery of basic services; and enhancing local development opportunities. But without innovative ICT policies, many people in developing countries - especially the poor - will be left behind (UNDP Barbados 2003).*

From the huge volume of written material, there can be no doubt that advances in ICT have huge and unprecedented implications for society at large. However, the uneven adoption of ICT across the world is great cause for concern to international collaborative bodies whose efforts are related to global inequity (UNDP 2001; DOTforce 2001). Adoption of the Internet in the Caribbean significantly lags that in the United States and other developed countries. But Internet adoption is also uneven within the Caribbean region, for example, in 2003 approximately 37 percent of the inhabitants of Barbados were Internet users compared to six (6) percent for St Vincent and the Grenadines, and one (1) percent for Haiti and Cuba (ITU 2004).

Many governments and global agencies have recognised the growing issues associated with inequitable ICT access and have provided funded programs aimed at addressing specific needs within nation states. However, experience in developed countries is showing that many of the high-cost IT infrastructure programs are failing to meet their stated aims in equity of end-use and that there is a glass ceiling in the adoption of ICT for either local community benefit or society at large (Gurstein 2003). Indeed, there is growing evidence that community based disadvantages resulting from uneven societal adoption of ICT are growing (Castells 2000). There is now increased understanding that the provision of ICT access, either high or low capacity, through government and private sector efforts by itself is insufficient to address these issues. In direct recognition of this, the United Nations through the International telecommunications Union committed to sponsor two World Summits on the Information Society (WSIS 2004) in Geneva in December 2003 and Tunis in 2005.

ICT IN COMMUNITY DEVELOPMENT

Community informatics systems research

Despite the huge potential of ICT to assist communities to increase their overall well-being through community development, there are relatively few examples of sustained community networks built around ICT when compared to commercial applications, even in the developed countries where the technology has been increasingly available for up to 20 years. Early work in the field has had mixed success (O'Neal 2001), and whilst the lack of external funding for equipment can be a barrier to success, provision in itself is no guarantee of successful adoption in community (Harris 2001; Byrne and Wood-Harper 2000). Researchers report a wide range of potential success factors and impediments (see for example, Gurstein 2000; Pigg 1999; Rosenbaum and Gregson 1998; Schuler 1996; Taylor et al 2003). But from the current work in *community informatics systems (CIS)* - an emerging discipline that investigates the use of ICT in community development - there are some common elements beginning to emerge. Pre-eminent amongst these is that collaborative partnerships, social network strategies and the building of social capital at the local level are key issues for the successful adoption of ICT for development (Horrigan and Wilson 2001; Harris 2001; Taylor and Marshall 2004).
Detailed below are two successful examples of ICT in community development (for others see Marshall et al 2003; 2004) from which we can draw lessons and parallels for the Caribbean and South Africa situations.

E-Bario and E-Bedian, Sarawak, Malaysia

Sarawak is Malaysia's largest state and about 60% of its 2 million people live in rural areas with very poor road and telecommunications infrastructure (Songan et al 2005). The district of Bario comprises a small group of remote Kelabit communities in the highlands of Sarawak. Only about 1000 people out of approximately 5000 Kelabit remain in the highlands, the rest having moved away in pursuit of jobs and education. Approximately 83 percent of the population is in the actively working group age, with farming being the main occupation. Twenty percent of the population has finished upper secondary education and less than one percent has completed tertiary education. Approximately 29 percent has not attended any formal schooling. The Long Bedian community comprises several ethnic groups, including Kayan, Kelabit, Kenyah, Morek and Punan. The population is approximately 1,700, of which 27 percent finished secondary education and less than five percent completed tertiary education. Approximately 36 percent of the population has not attended any formal schooling. The main occupation is farming.

The e-Bario and e-Bedian projects utilize computers, telephones and VSATs to connect villagers in the remote communities of Bario and Long Bedian to the Internet (Songan et al 2005). The e-Bario project is coordinated by Universiti Malaysia Sarawak and financially supported by the Demonstrator Application Grant Scheme and Canada International Development Research Centre (e-Bario 2004). The project connected the village to the Internet, not only to provide a means for the villagers to communicate with their relatives and others outside Bario, but also 'to identify opportunities for such communities to develop socially, culturally and economically from the deployment of the technologies' (Bala et al 2004, p.116). E-Bedian followed the success of the e-Bario project and where possible utilized the same methodologies.

The researchers realized the importance of engaging and empowering the community, and of placing the emphasis on the people and the process, not the technology. They identified with and learned about life in the village from the community, and the community learned about ICT from the researchers. They adopted a Participatory Action Research (PAR) model, in which community members performed major portions of the research. Data was obtained using a combination of surveys, direct interviews, workshops and discussion groups (Bala et al 2004, p.118).

Based on the experience of the e-Bario project, Bala et al (2002) identified several issues that needed addressing to improve the adoption of ICT in rural areas of Sarawak:

- Costly infrastructure, connectivity and use;
- Language of resources - English is not understood by many people in the rural areas and so the trainer had to simplify the manual and write it in Bahasa Malaysia;
- Coordinated approaches and skilled human resources – the use of ICT-based development in communities requires new skills and approaches from a variety of professions, in particular, researchers need to be able to work with the community;
- ICT awareness in rural communities - the base-line survey indicated that ninety-nine percent of the people in the Bario community had no knowledge of the Internet (Songan, Harris, Bala & Khoo, 2000).

In their analysis of the e-Bedian and the e-Bario projects, Bala et al (2004) conclude that a prerequisite for success and sustainability is the use of a collaborative approach in which the community participates fully in all stages and parts of the project. They also suggest that:

> *Since the information solutions span education, health, commerce, agriculture and culture as well as communications, there is no single agency that carries responsibility or authority for community development by means of ICTs. Instead, a range of agencies needs to be mobilized and coordinated for full benefits to flow to the community (Bala et al 2004, p.124).*

Community Informatics Internet Academy, Rockhampton, Australia

Rockhampton is an Australian regional city with a population of 65,000, which has been the traditional service and administrative centre for a large sparsely populated part of Queensland dependent upon mining, light metals processing, power generation and agriculture. It has comparatively lower levels of formal education, income, and people in the 26-55 year age bracket when compared to both State and National averages (ABS 2000; CQSS 2000). It has correspondingly higher proportions of people over 55 years of age. Despite the city being both the home base for Central Queensland University and it being a substantial base for regional public service administration, home connection to the Internet was approximately 34%, which was 20 points below that of capital cities and substantially below that of rural areas in Australia. Significantly, those over 55 years of age had home connection rates of 16% compared to 44% for the preceding cohort in the 40-55 age range.

In order to overcome what was seen as a major obstacle for Rockhampton to participate in the information society, the University proposed an action research project to introduce ICT for

community development. The initial attempt by the University was confined to a suburb of the target area and was heavily based on the involvement of schools as both adopters and influencers in the local community. The major objectives were to have class, teacher, parent and the Parent and Teacher Association email lists established to facilitate greater involvement through asynchronous electronic communication between all levels in the school community. This failed because the schools did not see a value of involving parents, teachers and students in an open dialogue using Internet technologies. This was despite the fact that the project was able to provide full assistance in establishing the email lists. The schools were mostly part of a state based and hence centralised educational system which did not have operational flexibility to either take the initiatives on or reduce other requirements to provide staff time. Subsequent evaluation determined that project leader credibility and a history of the University starting but not finishing community based projects and 'taking but not giving' were also significant issues.

As a result of reflection and analysis, the second cycle of the action research approach involved aligning the project more at organisational levels in the University (the Faculty of Informatics and Communication) and with the Rockhampton City Council (CEO's office and Mayor). The project commenced in mid-1999, as a joint venture between the University and the Council, in recognition that useful approaches to addressing the digital divide require such partnerships. The project aimed to:

- Provide computer and Internet access and training to members of community groups as a means to increase social participation;
- Measure changes in attitude and behaviour to the use of ICT for community development in individuals and the various community groups as a result of the project;
- Assist community groups develop an integrated approach to the use of ICT for community development.

Joint funding submissions to Government agencies (Federal and State) and business were developed by the Faculty and subsequently funded. The Faculty provided substantial cash contributions to match these funds and to equip the Community Informatics (COIN) Internet Academy in the centre of the city with computers, staff support and accommodation for four Council employees at very reduced rates. To further facilitate an integrative approach, the Faculty agreed that the externally funded staff positions should become a part of the Council staff compliment and report operationally through the Council. This was done with the aim of increasing the understanding of the role of ICT in community development within Council staff and elected representatives.

The COIN Internet Academy was opened in mid 2001 with two project managers, administration support, two post-graduate researchers, a ten-seat training facility and a nine-seat telecentre (Taylor and Marshall 2002). The project used a social learning model to develop learning groups. The participants registered with the COIN Internet Academy not as individuals but as members of a community group. They then attended the Academy with other members of their group for their free training sessions in computer and Internet use. In this way, the sessions were perceived as social activities associated with their community group rather than as daunting classroom experiences.

Initial survey work conducted after six weeks exposure with the commencing group of seniors (targeted as a result of their extremely low adoption rates) found that there was:

- 25% reduction in fear of computers and the Internet;
- 33% reduction in perceptions of difficulty of use;
- 36% increase in defining useful home based applications;
- 25% reduction in cost as an impediment to use and purchase;
- 40% reduction in individual skills as an impediment; and,

- An almost total rejection of the proposition that the Internet was having bad societal effects from an original position of ambivalence.

At the end of June 2003, the COIN Internet Academy had 109 community groups with 951 people registered as members for a wide range of programs including 'train the trainer' programs to provide for wider diffusion (COIN 2004). The University, Rockhampton City Council and the various groups are now collaborating to progressively create a site for vibrant online communities (Capricornia 2004) that extends and supports the development needs of their geo-physical counterparts.

The action research cycle produced a number of learnings. At the outset it was recognised that no one agency (public or private) had the responsibility for increasing the use of ICT for community development. More particularly, the traditional structure of government agencies including local government and educational systems viewed Internet technologies only as an additional tool for existing service provision and this mitigated against the concept of ICT for community development.

Essential to the success of the COIN project was the recognition that the effort must be collaborative with community in neither 'top down' nor 'bottom up' approaches but in a combination described as 'inside out' (Nyden 2001) that recognises the need for existing structures to extend their resources to address integrated community needs in equal partnerships. Change has to be introduced by 'champions' (individuals or organisations) who then have to face the hurdles of legitimacy, organisational embeddedness, resource allocation, and 'turf-protection' from existing stakeholders. Much of the eventual success in establishing the COIN Internet Academy was the result of collaborative championing by individuals in the University and the Council.

CONCLUDING REMARKS

The successful examples of CIS initiatives outlined above relied on partnerships between government, civil society and private sector - the three sectors recognised by the UN in its adoption of the General Assembly Resolution 56/183 to play meaningful roles in the WSIS summits.

Traditionally, local partnerships have been developed between public and private sectors within the confines of an economic development framework. This type of partnership concentrates on economic and infrastructural capital overlooking the potential contribution of social capital (Putnam 2000). This approach concentrates power in the economic, regulatory and administrative domains in respect to local development excluding the third sector, the civil society, from effective participation. Similarly, a cross-sectoral approach involving local government, Universities, private and voluntary sectors in which the agenda is narrowly focused on economic development, tends to disempower or exclude the community (Harris 1996).

In order to address the imbalance of power between governance, the private sector and the community, Schuler (2001) and others including Day (2001) and Gurstein (2000) propose new forms of partnerships, a focus on creating civic intelligence, and acceptance by Universities and local governance of their responsibilities in this regard (Harkavy 1998). A pluralist approach is required that not only addresses issues of politics and power but also provides a mechanism for delivery of community benefit to be legitimised. This can be achieved by using a CIS approach that is based in community, and provides legitimacy for community development, community action as well as service provision through established agencies. The social inclusion agenda that is fundamental to a CIS approach is based on principles of participation, self-actualisation and individual responsibilities to the rest of the community. The issue of new forms of partnership and

community engagement go to the very heart of educational responsibility and local governance. It puts potential of CIS at the centre of not only new forms of community representation but also community participation. It is neither the availability nor necessarily access to ICT that is the limitation to the adoption of a CIS approach. The limitations are to be found within existing structures that were designed to serve community's best interests.

For Universities, a new framework for research is required which addresses the needs of society in the information age and which allows research and practice to be described and linked. In this research construct, the role of the development professional or researcher is to support the empowerment of the people who are part of the project and rather than extract knowledge purely for the edification of other 'experts'; it is a process of collaborative learning that impacts on and is impacted by the process. The success of the university-supported CIS research described in the examples above rested on the use of an 'inside out' (neither top-down, nor bottom-up) collaborative methodology in which the community participates fully. The authors now intend to use this same approach to establish CIS projects in the Caribbean and South Africa. By using such an approach, we acknowledge that the development of local communities cannot be shaped by economics alone, as this is only one element of the human condition that requires communication and participation with others as part of the social fabric. This approach also recognises the rich creativity that exists in local Caribbean and South African communities and that this creativity can be harnessed to ensure the success and sustainability of the CIS project, which in turn empowers the community.

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Building community capacities in evaluating rural IT projects: Success strategies from the LEARNERS Project

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ABSTRACT

Given the current emphasis on the benefits of communication and information technologies (C&IT) for sustainable rural community development, effective evaluations of C&IT initiatives are increasingly important. This paper presents outcomes of a project that aimed to build capacities of people in two Australian rural communities to evaluate C&IT initiatives. The project's participatory action research and participatory evaluation methods were effective in increasing skills and knowledge, and facilitating various forms of empowerment. However, some limitations and disempowering effects and barriers to participation were identified. Based on our critical reflections, we present strategies for successful community capacity building projects and sustainable C&IT initiatives in rural areas.

Keywords: *Building community capacities; participatory action research; participatory evaluation methods; LEARNERS Project; rural communities.*

INTRODUCTION

This paper aims to provide critical insights into the complexity of building community capacities, to evaluate communication and information technology (C&IT) initiatives in rural communities, and to suggest success strategies for future capacity building and C&IT projects. From the results of the 'LEARNERS' project, we make a case for using participatory action research (PAR) (McTaggart 1991; Wadsworth 1998) and participatory evaluation methodologies (Brunner & Guzman 1989; Papineau & Kiely 1996; Rebien 1996) in community capacity building and C&IT projects. We outline the unintended and disempowering, as well as the intended and empowering impacts and outcomes of the project for the rural participants and their communities, along with barriers and issues that can hinder the success of capacity building projects.

The LEARNERS project (Learning, Evaluation, Action & Reflection for New technologies, Empowerment and Rural Sustainability) was conducted from 2001 to 2004 by an inter-disciplinary research team from Queensland University of Technology in Brisbane, Australia.[1] We conducted this project in close collaboration with people and organisations from two rural Shires in southern Queensland and five industry partners from the Queensland and Commonwealth public sectors. A full description of the project and its outcomes is provided in Lennie et al (2004).

The project implemented and rigorously evaluated the use of a capacity building framework known as 'the LEARNERS process' (see Figure 1) by representatives of organisations and groups and community members in the Tara and Stanthorpe Shires. The project aimed to build community capacities in planning and evaluation and through workshops, teleconferences and other activities. These activities sought to facilitate broad community participation in planning and conducting evaluations of local C&IT initiatives such as community websites and information literacy programs. Using PAR and participatory evaluation methodologies and methods, the

project aimed to increase collaboration and cooperation between community groups, to be empowering for participants, and to increase informal leadership skills, particularly for rural women.

The framework which we later labelled 'the LEARNERS process' was developed as part of an earlier pilot project which involved an extensive literature review and conducting focus groups with rural and regional participants to obtain feedback on a prototype evaluation capacity building framework (Lennie, Lundin & Simpson 2000). This project identified that the long-term sustainability of C&IT initiatives was a major issue for rural and regional communities and that better planning, coordination and evaluation of these initiatives was required.

The LEARNERS research team adopted an inclusive 'whole of community' perspective that focused more on the human than the technological infrastructure, and took the local and global context, and the many complex issues and factors involved in achieving sustainability into account. We adopted a critical approach which questioned assumptions about community participation, empowerment and the sustainability of C&IT projects. This approach recognised that there are many barriers to participation and empowerment and that a community members' choice not to participate, or to only participate in a limited way, is one that is legitimate and rational. From earlier research in this field, we also realised that participatory research can have disempowering and unintended effects (Lennie 2001; Lennie, Hatcher & Morgan 2003) and that there is a need to design and implement more rigorous methods for evaluating claims about the empowering effects of PAR projects (Anderson 1996).

Following an overview of the context of the project, including the issues that C&IT raise for sustainable rural communities, we present a rationale for using PAR and participatory evaluation in capacity building and related community development projects. We then outline the methods used in the LEARNERS project and present case studies of the trial of the LEARNERS process in the Tara and Stanthorpe Shires. These case studies provide some contextual information about the communities and their C&IT initiatives, and indicate the extent of community participation in the various project activities. A summary is then presented of the findings from our rigorous analysis of the impacts and outcomes of the project for participants and their communities and the barriers to participation that were identified. From our critical reflections on the project, we suggest principles and strategies for successful capacity building and C&IT projects in rural communities, and learnings for communities, researchers and government workers involved in related projects.

SUSTAINABLE RURAL COMMUNITIES AND C&IT

Governments and rural industry bodies have positioned C&IT as vital to community and economic development in rural Australia (Da Rin & Groves 1999; Groves & Da Rin 1999a, 1999b). C&IT includes the Internet, email, online discussion lists, community websites, teleconferencing and videoconferencing. These technologies are being used for purposes such as accessing education, health and legal services and information, and for business, entertainment, communication and networking. Initiatives such as electronic community networks, community websites and portals and telecentres have recently been established in many rural and regional communities around Australia. Research has shown that, implemented in ways that meet community needs and goals and key sustainability criteria, such initiatives can help rural communities to survive and prosper and to address the increasing 'digital divide' (Geiselhart 2004; Simpson 2001; Simpson et al 2001).

However, despite this positive focus on C&IT, many initiatives have failed. For example, of the 600 plus telecentres established in Australia since the 1990s, only 75% remain today (Geiselhart

2004). With major Australian government funding programs such as Networking the Nation winding down, the continuing feasibility of these projects requires local communities to find ways to make them self-sufficient and economically viable (DCITA 2003).

The long-term sustainability and success of C&IT initiatives is a key issue for rural and regional communities, due to factors such as limited funding and resources and the small, highly scattered populations in Australian rural areas. In addition, rural communities often rely on enthusiastic champions and volunteers to successfully maintain initiatives such as community websites. However, since many of these volunteers are already overcommitted with other responsibilities or may eventually leave the community, this situation may not be sustainable.
C&IT initiatives therefore raise many complex challenges and issues for rural community development and empowerment. Important issues for rural communities include:

- facilitating access to and adoption of new and rapidly evolving C&IT by all community groups and sectors;
- identifying the diverse C&IT access and information literacy training needs of community members and groups;
- securing ongoing funding and resources for initiatives;
- planning, developing and managing projects and initiatives; and
- evaluating what are often quite complex projects and initiatives that use new communication technologies.

Research indicates that developing effective strategies for access and participation that take differences in community needs, and the whole range of local social, economic, environmental and technological factors into account, can provide more equitable access to C&IT. Such an approach can also increase the overall sustainability and success of such initiatives (Simpson et al. 2001; The Rural Women and ICTs Research Team 1999). The value of using a 'triple bottom line' and 'whole of government' approach is demonstrated in a recent report on the sustainability of Australian telecentres (Geiselhart 2004).

Effective planning and evaluation of rural C&IT initiatives is therefore increasingly important. Indeed, our pilot research in rural Queensland indicated a considerable need for more effective planning, coordination and evaluation of C&IT initiatives (Lennie, Lundin & Simpson 2000). This research also suggested that better cooperation and collaboration among rural community organisations was required to enable more effective use of funding, resources, local knowledge and community skills and capacities.

BUILDING COMMUNITY CAPACITIES FOR SUSTAINABILITY

Building community capacities and social capital, developing 'learning communities' and increasing community participation and engagement are significant goals for governments and communities in Australia and overseas (Department of Premier and Cabinet 2002; Faris 2001; Mannion 1996; Mission Australia 2002; Woolcock, Renton & Cavaye 2004). Community capacity building has been defined as 'strengthening the knowledge, skills and attitudes of people so that they can establish and sustain their area's development' (Mannion 1996, p.2). Community capacity is seen as the ability of communities to solve their own problems, make their own decisions and plan their own futures. The aims of such programs are to increase community participation in planning and decision-making, to facilitate sustainable development by building on existing community strengths, and to create communities that are more inclusive, cooperative and self-reliant. The effective use of C&IT in these processes is seen as increasingly important.

The aim of learning communities is closely related to the goals of community capacity building. They involve community members from every sector working together to enhance the social, economic, cultural and environmental conditions of their community (Faris 2001). Engaging in formal and informal lifelong learning is an important element in building learning communities.

Sustainable communities are seen as communities that maintain and improve their social, economic and environmental characteristics so that residents can continue to lead healthy, productive and enjoyable lives (New South Wales Government 2001). The dimensions of a sustainable community include increasing local economic diversity, self reliance, careful stewardship of natural resources, and a commitment to social justice (Bridger & Luloff 1999, p.381). The LEARNERS project aimed to contribute to building community capacities, and to developing sustainable rural communities that value lifelong learning.

THE VALUE OF PARTICIPATORY METHODOLOGIES IN COMMUNITY CAPACITY BUILDING

Participatory forms of research and evaluation have been successfully used in a wide range of education and community development projects, including C&IT projects, for over 30 years (Brunner & Guzman 1989; Fetterman, Kaftarian & Wandersman 1996; Hudson 2001; The Rural Women and ICTs Research Team 1999; Papineau & Kiely 1996). However, many people in rural organisations and groups have limited skills, knowledge and experience in participatory forms of planning and evaluation. The need to build community and organisational capacities in these processes has therefore been increasingly recognised (Boyle & Lemaire 1999; Fetterman et al. 1996; O'Sullivan & O'Sullivan 1998; Khan 1998; Wadsworth 1997).

Participatory action research aims to address both the practical concerns of participants and stakeholders and the goals of research through people working together collaboratively on projects. It is a political process because it entails people making changes together that affect others in their community or organisation. PAR projects seek to enhance democracy, and individual, group, and community empowerment (McTaggart 1991). The process involves ongoing cycles of planning, acting, observing and critically reflecting on projects.

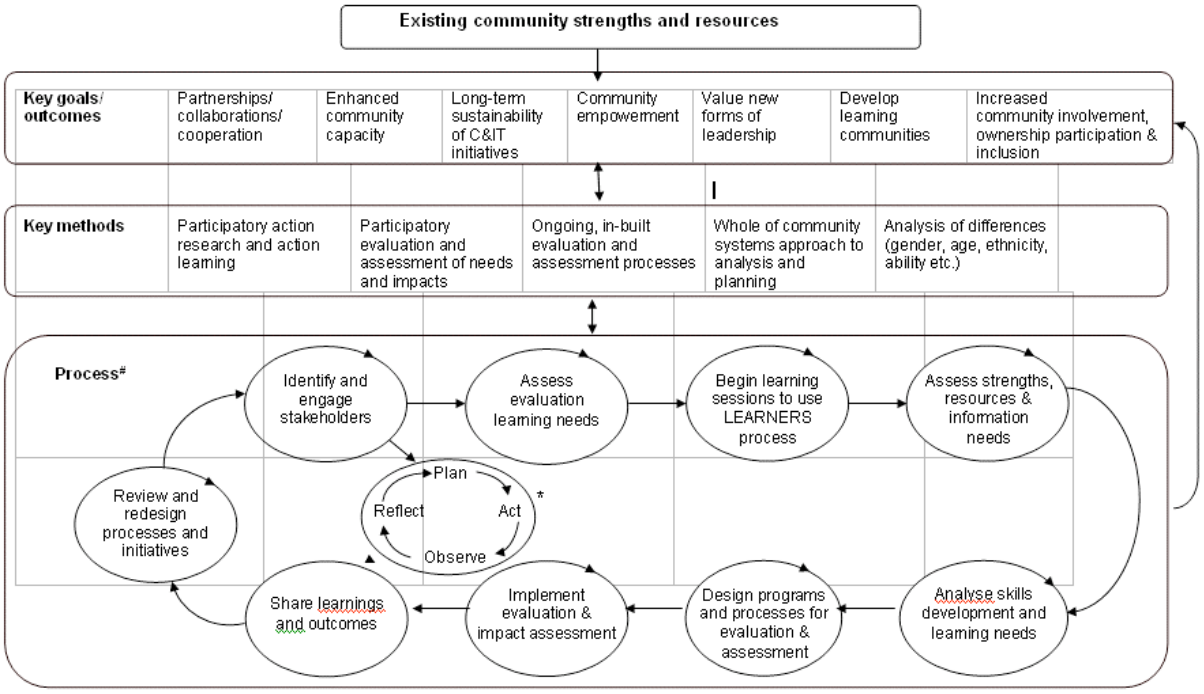
Participatory evaluations have been found to enhance the long-term sustainability and success of programs through building community capacities, and increasing community ownership, inclusion and participation (Brunner & Guzman 1989; Dugan 1996; Papineau & Kiely 1996). In a participatory evaluation, the evaluators are the participants and other stakeholders involved in a project. Researchers, or other professional staff, take on the role of methodological consultants. Participants and researchers usually jointly make decisions about the evaluation. Evaluation is seen as an ongoing learning process and an everyday activity that anyone with appropriate training can do, not just the 'experts' (Wadsworth 1997).

A key rationale for using PAR and participatory evaluation is that they can produce empowerment. This can result in an increased sense of power, confidence and control, which is often the consequence of successful action. Empowerment can happen at the level of the individual, the group and/or the community (Claridge 1996). In the LEARNERS project, empowerment was considered to be a long-term process that people undertake for themselves, rather than something that is done to or for another person. However, others such as community development workers or action researchers can provide valuable support in the process of empowerment. Power was understood in positive terms – 'power to' and 'power with' (Lennie 2001), rather than something associated with domination and control.

THE LEARNERS PROCESS AND PROJECT

Implementation and Evaluation

As Figure 1 suggests, the LEARNERS process that was implemented and evaluated in the project aims to identify and build on the existing skills, knowledge and resources in a community and to facilitate community empowerment and inclusion. Local coordinators for the LEARNERS project were therefore encouraged to invite a broad diversity of community leaders and members to workshops and other activities. People involved in or affected by the local C&IT initiatives that participants chose to evaluate were targeted in particular. Participants were also encouraged to obtain information about relevant differences such as those related to gender, age, and level of information literacy and access to C&IT when conducting evaluations. Such differences were also taken into account in our analysis of the impacts of the project.



\# Not all of these steps have to be followed or undertaken in this sequence. They represent activities that could potentially be undertaken by stakeholders and participants;

* Each of the steps involves a cycle of planning, acting, observing and reflecting.

Figure 1: The LEARNERS Process

In keeping with the use of PAR and participatory evaluation, the research team used a range of qualitative and quantitative methods to conduct and evaluate project activities and to regularly communicate and share information. Various forms of C&IT were extensively used in these activities. The methods used included:

- meetings, workshops, teleconferences and videoconferences involving community participants and industry partners;
- focus group discussions and individual interviews;
- workshop feedback questionnaires;

- participant observations of project activities;
- fieldwork diary entries;
- providing information via the LEARNERS project website: (http://www.learners.qut.edu.au);
- sharing information and obtaining feedback through two email discussion lists; and
- annual critical reflection workshops involving the research team, industry partners and key community participants.

Our use of multiple participation, research and evaluation methods provided a range of rich research data and ongoing feedback, which enabled rigorous validation of the findings and the data analysis. Most of the qualitative data was entered into the NVivo program were it was coded and analysed. Coding an analysis of project impacts used the framework of rural women's empowerment developed by Lennie (2001). Building on the work of Friedmann (1992), this framework comprises four interrelated forms of empowerment: social, technological, political and psychological.

Revisions to the LEARNERS process

The project involved an ongoing process of redesigning both the LEARNERS process and the various project activities so that they better met the needs and interests of participants and collaborating community organisations such as Shire Councils. Feedback from community participants about their need for a simpler, easier to understand version of the process, and more case studies and examples, led the research team to begin developing a less complex version of the LEARNERS process in late 2003. The revised process was a simple four-step evaluation process with key questions, a comprehensive case study of the whole evaluation process, and a variety of other information and resources. This revised process was designed as an online resource kit called 'EvaluateIT' (see http://www.evaluateit.org).[2] The contents of this resource kit, and the outcomes from focus group research on the kit in four rural and regional communities, are outlined in Lennie et al (2004).

CASE STUDIES OF THE PARTICIPATING COMMUNITIES

Based on a number of criteria, including the level of support from the local Shire Councils and the community having some existing C&IT projects, the Tara and Stanthorpe Shires in Southern Queensland were selected as the trial communities. The following case studies provide some contextual information about these communities and the C&IT initiatives they implemented. The extent of participation by various community members in the project activities, and outcomes of the trial of the LEARNERS process are outlined. More detailed information about the various project activities is provided in the Interim Report on the project (see Lennie et al 2003).

Case study of the Tara Shire community

The Tara Shire is located in 'prime hard wheat country' 330 kilometres west of Brisbane. It has nine small townships and settlements scattered in an area of 11,661 square kilometres. When the project commenced the Shire had a population of just over 3,800 people, and the principal town had a population of 1,000. The Shire was identified as being in the top ten most disadvantaged communities in Queensland (Tara Shire 2001). About a third of the community lived in very impoverished circumstances on rural residential subdivisions with few services and facilities. The Shire had some significant communication problems. Not only was there no effective mobile phone coverage but there were ongoing problems with telephone services, and there was no local newspaper or local radio station. Some areas of the Shire only received mail twice a week, the majority of roads were unsealed, and public transport services were minimal.

A combination of these social, economic, technological and geographic factors contributed to a divided community. Additionally, many people were seen as 'apathetic and negative', and there appeared to be minimal proactive leadership. Consequently, the area lagged behind other centres in its development and uptake of new C&IT.

However, the election of a new Mayor and Councillors in 2000 provided positive leadership. The Council instigated new community development initiatives and worked to build a better, more cooperative and pro-active community. Community leaders, particularly women, generated motivation through workshops and successful events such as a multicultural festival. New initiatives that used new C&IT included:

- The Tara Shire Community website (http://www.tara.qld.gov.au), sponsored and managed by the Shire Council.
- Public Internet access at the library.
- A Learning Network Queensland Centre which provided support to distance education students.
- Computer and Internet training courses.
- The 'Cyberflora' project which used C&IT to collaboratively design a public mural in a botanic garden.
- A school website developed by school students.
- After hours access to school computers and the Internet to adults who were taught by the school children.

Given this energy, the Council expressed interest in using the LEARNERS process to assist the community to work together to reach its goals, and to engage in more effective planning and evaluation. Council staff hoped that the process might improve communication across the Shire, as well as training and access to C&IT. The Council's Community and Economic Development Officer agreed to be the local LEARNERS project coordinator. She was assisted by the Council's IT Support Officer, based in the local library.

Eight people (seven women and one man) from various townships participated in the first community leaders' meeting. Twenty-three people (fifteen women and eight men) with a diversity of ages and occupations participated in the first community workshop, which included presentations about local C&IT projects and small group discussions. Participants worked in the areas of education and training, community and youth development, retail, accounting, and agriculture. One was a priest, three were retired and one was unemployed.

The local coordinator later gave presentations about the project at a major community meeting in a township and at a meeting of school principals from around the Shire. Representatives from various townships then participated in an 'email meeting', which nominated two projects that could be evaluated using the LEARNERS process: the Tara Shire Community website, and IT training and access across the Shire. A workshop to plan the evaluation of these projects was held in March 2003 with a small group of committed participants. Later workshops and a teleconference were held to analyse the results of a survey of all Shire residents and to plan key actions to be taken. While interest in the project continued to be fairly high, the loss of the Council's IT Officer in early 2003 had a major impact on local project activities.

The project coordinator reported that she found it 'very hard' to explain the project, and suggested that it needed to be put into 'a lot more user-friendly terms'. While groups such as the school principals 'picked it up straight away', others found the LEARNERS process difficult to understand. Nevertheless, the project had several positive impacts. It helped to improve the networking, communication, and information sharing between various community groups through email and the Shire website. More people in the Shire began using C&IT, particularly email and

the Internet, and some participants identified new ways of using C&IT to overcome communication and distance problems. Participants also gained knowledge and skills in participatory planning and evaluation that they were transferring to other aspects of their community development work. Participants thought they would continue to use and learn from the skills and resources provided through the project. This enthusiasm and growth was reflected in the positive feedback on and suggestions for improving the EvaluateIT resource kit and website provided in focus group discussions with participants.

While some problems were experienced, this case study illustrates that the processes used in the LEARNERS project can be of considerable benefit to disadvantaged communities, particularly those who seek to use new C&IT to facilitate community capacity building and sustainable community development.

Case study of the Stanthorpe Shire community

The Stanthorpe Shire is located 230 kilometres south west of Brisbane in the Granite Belt region. It has two main towns and six villages within an area of 2,669 square kilometres. When the project commenced the Shire had a population of 10,373, and the main town had 5,500 residents. Major industries in the Shire were agriculture, farming and tourism. A significant number of residents were of Italian descent and some did not have strong English literacy skills. The Stanthorpe Shire had good communication systems and was serviced by a local radio station and newspaper. However, there was a lack of public access to the Internet, and a lack of awareness among the business community of the potential opportunities of new C&IT.

Residents were concerned about the number of people who were leaving the area, particularly young people. The retention of young people was considered vital to the community's sustainability. The community was seen as conservative, and somewhat fragmented and reluctant to seek help from outside. As in the Tara Shire, women had taken leadership in many community development and C&IT projects.

The Shire Council implemented a range of economic and community development initiatives that used new C&IT. They included:

- The 'GraniteNet' website and virtual community project (http://www.granitenet.net.au), managed by the Stanthorpe Shire Council. Residents could join 80 diverse online community groups or start their own interest group; community and business users could also build their own websites, accessed through the GraniteNet site.
- The Shire of Stanthorpe website (http://www.stanthorpe.qld.gov.au) which provides access to Council services and information.
- The Stanthorpe Community Learning Centre initiative which aimed to become the hub of learning in the area and provide access to a range of education and training courses and communication technologies.
- A Learning Network Queensland Centre located in the Stanthorpe High School.
- Computer and Internet training courses.

The GraniteNet Project Officer and the Community Learning Centre consultant agreed to be the local LEARNERS project coordinators. Seven people (five women and two men) from various community organisations participated in the initial steering committee meeting. The steering committee participated in the first community workshop, which involved ten women and three men. This group was younger and less diverse than the first workshop group in Tara. Participants worked in the areas of education and training, community and economic development, and local

government. Several participants expressed disappointment about the lack of broad community representation.

These workshop participants identified establishing the Shire as a Learning Community as a key area of interest. Additional meetings and workshops were held to commence planning activities. Participants were encouraged to join the Lifelong Learning interest group on the GraniteNet site to facilitate communication and information sharing. Gradually, new participants joined these activities.

A workshop involving eighteen people (fourteen women and four men) was later held at which vision statements for a Learning Community were developed. However, while some participants were happy with the workshop process and outcomes, others wanted to work on short-term projects and were unclear about where the project was heading. Feedback also indicated that some workshop participants felt 'patronised' because their facilitation skills were not recognised. Maintaining motivation and interest was a key issue. Difficulties related to the ownership and control of the project were also evident. The local project coordinators and participants were confused about how the LEARNERS project fitted with the Learning Community project and wanted more participation by the research team in community activities. Problems were also experienced with involving the business community and people in service clubs and schools.

In early 2003, a small core group began planning and conducting an evaluation of the Lifelong Learning Group's website on GraniteNet as a pilot project. The mostly positive feedback from this successful evaluation helped to increase motivation among the local group. A workshop was later held to collaboratively analyse the data from an online survey of the Lifelong Learning Group members and to critically reflect on the evaluation process. Actions to be taken, based on this analysis, were agreed to.

While a number of disempowering and unintended impacts were experienced, participants indicated that the project improved communication and networking between community groups and organisations, and facilitated the formation of a core group of people enthusiastic about developing the Shire as a Learning Community. Several core group participants reported that their skills and knowledge of participatory planning and evaluation had increased. As in Tara Shire, participants provided very positive feedback on the EvaluateIT kit, which was successfully used in July 2004 to begin evaluating the new Stanthorpe library website.

SUMMARY OF THE PROJECT'S OUTCOMES AND IMPACTS

Our analysis suggested that the project's aim of facilitating participation, empowerment and capacity building in planning and evaluation was met, to varying degrees, for those who actively participated in the project over its duration. Participants in both communities were found to have experienced the four forms of empowerment used in the analysis: social, technological, political and psychological, to different degrees. However, some negative and disempowering impacts and effects were also experienced. They included initial misunderstandings and confusion about the project, problems with using technology to participate and communicate, and frustration due to factors such as having a lack of time and capacity to participate. Outcomes and impacts were particularly positive in the Tara Shire, which was considered to be a disadvantaged community.
The extent of community capacity building achieved by the project was somewhat limited due to the fairly low number of participants who were actively involved over the duration of the project, and other issues and barriers related to participation and empowerment. However, the feedback we obtained suggested that various ripple effects of this capacity building were experienced. They included using the skills developed in the project in other community contexts and making greater use of C&IT for communication and networking.

In both communities, a larger number of people participated in initial project activities while a smaller core group maintained involvement. As in the community capacity building project reported by O'Meara, Chesters & Han (2004), involving a wide diversity of community members and organisations was problematic. A large proportion of participants were women in the 40-59 age group with a white and/or Anglo-Celtic ethnicity. Many participants worked in the areas of community development, education and training or local government, in both paid and voluntary positions. Some participants in both communities held formal leadership positions in local government, community or business groups and organisations.

Most of the core group participants in both communities had a high to moderate level of existing skills, experience and knowledge in areas related to the project and in using C&IT such as email and the Internet. However, most of these participants increased their knowledge and understanding of participatory planning and evaluation. They also gained new knowledge and ideas about C&IT and strategies for improving local C&IT initiatives and making them more sustainable. Several participants and some community organisations made new or greater use of technologies such as email for community development, communication and networking purposes, particularly in Tara. For example, the Community and Economic Development Officer in Tara Shire gained more confidence and skills in using email and successfully used this technology to collaboratively prepare a major funding proposal for public Internet access with others who were scattered around the Shire. While some problems remain, the Tara Shire Community website and other communication and information sharing methods in the Shire were considered to have improved considerably. Skills and confidence in using email and other technologies were also considered to have increased significantly among the Tara participants.

Several active participants in both communities, particularly women, enhanced their leadership and networking activities and obtained and shared valuable new information. Some participants and industry partners also gained a broader or different perspective on the communities and a better understanding of their issues of concern. While there was some confusion about the LEARNERS process and the purpose of the project in its early stages, the workshops enabled community members to give voice to key issues of concern or interest related to communication systems, lifelong learning and C&IT access and use. The formation of the successful Learning Community Project group in Stanthorpe was seen as a key outcome of the project in this area. This group continues to meet regularly to plan activities.

BARRIERS TO CAPACITY BUILDING AND PARTICIPATION

We identified a complex range of issues and barriers related to community participation, empowerment and capacity building from our analysis of the multiple sources of data collected in the LEARNERS project. Many of these barriers have been identified in similar projects (Boyce 2001; Lennie 2001, 2002; O'Meara et al 2004; The Rural Women and ICTs Research Team 1999; Scott, Diamond & Smith 1997). As well as the factors already discussed in this paper, such as the misunderstandings and confusion about the project experienced by some participants, other important issues and factors identified by several participants were:

- a lack of time and/or capacity to participate due to factors such as undertaking both paid work and substantial volunteer community work;
- fear of computers and other technologies;
- lack of access to, or limited experience with, technology;
- divisions within the community; and

- some new community members feeling that they were not part of the community.

Other factors mentioned by a smaller number of participants included:

- the distance required to travel to workshops and other activities, particularly in the Tara Shire;
- the loss of key 'champions' in the community, such as the IT Support Officer employed by the Tara Shire Council;
- low literacy levels;
- lack of IT training and support;
- lack of confidence and experience with C&IT; and
- the social and economic effects of natural disasters such as drought and bushfires.

The limited resources available for the project was a further factor that affected the team's ability to address some of the issues identified above. These issues and barriers indicate important contextual issues that need to be considered when conducting capacity building and C&IT projects in rural areas.

PRINCIPLES AND STRATEGIES FOR CAPACITY BUILDING AND C&IT PROJECTS

Our analysis of and critical reflections on the LEARNERS project led us to consider the principles or strategies that communities and researchers might use to successfully conduct and evaluate PAR and capacity building projects and C&IT initiatives for sustainable development, particularly in rural, regional and remote areas. We identified the following principles and strategies:

1. Carefully and critically reviewing the assumptions of researchers, participants and the people and organisations they are collaborating with.

In particular it is essential to consider suppositions about:

- the amount of time that participants may need to engage in project activities;
- the level of resources required for researchers and communities to complete activities effectively (eg. financial, staff, infrastructure, etc);
- the positive and negative effects of volunteering, especially in rural and remote locations; and
- the agendas and goals of community participants, researchers and collaborating partners, which could be quite different.

Consideration of these issues is essential when collaborating with communities that are small, isolated and disadvantaged. For example, in such communities there may be limited resources and the pool of volunteers might be small, resulting in volunteer burnout and the potential for well meaning advocates to take over the local project agenda with other, alternative agendas.

2. Challenging the idealism that sometimes exists in PAR projects.

Such idealism could be related to certain beliefs, including that:

- there is a widespread desire for participation within a community;
- participation will lead to empowerment;
- consensus can be achieved within that community, and between participants and researchers; and

- all community members are equal, especially in relation to their capacity and power to be heard and to influence the direction of the project.

A lack of ownership and control significantly reduces the likelihood that community capacity will be built and that sustainable community development will occur.

3. Considering the choice of local champions carefully.

While it is necessary for researchers to identify and involve local champions in projects, they need to choose them carefully. This can assist in:

- ensuring better resourcing of the initiatives that communities choose;
- reducing the likelihood of volunteer burnout;
- enhancing participation in the project and its level of inclusion;
- circumventing powerful individuals and groups gaining control of the agenda; and
- preventing well-meaning champions from taking over the project with a different agenda.

The ideal local champion or project leader needs to:

- believe that capacity building processes can help address their strategic needs and issues;
- be committed to their community and to using empowering, capacity building processes;
- have sufficient time, resources and support to implement these processes effectively;
- have good networks and networking and communication skills; and
- have the ability to explain or 'translate' capacity building processes to a variety of community groups and individuals.

4. Identifying or finding key community members and leaders with an interest in the project and personally inviting them to participate.

This strategy will assist researchers in not relying on the champion to choose all of the participants, and working with existing local leaders, thereby enhancing the credibility of the project within government, community and business organisations. Nonetheless, achieving these outcomes requires the project to be adequately resourced.

5. Identifying relevant skills and roles participants want to undertake.

People in rural and regional communities have a wide diversity of existing skills, knowledge and experience in areas such as planning, organising, facilitation, communication and evaluation. It is important to identify and validate the particular skills and capacities of participants and to consult them about the type of roles they would like to undertake in evaluations and capacity building projects.

6. Building on existing local projects.

Given the often limited funding and resources available for community capacity building and C&IT projects, it is often useful to build on other related projects in rural communities. However, care needs to be taken so that confusion about different community projects does not arise.

7. Developing a plan to maintain momentum when projects go wrong.

Both researchers and participants need to recognise that things can go wrong in PAR projects and that they need to have a plan to maintain momentum when such events occur. Examples of these events are a technique not working, an anticipated outcome not eventuating, a negative evaluation, and the effects of natural disasters such as bushfires or drought. Strategies that might be useful here include:

- getting the timing of key project events right;
- building on existing local activities and networks, including everyday events;
- developing relationships between researchers and participants, and among participants which are based on trust and open communication;
- regularly reviewing goals and outcomes; and
- community groups employing key staff such as community development officers and information technology specialists to assist with project activities.

8. Making effective use of C&IT in action research projects.

A key question in working with rural communities, is whether C&IT projects can be effectively conducted at a distance. Our findings indicate that a period of prolonged face-to-face contact is required before significant activities can be successfully conducted at a distance. However, once relationships have been successfully built through face to face communication, project activities need to make effective use of C&IT. A good example is researchers and participants using email to maintain contact, organise project activities, and obtain feedback on activities. A further example is the LEARNERS project's successful use of conferencing technology to conduct annual critical reflection workshops involving all of the communities and stakeholders involved in the project.

9. Actively involving people in the project with technical capability, or who have access to C&IT resources and take responsibility in this area.

This strategy is important to making the most effective use of C&IT and the C&IT resources of communities and partners in the project.

10. Ensuring that the technologies chosen are relevant to the needs, interests and goals of the participants.

This strategy is necessary if technology is integral to the project. However, those community members without effective access to C&IT need to be considered.

11. Providing a very clear initial explanation of the project.

For learning to occur and anticipated outcomes to be achieved, it is essential for researchers to ensure that their initial explanation of the project is very clear to participants. A key message from participants in the LEARNERS project was that this explanation be kept simple and free from

jargon. Yet researchers need to be mindful that those with more extensive prior knowledge of the methodology, terms and processes being used are considered.

12. Achieving clarity about what researchers and participants mean by sustainability.

It is essential that researchers and participants are clear about what they mean by sustainability. This clarity must encompass what is to be sustainable. For instance, is the focus on C&IT specifically? Is it on community development? Does it relate to a wider process or does it compass C&IT, community development and the wider process?

In addition to the issue of clarity, factors in achieving sustainable C&IT initiatives for community development that we have identified include:

- leveraging micro-business enterprise development off government-funded technical and human infrastructure provision;
- building on local industry strengths;
- learning from global experiences whilst building on local assets;
- finding innovative business models to capitalise on new opportunities for content and applications;
- ensuring community involvement in deciding, planning and evaluating projects; and
- adopting a learning approach through cycles of evaluation based on action research processes that build capacities in planning and evaluating C&IT projects (Hearn et al. 2005).

LEARNINGS FOR RESEARCHERS AND GOVERNMENT WORKERS

In addition to the principles and strategies identified above, the following significant learnings from the project were identified for other researchers and government workers involved in PAR, C&IT and capacity building projects:

- Taking the macro and micro contexts of projects into account can increase awareness of important contextual and policy issues that can affect the successful implementation of these projects in rural communities and their sustainability.

- Implementing and evaluating capacity building projects requires addressing issues related to gender and power, other differences such as age, ethnicity and skill level, and diversity within communities. Successful projects are inclusive of the whole diversity of people in a community, including women and men, younger and older people, indigenous people, and people from various community sectors.

- The important informal leadership of rural women, their contribution to sustainable community development and social capital building, and their key role in C&IT uptake, needs to be more widely recognised, validated and supported.

- Developing and implementing strategies for more wide-spread adoption and use of C&IT is required before these technologies can be effectively used in capacity building and community development projects.

- To develop relationships with participants based on trust and open communication, researchers and project partners need to actively participate in activities such as community

workshops and meetings. This can result in mutual understanding about key issues of concern and shared learnings about the community and broader government policies that may be impacting on the community.

- Effectively managing and conducting PAR projects requires a wide range of skills, knowledge and abilities, including high level facilitation and communication skills; and the ability to translate key concepts into everyday language and simple, practical examples. Rigorous, ongoing evaluations of project activities and impacts are also required that are grounded in an awareness that PAR and evaluations are political processes that can have unintended or negative effects.

- Successfully conducting PAR and capacity building projects can require significant time, energy and resources which may not always be available. However, using effective planning and democratic decision-making processes can make better use of the time available. Email can also be effectively used to organise project activities and rapidly gather feedback on issues.

- Concepts such as 'evaluation' and 'community capacity building' may need to be demystified. For example, some participants may see evaluation as a judgemental activity that could highlight shortcomings in their projects, rather than a learning process that can help identify strategies to better meet community goals and needs.

- As well as building skills in planning and evaluation, capacity building and participatory evaluation projects also need to assist community members to identify funding and resources to implement the strategies for improvement and action identified by community members.

CONCLUSION

The outcomes of the LEARNERS project strongly suggest that PAR and participatory evaluation methodologies can be effective strategies for building community capacities, facilitating various forms of empowerment, and identifying strategies to increase the sustainability and success of rural C&IT projects. However, due to inequalities in power and knowledge, the different agendas of researchers and participants, pre-existing networks and alliances in small rural communities, and other complex issues and factors, the use of these methodologies can also produce unintended and disempowering effects. In the LEARNERS project they included a perceived lack of control of project activities, confusion and misunderstandings due to factors such as the unfamiliar language used, and frustrations due to poor quality C&IT or limited access to C&IT.

Our findings suggest that facilitating rural women's empowerment is integral to the success of future capacity building programs in rural and regional areas, given their significant leadership roles in community development and C&IT projects and in the uptake of new C&IT (The Rural Women and ICTs Research Team, 1999; Wells and Tanner, 1994). Given the growing importance of effective access to and use of C&IT in rural community development, increasing the technological empowerment of community members is a further important goal.

Outcomes of other research indicate that capacity building, skills training and mentoring can strengthen the link between participation, empowerment and sustainability (Lyons, Smuts & Stephens 2001). A number of contextual factors are also crucial to the sustainability of community development projects, including local politics and the community structure (Lyons et al 2001). As the findings of the LEARNERS project demonstrate, there are many complex issues and barriers that need to be addressed to more effectively facilitate community participation, empowerment and capacity building in C&IT projects and in their evaluation. From our critical reflections on the

LEARNERS project we have proposed principles and strategies that may assist researchers, government workers and communities to plan and conduct more effective PAR and capacity building projects and ongoing evaluations of C&IT initiatives that involve a broad diversity of community members and stakeholders. Our research findings suggest that implementing these strategies and conducting ongoing participatory evaluations should contribute to increasing both the sustainability of C&IT initiatives and rural communities.

Endnotes:

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A culture-based model for strategic implementation of virtual education delivery

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ABSTRACT

This study was designed to examine the critical success factors for implementing Virtual Education Delivery (VED) in Thailand, and to identify ways to facilitate such adoption and lead to effective outcomes. The study incorporated an analysis of three specific factors related to Thai culture: high power distance "Bhun Khun", uncertainty avoidance "Kreng Jai" and, collectivism "Kam Lang Jai". This paper reviews the development of the research model, describes the conceptual underpinning of the cultural model and presents the findings of the study. A strategic framework for successful VED implementation is proposed and can be modified for any cultural environment. In addition an audit instrument was developed for evaluation and review of VED outcomes on an ongoing basis.

Keywords*: Virtual education delivery; cultural impacts on IT; ICT in Thailand; implementing virtual education*

INTRODUCTION

An accelerating demand for mass higher education is driving universities to change from their traditional classroom setting to long distance delivery models (West and Hore 1989; Sherry 1996; Davies 1998; Peraya 2001). However, long distance has obvious limitations particularly with regard to on-going student engagement and has led Universities to embrace more interactive instruction models through on-line delivery (Bates 1993). This has led to widespread adoption and diffusion of Information and Communication Technologies (ICT) within the education sector and a new globalised vision for education delivery.

Over the last decade, many organisations have adopted the strategic concept of the 'virtual organisation' as an alternative business model to gain competitive advantage (Goldman et al 1995; Graenier and Metes 1995; Mowshowitz 1997; Venkatraman and Henderson 1998; Leimeister et al 2001; Burn et al 2002; Walters 2004). Increasingly, this is a model being considered by Universities to allow them to extend their markets across widely distributed populations and reap the benefits of economies of scale (Castells 1996; McFadzean and McKenzie 2001; Clarke and Hermens 2001). Thailand is a case in point where this model is under development.

In 2004 the estimated population in Thailand was 65 million (Nationbynation 2005) Of these there are approximately 7 million who have accessed the Internet (an increase of 100% from the

estimates for 2003) (Internetworldstats 2005). This growing number of Internet users may have an enormous impact on Thai society and, as the Internet becomes more socially significant, on Thai education (Tao 2001). There are a number of Thai universities such as Chulalongkorn University, Ramkhamhaeng University etc., which have begun to investigate virtual education delivery systems and moved to an instructional model which allows the instructors, learners, and content to be located in different non-centralised locations by using ICT networks. However, there are some major issues related to the management of the system as an educational tool and these critically influence success in implementing Virtual Education Delivery (VED) in Thai universities.

This study aimed to determine the factors leading to success in establishing a Thai VED and examines the implementation in four universities. Critical success factors are evaluated and inhibitors identified. The specific questions addressed are:

- What are the factors influencing effective implementation of VEDs in Thailand?
- How do these factors facilitate successful implementation?
- How can these be incorporated into strategies for implementation in the context of Thai culture?

The paper reviews the development of the research model, outlines the research approach adopted and summarises the results from both stages of the study. Finally, a model for future implementations and ongoing evaluation of VED effectiveness is proposed and an audit checklist designed as an integral part of a new strategic planning cycle.

REVIEW OF SUCCESS FACTORS

According to Alexander and Mckenzie (1998), VED success factors can be classified under 3 categories: improved quality and productivity of learning, and enhanced student perception of learning. Table 1 summarises the indicators used to determine levels of success within this study.

Table 1: Indicators used to determine the success of VEDs

Characteristics of successful VEDs	**Indicators used to determine the success**
Quality of learning	A variety of learning styles that meet students' needs (Borthick and Jones, 2000). Ability to move through learning materials that meets students' needs (Borthick and Jones, 2000). Adequate information and contents that meet students' needs (Dulworth, 1996). Accessibility to learning.
Productivity of learning	Creation and sharing of new knowledge (Alexander and McKenzie, 1998). Provide collaborative technologies to share knowledge. Encourage lecturers and students to share ideas and insights.
Positive Lecturer and student attitudes to teaching and learning	Perceptions of lecturers and students in an interactive VED courses (Alexander and McKenzie, 1998).

These factors were evaluated against a theoretical framework developed by Hiltz (1994) identifying four major approaches which could lead to success in the implementation of VED: technological determinism, the social psychology of users, human relations in organisation and the cultural context (Figure 1).

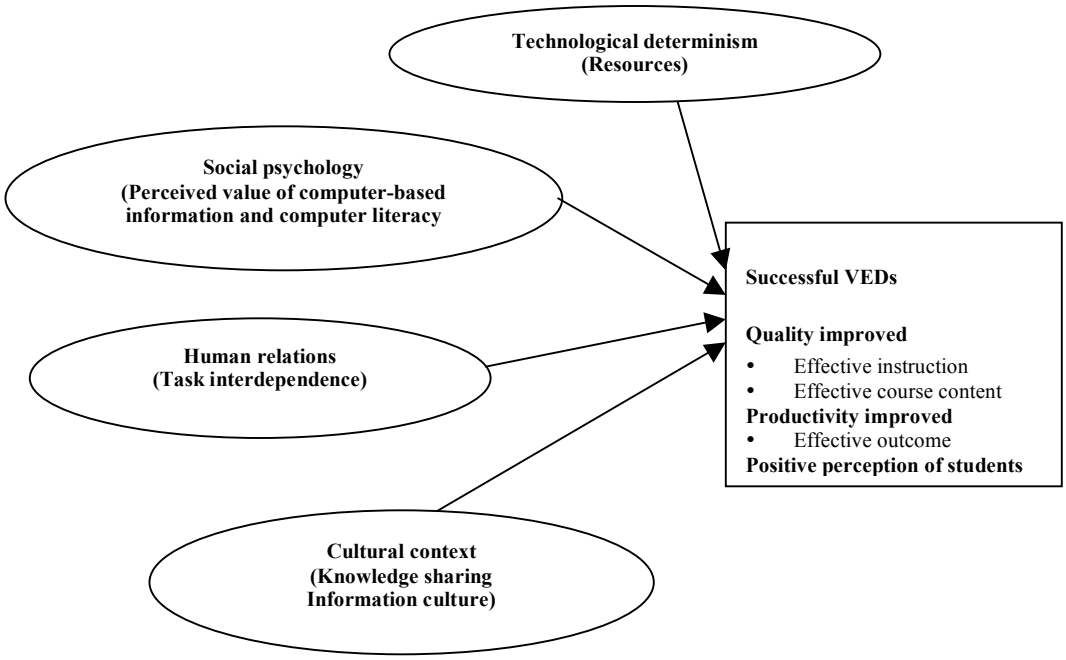

Figure 1: Evaluating Success Factors

These factors are summarised below and those implicit to the Thai context are further expanded.

FACTORS AFFECTING VED DEVELOPMENT AND IMPLEMENTATION IN THAILAND

Resources

The resources include all hardware and software but also the efficiency and effectiveness of system design and implementation (Mowshowitz 1997).
Computer literacy and Perceived value of computer-based information
This affects both students and lecturers with respect to their expectations from ICT enabled information but further impacts on their abilities to use ICT (Larson and Bruning, 1996; McCollum 1997; Jarvenpaa and Staples 2000).

Size of market

Significant market size is needed to provide sufficient financial return to maintain and upgrade the quality of VED courses (Bodain and Robert 2001; Green 2000).

Task Interdependence

A successful VED requires agreement of members including academics in each major unit. They must perceive its usefulness and collaborate to provide alternative learning styles. Members in Universities must be comfortable with discussion and open decision making to provide education on the Internet (Rada 1997).

Information culture

Information culture refers to values and attitudes about information processing, publishing, and communication. Staff and students characteristics and environments such as the institutional context influence information values and attitudes in many ways (Davenport 1997). A VED can utilise various types of information media such as electronic mail, discussion board, videoconference, web-based learning and etc., but student's preferences will be different (Jarvenpaa and Staples 2000).

Shared knowledge and competence of administrators, students and lecturers

Knowledge sharing is an interpersonal interaction involving two actions: representation, which refers to the ability of an individual to introduce their knowledge and subordination which, is the ability to accept or absorb another's knowledge (Davenport and Pruzak 1998; Erich and Williams 1998). Representation and subordination in VEDs, will have an affect on administrators, lecturers and students in their approach to knowledge sharing (Shore and Venkatachalam 1996). In particular, Thai culture will impact on this interaction. According to Hofstede (2001), Thai cultural issues, which can be viewed, as barriers to knowledge sharing are high power distance, high uncertainty avoidance and collectivism.

High power distance

High power distance is the first cultural barrier to knowledge sharing for Thai people (Komin 1990; Mckenna 1995; Rohitratana 1998). This refers to the acceptance of a hierarchical authority system with an emphasis on status differentiation and unequal power distribution. Thai subordinates usually accord respect and feel obligations to their superiors as a father figure in their family (Mckenna 1995). This kind of relationship between those who are in higher positions and their subordinates is called " Bhun Khun" (Holmes and Tangtongtavy 1995). This might obstruct the process of transferring knowledge through university networks, such as e-mail or discussion board since students are not encouraged to express their ideas to solve problems and lecturers are unlikely to oppose any ideas or opinions expressed by senior administrators.

High uncertainty avoidance

Thai people are characterised as having high uncertainty avoidance (Hofstede 2001). This refers to being threatened by ambiguous situations and trying to avoid challenging experiences. Thais seek certainty in their relationships and are normally reluctant to be the cause of discomfort to others. This trait can be expressed by the Thai word " Kreng jai" (Rohitratana 1998). Kreng jai refers to "an attitude whereby an individual tries to restrain his own interest or desire, in situations where there is the potential for discomfort or conflict, and where there is a need to maintain a pleasant relationship" (Holmes and Tangtongtavy 1995). Subordinates in Thai organisations

accept that their superiors make correct decisions and carry these out unquestioningly (Thanasankit and Corbit 2000). Kreng jai can be a serious impediment to knowledge sharing where a conflict situation may be implied (Trompenaars and Hampden-Turner 1998).

Collectivism

Thai culture is recognised as collectivist rather than individualist. The sense of collectivism in Thai people is strong as a consequence of their living in extended families (Hofstede 2001). Thus, the dependency relationship between the person and in-groups is stronger than in out-groups. They usually hold views and opinions respecting the group and this plays a vital role in their learning styles (Hallinger and Kantamara 2001). This is expressed in Thai as “Kam lang jai” and refers to the spirit and moral support in-group members provide to encourage self-confidence in students and promote knowledge sharing (Hallinger and Kantamara 2001).

THE RESEARCH MODEL

A theoretical research model, which incorporates the factors that facilitate the success of establishing an implementing of Thai VEDs, is shown in figure 2. The main focus of this study was to investigate the factors that have a critical impact and how these factors can facilitate the establishment and implementation of Thai VEDs.

Research Methodology

A multi-method research approach including quantitative and qualitative methods was chosen because of the nature of the participants and the scope of the problem. The study used both a survey and case studies conducted through a series of interviews. The survey and interviews were conducted in the Thai language with professional translators validating the instruments and responses. Students completed the surveys whereas the interviews were conducted with instructors, administrators and IT support in each of four Thai Universities.

The survey was developed from relevant research and based on the theoretical framework. This was administered to 240 students in four Rajabhat Institutes. 167 valid responses were received giving a response rate of 69.5%. Multiple regression analysis was used to test the relationships between dependant and independent variables. The dependant variable was the success of VED interpreted in terms of the effectiveness of quality, productivity and student perception of their courses. Independent variables were resources, computer literacy, perceived value of computer-based information, culture and information culture.

Multiple case studies through structured interviews were utilised in four Rajabhat Institutes and involved lecturers, administrators and IT support in each. These were analysed through conceptual cluster matrices and then by cross-case analysis to address similarities and differences across the group. Finally the results from the survey stage were analysed against the results from the case studies and an integrated cross-case comparison developed. The results from these several stages were used to refine a new model of VED success and to create an audit tool for use in evaluation of VEDs.

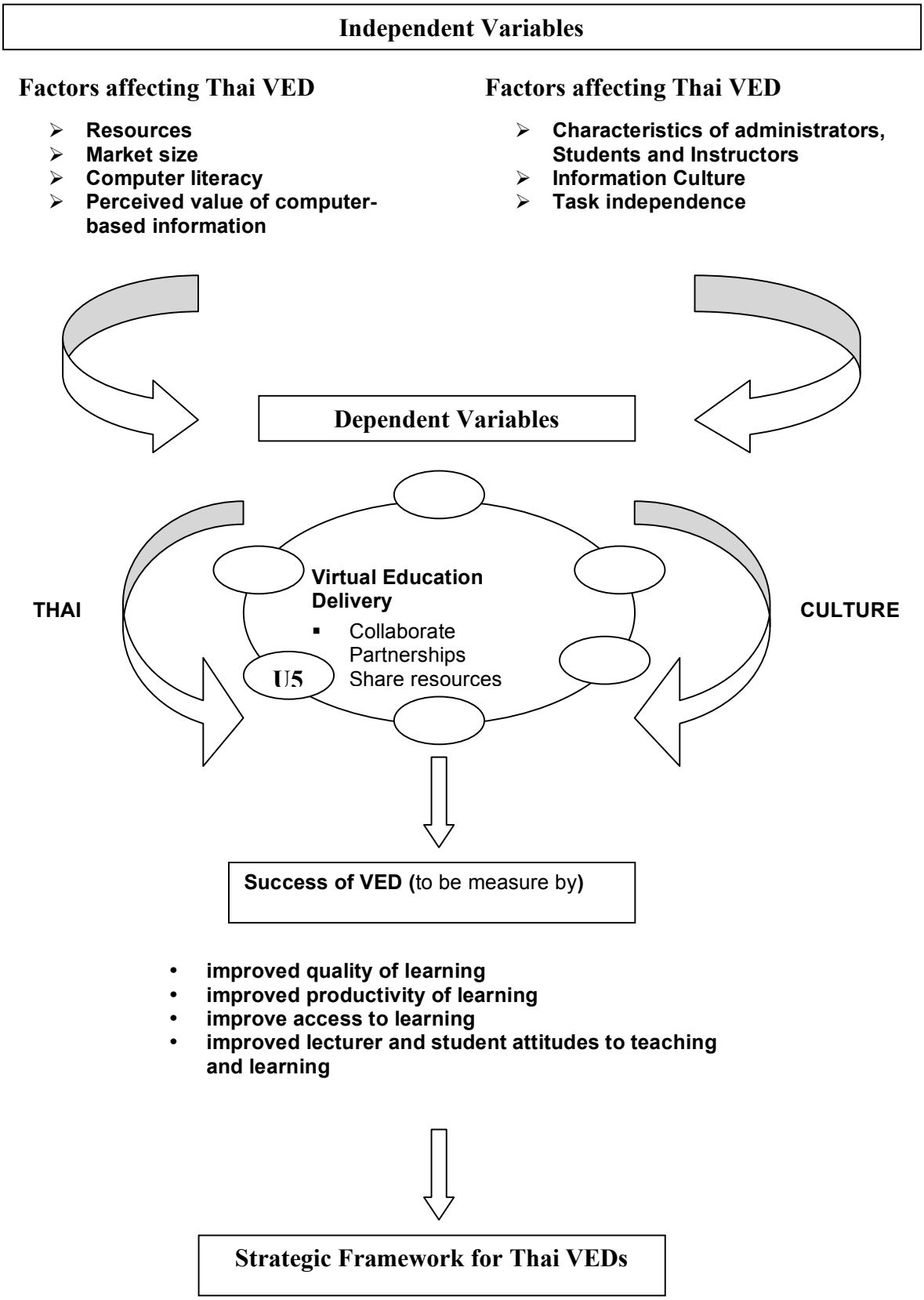

Figure 2. The research model of factors affecting Thai Virtual education

The Research Hypotheses

Hypothesis A: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the perception of Thai VEDs;

Hypothesis B: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of instruction of Thai VEDs;

Hypothesis C: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of course content of Thai VEDs;

Hypothesis D: The five factors: resources, computer literacy, perceived value of computer-based information, characteristics of students'culture and information culture will significantly influence the effectiveness of outcome of Thai VEDs.

DATA ANALYSIS AND DISCUSSION OF FINDINGS

Cronbach-Alpha was used to test the degree to which items were independent measures of the same concept and correlated with one another (Cavana et al 2001). The reliability coefficient of all research variables averaged 0.9083 implying that the research variables were reliable (Bryman and Cramer 1999). Construct validity was obtained through a thorough grounding of all questionnaire items within the existing literature (Cavana et al 2001; Creswell 1994; Yin 1994). Pearson's Correlation Matrix was used to test discriminant validity. The data showed low multi-collinearity (<0.5). This implied that all questions were valid and loaded more highly on their intended concept than on other concepts (Taq 1997).

Table 2 Characteristics of student participants

Characteristics	Percent
Gender	
Male	56.3
Female	43.0
Age	
18-24 years	82.8
25-34 years	13.9
35-44 years	1.3
Mode	
Normal	62.9
Weekend	35.8
Faculty	
Education	0.7
Management Sciences	11.3
Technology & Industrial Science	25.2
Humanities and Social Science	4.0
Science and Technology	57.6

Multiple regression analysis was used to test the hypotheses and the following results obtained.

Student perception of VED

Table 3: Results of Regression Analysis-Student Perception of VED

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	3.246	3.290	0.372	0.139	.097	.953		
Resources						.033	.020	.829
Computer literacy						.159	-.038	.673
Perceived value of computer-based information						.036	.180	.042*
Culture								
- high power distance						.096	-.106	.213
- high uncertainty avoidance						.085	-.089	.323
- collectivism						.131	.053	.517
Information culture						.065	.325	.000**

Dependent Variable: Perception of VEDs

The outputs in Table 3 show the seven independent variables that were entered into the regression model, the R (0.372) which was the correlation of the seven independent variables: resources, computer literacy, perceived computer-based information, high power distance, high uncertainty avoidance, collectivism and information culture. The dependent variable in this section was the student perception of VEDs. The interrelation of the seven independent variables was taken into account, and the R square (0.139) was significant at the 0.003 level (F value = 3.290). That means that 13.9 percent of the variance (R square) in student perception of VEDs was significantly explained by the independent variables. Among seven independent variables, information culture is the most important in explaining the variance in the perception of VEDs as the highest beta (β) value was 0.325. The second-ranked variable was perceived value of computer-based information with a beta (β) of 0.180. The positive beta weight indicated that if student perception was to be increased enhancing information culture by supporting useful material content on-line, e-mail discussion and supportive university contexts and perceived value of computer-based information would be necessary.

Effectiveness of instruction

Table 4: Results of Regression Analysis-Effectiveness of instruction

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	2.341	5.787	0.470	0.221	.182	1.176		
Resources						.041	.169	.054
Computer literacy						.196	-.097	.259
Perceived value of computer-based information						.044	.105	.210
Culture								
- high power distance						.118	-.125	.122
- high uncertainty avoidance						.104	-.295	.001**
- Collectivism						.161	.025	.745
Information culture						.080	.211	.008**

Dependent Variable: Effectiveness of instruction

The outputs in Tables 4 show the seven independent variables that were entered into the regression model, the R (0.470), which was the correlation of the seven independent variables with the dependent variables: the effectiveness of instruction. The interrelation of the seven independent variables was taken into account, and the R square (0.221) was significant at the 0.000 level (F value = 5.787).

That means that 22.1 percent of the variance (R square) in the effectiveness of instruction can be significantly explained by five independent variables. Thus, hypothesis P21-H_0 was substantiated (the null hypothesis was rejected).

Among seven independent variables only culture: high uncertainty avoidance and information culture was significant at the 0.001 and .008 level respectively. The results mean that culture: high uncertainty avoidance was the most important in explaining the variance in the effectiveness of instruction (β= 0.295). The second most important variable was information culture with a beta (β) value of 0.211. The positive beta weight of uncertainty avoidance indicated that students preferred their learning to be controlled by instructors rather than learning by themselves. In addition if the effectiveness of VEDs instruction were to be increased, enhancing information culture by supporting useful material content on-line, e-mail discussion and supportive university contexts would be necessary.

Effectiveness of course content

Table 5: Results of Regression Analysis-Effectiveness of course content

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	-.009	8.751	0.548	.300	.266	.474		
Resources						.016	.281	.001**
Computer literacy						.079	.036	.655
Perceived value of computer-based information						.018	.167	.036**
Culture								
- high power distance						.048	-.213	.006**
- high uncertainty avoidance						.042	-.064	.432
- Collectivism						.065	.156	.034**
Information culture						.032	.269	.000**

Dependent Variable: Effectiveness of course content

The outputs in Tables 5 show the seven independent variables that were entered into the regression model, the R (0.548) which was the correlation of the seven independent variables with the dependent variables: the effectiveness of course contents. The interrelation of the seven independent variables was taken into account, and the R square (0.300) was significant at the 0.000 level (F value = 8.751). That means that 30 percent of the variance (R square) in the effectiveness of course contents can be significantly explained by resources, perceived value of computer-based information, culture which composed of high power distance and collectivism and information culture.

Regarding independent variables, resources were the most important in explaining the variance in the effectiveness of course content as the highest beta (β) was 0.281. The beta (β) value of information culture was 0.269 and 0.167 for perceived value of computer-based information. The positive beta weight indicated that if the effectiveness of course contents were to be increased, enhancing resources, information culture and also perceived value of computer-base information would be necessary.

On the other hand, the negative beta weight of high power distance was -0.213 indicating that if the effectiveness of course contents was to be increased, a decrease in the degree of power distance had to be experienced. However, the positive beta weight of collectivism was .156 indicating that students working in a group-based orientation enhanced the effectiveness of course content.

Effectiveness of outcome

Table 6: Results of Regression Analysis-Effectiveness of outcome

Model	B	F	R	R^2	Adjusted R^2	Std. Error	Standardized coefficient of Beta	p-value
(Constant)	1.325	8.681	.546	.298	.264	.809		
Resources						.028	.155	.099
Computer literacy						.135	-.193	.094
Perceived value of computer-based information						.030	.270	.002**
Culture								
- high power distance						.081	-.032	.576
- high uncertainty avoidance						.072	-.009	.758
- Collectivism						.111	-.004	.834
Information culture						.055	.413	.000**

Dependent Variable: Effectiveness of outcome

The outputs in Table 6 show the seven independent variables that were entered into the regression model, the R (0.546) which showed the correlation of the two independent variables: information culture and perceived value of computer-based information with the dependent variables: the effectiveness of outcome. The interrelation of the two independent variables was taken into account, and the R square (0.298) was significant at the 0.000 level (F value = 8.681). That means that 29.8 percent of the variance (R square) in the effectiveness of outcome can be significantly explained by information culture and perceived value of computer-based information. Among the two independent variables, information culture was the most important in explaining the variance in the effectiveness of construction as the highest beta (β) was 0.413. The second-most important variable was perceived value of computer-based information with a beta (β) value of 0.270. The positive beta weights indicated that if the effectiveness of outcome was to be increased, enhancing information culture and perceived value of computer-based information would be necessary.

SUMMARY OF SURVEY FINDINGS AND COMPARISON WITH INTERVIEW RESULTS

Information culture and perceived value of computer-based information were significant influencers on the perception of VEDs. The greater the levels of IT comfort the greater the appreciation of VEDs.

The following independent variables: resources, perceived value of computer-based information, culture: high power distance, high uncertainty avoidance, collectivism and information culture were all significant influencers on the quality and productivity of learning in VEDs. Only high power distance – “Bhun Khun” showed a negative beta weight.

Computer literacy was not identified as an influence.

These results represent the views of the students and need to be considered against the views of the staff obtained through in-depth interviews. Table 7 presents a comparison.

Table 7: Comparison of findings from questionnaire survey and interview data

Quality, Productivity and Perception of Learning in VED		
Factors	**Facilitate/Inhibit**	
	Student	**Administrator & instructors**
Technological determinism Resources	Facilitate	Facilitate
Social-psychological approach Computer literacy	No influence	Inhibit
Perceived value of computer-based information	Facilitate	Inhibit
Size of market	N/A	No influence
Human relation approach Task interdependence	N/A	Facilitate
Culture context Information culture	Facilitate	Inhibit
Cultural aspects of knowledge sharing High power distance	Inhibit	Inhibit
High uncertainty avoidance	Facilitate	Inhibit
Collectivism	Facilitate	Inhibit

As can be seen the findings show some interesting contradictions. The staff identifies only two facilitators: resources and task interdependence (not evaluated by students). All other factors were seen as inhibitors apart from size of market. These conflicting views are briefly discussed below.

Social-psychological approach

Students did not believe that computer literacy was an inhibiting factor and may well refect the fact that students overestimate their own abilities in this regard. However, more interestingly, while staff found the level of literacy in students to be an inhibitor they also found their own levels of literacy to be inadequate and were quite frank about their perception of this as a major problem. This is also reflected in their perception of the value of computer-based information where it was found that students placed far greater value on ICT delivered information compared to staff. The instructors cited four reasons for their low ratings of VED:

- VED did not reduce teaching hours

- English language barriers on the web
- Overload of teaching hours
- Too little time to become proficient in using ICT

Cultural context

Students were comfortable with their information culture and found this a facilitator towards using VED effectively. Staff, however, found that students used the VED system in an unprofitable manner – playing games and visiting chat rooms. Further they themselves felt inhibited by the system and within the universities very little effort was made to develop an information culture with little or no electronic communication between staff.

Both students and staff found "Bhun Khun' to be a significant inhibitor to knowledge sharing in an online environment with a teacher centred approach being far preferred as a learning style. This extended even further within the university relationships between instructors and administrators with instructors stating that would not dare question any decisions made by the hierarchy and similarly would not admit to any problems with ICT usage.

Students believed that VED environments could provide them with a more certain environment and precise and detailed instructions for learning and so saw 'Kreng Jai' as a facilitator. Staff perceived this again as a major inhibitor since students did not adopt a self-learning, self-paced approach as allowed by VED and wanted structure and control – specifically being told what to think. Staff also felt less comfortable with not being in control and found the VED threatening.

Finally, students found that their preferences for group activity facilitated learning online whereas staff found this again a major inhibitor. This has to be understood within the Thai context where students attended study centres to access the VED system since they did not have computer access at home so in this way students met within their own study groups and worked together online. Staff found that their collectivist approach exemplified by 'Kam Lan Jai' prevented them from pursuing individual learning styles, raising questions or presenting novel ideas.

Staff and students views on the success of VED were also collected and measured on a four point scale. These are compared in Table 8.

Table 8: The evaluation of VED in four Rajabhat Institutes

	RIPN		RISD		RIRC		RIPV	
	Student	Admin & Instructor	Student	Admin & Instructor	Student	Admin & Instructor	Student	Admin & Instructor
Improved quality & productivity	2.9	2.7	2.7	2.6	2.9	2.1	2.8	2.6
Perception of usefulness	3	3.2	2.7	3	2.9	2.2	2.8	3.2

Students were generally more enthusiastic about quality and productivity improvements compared to staff views and had similar views about the perceived usefulness as a teaching and learning tool. Staff actually perceived that VED could be a more useful tool than was merited by current quality and productivity gains. The one institute where staff had very low rankings was the only one where the VED system had been outsourced and it was clear within this university that little attempt had been made to develop an information culture with no internal training and very

few ICT aware personnel. Nonetheless, overall VED was felt to be moderately successful and the interviews provided many pointers on how to improve future success.

IMPLICATIONS FOR THEORY AND COPING STRATEGIES

During the interviews members of staff were asked to identify the coping strategies they used or could envisage to overcome the inhibitors to VED success. They identified four major areas:

- improving technologies and providing technical support;
- increasing IT/IS competency and skills of students and instructors;
- changing instructors' attitudes and motivating them to adopt VED as an interactive teaching style;
- enhancing all members' cooperation and commitment.

This led to the refinement of the strategic framework as shown in Figure 3.

The research outcomes of this study showed several factors influencing the success of VED implementation in Thailand. These factors are resources, computer literacy of instructors and students, perceived value of computer-based information, culture of knowledge sharing, information culture and task interdependence.

Resources are seen to be the most important factor that can enhance or inhibit the learning outcome. Two issues are involved: the first is the quality and reliability of the IT/IS infrastructure, and the second is the way VED is implemented and serviced. Computer literacy of students and instructors involves an ability to use the computer and its facilities to enhance studying and teaching on VED. The perceived value of computer-based information by the participants is also accepted as being critical to the success and further, administrators, instructors and students must realise that using ICT provides them with value and usefulness.

Task interdependence and collaboration of members in an organisation is also essential.

Three aspects of culture in relation to knowledge sharing are found to influence the success of collaborative learning in VED. Firstly, there is high power distance between students and instructors and between instructors and administrators. Secondly, high uncertainty avoidance is found to be characteristic of Thai students, and thirdly, Thai students tend to be collectivist rather than individualist. Information culture is the final influencing factor found from the study. This refers to students and instructors' attitudes to use information processing, publishing and communication to perform knowledge sharing in VED learning environment.

Coping strategies for overcoming numerous barriers to successful VED are established and added to the model. These are improving technologies and providing technical support, increasing IT/IS competency and skills of students and instructors, changing students and instructors' attitude to accept VED usefulness, and enhancing the members' cooperation and commitment.

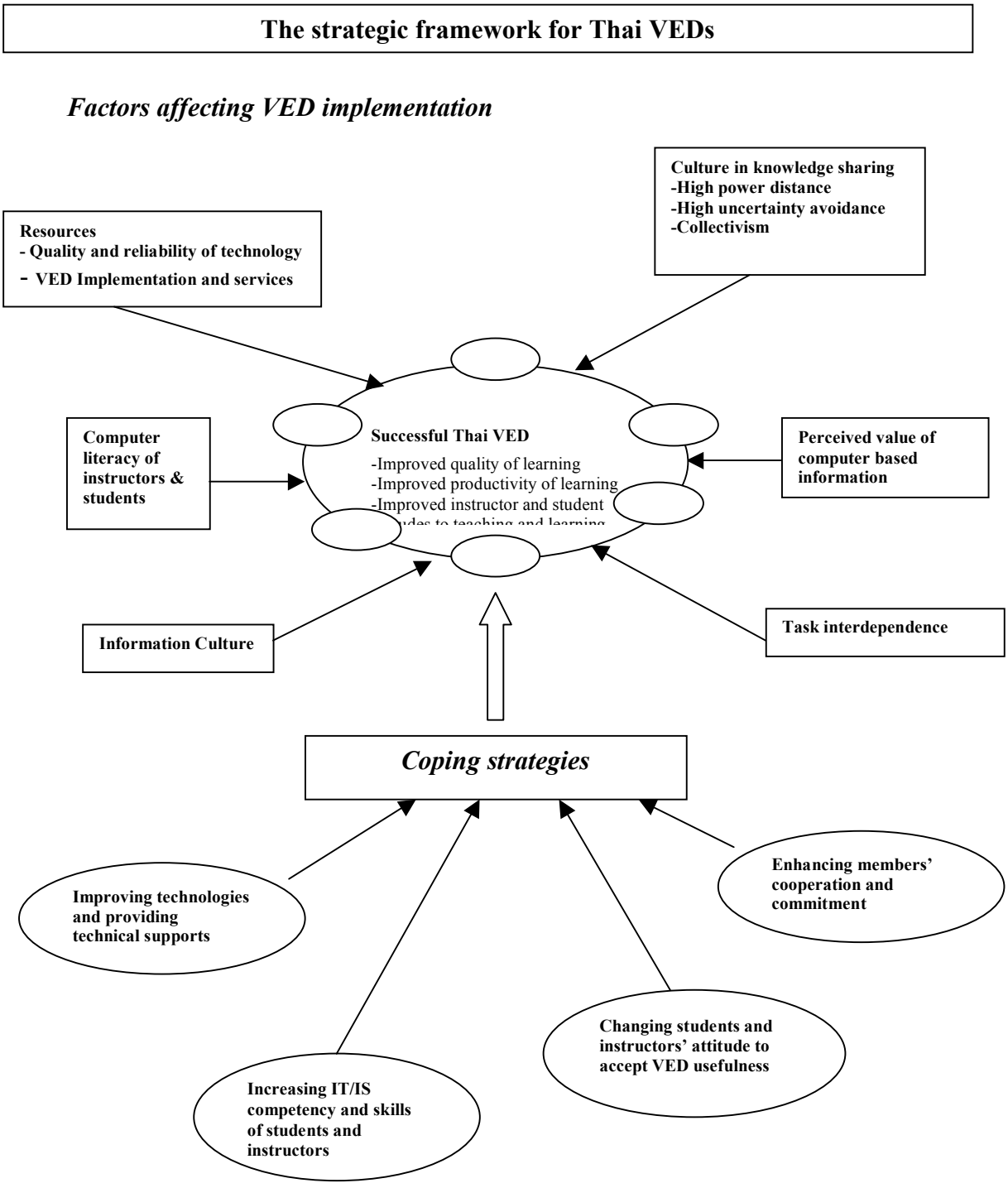

Figure 3: The strategic framework for Thai VED

NEW STRATEGIC PROCESS

In order to implement such a strategy, a new strategic process including audit checklists for staff and students was developed as shown in Figure 4.

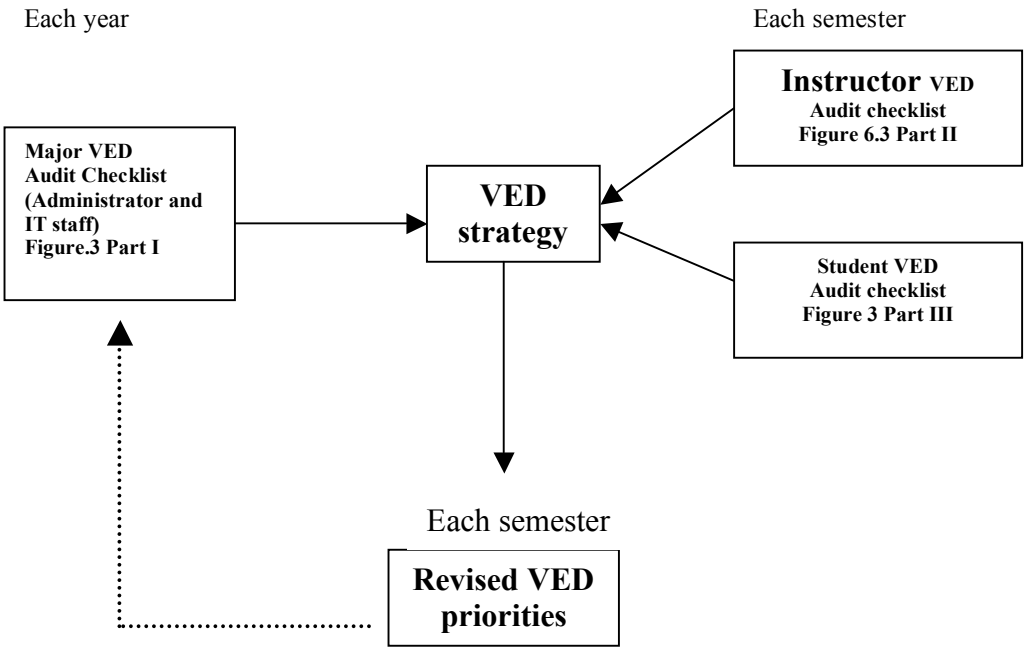

Figure 4 VED Strategic Planing Cycle

Each checklist uses a five-point scale - a ***student checklist*** administered every semester is shown below.

The ***staff checklist*** cover resources, skills, attitudes and commitment as well as effectiveness measurement and will provide a yearly monitor on progress and guidance for improvement.

If the total is below 30 (average), your institute needs to take immediate action to improve VED tools and establish a team to mandate information and course content. There is also a need to motivate instructors to provide a more collaborative learning environment through VED.

Table 9: Checklist for students

Accessibility, collaborative learning and perception of VED?	1	2	3	4	5
How much access do you have to the Web (anytime, anywhere)?					
What is the level of your VED system in terms of user-friendliness?					
What is the level of your VED system in terms of up-to-date content?					
How useful is VED in providing relevant content?					
How valuable do you find VED in assisting you to learn?					
How effective is VED in enabling you to discuss questions or share ideas with other students?					
How effective is VED in enabling you to discuss questions or share ideas with your instructors?					
Are your instructors enthusiastic in providing a VED learning environment?					
How well do your instructors use VED to provide stimulating and challenging instruction?					
How highly do you rank your VED courses compared to standard teaching mode?					

Total points_____

CONCLUSION

The main purpose of this study was to examine the strategies used by Thai universities to adopt the concept of "virtual education delivery" as an education tool. The study attempted to determine the critical factors that influence success in implementing Thai VEDs, and identified the ways to facilitate such adoption. These factors were synthesised with Thai environmental and cultural factors to develop a strategic framework which can be used to assist universities in Thailand to achieve more effective implementation of VEDs.

The conceptual research framework was derived from knowledge gleaned from a review of previous research studies. The literature suggested some understanding of the "what" and "how" factors influencing VEDs, but contributed generally rather than specifically to the Thai cultural environment. This framework enabled the researchers to contextualise issues and to determine factors influencing Thai VEDs. This was used to develop the domains of the research questions which were examined through case study analysis of four Thai universities.

A multi-method research approach including quantitative and qualitative methods was chosen because of its suitability to this problem. The contexts in determining critical factors influencing the success of Thai VEDs were examined through a survey and interviews. The questionnaire survey was developed from relevant research and based on the theoretical framework. This was administered to 240 students in four Rajabhat Institutes. One hundred and sixty seven (167) valid responses were received which was a response rate of 69.5 percent. Multiple regression analysis was used to test the relationships between the dependent variable and the independent variables. The dependent variable was the success of VED interpreted in terms of the effectiveness of quality, productivity and the student perception of their VED courses. The independent variables were resources, computer literacy, perceived value of computer-based information, culture and information culture. It was discovered that resources, perceived value of computer-based information, culture and information culture were significant influences on the success of Thai VED.

In order to identify recurring themes that could enable the interpretation of another setting, multiple case studies through structured interviews were utilised. This was examined through analysis of four Rajabhat Institutes utilising VEDs. The results from interviewing instructors, IT officers and administrators who were involved in VED were analysed by using a conceptual cluster matrix and cross case analysis to address the similarities and differences across cases. The results of this stage of analysis concluded that poor computer literacy, negative perceived value of computer-based information and information culture (of both students and instructors) were inhibitors to the success of VED. Further, some characteristics of Thai culture: high power distance, high uncertainty avoidance, and collectivism were founded to be critical barriers to knowledge sharing, essential for collaborative learning in VEDs.

Finally, the results have significant implications for administering and implementing VED. These suggested that there are four coping strategies to enhance VED implementation:
1) improving technologies and providing technical support;
2) increasing IT/IS competency and skills of students and instructors;
3) changing students and instructors' attitude to accept usefulness of VED; and
4) enhancing the members' cooperation and commitment.

In order to apply these findings in a practical setting an Audit instrument has been developed to allow continuous self-evaluation of the effectiveness of VED in Thai institutes.

Whilst these findings are applicable to Thailand the implementation models and audit evaluation should be equally applicable elsewhere and researchers are encouraged to apply these to determine the specific factors which influence online learning environments in their own cultural context.

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Measuring Africa's e-readiness in the global networked economy: A nine-country data analysis

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ABSTRACT

This paper assesses the integration of Africa into the global economy by computing the e-readiness for nine African countries. The measuring tool used is simple and incorporates a variety of indicators used by comparable tools. Overall, the mean e-readiness of Africa is poor in comparison to other economies. Particularly, Sub-Saharan Africa (SSA) - with the exception of South Africa and its neighbors - has a poor e-readiness score; on the other hand, North African countries fared better than those in SSA. Furthermore, the paper highlights areas of relative strengths where policy makers in the region could exploit as efforts are made towards integrating Africa into the global networked economy.

Keywords: *Information Age, Global networked economy, E-readiness, Africa*

INTRODUCTION

The world has witnessed the birth of a new era - The *Information Age.* It is akin to a global wave sweeping through all corners of the world; albeit, its impact in Africa is minimal at this point in time. Many researchers have advanced a variety of reasons why African and other developing countries lag behind in this revolution (see, Odedra et al 1993; Molla 2000; WSIS 2004, Ifinedo 2005); however, not many have focused on the e-readiness aspects, which is the primary focus of this article. Further, it has to be noted that African nations are beginning to make progress towards adopting reforms that could help them embrace this new order (WEF 2002; Mbarika et al 2002; UNECA 2004; WSIS 2004; Hamilton et al 2004). Basically, African countries tend not to have the same infrastructural facilities and support as the developed West, which are in fact prerequisites for the new order.

The term digital divide is used to refer to such differing standards or imbalances between countries fully poised to reap the benefits of the information age and those that are unable (The Bridge Organization 2001); sadly, digital divide may also exist within the confines of a single nation. Our scan of development reports and relevant literature suggest that countries with lower competitiveness in the global networked economy are synonymous with those on the wrong side of the digital divide (see WDI 2001; Dutta et al 2003; ASPA 2003; WSIS 2004; EIU 2004; KAM 2002). Regardless, the information age is bringing about gradual, but remarkable shifts in our global society, for both the developed and developing countries. It is increasingly becoming common to see more and more nations across the globe shift away from erstwhile agrarian and industrial economies to one that is knowledge-based in which information resource utilization thrives. Such economies go by various names: network economy (Hart, 2003), knowledge economy (Neff 1998), *E*-economy (Turner 2001) and information economy (Castells 1999a), amongst others.

African countries cannot afford to stand by the sideline and watch as the rest of the world integrates into this network economy. Avgerou (1998, p.4) writes that "At the present, most developing countries are severely disadvantaged within a global economy which is increasingly more technology and information intensive: Unequal distribution of resources, such as telecommunications and technical skills, causes concern about the ability of developing countries to participate in the emerging world economy." If we as researchers ignore the current situation

in Africa with respect to its poor use of ICT (e.g., Dutta et al 2003; ITU 2004) and its slow pace of integration within the global information economy (IMD 2001; WDI 2001; WEF 2004), this would only mean that the gulf between Africa and the rest of the world could be wider and historical patterns of inequality get reinforced (Heeks 2002; Avgerou 1998). In the bid to fuel discussions regarding the competitiveness of African countries in the global economy, this paper seeks to assess Africa's performance vis-à-vis other economies in the network economy with its discourse about Africa's e-readiness. Importantly, e-readiness of some African countries has been assessed by some organizations including the World Bank, World Economic Forum [WEF] and others (see, The Bridges Organization 2001). However, this study aims at closely looking at the e-readiness of nine African countries using the same measurement tool for the purpose of comparisons. Furthermore, it is hoped that by comparing the scores for the chosen nations; each would be able to compare itself with equals. That may in turn provide an opportunity for healthy rivalry and the need to learn from the "good practices" of better-performing countries.

The rest of the paper is organised thus: Section 2 presents the overview of the countries and the reasons for their choice. Also, the concept of e-readiness is succinctly discussed. Section 3 introduces the methodology, which covers the specific e-readiness tool used herein. In Section 4 the e-readiness of the selected countries is assessed and the average for Africa assessed. Finally, the paper presents its suggestions and conclusion.

E-READINESS CONCEPT AND OVERVIEW OF AFRICA

By and large, Africa is not a rich continent (World Bank 2001b). In terms of geography, Africa tends to be described as consisting two regions – North Africa and Sub Saharan Africa (SSA). The northern part is comparable with the Middle East economically and culturally (World Bank Group 2004b). On the other hand, SSA is associated with poverty, high illiteracy rate, civil strife and chronic under-development (World Bank Group 2001b, 2004b; Mbarika et al 2004; ITU 2004). Furthermore, South Africa (also known as the Republic of South Africa) tends to be excluded from the rest of SSA because of its relative high socio-economic indicators.

To produce a comprehensive review of the e-readiness of each of the fifty-five (55) countries in Africa is beyond the scope of this study. Moreover, in some instances data is unavailable for some of the countries in Africa. For example, no country data was provided for Senegal in the World Bank database, (see KAM 2002). In this paper, nine countries from the two regions of Africa as delineated above are selected primarily for the reason of data availability. They are as follows: Nigeria (NGR), Ghana (GHA), Cote d'Ivoire (CIV), Kenya (KEN), South Africa (RSA), Mauritius (MAU), Botswana (BOT), Egypt (EGY) and Tunisia (TUN). Henceforth, the abbreviations will be used in representing each. Secondarily, the countries above were chosen for illustration purposes in so far as they enable us to present a picture regarding the discourse. Further, their choice is informed by the classification made by Woherem (1996, p 77) wherein African countries were categorized into three broad groups:

- Category one – those with *very low* infrastructure, literacy level, GDP per capita, educational and technical endowments, etc., for example, Togo, Cote d'Ivoire
- Category two – those with *fairly good* infrastructure, adequate educational and technical endowments better than those of countries in category one, for example, Kenya.
- Category three – those with *relatively large* amounts of infrastructure, good educational and technical endowments, for example, Nigeria, South Africa

Additionally, geographical and regional groupings were taken into consideration; the selection extends to countries from the following regional groupings: Economic Community of West African States (ECOWAS), The East African Community (EAC), Southern African Development Community (SADC) and the Arab Maghreb Union (UMA) in our attempt to present a fairly

representative view of comparable countries on the continent. However, we are not claiming that this group of nine countries alone represents the whole of Africa, in all matters.

Having discussed the justification for the selection, let's now turn our attention to understanding the concept of e-readiness. Essentially, e-readiness is used to capture how nations across the globe fare in terms of creating, diffusing, adopting and using the various components of a networked economy. The e-readiness assessment of a nation provides policy makers with a detailed scorecard of their economy's competitiveness relative to international counterparts in the digital era. According to the Bridge Organization (2001), "E-readiness assessment tools and models can be divided into two main categories: those that focus on basic infrastructure or a nation's readiness for business or economic growth, and those that focus on the ability of the overall society to benefit from ICT". These two categories that their report describes as 'e-economy' assessment tools and 'e-society' assessment tools are not mutually exclusive. In general, a majority of the e-readiness tools and models are said to be *descriptive* tools because they tend to explain or describe what happened and *diagnostic* tools because they identify problem areas – as we intend to do in this study - but do not indicate how to address the problems.

In particular, several organizations and bodies have come up with measures and indices to measure e-readiness. The Bridges Organization (2001) provides a comprehensive coverage on many of the tools and their sources. Some of the organizations that have developed tools or models for measuring e-readiness of nations include, amongst others, The Center for International Development at Harvard University, The Asian Pacific Economic Cooperation (APEC), Electronic Commerce Steering Group, McConnell International. Bui et al (2003, p 6-7) have discussed some of the shortcomings associated with some of those e-readiness models and indices. Mainly, concerns are raised about the completeness, inconsistencies in description and computation, to mention but a few. They went further to propose a methodology that improves upon these other indices. Of note, other robust e-readiness tools available include those of the World Bank (see KAM 2002) and the Economist Intelligence Unit (EIU 2004), which at the best have less building blocks (see below for detail) in comparison with that by Bui and colleagues. Regardless, a nation's level of preparedness for the network economy or e-readiness may not be easy to fully represent by indices for a variety of reasons including reliability, availability and completeness of data. Above all, the Bui et al (2003) tool is chosen for its robustness in its assessment of 'e-economy' and 'e-society' indicators, unlike some of the other tools that are restrictive in their coverage or tend to concentrate only on either of the two classes.

METHODOLOGY

Bui et al (2002; 2003) developed a simple tool for assessing e-readiness that has been validated and used by other researchers (e.g., Davidrajuh 2004). The tool incorporates various components or factors of "macro-economy"; i.e. demand, supply and societal infrastructure forces. These forces span both 'e-economy' and 'e-society'. The tool is ease to extend and use. Furthermore, it accommodates a large set of indicators that are missing in other tools (see The Bridges Organization 2001). Particularly, a majority of the e-readiness tools available are not as extensive in their composition, some are not easy to use, others are not readily available (Bui et al 2002; 2003; Al-Solbi and Mayhew 2003; The Bridges Organization 2001).

In addition, Bui et al (2003) acquiesce that it is challenging to present a comprehensive model encompassing all the driving forces of an economy with respect to its competitiveness and e-readiness. Their e-readiness tool consists of three basic building blocks, see figure 1. The three basic building blocks are divided into eight major factors, and each of these major factors has a

set of indicators. The major factors and some of the indicators are shown in Table 1 below. See subsequent tables for more detail.

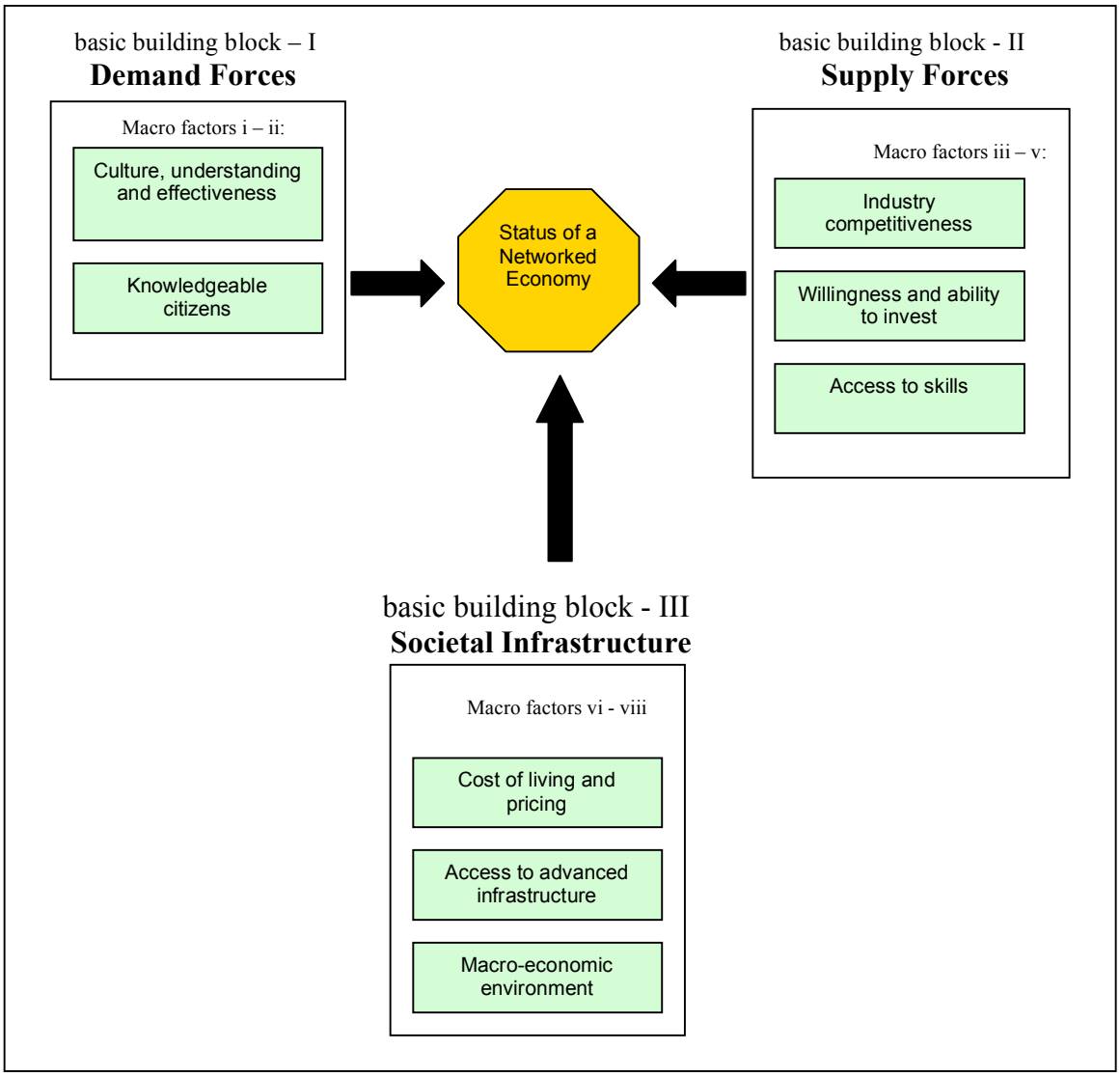


Figure 1: *Components of e-readiness measuring tool*
(adapted from Bui et al 2002; Davidrajuh 2004)

Table 1: *The Three Basic Building Blocks*

I: **Demand forces:** i. Culture, understanding and effectiveness: 4 indicators. Examples include *National culture is open to foreign influence, English language, etc.*
ii. Knowledgeable citizens: 6 indicators. Examples include *Adult literacy rate, tertiary enrolment, secondary enrolment, etc.*
II: **Supply forces**: i. Industry competitiveness: 7 indicators. Examples include *Technology Achievement Index (TAI), Gross tertiary Science and Engineering enrolment ratio, etc.*
ii. Access to skilled workforce: 6 indicators. Examples include *Public spending on education as percentage of GDP, University education meets the needs of economy, etc.*
iii. Willingness and ability to invest: 4 indicators. Examples include *Composite ICRG risk rating, Availability of venture capita, etc.*
III: **Societal Infrastructure**: i. Cost of living and pricing: 3 indicators. Examples include *International cost of living (COL) based on US$ 100, Inflation rate – CPI in percentage, etc.*
ii. Access to advanced infrastructure: 10 indicators. Examples include *Telephone per 100 people (Teledensity), Mobile phones per 100 people, etc.*
iii. Macro economic environment: 12 indicators. Examples include *Trade as a percentage of GDP, Adequacy of regulations and supervision of financial institutions, etc.*

In computing the e-readiness for each country, the formula proposed by Bui et al (2003, p. 8) is followed. The tool uses a total of 52 indicators.

$$\text{E-readiness}_i = \sum_{j=1,n} w_{ij}\, e_{ij} / n$$

Where

E-readiness: the overall e-readiness score
i: country
j: each of the 52 indicators
$w_{ij:}$ relative weights assigned each indicator
$e_{ij:}$ individual score for each indicator on a scale of 1 to 5 (1: the worst score & 5: the best score).
n: total number of indicators

Specifically, the Bui and colleagues' e-readiness computing procedure is adapted in this paper as follows:

i. select the list of countries whose e-readiness is to be computed and compared;
ii. gather data on the individual 52 indicators for each country;
iii. create a "normalised" (see, Bui et al., 2003, p 8.) scale for the indicator and assign the closest value for each country;
iv. sort the data in step (ii) to create 8 groups of data;
v. compute the average for all the building blocks;
vi. arrive at the e-readiness for each country.

In obtaining the 52 indicators or measures, data and information from reputable organizations such as The World Bank, ITU, Heritage Foundation, Transparency International, were used.

All the 52 indicators are evaluated on a 1-5 scale for each country. In "normalising" the scale, which simply refers to the scaling of indicators or measures to fit our 5-interval scale, we use

proportionality constant (simple proportions) in reducing the measures to. Take for example, an indicator, say "adult literacy (%)" in which Botswana, Kenya, Nigeria and Cote d'Ivoire have 82.7%, 79.7%, 60.6% and 50.9%, respectively (see WDI 2001; CIA 2004), on our 5-interval scale, this would correspond to 4, 4, 3, 2.5, respectively. Some may argue that boundaries such as 100-80, 79-60, etc. may suffice for our representation, in as much as we concur with such observations, the objective of this exercise differs somewhat. We aim to capture and represent as reliable as we can the performance of African countries vis-à-vis other nations across the globe. Using our "adult literacy" example, we know that there are countries in the world with 99.9% on this particular measure. Estonia is one example. As such, our scale representation above is justified.

Realistically, the best score of "5" is assigned the best performing nation in the world on any indicator and the scores for each of our nine countries computed by proportions. This process is called "normalization" by Bui and colleague. This study took great care as it "normalizes" (reduces) indicators or measures from the different sources that we consulted with, in the bid to have such data fit our 5-interval scale.

By the same token, we admit that a modicum of subjectivity is applied where necessary. For instance, on the "English language usage" indicator, which no data is provided by any of the reputable organizations, the colonial legacy and history as well as the literacy rate of each country, is factored in, to produce values for each country. Also, wherever no data exists from the reputable organizations, we use the lowest score of one "1" for that measure. Thus, we present the results and discussions in the next section.

THE E-READINESS RESULTS AND DISCUSSION

***Table 2**: Measuring the Demand Forces*

Major factor (MF)-1: Culture, understanding and effectiveness (sources: KAM, 2002; WDI, 2001;WNW, 2004; HDR, 2003)	**NGR**	**BOT**	**GHA**	**KEN**	**CIV**	**RSA**	**MAR**	**EGY**	**TUN**
Indicator-1 (e_1): National culture is open to foreign influence	2	2	2	2	2	3	2	2	2
Indicator- 2 (e_2): English Language usage	3	4	3	4	1	4	4	2	2
Indicator-3 (e_3): Percentage of Urban population	3	4	2.6	2.2	3	2.5	2	2	3
Indicator- 4 (e_4): Percentage of population 65 years or older	5	5	5	5	5	5	5	5	5
Major factor (MF)-2: Knowledgeable citizens (sources: KAM, 2002;HDR, 2003; World Bank, 2001a,2004; SIMA, 2004; CIA, 2004)	**NGR**	**BOT**	**GHA**	**KEN**	**CIV**	**RSA**	**MAR**	**EGY**	**TUN**
Indicator- 5 (e_5): Adult literacy rate	3	4	3	4	2	4	4	2.5	3
Indicator- 6 (e_6): Secondary school enrolment	3	3	3	3	2	4	4	2.5	3
Indicator-7 (e_7): Tertiary enrolment	2.5	2.5	2	3	1	2.7	2.5	3	2.7
Indicator-8 (e_8): 8th grade achievement in Science	2	2	2	2	2	3	2	2	4
Indicator-9 (e_9): MGMT education available in First class Business Schools	2.8	2.5	1	1	1	3.8	2	2.7	2
Indicator-10 (e_{10}): Flexibility of people to adapt to new challenges	2	2	2	2	2	2.5	2	2	2

In this part of the e-readiness measurement tool, which mainly relates to 'e-society', our selected countries fared poorly on almost all of the indicators with the exception of the indicator relating to the percentage of population 65 years or older. Average scores (3 is the midpoint score) were noticeable for other measures such as the percentage of urban population, secondary school enrolment, etc. The results seem to indicate that countries that were once colonies of the United Kingdom rate better than their Francophone counterparts. In general, low scores on many of the measures above suggest lack of competitiveness.

Table3: *Measuring the Supply Forces*

Major factor (MF)-3: Industry Competitiveness (sources: KAM, 2002; WDI, 2001; IMD,2001)	**NGR**	**BOT**	**GHA**	**KEN**	**CIV**	**RSA**	**MAR**	**EGY**	**TUN**
Indicator-11: Technology Achievement Index (TAI)	1	1	2	2	1	2.3	2	2.1	2.2
Indicator-12 (e_{12}): Gross tertiary Science and Engineering enrolment ratio	2	2	2	2	2	2	2	2	2
Indicator-13 (e_{13}): Administrative burden for start-ups	3	3	1	1	1	3.2	3.1	3.2	2
Indicator-14 (e_{14}): Patent applications granted by the USPTO 2000 (per million pop.)	1	1	1	1	1	2	1	1	1
Indicator-15 (e_{15}): Indicator-15: Private sector spending on R&D	2.4	2	1	1	1	2.5	1	2.5	1
Indicator-16 (e_{16}): Total expenditure for R&D as % GNI (Gross National Income)	1	1	1	1	1	1.5	1	1	1
Indicator-17 (e_{17}): High-Tech exports as percentage of manufactured exports	2	1	2	1	1	2.1	1	1	1
Major factor (MF)-4: Skilled workforce (sources: HDR, 2003; KAM, 2002; WNW, 2004; IMD, 2001)									
Indicator-18 (e_{18}): Public spending on education as percentage of GDP	1	2	1.5	2	1	4	2.3	3.3	4
Indicator-19 (e_{19}): University education meets the needs of economy	1	1	1	1	1	2.5	1	1	1
Indicator-20 (e_{20}): Indicator-20: Well-educated people do not emigrate abroad	1	1	1	1	1	1	1	1	1
Indicator-21 (e_{21}): Extent of staff training	2.7	2	1	1	1	2.3	2	2	2
Indicator-22 (e_{22}): Research collaboration between companies and universities	1.5	1	1.2	2	1	2.3	1.7	1.7	1
Indicator-23 (e_{23}): Number of technical papers per million people	1.1	2.1	1.2	2	1	2.8	1	2.2	2.2
Major factor (MF)-5: Investments (sources: ICRG, 2000; WEF, 2001; SIMA, 2003; World Bank, 2001a, 2004)									
Indicator-24 (e_{24}): Composite ICRG risk rating	3	4	2.5	3	2.5	3.4	2	3.5	3.6
Indicator-25 (e_{25}): Availability of venture capital	1	1	1	1	1	2.5	2	2.3	1
Indicator-26 (e_{26}): Entrepreneurship among managers	2	1	1	1	1	2.5	1	1	1
Indicator-27: Foreign Direct Investment as percentage of GDP	1.5	1	1	1	1	1	1	1	1

In the second building block that has indicators for 'e-economy', our selected countries fared even worse (in comparison with the first building block) in almost all the measures. In order to fully compete in the global economy, policy makers in the region must find ways of improving items in this segment.

Table 4: *Measuring the Societal Infrastructure*

Major factor (MF)-6: Cost of living (COL) and pricing (sources: Mercer, 2004; World Bank,2001a, 2004)	**NGR**	**BOT**	**GHA**	**KEN**	**CIV**	**RSA**	**MAR**	**EGY**	**TUN**
Indicator-28 (e_{28}): International cost of living (COL) based on US$ 100	5	5	5	5	2	5	5	5	5
Indicator-29 (e_{29}): Inflation rate – CPI in percentage	4	2	4	2	3	2.2	2	2	2
Indicator-30 (e_{30}): GDP per capita (PPP) in US$	1	2.5	2	2	2	2.5	2.5	2	2
Major factor (MF)-7: Advanced infrastructure (sources: ITU, 2004; Opexcom, 2004; Hamilton et al., 2004; WNW, 2004; TAI, 2001)									
Indicator-31(e_{31}): Telephone per 100 people (Teledensity)	1	2	1	1	1	2.5	2.5	2.5	2.5
Indicator-32 (e_{32}): Mobile phones per 100 people	1	2	1	1	1	2	3	1	2
Indicator-33 (e_{33}): Computers (PCs) per 100 people	1	2	1	1	1	1.5	1.5	2	1.5
Indicator-34 (e_{34}): Internet hosts per 10, 000 people	1	2	1	1	1	2	1.5	1	1
Indicator-35 (e_{35}): International Telecom, cost of call to US	1	2	1	1	1	2.5	1	1	1
Indicator-36 (e_{36}): Investment in Telecom as a percentage of GDP	2	2	2	2	1	2	2	2	2
Indicator-37 (e_{37}): Computer processing power as a % of worldwide MIPS (million instructions per second)	1	1	1	1	1	1	1	1	1
Indicator-38 (e_{38}): E-government	1	1	1	1	1	2	1	2.8	1
Indicator-39 (e_{39}): ICT expenditure as a percentage of GDP	1	1	1	1	1	1.5	1	1	1
Indicator-40 (e_{40}): Freedom on the Internet	3	3	3	3	3	3	3	3	3
Major factor (MF)-8: Macro economic environment (sources: Heritage Foundation, 2004; KAM, 2002; WNW, 2004; TICP, 2003; Freedom House, 2003; Kaufmann et al., 2001)									
Indicator-41(e_{41}): Trade as a percentage of GDP	1	3	2	2	2	1.5	1	2.5	1
Indicator-42 (e_{42}): Adequacy of regulations and supervision of financial institutions	1	3	2	1	1	3.9	1	1	1
Indicator-43 (e_{43}): Protection of property rights	1	3	1	1	1	2.7	2.7	2.8	2
Indicator-44 (e_{44}): Tariff and non-tariff barriers	1	3	1	1	1	2	1	1	1
Indicator-45 (e_{45}): Soundness of banks	3.4	3	1	1	1	4.6	4.3	3.4	2
Indicator-46 (e_{46}): Local competition	3.7	3	1	1	1	3.8	3.2	3.8	3
Indicator-47 (e_{47}): Regulatory framework	1	2.3	2	1	1	1	1	1	2.2
Indicator-48 (e_{48}): Government effectiveness	1	2	1	1	1	1	2	1	3
Indicator-49 (e_{49}): Political stability	1	2	1	1	1	1	3.4	1	2.5
Indicator-50 (e_{50}): Press freedom	1	3	2	1	1	3	3	1	1
Indicator-51 (e_{51}): Rule of law	1	3	2	1	1	1	2.7	1	2.2
Indicator-52 (e_{52}): Control of corruption	1	3	1.5	1	1	2.2	2.2	1.7	2.5

The third building block has a mix of the 'e-economy' and 'e-society' indicators. Countries on the continent seem to have less expensive cities, which could be exploited as foreign investors are

wooed. Governments in the region, it appears from the results won't suppress Internet freedom. This is vital for any emerging 'e-society'.

Overall, the economic climate appears unfavorable for our selected countries. The story is the same for the whole of Africa (see, World Bank 2001b). One could also notice that the infrastructural support needed for 'e-economy' and 'e-society' to thrive is lagging behind. Governments in the region have an uphill task in redressing what looks like a hopeless situation. Needless to say that the climate of instability, inept regulatory frameworks and corruption that are often associated with many African countries, exacerbates an already pathetic situation. Simply, in this paper, we aim at highlighting stark realities! Knowing fully well that policy makers at the regional and international levels are the only ones with the resource and power to effect change.

Further, in assigning weight (w_{ij}) to each e-readiness (e_{ij}) for this study, the author's view is reflected. Here, equal weights of unity (1) for all the indicators are assumed and used for comparisons purposes and simplicity sake. This perspective mirrors sentiments expressed by Bui et al. (2003, p. 13) that "national experts or policy makers would be the best qualified people for [the] task [of assigning such weights]." Different nations may assign differing weights reflecting their national strategies and interests. That said, we proceed to breaking down the scores on the major factors for each nation in Table 5. Subsequently, we compute the e-readiness value for each nation in Table 6.

Table 5: *Breakdowns of the Major Factors*

Major factors (MF)	**NGR**	**BOT**	**GHA**	**KEN**	**CIV**	**RSA**	**MAR**	**EGY**	**TUN**	**Avg**
MF-1: Culture, understanding, effectiveness: *emf_1*	3.25	3.75	3.15	3.3	2.75	3.63	3.25	2.75	3.00	3.20
MF-2: Knowledgeable citizens: *emf_2*	2.55	2.67	2.17	2.5	1.67	2.33	2.75	2.45	2.78	2.54
MF-3: Industry competitiveness: *emf_3*	1.77	1.57	1.43	1.29	1.14	2.23	1.59	1.83	1.46	1.59
MF-4: Access to skilled workforce: *emf_4*	1.38	1.52	1.15	1.50	1.00	2.48	1.50	1.87	1.87	1.56
MF-5: Willingness & ability to invest: *emf_5*	1.88	1.75	1.38	1.50	1.38	2.35	1.50	1.95	1.65	1.70
MF-6: Cost of living and pricing: *emf_6*	3.00	3.17	3.33	3	2.33	3.23	3.00	3.17	3.00	3.02
MF-7: Advanced infrastructure: *emf_7*	1.30	1.8	1.30	1.30	1.20	2.00	1.75	1.73	1.67	1.56
MF-8: Macro economic environment: *emf_8*	1.44	2.78	1.79	1.42	1.42	2.31	2.29	1.77	1.95	1.91

Table6: *The E-readiness of the Nine Countries*

Basic building block-1: Demand forces (*eDF*): $eDF = \frac{emf\_1 + emf\_2}{2}$	NGR	BOT	GHA	KEN	CIV	RSA	MAR	EGY	TUN	
	2.90	3.21	2.66	2.90	2.21	3.48	3.00	2.60	2.89	
Basic building block-2: Supply forces (*eSF*): $eSF = \frac{emf\_3 + emf\_4 + emf\_5}{3}$	1.68	1.61	1.32	1.43	1.17	2.35	1.53	1.88	1.66	
Basic building block-3: Societal Infrastructure (*eIF*): $eIF = \frac{emf\_6 + emf\_7 + emf\_8}{3}$	1.91	2.58	2.14	1.91	1.65	2.51	2.40	2.17	2.21	
E-readiness (e_r) for each country	NGR	BOT	GHA	KEN	CIV	RSA	MAR	EGY	TUN	**mean (m)**
$e_r = \frac{eDF + eSF + eIF}{3}$	2.16	2.47	2.04	2.08	1.68	2.78	2.31	2.22	2.25	**2.22**

On the whole, the e-readiness value computed for each of the nine countries, in Table 6 above is visibly below the average value of 3 (midpoint of our 1-5 scale). Nonetheless, some of the countries fared relatively well in some of the major factors. Figure 2 below depicts the detailed benchmarking based on the eight major factors using Bui's et al (2003) model.

Apparently, the e-readiness of South Africa is the best, with Botswana coming in second and that of the Cote d'Ivoire came in last. The two North African countries have scores equal to or better than the average for Africa. Also, the average e-readiness for the three countries in the southern part of Africa, in our selection is 2.52, which is better than those of Africa as a whole, at 2.22. Realistically, the Global Competitive Report by (WEF 2004) has Botswana as African's best performing economy. Likewise, South Africa was rated as having the best e-readiness score in Africa (EUI 2003). The country scored 5.79 out 10 (EUI 2003). Invariably, this shows the relative strength of countries in that region of Africa, as this paper has shown. Essentially, as was discussed earlier, that several e-readiness tools tend to be composed of differing indicators, which may explain the variance in the ranking for these two countries, i.e. South Africa and Botswana. We have clearly stated in this work that the e-readiness tool that we used in our analysis is more robust. For instance, the World's Economic Forum's e-readiness ranking, which has fewer indicators and tends to focus more on growth competitiveness of nations than e-readiness measures, *per se*; has the following ratings for some African countries; South Africa (4.53); Botswana (4.30); Ghana (3.78); Kenya (3.45) and Nigeria (3.16) from a total of 7. Importantly, these ratings are not dissimilar with those obtained herein. Thus, we are assured of the reliability of our computations and results.

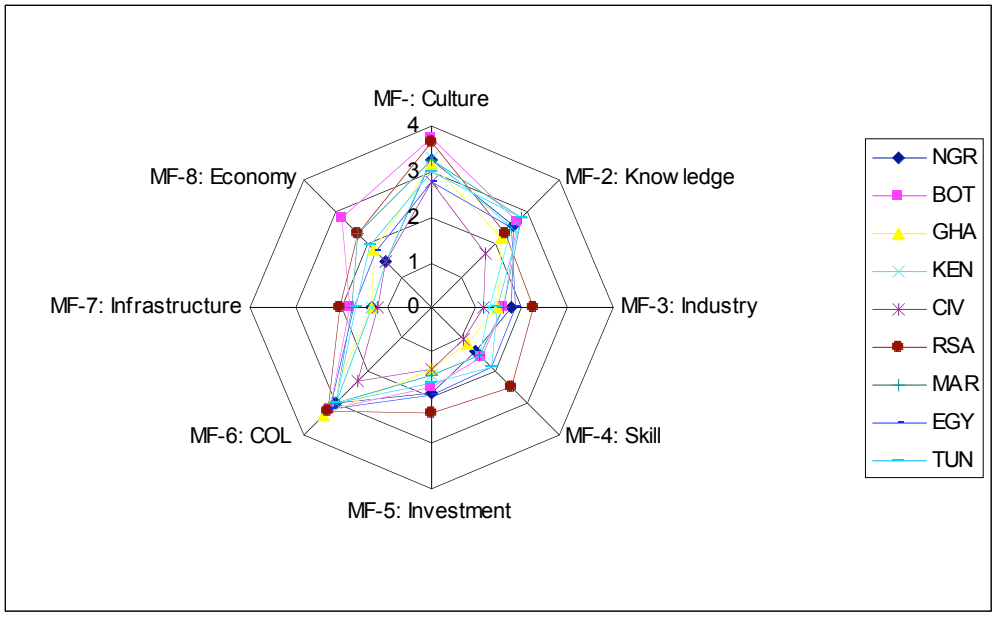
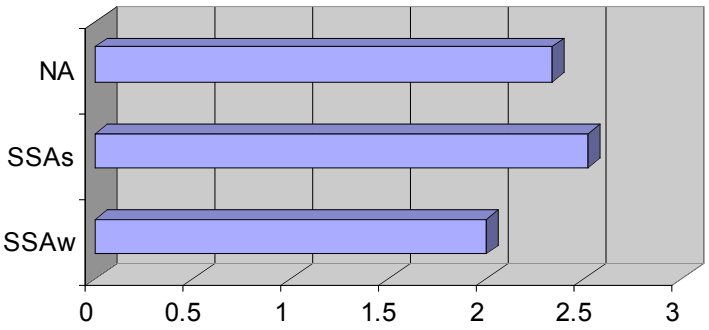


Figure 2: *E-readiness for nine African countries*

For our study, we aggregated the performance of the selected African countries according to regional groups, i.e, SSA (south), SSA (west and east) and North Africa. See Figure 3 below.

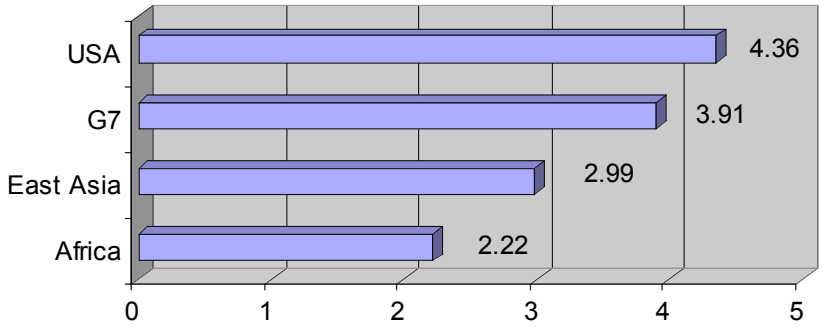


Legend: SSAw (Sub-Saharan West and East), SSAs (Sub-Saharan South), NA(North Africa)

Figure 3: *E-readiness of region of Africa*

Also, Figure 4 below compares the e-readiness of Africa with those of other well-known economies using the same e-readiness tool (see Bui et al 2003). Notably, East Asia, the US, and the G7 averages were given by Bui et al. (2003) as 2.99, 4.36 and 3.91, respectively. Glaringly, the e-readiness of Africa, which was arrived at with computations for our selected nine countries suggests that the continent is not prepared or compares poorly with other economies in the global networked economy. This finding may not be unexpected given the vast accounts of

inadequacies confronting Africa on many fronts including economic, social and technological. Nonetheless, our focus also extends to finding specific areas where Africa could exploit comparative advantages. Such will be discussed below.



Legend: G7 (Group of 7 developed western countries), USA (United Stares of America)

Figure 4: The e-readiness of Africa and other economies

The information in Figure 3 shows that the southern part of Africa with South Africa, Botswana and Mauritius as examples is perhaps relatively better prepared for the global networked economy than other parts of Africa. As can be seen, Africa scored lowly on most of the indicators, with the exception of factors relating to “Culture, understanding, effectiveness”, which includes English language usage and population demographics. African countries tend to have a large portion of their population be less than 65 years, which is a positive indication for vibrancy and growth.

The cost of living in Africa is lower in comparison with other continents. African countries performed averagely on the “International cost of living” factor. Inflation rates are within acceptable limits, at least, for our sample countries. Apart from Dakar (Senegal) and Abidjan (Cote d’Ivoire) that were listed among the top 50 most expensive cities in the world (Mercer 2004), most SSA cities are relatively inexpensive when compared to cities the developed world. Further, the colonial legacy and history of some of the selected countries may be a useful arsenal towards integrating into the global economy. For example, English is the official languages in Nigeria, Ghana and Kenya.

Despite this poor showing by Africa with regard to integrating within the networked economy, all hope is not lost as African governments have realised or are beginning to realize the need to formulate policies that could help them overcome their apparent backwardness and connect to the global network economy (Molla 2000; Mbarika et al 2002; WEF 2002; Hamilton et al 2004; UNECA 2004; WSIS 2004). For example, many African governments now operate within the directives of The World Summit on the Information Society (WSIS 2004) and similar world bodies (see G8 DOT Force 2001; UN ICT TASK Force 2004) as they set about implementing of key recommendations. Example to cite include the formulation of National IT polices. Also, regional partnerships are being developed. Enabling economic climate that include deregulation and liberalization policies are emerging on the continent (WEF 2002; Ifinedo 2005).

Given the chronic socio-economic problems (World Bank 2001a; Sachs and Warner 1997) and technological inadequacies (Odedra et al 1993; Woherem, 1996; WSIS 2004) confronting Africa, it is not expected that the transition would be an easy exercise. Relatedly, a recent World Bank publication (World Bank 2004a) concludes that the overall socio-economic development and progress is being hampered by poor governance and corruption in the developing countries including SSA. This suggests that in order for Africa to integrate into the networked economy, initiatives and commitment from governments in the region may be needed. Africa fared poorly on indicators relating to governance, corruption and so on.

Additionally, the import of ICT in the socio-economic transformation of the region cannot be overemphasized. For example, Woherem (1996) and Avgerou (1998) have eloquently argued how ICT can help uplift developing countries especially those in Africa from the fathoms depths of inadequacies and deprivations, if government policies and strategies are well developed. On the contrary, others have sounded a note of caution that technology (IT) alone may not be panacea for the malaise plaguing under-developed countries (Castells 1999b). Suffice to say that sound leadership and commitment may be needed to help steer developing nations (including those in Africa) towards occupying a befitting place in the changing world, in which reliance on knowledge and information is paramount. Our desire to assess the e-readiness of African countries is borne out of the understanding that the preparedness of Africa vis-à-vis other economies in the networked economy would help focus the attention of policy-makers in the region on areas where improvement can be effected, or opportunities exploited

Cynics may argue that there is little or no hope for Africa in the networked world. On the contrary, evidence suggests that countries that have taken it up upon themselves to bring about a change have succeeded. For example, India went from nowhere to where it is today by focusing on areas where it posses comparative advantages (see Nair and Prasad 2002). Similarly, other countries in East Asia have streamlined their national IT policies towards improving the lot of their citizens; at the same time, seizing on opportunities wherever possible in the global economy (see Kraemer and Dedrick 1995). African countries can do likewise, when each country on the continent understands its relative position to other countries in the world and sees the need for a change by marshalling resources that could hasten its integration within the global networked economy. For instance, South Africa set its priorities in the 1990's regarding its economic policy and development goals as that country matches towards the *information age.* Arguably, South Africa's performance on e-readiness is the result of those well-nurtured policies (Miller 1999; Molla 2000; WEF 2002), amongst other factors. Other African countries only need to look at South Africa's e-readiness value here, in this study, or elsewhere (EIU 2003) with regard to its level of integration and preparedness in the global economy to appreciate what they should be doing. The Republic of South Africa has scores that were well above the average on many of the measures in this study in comparison with other selected countries.

The suggestions for African policy-makers are discussed as follows: In light of the fact that African countries are seen to perform fairly well on the "culture, understanding, effectiveness" factor; these could be used as springboards towards improving their overall position in the networked economy. How? African governments may take a cue from the practices of some East Asian countries such as the Philippines that found ways of using its rather limited resources in hooking up to the global networked economy. Kraemer and Dedrick (1995) write about how countries in East Asia (including The Philippines) engineered their national IT policy for sustainable development in the global IT industry. Africa, with its abundant human resources, relatively low cost of living expenses, wages and the use of the English language by some African countries can utilize their advantages on such indicators. For example, business opportunities involving data, call/telecentres, business process outsourcing (BPO) and similar services for organizations in the developed world could be looked into. Of note, we are not arguing that exploiting such opportunities alone can bridge gaps in economical and technological

inadequacies seen in the region, rather any opportunity available, as with such indicators should not lie fallow. By the same token, African governments must take it upon themselves to turn a new leaf. They could make efforts to improve on some of the indicators in the 'e-economy' and 'e-society' enablers such as “government effectiveness”, “regulatory framework”, “administrative start-ups” and other related items in which they fared poorly. Apparently, such items as those in the foregoing are within their purview.

It must be emphasized also that there are hosts of factors such as “export-related items” and others that the developed countries’ will, assistance or generosity may be sought. This is a necessity because in the networked economy, the actions of one region/nation – specifically those in the developing countries - alone might not suffice in helping it bridge the digital divide or improve upon its e-readiness value. Candidly, in order to help Africa, which is “relatively isolated both economically and technologically” (Plemming 2004) realize the objectives of the Millennium Development Goals (UNDP 2002); governments (leadership) in the region and the wider international community must truly appreciate the lack of preparedness by African countries in integrating itself into the networked economy. African governments on their own part must get their acts together, given their reputation for nonchalance on crucial issues of political and socio-economic development (e.g., Sachs and Warner 1997; Ifidon 1996). By the same token, the developed world must move beyond mere rhetoric and truly seek measures to improve Africa’s standing. For example, the inflow of foreign direct investment (FDI) to Africa, which is at about 5% of the world’s total (World Bank 2004) could be improved. This will go along way in improving the e-readiness for the continent.

On the technological front, an overhaul of the technology transfer process (TTP) to Africa (Udo and Edoho 2000) may be necessary. A TTP that is complete – acquire, make, repair and adapt, and not just a dumping ground of technology is crucial, if Africa is to improve its e-readiness score. Likewise, in order for Africa to better its e-readiness position, its level of participation or ownership of key resources such as the Internet needs to be addressed. African nations may need to claim more control over their share of the global Internet resource, now controlled mostly by foreign corporate interests (Mutume 2004; Wade 2001). Mutume (2004) notes that South Africa is one African country calling for change in the governance of the Internet. This *status quo* may explain why for the indicators of Internet use and computer processing power as a % of worldwide (MIPS), to some degree, Africa’s showing will continue to be insignificant. Redressing the imbalance with the crucial resource of the Internet – and its governance - will provide better and fairer opportunities for developing countries in Africa to tackle the long-standing question of the digital divide (see, Wade 2001). Moreover, integrating into the global 'e-economy’ or developing a modern 'e-society' for citizens of any nation depends on this technological resource amongst other related infrastructure.

CONCLUDING COMMENTS

In this paper we compute the e-readiness of some African countries with the view to assessing the preparedness or competitiveness of the continent in the global networked economy. A simple e-readiness measuring tool was used. In general, Africa’s s e-readiness was seen to be uncompetitive vis-à-vis other economies. Our findings indicate that South Africa leads the rest of Africa in terms of e-readiness. Likewise, southern African countries have e-readiness scores that are relatively better than that of Africa’s average. Countries in western and eastern parts of Africa performed poorly - below Africa’s average - whilst those in North Africa have scores that compare with Africa’s average. Collectively, Africa’s e-readiness is poor within the global economy. Nonetheless, a couple of areas of strengths were highlighted where Africa could exploit. Also, the paper succinctly discussed the measures that might help Africa improve its position in the increasingly global networked economy. The issue of leadership and commitment by African

governments as well as the reticence of the developed and richer international community in providing the ingredients to help bridge the widening digital divide between Africa and the rest of the world were noted in this discourse.

Avgerou's (1998) observation of the severely disadvantaged position of developing countries including those in Africa within a global economy with regard to technology and information resource is a situation that needs to be addressed adequately and promptly. To be complacent about redressing some of the areas demanding attention, as identified in this study "will only reinforce historical patterns of inequality" (Heeks 2002, p.18). The onus is with the African leadership and the international community. Furthermore, Heeks (2002) comments above are not dissimilar with those of the late President of Cote d'Ivoire – F. Houphouet-Boigny – where he commented that "after, having missed the industrial revolution, Africa should not once more miss the computer revolution." He continues: "…countries that neglect this domain in their development process are increasingly widening the gap between themselves and the developed countries, who will find in this a new reason to exercise more monopoly over power" (Maombe-Neko 1996, p. 67).

Thus, the contribution of the paper is seen in its attempt to assess the e-readiness and/or competitiveness of some African countries in order to provide a picture of its performance and preparedness in the world. The findings of this study may entice regional policy makers to further investigate what actions or strategies enabled some parts of Africa to perform better than others; as such create an atmosphere of emulation and healthy rivalry between nations on the continent.

On the whole, there are limitations to this paper: First, most e-readiness tools are descriptive and diagnostic by nature, the same applies with this effort. Second, the historical nature of the data used is another limiting factor. However, this may not be much of a problem given that comparisons are made for countries within the same time frame. Moreover, data source(s) for each indicator used in the study is same. Third, the unavailability of data on some items, which this study assigned "worse" score, may in fact not be totally correct. Perhaps, this underscores the sorts of problems often associated with meta-analytical methods studies of this nature.

Nonetheless, this endeavor has not been diminished by the limitations above as areas of strength and weakness vis-à-vis nations were well-presented. Without doubt, a picture of Africa's performance regarding her e-readiness within the global economy is presented. Finally, it is hoped that African policy makers and governments can make the most of the information herein; in particular, as they seek input for national development plans. Also, each country's e-readiness score could be compared with future scores in order to assess trends in e-readiness for each country. Lastly, it is not claimed herein that our e-readiness scores for the selected countries (and for Africa) in this study represent the final word for such an exercise. Rather we acknowledged that there are differing perspectives on the subject of e-readiness assessment to which this endeavour is just a part.

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Designing for learning through multimodal production: Film narrative and spectatorship in Director's Cut

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ABSTRACT

We describe the evolving learning design of a computer-based exercise called *Director's Cut* that challenges students to create their own video sequence from a set of clips we provide. The context is a film theory course where the community of educators has been interested in introducing practical exercises so students can, for example, experience how their choices influence which character the audience identifies with most strongly. This design process is presented within the theoretical frames of multimodality and production based learning, offering insights into how we balanced constraints and creativity as learning designers in the context of a South African university.

INTRODUCTION

Overview

While audiences watching television and films understand the messages being communicated through editing, they are generally unaware of the specific conventions and techniques being applied in their production. In part, the role of introductory film courses is to make students aware of such conventions, their relevance, and their impact on the audience. The majority of students studying film criticism at an introductory level have little or no practical experience in screen production. Teaching methodologies in film theory and analysis courses are traditionally text based. One of our underlying premises is that the capacity of a film critic to recognise and assess the skill of a filmmaker is enhanced if they have a sense of the process rather than just the end product. Production based learning approaches can support students learn film theory by enabling the analyst to do the cinematic equivalent of 'reading between the lines', appreciating decisions made by the director, the editor and other involved in the filmmaking. *Director's Cut*, the computer-based exercise we developed, invites film analysis students to apply their understandings of theory and to edit their own short sequence. This is one component of an undergraduate film narrative course about film spectatorship, genres, and modes of composition as well as editing practices and conventions. The exercise integrates other teaching and assessment components complementing the traditional essay assignments, seminars and lectures.

The process of developing such learning activities is invariably collaborative, drawing on the skills of many people. It is the nature of such productive collaboration among educators and how we understand design choices that enables us to develop effective exercises (Morrison *et al* 2005

under review). In much the same way that most viewers are unaware of film editing conventions, these aspects of learning design and collaboration are generally invisible even to colleagues who may be involved in the process.

We present the process of developing *Director's Cut* as an educational case in which information communication technologies (ICT) is positioned within a broad socio-cultural approach to learning at the University of Cape Town (UCT). The role of UCT's Centre for Educational Technology (CET) is to develop and research the situated and integrated roles of ICT in the changing landscapes of higher education in post-apartheid South Africa (e.g., Czerniewicz 2004). CET has extended its role to encompass supporting staff development and it is in this context that the three authors were able to collaborate and reflect on how ICT is impacting not just on student learning but also on deepening our understandings of the creative uses of technology. We now also use *Director's Cut* in CET's staff development workshops as an example of what Laurillard (2002) would classify as a 'productive media form'. This enables us to illustrate how students might be supported in the production of multimodal texts that assess understandings of conventions and processes, extending expectations about the use of ICT beyond course websites.

The paper is based on a shared interest in designing and developing contextually appropriate resources for students' own production based learning. This involves students and staff alike in understanding and generating intersections of media types and modes of expressive communication. Together these media and modes may be conceptualised as multimodal discourse (e.g. Kress and van Leeuwen 2001). The paper also addresses matters of how a Community of Practice (e.g. Lave and Wenger 1991) is being built around the development of socio-cultural approaches to ICT in teaching and learning for lecturers and tutors in the Humanities. Finding ways of assisting and improving students' learning about filmic conventions in and through genre is a rich area to investigate using ICT. We see ICT as providing flexible tools and communication sets for deconstructing film 'languages' and for reading and composing multimodal discourse (e.g. Rabinowitz 2002; Kress and van Leeuwen 2001). Here we access recent writings on multimodality and position them in relation to teaching and learning with and through ICT in a southern African context.

Outline and research rhetoric

In Part 2 we provide a frame in which we consider how research in multimodality, production based learning and the building of a Community of Practice, together with considerations of the local context of educational technology work and film studies at UCT. These we suggest are useful tools in understanding our learning designs. In Part 3 we give a more detailed description and analysis of *Director's Cut*. Finally, we reflect on factors that appear to either encourage or inhibit more creative use of technology and the impact that this can have on staff development and student learning.

While much of the paper is conventional in its style of presentation, Part 3 includes annotated illustrations as a means of communicating the research text. Later in the paper we show the actual screenshots of the interface. This allows us to depict aspects of the learning experience that cannot be included in a paper. The annotations are also an instance of communicating multimodal pedagogies and analysis. We see our research rhetoric needing to reflect how we are aiming to influence teaching and learning through the use of multimodal production.

BUILDING COMMUNITY AROUND DIRECTOR'S CUT

Multimodality

The film culture that students are exposed to is inherently multimodal which is in stark contrast to their experiences in a traditional film theory course. The rapid and expanding adoption of ICT in the past two decades has resulted in an expanding 'crossmedia' domain in which a variety of media types and modes of communication may be related, combined, composed and distributed. Earlier separations of visual and verbal text have been quashed in calls for the study of intersecting multimodal discourse, particularly in learning contexts (Kress 1998; Kress 2003). This has important and challenging implications for emerging and changing literacies (e.g. Morrison 2001, Kress 2003), extending earlier literary and logo-centric approaches to texts, learning and meaning making in a turn to the visual (Kress 1999; Morrison 2005). This turn increasingly involves teachers and students in the application of a variety of digital tools and communication devices in shaping and communicating moving media. Lemke (1998) has discussed these changes in terms of an emerging and transformative metamedia literacy. However, there still remain few instances of the application of multimodal discourse theory in learning about media through media production in higher education.[i]

Traditional university film studies programmes tend to place greater emphasis on analytical skills rather than production skills. This is indicative of the genesis of film studies in the academy in contrast to vocational or technical film schools where production is central. The 'experiential learning' teaching philosophy at the Centre for Film and Media Studies (CFMS) emphasises the interpenetration of theory, analysis and creative practice (Kolb *et al* 2001). At UCT and elsewhere, university level courses are increasingly including digital tools and technologies as modes and means of learning about film. In part this is changing with greater access to inexpensive and high quality film making and editing equipment. However, in large classes this places considerable strain on material resources as well as requiring extensive support by both technical and academic staff. As Tomaselli and Shepperson (2003) observe, these demands often create tensions between academics and university administrators. Therefore *Director's Cut* was designed with collaboration and input from administrators, academics and technical experts to offer large classes equitable access to media technology and training, while limiting costs and supervision in an institutional context where enhancing technological competence is a concern, but funding is limited. The needs assessment phase of the curriculum design process (Flowers 2001) identified the importance of bridging the digital divide and enhancing multimodal connections between thinking and doing, and between image, sound, text, and abstract theoretical concepts. We also identified the need to offer students opportunities to express their creativity in practical ways while considering the overall experiential and emotive impact of a film text on spectators. The ideal is to design creative exercises that are manageable and to avoid unrealistic expectations of what technology can contribute. What we wish to explore here is how such creative designs can develop through applying multimodality, learning theory and communities of practice.

Director's Cut has far fewer features than sophisticated professional editing software, requiring much less technical expertise than an assignment where students shoot and edit their own film. For educational purposes limiting functionality to simplify the activity has distinct advantages. First, the combinatorial storyboarding and editing features in *Director's Cut* were designed to support a multimodal comment loop, an annotational tool and a loop that encouraged students to review their sequences. Such features, which offer feedback and reinforce learning, are not available using existing software like *iMovie* or professional video editing applications. Second, unlike a more open-ended shooting and editing exercise in which students may be inclined to focus on either technical mastery or creativity at the expense of critical reflection and the application of film theory, *Director's Cut* has well-defined learning objectives with strong links

between theory and creative practice and an appropriately aligned assessment. It requires less intense supervision, shifting the focus from mastering technology to understanding the relationships between technique, content, meaning and impact.

Technology has been seen as one way that such creative tasks can be structured and scaffolded to avoid some of the assessment challenges introduced by multimodal pedagogies. Such pedagogies take the position that traditional written assignments should be seen as just one collection of 'semiotic modes' (Kress 2003). In terms of a multimodal pedagogy, the aim is to provide scaffolding for students to communicate their ideas using a variety of discourse modes and media types, such as oral presentations, pictures, video, dance, and music, and combinations of these (e.g., Davis and Reed 2003; Morrison 2004).

Film Narrative course

The *Director's Cut* exercise ran towards the end of Jane Stadler's large introductory Film Narrative course (FAM201S) in September 2004, with about 250 second year students. This theory course investigates the process of film narration from screenwriting through to an 'auteur' approach to film studies that considers film authorship in terms of a director's 'signature style'. It examines the relationship between meaning, form, ideology and narrative structure and explores the influence of the conditions of production and reception on storytelling and meaning making.[ii] Here students are introduced to a range of theories of narration and spectatorship, and are required to develop critical skills that enable them to analyse genre, conventions and character engagement.

Evolving learning design

Traditionally film theory and production are taught separately, yet one of our underlying premises is that students will learn best if the relevance of theory is made clear though application. Jane Stadler had for some time observed that students in theory courses did not necessarily appreciate that different shot perspectives impacted on the storyline despite having covered such points in lectures and course readings. She voiced:

> *I'm a bit worried about the division between theory and praxis - production teaching takes so much time that students are not reflecting critically on the texts they produce. Perhaps they need to master basic production skills before they are able to step back and make the links to theory?* [Jane Stadler, participant in the ICT-UCT project's Overview Workshop, April 2004]

One of the initial proposals during the preliminary design phase early in 2004 was a suggestion by a colleague that we provide a basic script and then ask students to search for photos on the web and crop these to produce their own storyboard, cinematography notes and script. This draws on the notion of multiliteracies in which learning with ICT crosses media types and discourse modes in multiple combinations. Cropping photos is often used in textbooks to illustrate the differences between say long, medium and close-up shots (e.g., Nelmes 2003). Although many of the rules can be illustrated in this way, it still requires considerable imagination to conceive the final product. While this approach is valuable, it provides few scaffolds of the learning process and is relatively open to diversions in large classes: there is always a tension between giving students freedom to express themselves and requiring they give voice to their own critical reflection.

Andrew Deacon's suggestion was that if we could shoot appropriate video footage, students could develop their own narrative structures from these clips. By adapting an earlier activity called *NewsBreaks* (van der Vliet and Deacon 2004), we could develop the equivalent of a simple 'multimodal word processor' for students to produce edited sequences. Working with video forces

students to consider how the script matches the pictures in each frame as well as the cuts, which is more challenging than in pre-production storyboarding where there are fewer constraints. This proposal became the basis for the design of *Director's Cut* which located students in a role somewhat like that of a director arranging a rough edit; student 'directors' need not be concerned with all the details of the scriptwriter, camera operator or editor as such.

Film and Media Studies at UCT

The CFMS offers a range of courses and perspectives at undergraduate and postgraduate levels.[iii] A small but dynamic Community of Practice between CFMS and CET has been built through various collaborative projects.[iv] A common challenge inherent in many of these projects has been how more practical exercises could be integrated into the curriculum (van der Vliet and Deacon 2004). Another challenge has been working with large classes for whom it is impractical to provide access to professional equipment. The CFMS rather invested in professional equipment for students in senior courses as part of the Production stream. This represents a balance between what types of technology interventions we considered feasible and what is seen as necessary to support student learning (e.g. Tomaselli and Shepperson 2003; van der Vliet and Deacon 2004). These collaborations have contributed to the ongoing staff development project ICT-UCT and are clear indicators of how interdisciplinary links between content specialists and ICT and learning specialist may be initiated, negotiated and sustained. They also provide important locally situated examples of how ICT can be co-developed and implemented locally. Here the media rich character of these activities provides multimodal resources for other CET partnerships with academic departments.

ICT and learning at UCT

The role of CET[v] in researching and developing educational technologies is strongly influenced by its location in the Centre for Higher Education Development, a cross-faculty unit facilitating the continual improvement in the quality and transformation of higher education. CET grew out of several other units developing and supporting educational technologies, including the Multimedia Education Group[vi] (Czerniewicz 2004), whose work was specifically concerned with '…building knowledge, expertise and insights at the micro-level while simultaneously responding to interrelated macro-challenges, of which three in particular frame this work: (1) increasing access to new technologies and overcoming the digital divide, (2) dealing with a new communication order, and (3) transforming higher education in South Africa.'

Learning through production

ICT has been rapidly taken up as part of teaching and learning in higher education, especially since the development of the web has made collaboration and distribution part of the global culture. Laurillard's (2002) review of how ICT can support teaching and learning in higher education suggest we think in terms of different media forms that emphasise different modes of conversations between lecturer and student. Productive media are one of these that have a very intuitive value in supporting learning, but can present many challenges in devising such activities (e.g., Papert 1991).

For universities in many 'developing' countries, web access remains problematic and there are perceptions that the roles and engagement of students is often compromised. This demands that educators devise activities suited to local conditions, allowing students maximal involvement given restrictions of bandwidth, quality of the infrastructure, time on screen and collaborative connections. Lecturers and tutors who are motivated to use ICT as an active and experimental part of their own pedagogy add innovative tools and methods to their formal conducting of content. There are numerous cases illustrating these points, one of which is *HyperLand,* a CD-

ROM project that involved deconstructing representations of land in Zimbabwe (Morrison 2001). Here students were involved in the selection and development of content, peer tutoring and student-led introductions to hypermedia for staff.[vii] As Buckingham and Sefton-Green (1991: 303-304) argue, 'by giving the students time and space to experiment, and to bring their cultural experiences to the technology, we hope to explore how their "writing" challenges our concepts of literacy'. This captures the insights we wish to gain in developing multimodal production activities that are otherwise often invisible.

Building Communities of Practice

From a staff development perspective, there is a growing need to support lecturers in their understandings of how activities such as *Director's Cut* are conceived (e.g. Littlejohn 2000; Laurillard 2002) as it is generally not obvious how to design such learning activities without lecturers' active contributions. CET approaches this by promoting the building of a Community of Practice (Lave and Wenger 1991; Wenger 1998, Wenger *et al* 2002) between the various production and pedagogical participants in applying new media technologies to university level teaching and learning. Here we refer to a Community of Practice as group of educators who meet to discuss and develop shared practices, informed by their own experience as practitioners and researchers. Additionally the contribution of process that involves developing artefacts such as *Director's Cut* is acknowledged as these serve as 'a point of focus around which the negotiation of meaning becomes organised' (Wenger 1998: 58).

Analogous to how audiences understand cinematic conventions without necessarily recognising the production techniques being employed, lecturers may understand how exercises such as *Director's Cut* support learning without always understanding how they were developed. Such an activity is obviously not about teaching software engineering or programming but rather an abstract language to discuss the integration of the development and implementation of pedagogy, content and software designs (Peterson 1998; Torrisi-Steele and Davis 2000; Sinclair *et al* 2002). As Salomon (2000) has so clearly argued, it is the educational rationale and not the technical tool that is of primary concern behind these integrative moves.

Without such understandings, we would argue that there may be fewer creative uses of technology and less sharing of ideals within the community of educators. Often the initial reactions of many lecturers are that their courses have no equivalent types of activities and that these seem too complex (Porter and Corderoy 1998). In building a Community of Practice, where academics are encouraged to think of ways to use technology beyond a traditional course management system structure, the language of designs and architectures becomes an important tool to probe alternatives (Mason *et al* 1999). This language is built through collaboration and the circulation of different disciplinary and interdisciplinary intersections. Cases such as *Director's Cut* provide locally developed examples of how collaboration may be realised.

SHAPING NARRATIVE AND SPECTATORSHIP IN DIRECTOR'S CUT

Developing local material

Attention to genre is central to both film making and the more analytical field of film studies. For *Director's Cut*, Jane Stadler developed a shot list for a scene in a *Film Noir* style interrogation scene in which the Detective questions the *Femme Fatale* about her whereabouts and actions on the night a crime was committed. Rather than locating the story in the original *Film Noir* of the 1950s, we were also inspired by more recent *Noir* films such as *LA Confidential* that incorporate modern stylistic elements. Past students of the course were employed to act in, film and edit the

footage. This encouraged students to identify, both personally and narratively, with the material and their own edit.

The clips for each scene were shot from different points-of-view (i.e., both the Detective's and the *Femme Fatale's*), multiple camera angles (e.g., long shot, medium close up, big close-up) and various cut-away imagery (e.g., gun, glass breaking and champagne cork popping for a loud noise). These shot choices are the building blocks for 'director's' to tell their own story, deciding whether the detective is suspicious about the *Femme Fatale* having an affair or that he suspects that she killed a man, among other choices. Students can choose whether to tell the story from her point of view, or from his or alternate between the two. They write the voiceover narration, as is conventional in the *Film Noir* genre but must use the given dialogue where one can see the actors speak their lines. This is the grammar which students must use to tell their story. The students had had lectures and readings on film narrative, screenwriting, genre and spectatorship that prepared them for understanding these concepts that they now needed to apply.

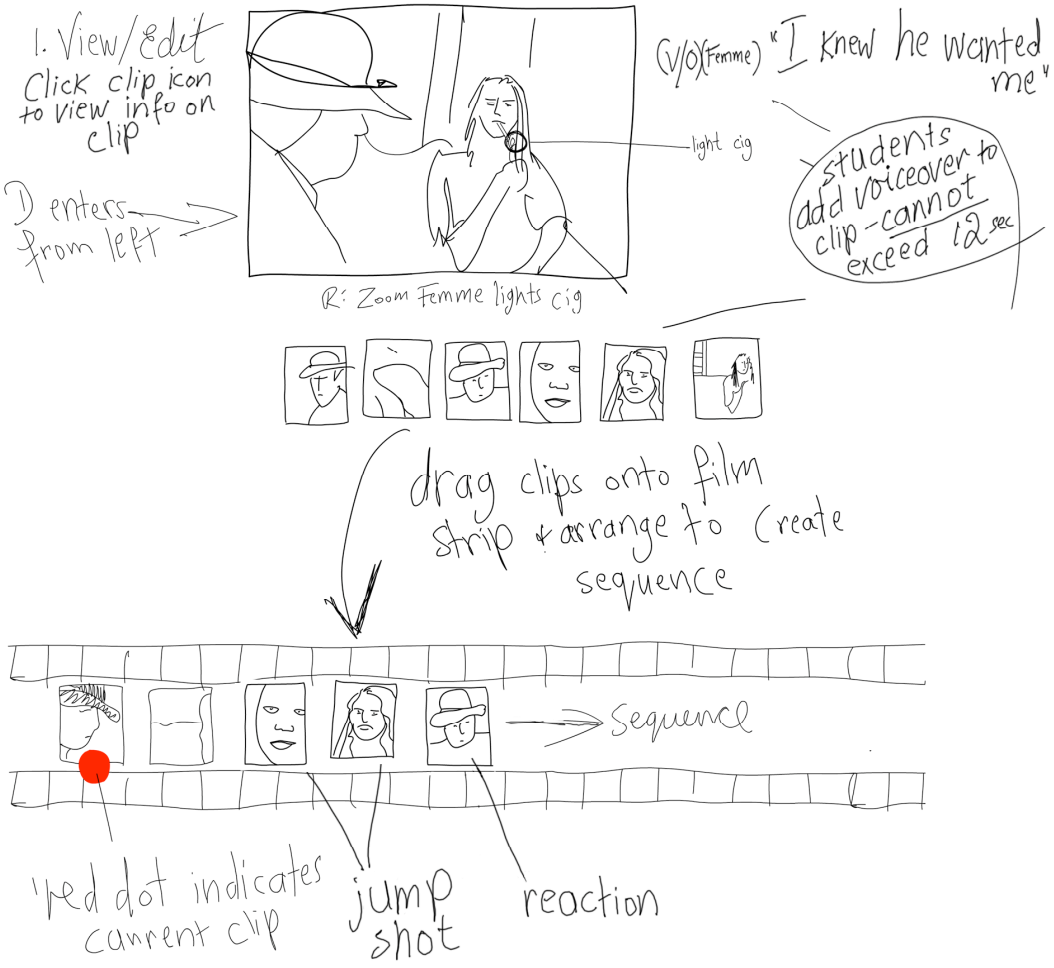

Figure 1: Storyboard showing Director's Cut interface to create a sequence. A jump cut was added which will cause Director's Cut to remind the student to insert a reaction shot in between the two similar shots of the Femme.

Creating a sequence

The *Director's Cut* learning design focuses students' attention on what we considered the core learning objectives by automating and simplifying the unassessed aspects of the task as far as possible. The underlying data structures define the power of the grammar which students can communicate their ideas. Since the clips are known in advance, unlike a professional editing suite, we can associate various descriptive attributes or semantics with each clip. The lines spoken by the actors, the length of the clip, the camera angle and other descriptive information that a director would know are all stored in a setup database. The program retrieves this information so it can be used when appropriate. This approach simplified design negotiations allowing some behaviours to change even once some students had started using the program by editing information in the setup database as we saw how students responded. Other information stored in the program captures what students do, such as the ordering of their clips and the text for their voiceover narration. Only the student's own information needs to be saved. When closing *Director's Cut*, the sequence and responses are stored in a central database, allowing students to return later where they left off (Deacon and Jaftha 2004).

Describing the operations of such an interface and even giving instructions to students on how to develop their sequence can be more difficult and less effective than a demonstration or trying to create one's own sequence. In this paper we illustrate how a student might work in creating their sequence by using a storyboard-style diagram. This is in keeping with our approach, inspired by concepts underlying multimodality and multimedia learning (Mayer 2001), to explore a range of integrated strategies to communicate information such as the instructions and feedback. Our ideas have evolved over a number of projects (e.g., van der Vliet and Deacon 2004; Deacon *et al*. 2004, Skjulstad and Morrison 2005 *in press*) where multiple abstractions of information are offered to support learning.

Film textbooks describe in detail the 'rules' or 'conventions' used in TV and film. In exposing students to these rules we wanted to allow them to create learning artefacts to demonstrate their understandings rather than simply recalling a list of the definitions. The combination of technology to support this approach is one of the more novel aspects of our design. An important aspect involved using rules to generate feedback as students construct their sequence or write their answers. The program has sufficient information to detect for example jump-cuts, scripts that are too long and dialogue that includes inappropriate words. Our feedback rules can be reduced to two generic forms. The simplest form considers a single clip's attributes, such as the voiceover text a student wrote, and applies a function to count the words and sentence length, or find specific words. Feedback is generated if there are too many words, sentences are excessively long or inappropriate words are used. The second form considers a pair of clips in the sequence. This allows the detection of repeating dialogue, a jump cut effect or crossing-the-line-of-action. A schematic representation of the mechanisms to detect this is illustrated in Figure 2.

Working with a small number of clips it is feasible to specify all rules for detecting clip combinations we want to give feedback on. We used 72 feedback rules of the first form that operate on to a single clip and 38 of the second that check for pairs of clips in a sequence. The rules are checked whenever changes are made to the script, sequence or answers and the feedback formatted as a paragraph which appears on the screen. This might include a suggestion to insert a reaction shot to avoid the jump cut effect.[viii] Essentially this exploits the 'Eliza effect' that depends on students believing that the feedback is actually intelligent even though the mechanism is a simple automated response (Hofstader 1995). Here tutors play an important role in discussing, for example, how a student responds to feedback and when it might be ignored. Many students commented on the influence that feedback had in identifying issues they would not otherwise have considered, but did not completely eliminate the types of mistakes the rules react to. The number of students who ignored the most basic cinematographic conventions was

reduced significantly, allowing the assessment to reward aspects more central to the learning outcomes.

Working in laboratories

A session was held to familiarise the tutors with *Director's Cut* prior to the first session with students. Interestingly the tutors found the task challenging, as they soon realized it was not straightforward to construct their own sequence or answer the questions. UCT, like most other 'developing' countries, continues to rely heavily on computer laboratories as students do not have sufficient access. This is in contrast to trends elsewhere where universities are dismantling many teaching laboratories in favour of distributed campuses. Here students are working independently, often on their own computers and over the web. Exploiting the teaching opportunities in our laboratories has been important to us, allowing greater interaction with tutors and more video-rich activities than would otherwise have been possible with web supported independent forms of learning. The course has 1 tutor per 20 students in a class of 250 students. The laboratory has 80 computers so we held five 45-minute sessions to accommodate the class. The introductory session is an effective model to clarify the activity and assist students with conceptual issues that are otherwise difficult to communicate effectively. These ran during a single weekly teaching cycle, with students completing the task in their own time and handing-in two weeks later.

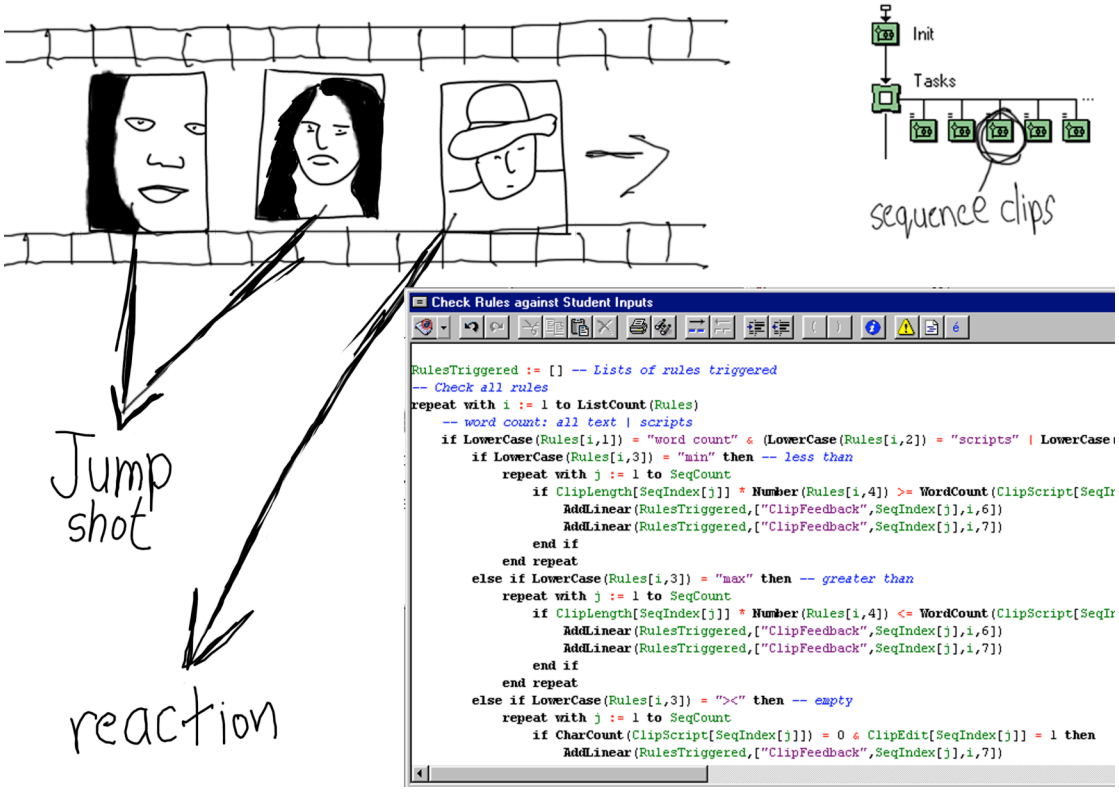

Figure 2: Shows jump-cut from Figure 1 and how rules in Authorware code are checked.

Figure 3: Screengrab for the interface shown in Figure 1, with instructions on how clips are viewed, voiceover narration is added and feedback is generated

Reflective questions

In addition to creating a sequence, students are required to answer five open questions and five multiple-choice questions. The open questions ask students to propose a title for their film, outline the back-story, identify the dominant point of view in their sequence and provide an explanation of their own 'directorial signature style' using terms drawn from film theory. This involves discussing the impact they intended their sequence to have on a film spectator, particularly in terms of character engagement. Requiring students to answer such questions demands reflection and appreciation of how they worked (possibly intuitively) to develop their sequence. A number of students commented on how this allowed them to recognise inconsistencies and contradictions in their own work more clearly.

The five multiple-choice questions had a different role in underscoring the relevance of film theory to creative praxis. Each question required students to play a clip randomly assigned to them and identify how a particular film theorist would have characterised the clip. The different question variants were designed to avoid plagiarism. The articles discussing the film theorists' ideas are included in the course reader. Essentially this quiz is confirming whether or not students have done their readings and can understand and apply the theoretical terminology used in the academic articles. The multiple-choice quiz is automatically assessed when students prepare their storyboard for printing.

Printing storyboards

While it may appear sufficient to submit ICT based assignments electronically, there are several significant advantages in requiring student to hand in a paper copy of their work. In part this is because many students want copies for their portfolios and tutors find a paper copy easier to read

and write comments on, but it is also important as a record of completion and for the external examiner to review. Thus the mode of assessment differs slightly from the mode of production and we wanted students to be aware of this change. Once students have finished developing their edit in the *Director's Cut* program, they had to open the *Storyboard Loader* to print their sequence and answers. The *Storyboard Loader* is a *Microsoft Word* document that when opened queries the database and extracts the student's saved work, formatting this in a storyboard layout (see Figure 4). This functionality builds on work developed in other projects involving the customization of *Microsoft Office* applications to support learning activities[ix] (Deacon *et al* 2004). Having a familiar word processor document allows students to do any final text editing such as correcting spelling before handing-in. Changes are saved back to the database so students can return to change their sequence in *Director's Cut.*

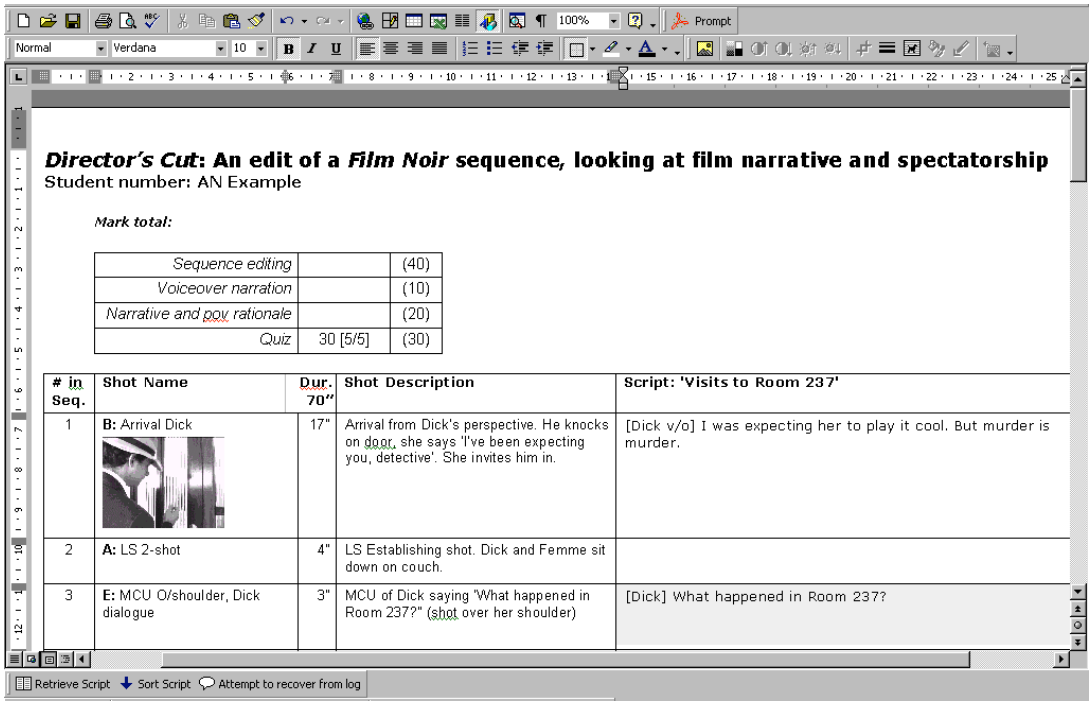

Figure 4: Screengrab of the Storyboard Loader showing a formatted sequence that tutors mark and add comments to. Independently, tutors can call-up and view the video sequence.

From given material to critical reflection

Our intention had not been to setup an experiment to measure the impact of *Director's Cut* on student learning as in any real course there are far too many variables that cannot be controlled. Such approaches have tended to offer limited insights into many aspects of the learning design we wished to share within the community of educators (e.g., Sandoval and Bell 2004). Rather here we have been interested in for example what students did and impressions of tutors in the course in reflecting on the context. In these larger courses tutors have important roles in both facilitating learning and assessment of tasks. The negotiated learning design was influenced by the requirement for the assessment to be aligned and straightforward for tutors. Interestingly, in the beginning some tutors found their assignment role difficult as they were then not as familiar

with the clips as students had become in creating their own sequences. Tutors had to watch students' sequences because they could not yet visualise a sequence on paper, recognise the reasons for some more subtle choices or how the voice-over would sound in relation to the images. We had created a version of the *Director's Cut* program that allowed tutors to easily retrieve different students' sequences and play them while they marked at the paper copies.

Tutors remarked that students came up with an unexpectedly wide range of ways of combining a limited set of clips, elaborating and personalising their meaning by writing voice-over scripts, and explaining their meaning using critical reflection. The statistical correlation between the marks awarded by tutors for *Director's Cut* and the final mark while significant was not as strong as those of the two essays suggesting different types of understandings were being assessed. This supports the observations made by several tutors that different groups of students had done well in the *Director's Cut* exercise, rewarding students who could articulate the connections they made between theory and practice. There were 24 students in the Production stream who already had experience using professional video editing applications. A number of these students remarked that as they knew how to edit their sequence using *Adobe Premiere* and that they had sometime felt limited. We observed that these same students were generally no better in articulating their intentions within the *Director's Cut* constrains of producing a rough edit and using the theory to explain intentions.

There were clips or combinations of clips we thought students should never use, as they were essentially 'mistake shots' or edits not acceptable in *Film Noir*. Not all of these triggered automated feedback, as we had been curious about what students would produce. While these clips were the least frequently used, still about 30% of all students used at least one of these potential 'mistake' shots with smaller numbers ignoring automated feedback. A few ingenious strategies emerged such as including shots that crossed the line-of-action by inserting flashbacks in between these clips. The repetition of dialogue, used by 9 students, was justified by some to create effects such as a 'postmodern style'. While encouraging these imaginative edits we insisted that students justify their choices in order to convince their tutors of the merits. The tutors enjoyed discussing among themselves, which they considered original ideas and which could not work or were simply confusing. We also emphasised that since sequencing clips of a fixed length is really only a rough edit, students could add notes suggesting how the in and out points of individual clips could be changed.

This 'gap' between abstract understandings of concepts or words and the concrete relationship to audio-visual material is one of the difficulties students have in film studies that was raised in the examiners' meeting. Here *Director's Cut* was seen as having contributed to addressing some of these concerns, among both weak and strong students, which had not been addressed in another course where there was no equivalent exercise linking practice and theory.

CONCLUSIONS

Facing constraints

Director's Cut demonstrates an approach to learning through multimodal production, by developing microworlds rather than using professional applications or by limiting the modes of expression. The interface supports the basic tasks students need to construct a filmic sequence, testing their understandings of film narrative and spectatorship. This functioned as a capstone activity in the course, promoting skills expected in later courses. Elsewhere (Morrison *et al* 2005 under review) we have included students' comments on the strengths and weaknesses of the activity as a resource for its redesign. Here we have focused on how the *Director's Cut* design

developed from earlier activities and the community of practice among academics in the CFMS. In CET's staff development programme *Director's Cut* is now used to illustrate how such communities develop and what can emerge to address specific requirements of a course. This has been very valuable in generating broader discussion in how ICT can be used to support learning.

Notions of multimodality, as advanced by Kress, need to be carefully negotiated when applied to large classes. While detailed issues of multiliteracies and multimodality may well be suited to small classes and more personal tuition, *Director's Cut* shows how close collaboration between learning designer and content specialist can result in educationally well founded outcomes in large groups. Without such cases it is not always clear how ICT can enhance students' understanding of, say, theory though production based learning. We argue that research on multimodal production has relevance for designing for learning because ICT offers new and different ways of integrating a number of elements in one main activity that has clear boundaries and expectations. A degree of certainty and predictability is important when working with large numbers of tutors and students within an inflexible timetable.

In designing the *Director's Cut* exercise to bridge the divide between theory and practice, it was revealing to observe that while the vast majority felt we succeeded, several of the 24 Production stream students who had experience editing video felt constrained. They wished to add transitions, shorten clips, add music and even re-shoot footage that step outside the boundaries we established. While we had considered some of these features in Morrison *et al* (2005 under review), for the most part they are impractical using the basic technologies we used and would divert attention away from some of the underlying filmic techniques being taught making assessment complex. Rather we framed the exercise as being about creating a rough-edit and the links to theory rather than a complete production.

Value of creativity

We developed the *Director's Cut* application rather than purchasing professional applications or using cheap alternatives as these would have been impractical in our context. While students would welcome using professional applications, licenses are very expensive and training becomes involved and time-consuming. Rather we have invested in developing what we needed, following similar strategies to those that encourage 'developing' counties to adopt open source and that emphasise developing design skills rather than paying for licenses of often expensive technologies (Candy 1997).

The requirement of a film theory course imposed additional constraints on the content and duration of the practical exercise. The focus of the creative interaction centred on the selection and sequencing of pre-shot footage with the addition of voice over narration which is comparatively straightforward to implement using existing development tools and the universities laboratory infrastructure. The quiz and reflective questions were tightly integrated within the same environment in order to challenge the students' to apply terminology from film theory, analysis to the screen text they produced and provided a written rationale. Where film theory attempts to explain how audiences respond to movies in terms of character engagement and the way in which viewers are positioned in screen space via camera angle and point of view, *Director's Cut* allowed students to apply theory in a relevant manner, using it to experiment with manipulating the spectators of the films they created themselves. When marking exams, tutors commented that students were able to recall, explain and apply the theoretical terminology that had been reinforced in *Director's Cut* at an unusually high level. In summation, investing collaborative effort into multimodal design strategies effectively enhanced learning by facilitating creativity among the educators within contextual constraints, and by enabling the interpenetration of theory, analysis and production within an integrated activity.

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NOTES

[i] Considerable attention has been given to teaching about story-discourse relations (Chatman 1978) and to the ways in which ICT has made it possible to circumvent the text's time of telling through for example the VCR (Cubitt 1993). Attention to video as part of hypermediated communication (Liestøl 1999), has tended to focus on ways of linking and connecting digital video through non-sequential information structures and link-node relations (Liestøl 1994, Miles 2000, Miles 2003) and has been less about students' own making of digital video and learning about and through producing filmic discourses via ICT. There is a small body of work about teaching about video within hypermedia (Liestøl 1993), visual aspects of web design (Wysocki 1999) and online video blogging (e.g. Miles 2005).

[ii] See course description: http://www.cfms.uct.ac.za/

[iii] Several members of the Centre have an interest in how digital media technologies may be implemented in film and media courses, productively and analytically. This has resulted in several close collaborations with CET. In particular, these have been strengthened by the move of a former CET member to the CFMS.

[iv] CET's collaboration with CFMS was well established before *Director's Cut* was conceived in mid-2004. There has been considerable innovative work in using ICT in this context, particularly that involving Marion Walton and Emma van der Vliet. A number of projects, whose designs are similar to that of *Director's Cut* had been developed for the large Media Studies courses. These included:

- *NewsFrames (1st year, 450 students):* Here students are given the chance to apply their understanding of how news is framed on the front page of a newspaper by writing the headline, caption and selecting a photograph (Deacon 2002). The aim is to engage students in the news production processes and the controversial debates that emerge when they need to write a headline to attract the readers' attention without causing offence (30 words to frame the front page).
- *NewsScripts (2nd year, 300 students):* This web-based exercise requires students to write an accompanying script for a prepared TV news segment on the Asian tsunami, using footage shot by tourists. This involves students sourcing facts, writing to picture, and applying news production conventions so that their script can be read to the video clip we provide (120 word script). The exercise is not dissimilar to how many TV news items, bought by a local broadcaster, are prepared for our local audiences.

- *NewsBreaks (3rd year, 200 students):* Here students can sequence and select clips to edit together their own television news segment, using footage of a controversy surrounding a local penguin colony (van der Vliet and Deacon 2004). They then write the accompanying script and provide justifications for their choices (300 word script). Like *Director's Cut*, *NewsFrames* and *NewsBreaks* were developed in the application *Authorware*.
- *EduSoap (3rd year, 200 students):* Student working in groups must prepare a tender for a TV educational soap opera production. This involves preparing a digital storyboard for an episode and presenting a pitch to the class and invited television personalities (van der Vliet and Deacon 2004). Here technology was seen as a facilitator in encouraging creative expression in larger classes while providing students with some practical skills in fictional narrative.

[v] The implementation of ICT across of variety of higher educational institutions and contexts has had a challenging and transformative effect on teaching, learning and research. Candy (1997:179) argues that such institutions in the 'developing world' need to anticipate these effects and changes and to devise local strategies for engaging with them. In post-apartheid South Africa, ICT is seen as an important but necessarily integrated part of wider educational change process. The issues around for example globalisation, changing expectations of higher education and the 'digital north-south divide' are perceived to be inhibiters to flourishing places of learning.

[vi] This was provided by a grant to the Multimedia Education Group from the Andrew Mellon Foundation, USA.

[vii] University of Zimbabwe and the Harare Polytechnic students were included in *HyperLand* as a development resource and as catalysts for student centred making and critiquing of hypermediated communication and pedagogy. In *HyperLand*, however, the lack of undergraduate students in film and media restricted the possibilities of learning through making video. The system included 80 or so videos but these were integral to the overall pedagogical design rather than specific student-directed activities. Nevertheless, video was included in a student project on Zimbabwean pottery, first as orientation to their practice and related research, and second as a mode of voicing reflections on learning. These videos thus provide examples of the socio-cultural and experimental co-construction of learning though production.

[viii] Loosely related work on rules systems in 3D animation environments applies artificial intelligence approaches to for example select camera angles and shot scales dynamically (see Friedman 2003 for a recent review of this work). This context is more challenging since generally less information can be extracted from the scripts of a 3D animation game than from our prepared clips. The goal here is to develop various heuristics rules that capture cinematic knowledge of genre such as television sports coverage or soap operas to make 3D animation scenes appear familiar without detailed scripting of camera angles. These are designed for games or film pre-production planning rather than to support student learning.

[ix] *Microsoft* now supplies the *Office* suite to South African government schools at no cost and at significant discounts to universities, in perpetuity. Similar programmes are being initiated in other developing countries (http://www.microsoft.com/southafrica/education/). Given the fortuitous discounts, powerful functionality, pervasiveness and existing skills-base we considered it important investigate how *Office* can be exploited to support teaching and learning in our context (Deacon *et al*. 2004, Deacon and Jaftha 2004). Our related work has included developing learning activities around *Excel* for tutorials on research methods and economics, customising the application environment to support a tutorial-style learning valued in these courses.

Original article at: http://ijedict.dec.uwi.edu//viewarticle.php?id=26&layout=html

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Evolving spaces in landscape management: Linking spatial information for effective decision-making

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ABSTRACT

Community, in the policy context, is defined on the basis of fixed in place socio-political unit having residential proximity to the resource or according to state recognized political units. With the boundaries drawn at the village level and the custodial rights of the common lands vested with various departments of the state, it is difficult on the part of the communities to manage such resources. With the advent of participatory forest management powers have been devolved to the communities for protection and use of the resources. Apart from the institutions at the village level, many of the discussions in recent times have focused on the need for nested institutions at various levels to help conserve and protect large landscapes.

The need for nested institutions emerges to resolve conflicts and work towards reshaping the boundaries to establish stable governance of the resource. Despite the regulated use of the resources by community institutions, the resources have tended to get degraded gradually. Conservation of large landscapes requires mechanisms to bring in equilibrium the demand and supply within and among the communities in the larger socio-political setting. These institutions in many circumstances feel incapacitated to understand the entire landscapes and assess the quality and the availability of the resources and therefore take decisions based on the "who is right" and not "what is right".

The protection and use posits a need for "means" to understand the entire resource base to take decisions effectively. Geographical Information System (GIS) technology is one of the widely used tools to assist in the management of larger landscapes in terms of forest conservation, pastures, water resource management and wildlife management. The integration of both spatial and non-spatial data allow users to efficiently and effectively make well-informed decisions using visual aids and three-dimensional models that simulate the environment. This paper discusses a participatory Geographic Information System (GIS) with community forest management groups in India and the importance of 'putting people before technology' in order to make GIS a truly participatory process in landscape management. The process of dialogue can lead to better information and more transparency about community needs, strategies and the problems at stake.

Key words: *Community; land management; Geographical Information System; nested institution; India.*

INTRODUCTION

Community management of forests and grazing lands in India has gained momentum since 1980s through various programmes launched by the State. Typically, the institutions and tenurial rights are based on habitation boundaries or administrative units. The custodial rights on the commons still lie with various Government departments. However, the contiguity of the resources demarcated to various institutions (and communities) and the scale at which ecological processes

need to be looked at, say a landscape, imply that the village communities may only be looking at a part of the larger whole. Conservation and the protection of these commons have been facilitated by different agencies at various levels. However, these efforts are often isolated or scattered and do not address an entire landscape.

To effectively manage landscapes, there is a need to expand the vision to larger spatial and temporal scales. The work on restoration of ecological processes (example: succession, water regimes, genetic evolution, wild fire etc.) requires intervention over large spatial and temporal scales. Understanding the underlying ecological processes that drive the ecosystems would help in better analysis for effective management of the landscapes. Further, the dependence of the communities is also not limited to the administrative boundaries but they transect across the landscapes to access particular ecosystem benefits, though the access and the method of transactions may vary.

This article looks at the present trends in the management of natural resources - while the management at the local level is taken up by the communities at the habitation level, the management of the landscapes are vested with larger institutional structures such as panchayats, talukas and the district. There are a few community initiated meso level institutions emerging as conglomerates of village institutions to largely deal with issues at the landscape level. These meso level institutions are faced with three kinds of issues:

(i) Conflicts between village institutions on administrative boundaries;
(ii) Sharing of benefits between communities or between villages; and
(iii) Enforcement of protection and conservation mechanisms across the landscape.

It is in such a scenario that GIS offers an opportunity for the community institutions and their conglomerates to better understand and address the above issues by comprehending and quantifying aspects of the resources (biomass, bio-diversity, resource flows etc.) at a scale larger than what they are used to, i.e. at a landscape level rather than within the boundaries of the forests and grazing lands that they are protecting. It also helps in analyzing the trends and changes in the landscape over time, including forecasting based on the past and imminent changes. This information base enables the communities to make realistic and accurate assessment of the status of the resources and accordingly decide the use regime – in a real sense - gain control over their resources and lives. The meso level analysis can provide inputs for governance of commons at the village level through quantification of resource availability and use patterns. Presentation of such information to the representatives of the village and new collectives would enable them to engage with issues emerging out of an analysis of the overall potential and limitations in terms of biomass, biodiversity and water availability and their extraction patterns. Such information would feed into and form the basis for evolving rules and norms for provision and appropriation at a micro and meso levels.

The potential for collective action strategies to promote adoption of large-scale technologies and natural resource management practices is generally greater. Collective action institutions may not only facilitate joint resource management, but also include inter-community dialogue and conflict resolution. This is not to say that the association, monitoring and enforcement costs of collective action do not increase with space, but that the coordination costs and efficiency losses of managing large scale resources privately will, up to a certain level or size, often overwhelm other costs, making collective action an economically superior alternative, at least in terms of social costs and benefits. Once a threshold size is reached in terms of the transaction costs of sustaining collective action, a role for the state may be warranted.

GIS thus has the potential to bridge the information gap allowing communities to play a critical and informed role in the decision-making processes on commons, particularly at the landscape level. Accurate and comprehensive spatial data play a crucial role in all areas of environmental

management and sustainable development. The benefits of appropriate landscape management would far outweigh the costs of setting up and running the GIS database. Providing the information on the status of biomass, bio-diversity, water regime etc. of the landscape to the communities helps in decision-making process in the management of the natural resources.

DEFINING COMMUNITY

Historically, a community has been defined as a group of people who share similar beliefs and customs and who live in the same area. Among the oldest and most basic of institutions, the community perhaps ranks second only to the family. Members share a sense of connectedness – of belonging, mutual obligation and identity. They are linked by economic, social, and emotional relationships. These connections and relationships are not owned or controlled by individual community members; but are held by the community "in common" – owned by all to be shared equally by all. The essence of true community is embodied in the "community commons" (Irked 2003).

Most rural communities are characterized by a strong sense of place; these communities draw as much a sense of identity and connectedness through their geographic location as they do through their relationships with each other. The sense of place usually comprises of and is defined by the landscape, the climate and sometimes even the location in relation to surrounding regions and areas. However it is the landscape comprising the forests, lakes and farms that primarily gives the community its sense of belonging and security. "The land," like the connections or bonds among people within a community, is distinguished by its contributions to the "common good."

Community, in the policy context, is defined on the basis of fixed in place socio political unit having residential proximity to the resource or according to state recognized political units. With the boundaries drawn at the village level and the custodial rights of the common lands vested with various departments of the state, it is difficult on the part of the communities to manage such resources. With the advent of participatory forest management powers have been devolved to the communities for protection and use the resources. Apart from the institutions at the village level, many of the discussions in recent times have focused on the need for nested institutions at various levels to help conserve and protect large landscapes.

LANDSCAPE MANAGEMENT - THE EMERGING NEED

There is evidence that communities across the country have made efforts to protect and conserve the forests, but these initiatives have largely been in isolation (Singh & Nayak 2003; Singh 2003). The individual habitation are most often interested only in protecting the resources within their administrative boundaries and do not bother about the neighboring commons. In another case, the communities continue to protect the resources in their vicinity and continue using the neighbouring forest areas to meet their requirements, thereby degrading the same. Similarly, in case of water, the farmer who is extracting the groundwater is unaware about its impact on the aquifer, which caters to more than one farmer or a village. Water conservation and harvest in the uplands might be beneficial to the downstream farmers through increased recharge and consequent rise in water levels in their wells. On the other hand, obstructing the flow from the upstream might lead to reduction of the flow or non-availability of water to the downstream farmers. Thus it is therefore necessary that the larger landscape be looked at to visualize the influence of interventions. Besides the impact on the resources can be significant only if the entire landscape is protected rather than small patches. To accomplish this task the whole community around the resource needs to be mobilized in conjunction with each other based on a common

and agreed upon set of rules and regulations on protection and on provision to and appropriation from the forests and common lands.

The information on the whole landscape such as biomass, species, water regime and impact of the wild fire helps the community in visualizing the influence of their interventions on the whole landscape (Alison 2004). The essence of the integrated approach finds expression in the coordination of the sectoral planning and management activities concerned with the various aspects of land use and land resources. The role that spatial technologies can play in strengthening such efforts is thus very significant.

Problems of integrating administrative boundaries into landscapes

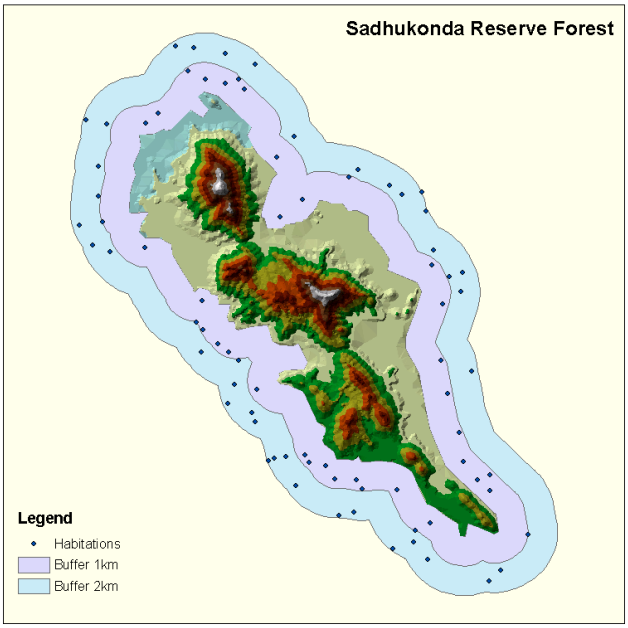
The present form of resource demarcation has been done in terms of habitations/villages nested in a larger institution of the panchayats, taluka and the district. These boundaries are drawn for administrative convenience and don't necessarily integrate landscape boundaries of the river basin, forests or any particular habitat. Further, confusion lies in the fact that the responsibility of managing the resources lies with such institutions. A closer look at the various resources that lie within the boundary of a habitation reveals that certain lands are managed by the forest department, certain by revenue department, some by the panchayats while the water resources are managed by the water resource department, and the habitations have little or no control over the resources. The departments too do not have clear and a combined land use plan and strategy for the management of the resources.

However at a habitation level, a properly demarcated forest confers the finest sense of security to the forest community. Tenurial confusions emerge due to a lack of clear sense of physical limits of a particular resource leading to unperceivable notions about its boundary. Forest communities have entered into vicious conflicts, both among themselves as well as with the Forest Department, in situations where the forests have been improperly demarcated. It is foremost in the course of achieving tenure that the forest be demarcated judiciously, which in itself forms a strong foundation for tenurial security. This is true both in the case of private and common property resource regimes.

A well-demarcated forest area does not automatically and in itself entail a physical boundary around the resource. Experiences in community forestry indicate that instead of encircling the forest with physical barriers it is the manner in which the process of forest demarcation is achieved holds greater importance. The exercise of demarcating the forest area should take into account the historical and current relationship of the community with the resource. Forest area specification would not only establish the physical limits of the resource; it would also quantify the area for future reference and record.

It may be understood that it is neither easy to change administrative boundaries nor is it possible to change the administrative structures, but it is essential to imagine new ways for managing the landscapes. This may vary from having specific plans for each identified landscape, evolve innovative institutional systems and effective supporting mechanisms to enable conservation of the larger landscapes. The Mekong River Valley project in South East Asia presents a good example that has gone beyond national boundaries for the management of resources in the river basin (Mekong River Commission 1995). The spatial information helps understand the whole landscape with the administrative territories and thus can play a major role in determining how the resources can be managed effectively.

Conflicts and their nature



Expanding human requirements and economic activities are placing ever-increasing pressures on land resources, creating competition and conflicts and resulting in sub-optimal use of both land and land-based resources. Most of the conflicts are a manifestation of greater human needs vis-à-vis the limited availability of the resources or due to limited potential of the resource (Singh 2003). The conflicts could be related to access, demarcation of boundaries or in regards to the use of the resources.

As one looks at the complexity of the resource use pattern within a village and across villages, the communities have evolved transaction mechanisms depending on the availability of particular resource across the landscape. These transactions have evolved through negotiations over a long period. The norms of transaction vary across the landscape - some because of their immediate proximity to the resource, some because of the availability of particular species and/or some for their livelihood needs.

As the institution matures and the same begins to reflect in the status of the resource, there is a need for the institution to develop mechanisms for dealing with issues of distribution and appropriation. The degree and nature of dependence on forest not only differ from communities to communities but also between groups within a community. A resource management arrangement needs to take into account these different needs and dependence on the resource and strike a balance between them. Such a process is invariably complex and conflict-ridden (Singh & Nayak 2003).

At this stage the issue of boundary and user rights re-emerges where claims and counter claims are made which need to be addressed; the boundary remains fragile unless there are mechanisms to bring equilibrium in the demand and supply equation within and among the communities in a comparatively larger socio-political setting. The boundary remains volatile where the community does not have complete ownership and control over the resource (Singh 2003).

Conflicts due to the violation of rules are more frequent; the elite begin to take control over the management of the resource; and the “weaker” or dis-empowered sections tend to lose out. The rise in the value of the resources brings in new dynamics in resource appropriation within the village or between villages; tensions arise due to different sections trying to mould or break rules to derive a greater share of benefits.

Fresh conflicts have evolved with the government’s decision of devolution of the natural resources such as forests and water resources. The idea of decentralization of governance through Panchayati Raj Institutions (through the 73rd Amendment of the Constitution) and programmes such as the Joint Forest Management, watershed programmes etc has brought in

an element of property rights into discussion and thereby conflicts regarding who would own which part of the resource. The transaction mechanisms developed over the years of negotiations weaken because of the state imposed programmes, which talk of boundaries at the level of the revenue villages. While the programmes may be appreciated to build in protection mechanisms for areas where no management existed, they have tended to bring in new conflicts and therefore a new range of negotiations in the management of natural resources.

The second level of conflict lies in the fact that there is still no consensus among the policy makers and the practitioners on defining the user rights and regimes, devolving powers to the communities; appropriate institutions etc. Irrespective of tenurial rights the communities in certain pockets across the country, more often without the support of the government officials, have over the years done well to protect and regenerate forests. They have evolved rules and regulations for managing these resources. The visible resource, their confidence to manage the resource and their historical associations with the forests have become the basis for the claims by communities on the resource. This has in several instances set the government against the communities and the ensuing conflict has become a threat to the sustainability of resources and the institutions managing the same.

If, in the future, human requirements are to be met in a sustainable manner, it is now essential to resolve these conflicts and move towards more effective and efficient use of land and its natural resources. Integrated physical and land use planning and management are an eminently practical way to achieve this. By examining all uses of land in an integrated manner, it makes it possible to minimize conflicts, to make the most efficient tradeoffs and to link social and economic development with environmental protection and enhancement, thus helping to achieve the objectives of sustainable resource management.

Need for nested institutions

Nested institutions at the landscape level emerge when there are several users from different habitations who, based on their historical dependence on a common forest patch, may collaborate to form one user unit. Also, a number of user units may form a second level of collaboration either because all of them are located around a larger contiguous forest area or because of certain cultural links. The second level of collaboration is basically to deal with protection, forest fires and boundary related issues across a larger area. The approach ensures that the collaborators regulate the behavior of their respective members thereby reducing threats to the forest area as a whole.

By participating in such collaborations, the users achieve greater balance in power equations amongst themselves, monitoring becomes easy and more frequent while the cost of monitoring remains low. Increased collaboration strengthens the element of mutual respect and recognition between user units towards each other's forest area, local institution and governance rules. Members behave responsibly knowing well that any infraction on their part may expose them to several layers of authority.

The role of such institutions slowly transforms into conflict resolution and work towards more established multi-layered boundaries for ensuring stable governance of the resource. Despite the regulated use of the resources by community institutions, the resources have tended to get degraded gradually. Conservation of large landscapes requires mechanisms to bring in equilibrium the demand and supply within and among the communities. Establishing clear and secure forest tenure through a set of principles relating to resource boundary, user unit, local institutions and other operational mechanisms does not mean creating a closed system of forest management. The local institution of one user unit is just a small component of a larger system comprising many such well defined forest areas, user institutions, governance rules and

mechanisms for management and monitoring. In order to ensure that the local institution does not evolve into creating isolated islands of forest areas, the users need to open up channels of communication with similar groups. Forest user groups need to collaborate on strategic matters with each other.

These institutions in many circumstances feel incapacitated to understand the entire landscapes and assess the quality and the availability of the resources and therefore take effective decisions. The use of visual and spatial representations can enable the nested institutions to visualize the extent of area that they as a part of the conglomerate collectively protect and manage. The exercise would enable them to look beyond their own protected resource and those in the immediate vicinity to a much larger area that they as part of a collective are responsible for.

USE OF GIS IN CPR MANAGEMENT

GIS technology is now being used more widely in the management of Common Property Resources (CPR). GIS is developed from the concept of a map. A map allows relationships between a wide variety of both quantitative and qualitative data to be organised, analysed, presented, communicated and used in a way no other product can match. The database component of a GIS is a structured collection of related spatial and non-spatial information. The sets of tools ensure safe and efficient access to the data stores and subsequent display of solutions. Spatial information such as land-use, cropping pattern, geological features etc. integrated with non-spatial data provides better analysis and thereby a better understanding of the landscapes.

One of the most important challenges facing natural resource managers today is to identify, measure, and monitor the cumulative impacts of land use decisions across space and time. Natural resource management is a multidisciplinary field and it demands new tools to improve and augment scientific knowledge for better management. The protection of the landscape posits a need for “means” to understand the entire resource base to take decisions effectively. GIS technology is now being used widely to assist in the management of larger landscapes in terms of forest conservation, pastures, water resource management and wildlife management. The integration of both spatial and non-spatial data allow users to efficiently and effectively make well-informed decisions using visual aids and three-dimensional (3D) models that simulate the environment.

While the Remote Sensing/Geographical Information Technologies (RS/GIS) technologies in the developed countries are basic to all planning exercises, developing countries have yet quite a distance to go before such technologies can be used at such scales. The massive amount of capital required, ignorance of some of the technologies and techniques and lack of access to information together make it difficult to use RS/GIS technologies on a large scale. Nonetheless these technologies are picking up slowly mainly due to the enormity of the task at hand and the level of efficiency in planning and implementation that the application of such techniques enables.

The primary contribution of RS/GIS technology to CPR research is to detect the dependent variable - the “condition of the resource”, objectively, accurately, precisely, comprehensively and repeatedly. RS/GIS can integrate information on some explanatory variables such as tenure, soil condition, land-use, and proximity to towns or roads. Further, resource users could use RS/GIS as a planning and monitoring tool, and for the mapping and legitimisation of tenure.

But perhaps the most important requirement for CPR research is longer time-series data that enables estimation of change in resource condition over several years and decades. Planners and resource users find that these technologies increase the apparent comprehensiveness of

their planning and the apparent objectivity, reach and accuracy of their monitoring. The quality of decisions, which have wide-ranging impacts, depends on the analytical tools at disposal of the users. In a GIS, individual maps, composite maps, or spatial overlay, analyses are produced to meet unique requirements. The different layers displayed on the same map, in combinations or individually, provide the user the ability to understand the information.

The distance of the habitation from the resource determines the dependence of the community on the resource. The habitations that are adjacent to the resource are more dependent on the resource and exercise more rights over the resource than the habitations, which are further away. In order to understand these dynamics neighborhood analysis gives answers to the influence of regional location to a resource and its impact to others. Both distance and direction have been used to analyze spatial relations of points, lines and area features in the common property domain; for example, effects of an intervention on the upland resources impact downstream low lands. With the help of GIS it is possible to confirm whether and how soil and moisture conservation measures implemented in the upstream would affect communities 100km downstream. Similarly, it is also possible to measure the extent of the resource, length of the stream, boundary of the landscape etc. The probability and the extent of reliability of the results are computed and tested against known models. Samples representative of each area can be acquired and compared with the simulation. Cartographic modeling and visual techniques (3D) of GIS is a common application used to present the datasets to the users/planners for understanding the resource for better management of the landscapes.

In managing common property resources, the purpose is to improve the accessibility and equity of opportunities and services. GIS accommodates more sensitive configurations of economic activities and common property services. GIS capabilities for handling spatial data allow researchers to develop detailed representations and analysis of the spatial distribution of disadvantaged populations and their access to opportunities and services. GIS-based techniques for solving sophisticated and realistic location and distribution problems can allow these systems to be configured to maximize accessibility and equity.

Taking GIS to the communities

Management of forests, pastures and wildlife are critical in India, as the population is likely to exceed the capacity of the land soon. The need for integrated data gives an interdisciplinary perspective to common property resource management. Data generated from spatial analysis using visual techniques enable the communities and their representatives to discuss and come up with appropriate solutions. Importantly such visual representation also allows the member institutions of the conglomerate to understand and dialogue upon their current use and extraction patterns vis-à-vis the pace of resource regeneration.

Participatory models of management for decision making enrich the regulatory process by giving information and knowledge of the sustainable use of a natural resource that would lead to more appropriate local regulations for natural resource management. All in all the appropriate application of GIS at the community level can only lead to further broadening the base of the decision making processes among the participatory stakeholder groups by contributing to a more economically proficient management regime with improved efficiency and efficacy. The process of dialogue can lead to better information and more transparency about community needs, strategies and the problems at stake.

This can be analyzed further on the basis of a case study that briefly describes the above process to depict the necessity of taking technology to the community.

A CASE FROM SOUTH INDIA

An attempt was made to link the spatial information for an effective decision making process by the village communities protecting a dry deciduous forest under the jurisdiction of the State Forest Department and given the administrative category of a Reserve Forest (RF) in South India. The objective was to understand the supply and demand scenario of the biomass available in the RF as well as in commons and to frame strategies to discuss with the communities the conservation of the resources. Remote sensing and GIS techniques have been used in the study to enumerate the species, to quantify the above ground phytomass and to understand the extraction patterns by the communities. The dependant villages are randomly selected based on their proximity to the resources, size of the village and their economical status. The findings of the study show that there is an improvement of the vegetative cover and diversity in the RF due to the community protection. Concerns however have also emerged from the study that despite the improvement in the forest cover current levels of fuel-wood extraction, both for self use and for sale, are well above the recommended limits.

Methodology

Satellite imageries of different years and of the same season were used to produce the classified maps of vegetation. The existing species in the RF were enumerated considering the forest type, topography, species composition and types of microhabitats. Simultaneous field study was conducted to estimate biomass and diversity. The quantity of biomass was estimated using interpolation techniques using GIS. In order to study the extraction patterns of phytomass seven villages based on parameters such as proximity to the forest, economic condition, size of the habitation were selected and information on the extraction of fuel-wood, Non Timber Forest Produce (NTFP) and fodder through household survey was conducted.

Study Area

The Sadhukonda Reserve Forest in District Chittoor, Andhra Pradesh in South India constitutes the designated area for the study. The RF area is sufficiently large and compact and the period of intervention has been around six years. Of the 25 villages protecting the forest 8 villages were supported by the Forest Department since 1996. Foundation for Ecological Security (FES) worked with the remaining 17 villages since 1998. The area of the RF is 6380 hectares. Besides campaigns to refrain from injudicious harvesting of trees and setting fire to the forests, no other physical activities were undertaken by FES in the forest area during this period.

Findings

A comparison of satellite imageries of December 1996 and December 2002 indicates considerable improvement in vegetative cover during this period on Reserve forestland in spite of six consecutive years of drought. The dense and open forest categories of vegetation have increased by 24% and 60% respectively. In addition the wasteland category of land has reduced by 66%. The improvement in tree cover can be singularly attributed to natural regeneration from the available rootstock. The increased green cover is mainly due to efforts of the communities at protection and self-regulation, as they have not undertaken any physical measures in most of the area.

The bio-diversity indices calculated using Simpson's and Shannon-Weiner's formulas revealed that although there is a rich diversity of species, a few species such as *Anogeissus Latifolia, Acacia Sundra, Dolichandrone Atrovirens, and Chloroxylon Swietenia* are dominant in

numbers. Apart from the diversity element, the quantity of aboveground phytomass of the entire *Sadhukonda* Reserve Forest has also been estimated as 472,315 MT using GIS. This yields an average tree biomass of 80 MT/ha for the RF. The assessment of biomass through this field study has also been corroborated through the remote sensing analysis.

The extraction per annum is 8,185 MT, which is 1.73% of standing tree biomass. Literature suggests that in a regenerating forest, the maximum permissible limit is 'one-third to half' of the mean annual increment (MAI = 2.84% of standing tree biomass). Thus, the current level of extraction seems to be well above the permissible limit. 75% of the total phytomass is extracted for fuel-wood either for local use or as a means of livelihood where they sell the wood in the nearby towns. This forms as input to the communities to frame strategies to address the issues relevant to the extraction of fuel-wood and also to find alternative mechanisms to meet the requirement.

The results of the study, when taken to the communities, has brought in an understanding of what has been going wrong though the communities have been protecting the resource and using the same with effective rules and regulations at the habitation level. The visual illustration of the facts using GIS has been able to generate a discussion on the management systems required at the meso level (the conglomerate of 25 habitations). Though rule making at this level is a long drawn process of negotiation within and across communities, such an intervention has definitely been successful in raising critical questions, which would have been difficult to raise otherwise.

CONCLUSION

Globally GIS applications are being used significantly in areas of forest conservation, wildlife management, pastures, water resource management and climate studies but the use of the technology has been primarily limited to the use of research only. The challenge lies in taking the findings and the technology to assist communities in day-to-day decision-making processes. The field of resource management at the community level is quite complex and challenging as different categories of use decisions are shaped by numerous competing and often conflicting claims on the natural resource base. GIS could bridge the gap in information as it can combine spatial information with a variety of non-spatial variables to provide alternatives for decision-making.

Most often when conflicts break out within communities and between village institutions, it is easier for those mediating to identify who is right. There is however a more difficult question to answer in such situations and that is to determine what is right. While it is necessary to know what is right, it is difficult to decide on the part of the community to assess the scale of the resource, the capacity of regeneration, the annual incremental growth of the resource and the quantity that can be extracted. As in the case study, though it may be comprehensible that the communities can manage the resources at the habitation level and have a balance between regeneration and the use of the resource, it is difficult for communities to do the same at the landscape level.

The decision at the landscape level requires the meso level structures to step in – be it the panchayats, taluka or the district level officials or in some cases the conglomerates of communities (as in the case study). However such structures also fail to take up issues of "what is right" because of the lack of such information about the landscape. Taking GIS to the communities though quite a challenge both in terms of costs as well as the complexities involved with resource use is still essential. Such initiatives would definitely help in better use of the resource and protecting the critical resources that are disappearing fast, mainly because of a lack of coordinated effort at the landscape level.

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Building ICT4D capacity in and by African universities

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ABSTRACT

Universities and community telecenters have somewhat parallel missions in society. These include the generation, storage and diffusion of knowledge and information. Yet, in most developing countries where telecenters strive to be demand-driven, universities are seldom perceived as relevant to telecenters sustainability. Focusing especially on Africa and using the nomenclature of the New Partnership for African Development, this paper examines the mutual benefits that universities and telecenters could gain from a stronger relationship, and lays out the kinds of steps that might be taken to build a partnership. The paper challenges the perception that "universities are irrelevant" and describes a comprehensive ICT development initiative that includes teaching, research and outreach.

Keywords: *Telecenters; universities; Africa; ICT Development (ICTD); ICT for Development (ICT4D).*

INTRODUCTION

A report released at the World Summit on the Information Society in 2003 identified a significant role for information and communication technologies (ICT) in strategies for African development (Okapaku 2003). The report notes that the New Partnership for African Development (NEPAD) includes a strong focus on the dual strategies of *ICT Development* (ICTD) and *ICT for Development* (ICT4D*).* In this paper we argue that universities in developing nations are potentially important players in both of these NEPAD strategies, and that the *eReadiness* of African universities is a vital issue in African development. The eReadiness of African universities is clearly relevant to the global creation and distribution of knowledge - which, in turn, is a core challenge in the world's thrust toward the Millennium Development Goals (World Bank 2004a).

First a clarification. We apply the NEPAD terms to universities in the following way:

- *ICT Development* in the university context refers to building media and digital facilities to support university internal functions, along with an academic and research programs that prepare students to function effectively in an information society - in both the public and the private sectors;
- *ICT for Development* refers to the university applying ICT in programs outside its walls in the service of communities and the nation.

Central to creating a digital resources and academic infrastructure is the question of universities' relevance to the world around them, and especially to the challenge of being an active player - "an anchor of a broad-based poverty alleviation strategy" in an increasingly knowledge-based economy (Nwuke 2003 p.19).

Recently we raised this relevance issue on another continent when the National Alliance for Information and Communication Technologies for Basic Human Needs came into being in India and immediately set a goal of bringing all of the nation's 600,000 villages into the modern

"information society" by 2007, the 60th anniversary of the nation's Independence. When we proposed that the agricultural universities in India be explicitly included in the National Alliance, we received this terse email response:

> *The universities have failed miserably in many respects. Most university faculty have no clue to life outside the campus nor have they any social concerns. Sorry for being very forthright or even blunt.*

Is the situation different in Africa? Recently published documents provide a mixed picture (Beebe et al 2003; Okpaku 2003). For example, we do not find a clear statement of an explicit institutionalized role for universities in the vision of the African Information Society Initiative's framers (Soltane 2003).

TELECENTERS: A ROLE FOR UNIVERSITIES

Universities can become practically involved in ICT by incubating telecenters, which are part of the worldwide ICT4D movement. A telecenter is a public facility in the community that affords people the opportunity to use computers, networks, copiers, scanners, telephone, community, printed materials, and audio and video resources for information searching, communication, training, and entertainment. The services are free or available at an affordable cost. The primary mission of a telecenter is community service as compared to a cybercafé whose primary mission is profit. A telecenter has staff who actively assist the public in solving information and communication problems. The telecenter management also collaborates with other institutions such as those in agriculture, health, government, and education to mobilize information, training and distance learning resources.

Universities and telecenters have a logical affinity. Telecenters can function in at least three ways for universities:

1. A means for reaching beyond their "ivory tower" to extend their knowledge and learning resources to the surrounding communities and to other populations in the region. This includes translating, adapting, localizing and re-packaging information from external sources to fit the agronomic and cultural characteristics of those local communities. This function is especially vital to the worldwide priorities identified in the Millennium Development Goals.
2. A laboratory for faculty and researchers to carry out ICT and extension-related research and development (R&D) projects especially involving issues ranging from HIV/AIDS to small business enterprises and poverty alleviation, and to universities' involvement with these issues.
3. A learning environment for students, as telecenter volunteers, to gain practical experience in helping people in the community - including grade school and out-of-school youth - apply information and communication technologies to challenges in their daily living. Students' assignments and semester-long or summer internships can be attached to courses in adult education, non-formal education, extension, communication and media, rural sociology, computer science and information technology, etc.

UNIVERSITY-TELECENTER MODELS

Higher education institutions can experiment with at least three models of university-and-telecenter structures. (This is largely unexplored territory in university-telecenter research and is worthy of further study.) The models include:

1. University-based telecenters where the telecenter is physically housed in a university facility, and where the ICT resources can be shared under suitable arrangements with people outside

the university. This model has been successfully in association with lower level schools World Bank projects (World Bank 2004b).
2. A university-administered community-based telecenter where the telecenter becomes an outreach or extension center apart from the institution's main campus. This model was used as a telecenter *incubation* strategy in south India but has not otherwise been widely exploited (Colle & Roman 2003).
3. A university-*supported* arrangement where the university provides continuous services and help to a telecenter that is owned and operated by a community entity such a local governmental body, or a non-governmental body such as a cooperative. (A university-supported commercial *cybercafé* that takes on a public service mission is an application of this model yet to be tested.)

We went beyond the rather general indictment of academia as depicted by my email correspondent and looked at five dimensions of what we called *eReadiness* in the university context. These included:
- ICT facilities and network access;
- Personnel available to support the design and production of digital materials such as CDs, web pages, and distance learning (training) packages;
- Academic programs including field experience opportunities that prepare students for applying ICT to communication and development;
- University policies that encourage faculty participation in community outreach programs;
- A faculty ICT posture - for example, a positive disposition toward the use and efficacy of ICT in education, teaching and learning.

To explore some of these dimensions, we drew on three studies, two in African countries and one that included respondents in Africa, Asia and Latin America. Our research consisted of surveying approximately 400 respondents from universities in the two African nations, Senegal and Ghana (which became two Master's theses); and more than 1000 faculty and researcher respondents across Africa, Asia and Latin America who have experience with The Essential Electronic Agricultural Library.[1] The data were collected in early 2004 and focused on the readiness issues as they were perceived by academics and researchers.

From the TEEAL data collected at ten institutions in eight African countries (Botswana, Ghana, Kenya, Malawi, Mozambique, Nigeria, Tanzania and Zimbabwe), we got a sample of 497 respondents who reported devoting part of their working time to outreach activities. It is important to underline that:
- 35% of African respondents involved in outreach work have used ICT at least once in their outreach activities;
- Over 75% of the respondents are beyond 7 in a 10-point scale where 10 means “very interested” in applying ICT in outreach activities;
- Over 80% of the respondents agree (at 7 or higher in a 10-point scale) with the statement that “integrating computers and the Internet in outreach programs would be useful”;
- About 40% of the respondents agree (at 7 or higher in a 10-point scale) that “integrating computers and the Internet in outreach programs would be difficult".

And finally, more than 80% of the respondents agree (at a similar level as indicated in the above results) with the statement “if I had the opportunity to integrate computers and the Internet in outreach programs, I think I would do it".

We noted that respondents with more years of experience in Internet use were significantly more interested in applying ICT in their outreach activities than their less experienced counterparts. In other words, contact with ICT seems to be an important factor in motivating individuals to try ICT

applications for development. In the same way, the people who have had less contact with the Internet do not seem as interested in using ICT in their outreach work.

While our data require more refined analysis, we can say, in summary, that a relative minority of respondents use ICT in outreach, yet a majority see the potential - but they perceive difficulty in applying ICT in their outreach work. Because our questions were not a main part of the TEEAL evaluation study, we did not have an opportunity to explore the "whys" of some of these responses.

In one of the African studies mentioned earlier, our associates collected survey data from faculty and research staff at five universities in Senegal to assess their perceptions about the ICT-enabled outreach activities supported by their educational institutions. Slightly more than 50% (97/172) are involved in outreach activities. Approximately 35% of these reported using websites at least "occasionally" in their outreach activities. More than 40% use email for this purpose. Almost 60% of university people engaged in outreach in Senegalese universities report a strong interest in applying ICT in their outreach work.2 Almost 45% of the faculty involved in outreach agree or strongly agree that “using computers and the Internet in outreach programs would be useful”, while approximately 50% agree or strongly agree with the statement: “If I had the opportunity to use computers and the Internet in outreach programs, I think I would do it".3

In contrast, 50% of the Senegalese sample considers that “using computers and the Internet in outreach programs would be difficult” and only 8% of the respondents agreed with the statement: “I think my university can afford to invest in computers and the Internet for outreach programs". These data show that although there is considerable interest among Senegalese faculty to apply ICT in university-supported outreach programs, there is concern about the current feasibility of such programs. As in the TEEAL study, our preliminary assessment suggests that there is a core of faculty members who see the potential of ICT but have doubts about their university's readiness to support such initiatives.

In Ghana, a nation that has made significant strides in ICT development and which has created an ICT center named in honor of UN Secretary General Kofi Annan, the survey results were similar. Of those who do outreach at a sample of agricultural and technical universities and institutes, more than 75% do not use ICT (CDs, computers, web pages); but a very large majority (almost 90%) have a strong interest in using them. Almost 50% of those who do outreach perceive that the university cannot afford to use ICT. Approximately 80% of those doing outreach score at least a 7 on the 10-point "strongly disagree-strongly agree" scale indicating a predisposition to use ICT if they are available. Once again, a strong interest in ICT exists, but there also exists a doubt about their institutions' readiness to move forward.

MOVING FORWARD

A design to build ICT4D capacity

What might be done to promote greater involvement of African universities in ICTD and ICT4D institution-building initiatives? Based on our research and observing ICT and development initiatives around the world, we have proposed a design to build the ICT4D capacity in a *regional group* of African universities. Its characteristics include:

- Applying information and communication technology for rural development;
- Training students in the application of information technologies to national development priorities, including those linked to economic development and the Millennium Development Goals;

- Developing cost effective ICT mechanisms to enable the free flow of information within and among universities;
- Developing locally relevant multi-disciplinary content for rural populations using multi-media dissemination channels;
- Developing a range of ICT applications that strengthen the participating universities' outreach and extension programs to marginalized populations such as women, older people, and the poor;
- Engaging in research and development initiatives related to the role of universities as incubators of telecenters and other outreach implementations.

Outputs

What might the realistic output targets be for a multi-year involvement by universities and funders? After a three year initiative, in a well planned and organized initiative, observers could expect to see the following outputs.

- An operating regional ICT resource center for supporting the universities' ICTD and ICT4D activities. The support would include practical training of key personnel, production of educational and training materials useful across the participating universities, collaborative research, and systematic exchanges of information, knowledge and experience;
- A regional network of ICT-enhanced universities officially cooperating in ICT initiatives;
- A model curriculum and learning materials for ICT-for-rural development academic and training programs;
- A cadre of trained ICTD/ICT4D "champions" on the staffs of the participating universities promitng routine interaction to advance applications of ICT for development;
- An explicit policy and program at each participating university for recruiting students and in-service training candidates into ICT4D courses and workshops;
- A plan of action for establishing communication linkages among ICT policy makers in government, faculty members in universities, scientists in research institutes, agricultural and business enterprises, farmer groups and rural communities.

THE TELECENTER CHALLENGE

Universities that take on a mission to employ ICT in development programs can look at the emergence of telecenters as a potential partners. There is a strong interest and a great deal of activity in Asia, Africa and Latin America in using telecenters as a means of providing ICT resources for people who do not have their own computers and network connections. Many of these telecenters are struggling to survive. What they need are resources that universities might provide. For example:

- **Research** - Telecenters need to find out what kinds of information and communication resources their communities want and need. This is what helps telecenters become demand-driven − a vital issue in their sustainability. Telecenters need research also to evaluate continuously how well they are serving the needs of their communities. Many universities have research capabilities that could be applied to these telecenter research needs. And, as indicate earlier, universities could use telecenters as social research labs for their faculty and students.
- **Local and relevant content** - Too much content on the web is not relevant to farmers and other rural people. It is a common problem around the world, where external information dominates locally-tailored material. This is where credible, useful and user-friendly information needs to be crafted. The UNDP has suggested that the most important reason for the failure of telecenters is their lack of suitable content. Universities such as agricultural universities have access to science-based information that could be tailored to regional,

provincial and local agronomic, social, linguistic, and cultural characteristics, and could be matched with many of the Millennium Development Goals.

- **Training and Learning resources** - People in telecenters need to be trained in how information can contribute to development. We have found telecenter managers who know a lot about computers but don't know how to link telecenter potential to health clinics, schools, agricultural extension, or local government. Likewise, telecenters need to make their communities aware of the value of information, such as peanut marketing information and technology transfer in silkworm enterprises, or the chances for more education through distance learning. Awareness of the value of information will help the communities realize the value of the telecenter. Naturally, universities have the capacity to teach and train, but equally important, they have the cultural credentials to give credibility to their knowledge resources and training initiatives.
- **Human resources**. — Telecenters need volunteers who can help make telecenters good places to visit − volunteers who can help people search and understand the basic rewards of a digital experience. And who can welcome special groups such as women and the elderly who are frequently shutout by culture. Universities have human resources such as students who could serve as telecenter interns, and faculty members who could serve as content and development advisors. One of our researchers has devised a plan to incorporate telecenter internships as part of one African nation's post graduation service requirement (in Ghana). For some places perhaps service in a telecenter for young men and women could become an alternative to military service.

CONCLUSION

Our research in south India and Africa focuses on public access telecenters and especially on issues related to public demand for their services and to their sustainability. We believe that telecenters constitute an important force in efforts to build an Information Society and to join the march to the Millennium Development Goals. Our experience in India suggests that universities can be valuable actors in providing some of the resources telecenters need for their survival. This is important because colleges and universities are enduring entities in most nations, and the social role of the university historically has been to create, store and diffuse knowledge, a collection of activities that partially parallels some telecenter operations. Yet, few major programs link universities to telecenters as an institutionalized source of information, knowledge and training - the basic commodities of a telecenter. University eReadiness is a good place to start.

Endnotes:

[1] With Rockefeller Foundation support, Cornell's Mann Library has produced The Essential Electronic Agricultural Library, a collection of more than 300 CDs. TEEAL contains a comprehensive compilation of current journals, and provides a complex bibliographic search engine. TEEAL has been called a "Library in a Box" because its CDs arrive to the purchaser in a box.

[2] This percentage corresponds to the number of survey participants that checked from 7 to 10 in a 10 point scale where ‘10’ means "very interested".

[3] These percentages correspond to the number of survey participants that checked from 7 to 10 in a 10 point Likert-scale where ‘10’ means "strongly agree." The following data in this paragraph presents percentages based on the same scale.

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Using informal collaboration to develop quality assurance processes for eLearning in developing countries: The case of the University of Botswana and The University of the West Indies Distance Education Centre

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ABSTRACT

Collaboration among institutions of higher education involves the sharing of financial, administrative and infrastructural resources with others through a formal memorandum of understanding. There are occasions where due to bureaucratic or political barriers, a formal collaborative arrangement may not be possible, however, academic partnerships may foster informal collaboration or cooperation among institutions. This paper examines one such informal collaboration existing between the University of Botswana and The University of the West Indies Distance Education Centre. The authors share the informal collaborative model used to develop a quality assurance tool for eLearning and compare approaches in eLearning course development and quality assurance procedures at both institutions.

Keywords: *Collaboration; eLearning; course development; quality assurance; developing country; blended learning.*

INTRODUCTION

Michael Moore and Kris Lambert (1996) point out that while distance education has always been characterised by communication, new technologies have made collaboration among all stakeholders in open and distance learning far easier than before. Definitions of collaboration include “an active working partnership supported by some kind of institutional commitment” (Neil 1981:25). Evidence of formal collaboration in distance education over the years exists in the form of associations and consortia such as the Asian Association of Open Universities, the Latin American Cooperative Network for the Development of Distance Education and the Commonwealth of Learning (COL). While researchers such as Moore and Lambert (1996) and Dhanarajan (1998) emphasize the many benefits of formal collaboration, particularly for open and distance learning, writers such as Moran (1990) point out that informal and ad hoc agreements can also yield benefits for institutions and individuals involved in open and distance learning, particularly in developing countries.

The University of Botswana (UB) and The University of the West Indies (UWI) share similar socio-economic environments. Similar higher education experiences and existing resources at both institutions make formal collaboration an attractive premise. Efforts have been made by the administration of UWI to establish a memorandum of understanding with UB, but this has not yet materialised. In the meantime, however, academics within both institutions have been using their professional links with colleagues to establish informal working relationships. This paper

describes one such relationship which emerged out of a joint research project undertaken by members of staff of both institutions and which has resulted in the development of quality assurance benchmarking criteria for eLearning at both institutions. The paper also examines the similarities and differences between the institutions, which reinforce the notion that a more formal collaborative arrangement would be beneficial to both institutions.

BACKGROUND

The University of Botswana's experience in use of ICT in education

The University of Botswana, through the Educational Technology Unit (EduTech) of the Centre for Academic Development (CAD), has embarked aggressively on a programme of technological transformation over the last three years (Uys, Nleya & Molelu 2003). EduTech has led the eLearning (UBel) initiative, where eLearning is defined as the appropriate blend of information and communication technologies (ICT) to enhance student-centred, collaborative and lifelong learning, combining face-to-face and web-based approaches in teaching and learning. The initiative was launched in February 2001, to transform teaching and learning through use of eLearning as a blended learning approach. A large part of this technological transformation, particularly at start up, has been development of academics in the effective and appropriate use of educational technologies. In response to this need the EduTech has developed a programme for UB teaching staff consisting of eighteen (18) workshops that lead to an "eLearning Certificate".

Substantial progress has been made at UB, with funded research for development of eight eLearning pilot courses to establish best practice models and quality assurance measures. In addition, the Academic Programme Review Unit (APRU), also in the CAD, has assisted in development and testing of standards and criteria for evaluation of these eLearning pilot courses. This research and the outcomes of this research to date have been primarily centred on on-campus learning because of the level of development that exists within the university and the lack of access to ICT for off campus students.

The Centre for Continuing Education (CCE), designated in 1994 by the Government of Botswana as the leading institution for development and delivery of part-time and distance education at the tertiary level, has been functioning separately from the on-campus eLearning initiative. Programmes offered by the CCE include: Part-time Diploma in Accounting and Business Studies through the Extra Mural Unit; Diploma in Primary Education for certificate holders; Diploma in Adult Education through the Distance Education Unit; and, non-credit courses in the Public Education Unit. Of the three units that comprise the CCE, the only unit that uses distance education strategies is the Distance Education Unit (DEU). Programmes offered by DEU are primarily a combination of print based, video and audio materials combined with face-to-face delivery. Although the basic mode of delivery of courses at the CCE may be similar in some ways to the UWIDEC mode of delivery, the level of sophistication in the use of ICT is significantly lower in the DEU.

UWIDEC's experience in use of ICT in education

UWIDEC was established in 1996 to expand the university's initiatives in distance education throughout the English-speaking Caribbean. It was thought that the addition of use of a combination of technologies could reduce cost, expand the range of programmes and improve quality in programmes offered through distance education (Kuboni, Thurab-Nkhosi & Chen 2002). Currently, the UWI offers three full undergraduate degree programmes at a distance through its thirty (30) centres located in sixteen (16) Caribbean territories. These Centres are administered by the three campus offices located at Mona, Jamaica; Cave Hill, Barbados and St. Augustine,

Trinidad. UWIDEC does not regard its use of the Web as high level and currently considers eLearning as asynchronous learning involving the blending of multimedia technology and web-based learning with the more traditional print based delivery and audioconferencing.

In an attempt to capitalize on use of technologies in educational programmes UWIDEC has conducted research on their distance education programmes and the value of the online experience. In 2001, staff at the St. Augustine, Trinidad office of UWIDEC embarked on a long-term research and development project designed to monitor and evaluate the expanded use of ICT in programme delivery and to identify and analyse the key factors required to facilitate sustained growth of eLearning in the university's distance education programme. Based on the first two phases of this research, it was projected that in order for UWIDEC to successfully incorporate web-based learning into its existing mix of course delivery methodologies, it was necessary, at least in the initial stages, to focus attention on development in three specific areas. The areas were: instructional design/course development, the training and development of course writers/coordinators (content experts) in eLearning course development and the training of technicians at UWIDEC sites to function in the area of student support (Kuboni, Thurab-Nkhosi and Chen 2002).

While the UWIDEC network provides the connectivity for the online delivery mode from 2000 to late 2004 the Web CT learning management system (LMS) was the platform on which the online teaching/learning environment was built. In 2004, based on financial considerations, UWIDEC took a decision to move to an open source LMS called Moodle for all future online course elements.

With the growing use of web-based technologies in formal education, there is a variety of emerging modalities in which the computer-networked environment is being used for instructional delivery. UWIDEC's approach to the use of the Web between 2001 and 2005 can be regarded as falling at the lower end of Eastmond's (1998) continuum of Internet-based distance education. Along this continuum, Eastmond identifies three types of Internet use. Type I, at the lower end is described as traditional distance learning supplemented with Internet activities. He explains further that this type of learning "allows students to participate in e-mail exchanges with instructors and other students, supports online research in libraries … and may also make use of online discussion groups…" (p.34).

Between 2001 and 2005 UWIDEC St. Augustine had a web-based component in eight (8) courses, which seemed to fall within Eastmond's Type 1 for Internet use. These courses were:

- Introduction to Sociology
- Caribbean Business Environment
- Industrial Sociology
- Topics in Economic Development
- Operations Planning and Control
- Current Issues in Educational Administration
- Principles of Marketing
- Survey design and analysis

The online elements of seven of these courses have been available to students since 2001 and have been the subject of a research study conducted by UWIDEC St. Augustine. (Kuboni, Thurab-Nkhosi and Chen 2001; 2002).

Comparison of the UB and the UWIDEC eLearning Approaches

Similarities

There are a number of similarities between UB and UWI in regard to eLearning approaches. One feature that both institutions have in common is that both institutions, at least until 2004, use WebCT as the Learning Management System. This feature is useful as it provides one with greater ability to compare approaches and challenges to development and delivery with a view towards sharing of strategies that work. As UWIDEC gains experience with the open source Moodle system, UB may benefit from collaboration on experiences with this system.

Both UB and UWI have recognized the need for capacity building of staff members and have organized formal training to achieve this. Both institutions have focused on instructional design principles as a foundational skill for integration of eLearning into courses and both have developed courses to facilitate increased teaching staff skills to utilize a variety of eLearning technologies. Because of the need for capacity building of staff, both institutions have integrated eLearning elements into pre-existing courses and are conducting research on best practices in development, delivery and quality assessment of eLearning courses. Results of the research and sharing results of these studies have informed the present systems of course development, delivery and quality assessment at both institutions.

A particular focus of both institutions lies on the instructional design of eLearning courses. In both institutions instructional design is seen as a sequential process, which is flexible and practical (not linear). The instructional design process for eLearning at UB and UWIDEC takes into account the context of both institutions. In this regard, the instructional designers at each institution consult with the lecturer interested in eLearning, and together they develop a course outline. The lecturer follows the general steps identified in the various models of instructional design, and completes an “eLearning Course Concept Development Checklist”, covering all areas affected by eLearning, such as content, communication, tutoring, collaboration, assessment and quality assurance.

Both institutions address student support in their staff training but neither institution has developed formal programmes for student capacity building to date, although orientation sessions for students using WebCT are being conducted at UB at the beginning of each eLearning course and orientation sessions are conducted with the distance education students at UWIDEC. Some of the islands, which form part of the UWIDEC network are yet to fully accept eLearning as a part of the UWIDEC course delivery strategy and as such are providing some resistance to efforts to take the process forward. Resistance by the Distance Education Unit at UB is also problematic. Reasons for this resistance need to be explored, however, resource limitations may be the primary reason for the lack of initiative in this area. An additional reason for resistance may well be pedagogical biases, especially in the case of more traditional thinkers, which was demonstrated in the study of online learning at UB where older, higher level professionals were more resistant to online learning (Gachago-Giannini, Lee & Thurab-Nkhosi 2004).

Differences

Facilities that promote eLearning are different between UWI and UB in that UWIDEC has synchronous (telecommunications centres) and asynchronous technology, including personal computers for twenty-five (25) students at all satellite centres (Thurab-Nkhosi 2004) while UB has only recently arranged for use of Ministry of Education facilities, including personal computers, in some of the satellites throughout Botswana. As a result, use of the Internet is nearly absent in distance education at UB with only those students in the Diploma in Accounting and Business having access to the Internet and that access is severely limited.

Other differences that exist between the approaches to eLearning used by each institution include the staff involved in eLearning support. UB relies on an eLearning support team of three people, namely an Instructional Designer, a Graphic Designer and a Multi Media Producer for all 650 staff members, while UWIDEC relies on three (3) existing curriculum development teams, which were initially brought together for developing print-based courses. There is currently only one graphic designer, one multi-media producer, and one web developer to be shared among the three teams on the campuses at Mona, Jamaica; Cave Hill, Barbados and St. Augustine, Trinidad.

Furthermore, UB provides workshops, individual consultancy and training for lecturers interested in eLearning and the eLearning certificate. While UWIDEC provides training in the principles of course design and more recently an orientation to blended learning in the UWIDEC context, the main responsibility for training academic staff at UWI rests with a separate department, the Instructional Development Unit (IDU), which falls under the Office of the Campus Principal. Currently, the main campus is still using the WebCT LMS and as a result the IDU's training for eLearning is centred on WebCT.

At UB, after the eLearning team completes the eLearning Course Development Checklist, the lecturer then works with a multi-disciplinary development team to finalise the eLearning activity(ies) chosen. This team includes the lecturer/content expert (academic staff member), instructional designer (EduTech), online media developer (EduTech), graphic designer (EduTech), and a Library Representative. This is where the process differs at UWIDEC because the continued development of the course rests with the content expert and the instructional designer and editor, without the assistance of an eLearning development team. Furthermore, at UB, support for the development of a well-designed course is given individually and interested lecturers/content experts can seek support at any stage of the eLearning course development process. This assistance consists of training in development and publishing of online material, the development of power-point presentations or any other aspect of integrating ICT in teaching and learning (Thurab-Nkhosi, Giannini and Lee 2004).

COMPARISON OF QUALITY ASSURANCE PROCEDURES IN eLEARNING AT UB AND UWIDEC

Clearly the process used for course development and delivery described above is a very important factor in the level of quality of programmes. The similarities and differences and lessons learned from these approaches are used by these institutions in development of their guidelines for development and delivery, which are discussed in a later section of this paper. In this section similarities and differences in quality assurance procedures for eLearning courses are discussed.

Similarities

Both universities have adopted the definition of quality as "fitness for purpose" (Thurab-Nkhosi 2004; UB Academic Quality Management Policy 2003), although both UWIDEC and UB may review this definition in relation to specific distance education activities. While quality assurance systems are in place for on-campus courses both universities have been slow to develop quality assurance standards and systems of measurement for distance education courses and programmes. Furthermore, these policies, procedures and processes are overseen in both institutions by special bodies that have quality assurance as a primary mandate.

The global emphasis on a dual approach to quality assurance, with internal and external systems as the most common strategies, has been adopted by both institutions (Thurab-Nkhosi 2004; UB

Academic Quality Management Policy 2003). There are, however, differences in the stage of development of quality assurance strategies used for eLearning in the two institutions.

Differences

The difference in quality assurance for eLearning courses at the two universities is essentially found in the level of the strategies in place. At UWIDEC the strategy is at a development and delivery level, while at present at UB the strategy is at the individual course delivery level. In order to maximize the lessons learned from each institution both are sharing best practices and lessons learned in the less developed area of quality assurance, i.e., individual course delivery or programme development level quality assurance is shared by UWIDEC while UB shares the lessons learned in their quality assurance in individual course delivery. These activities are discussed in the section on the collaborative model that is presently in place.

WHY COLLABORATION BETWEEN UB AND UWI?

The following information is provided to support the authors' notion that there are similarities between Botswana and Trinidad and Tobago. It was based on these similar characteristics that the authors felt that this could be an opportunity for meaningful collaboration. Trinidad and Tobago has a population of 1.3 million, only slightly less than Botswana's 1.7 million and both are considered developing countries. Both Botswana and Trinidad and Tobago are economically dependent on non-renewable natural resources, Botswana on diamonds and Trinidad and Tobago on petroleum (Mogae 2003). Furthermore, the Caribbean countries that comprise UWI are all Anglophone countries as is Botswana. Both countries, until recently, have a national/regional university with "satellites". However, because the West Indies is a region composed of many islands, UWI (with over 30 satellites spread throughout sixteen Caribbean islands) has greater dispersion of university facilities than does UB. Based in a land locked country, UB has only six "satellites".

It is likely that these two countries have more contextual elements in common than would two countries with vastly different populations or political-economic contexts. Many countries are aligned on the basis of these areas of similarities, especially with regard to quality assurance (Fourie, Strydom & Stetar 2000). It is because of these significant similarities that collaboration of the two countries was considered to be useful in learning about best practices in course development and delivery and quality assessment in eLearning.

THE UB-UWIDEC INFORMAL COLLABORATIVE MODEL

As stated earlier, the collaborative model used emerged within the context of a research project developed by the Academic Programme Review Unit at the University of Botswana to develop guidelines for best practices and an instrument(s) for assessment of quality in Web-based courses. The research team comprised the staff of the APRU, which included a visiting member of UWIDEC staff who was working on a short-term contract with the APRU at the time and a member of staff of the eLearning support unit of the Centre for Academic Development. The model involved the development of processes based on the research undertaken at UB and the application and revision of these processes at UWIDEC, based on the experiences at UB. The collaboration therefore progressed through four stages:

Stage 1: Development and conduct of the UB research project;
Stage 2: Development and pilot testing of a UB benchmarking tool for quality assurance in eLearning course development;
Stage 3: Adaptation and pilot testing of a UWIDEC quality assurance tool for eLearning course

development based on the UB experience;
Stage 4: Sharing of experiences in using the tools developed and revisions.

The following section describes these four stages as they relate to a study to develop an instrument(s) and processes to measure quality of eLearning courses.

Stage 1: Development and conduct of the research project

The purpose of this study was to use benchmarking research to develop indicators of quality in eLearning courses at UB and to use these indicators to assess the quality of eight eLearning pilot courses developed by faculty members at UB in collaboration with the instructional designer, EduTech. Based on the research findings, a best practice model and criteria and processes for assessment of future eLearning courses at UB were to be developed.

The draft instrument to be used for quality assessment was developed by the research team based on, but not limited to, benchmarking research done by the following: WebCT Exemplary Course Awards Rubric; Billings, Conners & Skiba (2001) research on quality of web-based nursing programs; the Educational Technology Unit eLearning Course Design Checklist; and, the US based Flashlight Program that conducts research on use of ICT in educational programs. Students, designers and other teaching staff of the eLearning pilot courses were asked to complete the instrument(s) developed to assess the benchmarks. In addition, ten (10) focus group discussions were conducted to obtain qualitative data on the experience of students and staff. The qualitative data were used to validate and augment the data obtained through administration of the quantitative instrument(s). Furthermore, these qualitative data were instrumental in guiding the researchers in adopting the resulting quality assurance processes.

Quantitative data were analysed using SPSS. Descriptive and inferential statistics were used to determine the significance of variables in determining the quality of the eLearning course. Qualitative data from focus groups were recorded and transcribed by research assistants. Use of a constant comparative method of data analysis was used with categories and themes of responses identified. These data were used to further define the significance of variables measured in the quantitative instrument(s) in contributing to best practice. Comparison of marks, in those courses with a face-to-face counterpart or that have been taught by face-to-face previously, were used to determine overall impact of the eLearning mode of delivery to the quality of learning and teaching. Finally, all of these data were used in development of guidelines for best practice in eLearning at UB.

Stage 2: Development and pilot testing of a UB benchmarking tool for quality assurance in eLearning course development

The 'Draft Quality Assessment for Online Learning Rubric' was initially made up of six distinct domains of assessment criteria. The domains emerged from the literature on quality assessment of web based programmes and courses, as indicated previously. The number of items in each domain is contained in brackets after the domain. The six domains were: needs assessment (2), student learning objectives and performance (2), active learning (5), online organization and delivery (14), student support (6), and student and course evaluation (11) for a total of 40 items. A balance was sought between usability, in terms of convenience and time required to assess the quality of the course and validity of the scores, of the completed assessment rubric. For these reasons, the researchers attempted to keep the number of items below 50 and developed the tool using MS Excel so that scores could be generated automatically and quickly (Appendix A).

The levels of performance to be indicated on the rubric were rated: not present (0), weak (1), acceptable (2) and exemplary (3). Each of these ratings was given a number as indicated in

brackets behind the rating. The descriptors for each of the ranks for the criteria were based on reports in the literature on performance in web-based and distance learning programmes in both developed and developing contexts. The highest possible score for each domain was calculated by taking the number of items multiplied by three, i.e., domain one: needs assessment, with two items, has 2 X 3 = 6 or a possible maximum score for this domain of six. A maximum total score for the combined domains in the rubric was 40 X 3 = 120.

Pre-testing of the 'Draft Quality Assessment for Online Learning Rubric'

The 'Draft Quality Assessment for Online Learning Rubric' for evaluation of eLearning courses was tested in April 2003 on four Southern African Development Corporation (SADC) environmental courses that were developed through a regional development project (SANTREN) by one member of staff of UB staff and the visiting staff member from UWIDEC. The review was conducted prior to the courses being implemented. The purpose of this pre-test was to determine the usefulness of the rubric and to make modifications as necessary based on the reviewers' suggestions following assessment of the courses. The reviewers that utilized the 'Draft Quality Assessment for Online Learning Rubric' for evaluation of the SANTREN eLearning courses found a number of benefits and weaknesses through this pre-test of the instrument. The most apparent strength of the draft rubric was the ease of its use for determining the level of quality of specific elements of the courses assessed. Because of the multiple sources of information used in determining the criteria to include in the rubric, the authors found they were able to enhance clarity of the criteria as well as promote the quantification of performance on each of the criteria.

Stage 3: Adaptation and pilot testing of a UWIDEC quality assurance tool for eLearning course development based on the UB experience

The curriculum development teams at St. Augustine, Mona and Cave Hill, with permission from the team leader of the UB research group, reviewed the UB Benchmarking rubric and arrived at a format and specific criteria to be covered in a quality assurance tool for UWIDEC. While the UB benchmarking rubric was essentially an evaluation tool to be used at the end of course development, it was felt that UWIDEC should develop a quality assurance tool to be used throughout the course development and delivery process. The criteria used by UWIDEC were informed by international criteria established for measuring quality in distance education, a decision that resulted from the differing level of eLearning infused in distance education between the two institutions.

Based on the criteria, and the UB experience with the benchmarking rubric, the UWIDEC quality assurance tool was designed to be used during three stages of course development, namely pre-production, production and evaluation. A series of teleconferences were held to arrive at the draft quality assurance tool (see Appendix B). It was decided that this tool would be used on a pilot basis as new online courses were developed so that revisions to the tool could be done based on practical experience. To date the tool has been used by the St. Augustine and Mona campuses.

Stage 4: Sharing of experiences in using the tools developed and revisions

Based on experiences of the two institutions, the authors believe that lessons learned through research and practice at each institution could continue to be shared to develop more useful guidelines for eLearning programme development, delivery and methods to measure quality of the programmes. It is felt that sharing research findings from UWIDEC's long-standing distance education experience and UB's more developed on-campus use of eLearning strategies will benefit both institutions in their quest for further development of eLearning in these two developing country settings.

At UB, what has been learned from the eLearning pilots has been developed into Draft Guidelines for Development and Delivery of eLearning Courses (Appendix C). In addition, further development of the benchmarking rubric to include data from a revised interview schedule for focus group discussions (student and course expert) and revised student online questionnaire is being implemented and tested.
At UWIDEC the following has been learnt from application of the quality assurance tool.

Adequate Time Frame

A course must be developed within a reasonable time frame so that the tool can be applied early enough to allow for changes in the course development process. In other words, courses that are being developed as they are delivered do not allow for application of the tool and this is clearly not best practice. To benefit from the outcomes of the use of the tool, there must be adequate time for planning the course to allow for changes, questioning during the development and delivery process, reflection on the process and finally amendments when required.

Consistent application

To be effective the quality assurance tool must be applied consistently throughout the process. Application during the planning and development stage, while omitting the evaluation stage for example, devalues the tool and reduces its effectiveness. It should also be recognized that a decision to use the tool requires application to ALL courses with an online component and not just to the ones that UWIDEC may have more time to work with. This requires commitment by staff on all campuses involved in the course development and delivery process.

Responsibility for applying/using the tool

Specific individuals should be assigned responsibilities for applying the tool in order to ensure consistency of delivery. The various levels or phases of the planning and delivery process to which the tool can be applied generally determine the person(s) responsible for application. For example, during the course planning stage, the curriculum specialist should assume responsibility for ensuring the criteria identified for quality are met. Clear guidelines on who is responsible for what activity must be given at each phase of course development.

Follow-up

Decisions and action must be taken on data obtained from the quality assurance tool, and clear time frames developed and specific actions taken to address any problems or challenges identified. Online environments can allow for changes and adjustments to courses with relative ease. Advantage must be taken of this characteristic.

CONCLUSION

In this paper the authors have compared approaches to eLearning course development and quality assurance at the University of Botswana (UB) and The University of the West Indies Distance Education Centre (UWIDEC). The paper further describes a collaborative model where lessons learned in these two institutions are shared and compared with the result being guidelines for course development and delivery and quality assessment of eLearning courses at UB and UWIDEC. UB and UWIDEC have had similar learning experiences and both institutions will be sharing strategies to strengthen the quality assurance and course development processes based on lessons learned.

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APPENDIX A

UB QUALITY ASSESSMENT FOR ONLINE LEARNING RUBRIC

Evaluation Phase 1 (after production)

BENCHMARKING RUBRIC									
#	**Benchmark**	**0**	**Weak Performance**	**1**	**Acceptable Performance**	**2**	**Exemplary Performance**	**3**	**Comments**
Needs Assessment Criteria									
1	Needs assessment		There is little evidence in the course materials that student and society needs have been considered in the development of the course		The content seems to address society and learner needs but there is no indication that a formal needs assessment was conducted		Clear rationale for selection of content and its relation to society and learner needs is communicated in the course		
2	Target group		The target group for this course is not clearly communicated in the course		The target group is clearly stated in the course materials		Rationale for selection of this target group is communicated in the course materials		
		0		0		0		0	
							Needs Assessment Criteria Total:	0	
Student Learning Objectives and Performance Criteria									
3	Clear student learning objectives		Student learning objectives stated in vague terms		Student learning objectives stated clearly		The student has inputs into the objectives, i.e., student objectives		
4	Clear performance criteria		Unclear pefomance criteria		Clear performance critera		Clear, manageble performance criteria with conditions for performance, i.e., rubrics		
		0		0		0		0	
							Student Learning Objectives and Performance Criteria Total:	0	
Active Learning Criteria									
5	Active learning, i.e., case study, problem based, anchored learning		Only one example of active learning for the course		On average one example of active learning per unit or module of the course		The entire course is based on students actively interacting with the content		
6	Opportunity for student to student interaction		Limited encouragement for student to student interaction		At least weekly interaction is expected between students		Nearly continuous interaction is expected		
7	Opportunity for student to instructor interaction		Limited expectations for student to instructor interaction		At least weekly interaction is expected between student and instructor		Nearly continuous interaction is expected		

8	Further resources, e.g. links, presentations, audio, video files		Further resources used in a limited way		Opportunities for students to access further resources		Further resources engage students in the learning process		
9	Appropriate use of technology tools for the objectives		Tools not clearly related to the learning objectives		Tools relate to the learning objectives		Tools enhance learning of the content and meeting objectives		
		0		0		0		0	
							Active Learning Criteria Total:	0	
	Online Organization and Delivery Criteria								
10	Homepage (welcome, information & uidance)		The homepage is available but provides little welcome information nor guidance		The homepage provides some welcome, information and guidance		The homepage not only provides information and guidance, but it is engaging		
11	Course outline		Limited information in the course outline		Most necessary information is in the course outline		Provides all information required of the student in the course		
12	Course schedule		Limited information in the course schedule		Most information is available in the course schedule		All information is avialable on the course schedule, e.g, assignment and assessment dates		
13	Information provided to guide student through the learning process (Help)		Limited material to guide the student's learning and difficult to access		Some material is provided that guides student learning		Consistent guidance available and easy to access		
14	Ease of navigation through course components		Difficulty navigating through course components		Some difficulty navigating through course components		Easy to navigate through the course components		
15	Navigation through content		Difficulty navigating through the course		Some difficulty navigating through the content		Easy to navigate through the content		
16	Content in manageable segments		Easily become overwhelmed by the amount of content		Most segments do not overwhelm the student		All segments have manageable amounts of information		
17	Mechanisms used for active learning are cohesive with content		Little relationship between the content and the learning activities		Content and learning activities are cohesive		Learning activities are part of the course content delivery		
18	Aesthetic design of course		Course design rudimentary		Course design aesthetic		Course design very appealing visually		
19	Accessibility issues are addressed		Few alternative access possiblilities		Some alternative access possiblilities		All course materials are accessible for people facing connection problems		
20	Technology tools used are appropriate for the content and objectives		Tools sometimes inappropriate for content and objectives		Tools appropriate for content and objectives		Tools enhance learning of the content and ability to meet objectives		

21	Components of the course (objectives, instructional strategies and assessment techniques) are closely aligned		Little alignment between course components		Most course components are aligned		All course components are clearly aligned		
22	Consistency in the layout of course pages		Little consistency in the page layout		Most page layout consistent		All page layouts consistent		
23	Overall consistencies and cohesiveness in the course design		Many inconsistencies in course design		Few inconsistencies in course design		Course design is consistent throughout		
		0		0		0		0	
	Online Organization and Delivery Criteria Total							0	
Student Support Criteria									
24	Course orientation provided		Orientation not well organized		Organized orientation provided		Well organized orientation		
25	Adequate tutors for the course*		More or better trained tutors would enhance learning		Adequate number of trained tutors		Adequate, well trained tutors		
26	Communication tools used in the course		Inadequate or inappropriate communication tools used in the course		Adequate or appropriate communication tools used		Adequate and appropriate communications tools used		
27	Consideration of different learning styles		Little consideration is given for different learning styles		Some consideration is given for different learning styles		Learning styles are considered throughout the material		
28	Opportunities for remediation		Few opportunities for student remediation		Many opportunities for remediation		Most assignments/ assessments provide opportunities for remediation		
29	Opportunities for student advisement		Few opportunties for student advisement		Some opportunties for student advisement		Many opportunties for student advisement		
		0		0		0		0	
	Student Support Criteria Total							0	
Student and Course Assessment and Evaluation Criteria									
30	Assignments congruent with course objectives		Not all assignments are clearly related to objectives		All assignments are related to objectives		Objectives are assessed through a minimum number of assignments		
31	Assignments clearly communicated		Not clearly communicated		Clearly communicated in course materials		Clearly communicated and explained in course materials		
32	Assignments/ assessments appropriate for target group		Some assignments not appropriate for target group		Most assignments are appropriate for the target group		All assignments are appropriate for target group		
33	Assignments encourage critical thinking		Little critical thinking required		Some critical thinking required		Assignments cannot be done without critical thought		

34	Assignments encourage problem solving		Little problem solving required		Most assignments are based on a problem scenario		All assignements are based on a problem scenario		
35	Performance criteria for assignments/ assessments shared with students		Few of the criteria are shared		Many of the criteria are shared		All of the criteria are shared		
36	Opportunities for self assessment		Few opportunities for self assessment		Many opportunities for self-assessment		All assignments include an opportunity to perform self-assessment		
37	Opportunities for peer (student) assessment		Few opportunities for peer assessment		Many opportunities for peer assessment		All assignments include an opportunity to perform peer assessment		
38	Opportunities for student input into assessment criteria		Few opportunties for student input into assessment criteria		Many opportunties for student input into assessment criteria		Student input into all assessment criteria		
39	Multiple assessment strategies used		Two or less methods of assessment used		Between 3 and 4 assessment methods used		More than five methods of assessment used		
40	Course evaluation		Inadequate or inappropriate tool for couse evaluation		Adequate and appropriate course evaluation tool		Wide variety of evaluation tools used		
		0		0		0		0	
	Student and Course Assessment and Evaluation Criteria Total							0	

APPENDIX B

UWIDEC QUALITY ASSURANCE TOOL

	Activity	Person(s) Responsible	Time Frame	Assumptions	Measurable output	Remarks	Score
	Phase 1: Course Concept (planning)						
1	An eLearning course development checklist has been completed	Course developer and instructional designer	will be set when course writer's contract is being signed	a separate, comprehensive tool that identifies the elements in a course plan exists.	a course concept outlining choice & combination of media, content areas, assessment etc		
2	Clear student learning objectives have been developed	Course developer and instructional designer			Student learning objectives stated clearly in the course plan		
3	Clear performance criteria set	Course developer and instructional designer			Assignments, rubrics for students		
4	The course plan includes Active learning, i.e., case study, problem based, anchored learning	Course developer and instructional designer					
5	The plan includes opportunity for student to student interaction	Course developer and instructional designer					
6	The plan includes opportunity for student to instructor interaction	Course developer and instructional designer					
7	The plan includes the use of further resources, e.g. links, presentations, audio, video files	Course developer and instructional designer					
8	The plan includes the appropriate use of technology tools for the objectives	Course developer and instructional designer					
	Phase 2. Production Preparation						
9	Draft course content has been prepared in manageable segments based on the course concept	course developer and ID					
10	Draft content and course concept have been reviewed	Instructional designer					
11	draft content has been edited	editor					
12	relevant copyright information has been requested	editor					
13	A consistent, visually appealing course design has been developed	graphic designer					

14	Website structure has been defined, i.e. areas for course , pages in these areas	web designer					
15	HTML pages have been developed and uploaded	web designer					
16	The homepage not only provides information and guidance, but it is engaging	web designer and graphic designer					
17	The course outline Provides all information required of the student in the course	ID and CD					
18	Course schedule contains all information on assignments and assessment dates	ID and CD					
19	Consistent guidance available for student and easy to access	web designer					
20	Easy to navigate through course components	web designer					
21	Easy to navigate through the content	ID					
22	All segments have manageable amounts of information	ID and CD					
23	Learning activities are part of the course content delivery	ID and CD					
24	A consistent, visually appealing course design has been developed	Graphic Designer					
25	Accessibility issues are addressed	Web designer					
	Phase 3: Student Support Criteria						
26	Course orientation designed	team					
27	Tutors assigned for the course						
28	Communication tools developed for the course	team					
29	Response time for communicationdecided on	team					
30	Learning styles are considered throughout the material	Id and CD					
31	All chats and discussions will be moderated	CD					
	Student and Course Assessment and Evaluation Criteria						
32	Assignments developed to encourage critical thinking	CD and ID					
33	Self assessment activities have been developed	CD and ID					
34	Opportunities for student input into assessment criteria	CD and ID					
35	Course evaluation	team					

APPENDIX C

GUIDELINES FOR DEVELOPMENT AND DELIVERY OF ELEARNING COURSES AT UB

The following guidelines should be consulted and used in the development of eLearning courses in order to ensure the highest quality of the course.

I. The course design and planning process

a. Plan course carefully, consult with EduTech, use course outline template
b. Before starting to plan your course, research existing courses on the WWW or through personal contacts
c. Experiment, you need to gather your own experiences, find your own way of using eLearning but also consult departmental/divisional/unit strategies, where existing
d. Use a step by step approach to familiarise yourself with possibilities of eLearning, start with a few elements of eLearning and progressively add new elements every semester
e. Consider using eLearning, preferably after your students have taken general computer literacy courses, e.g., GEC121 or 122.
f. Analyse your content and identify gaps that eLearning could fill in, e.g., simulations, visualisations, graphics – research on the Web, where there are large quantities of such materials available
g. eLearning can facilitate international cooperation, e.g., international colleagues can serve as experts or can link their students with your students to discuss common topics of interest using online discussion forums
h. Contact the professional world for experience exchange and professional input
i. If you plan collaboration activities, make sure students have enough time for it
j. If you want students to research on the Internet, provide “pathfinders”, web sites as starting points, to make their research easier
k. If you want students to research on the Internet, make sure you give them guidelines on how to evaluate a website (e.g., http://www.library.cornell.edu/olinuris/ref/webcrit.html)
l. Be aware of level of computer skills of your students, if they have little or none, they will need a high level of personal support from you
m. Be aware that one of your course objectives could be increased computer and/or information skills and integrate this in your assessment scheme, therefore, include eLearning in your assessment strategy from the very beginning, not just as an additional resource (e.g., allocate marks for continuous assessment or life-long learning skills developed through eLearning)
n. Just provide what is of real added value to your students, the majority won’t access anything else.
o. Think of anchors/metaphors to personalise your content, like illustrations, stories, scenarios or case studies, it enhances identification with course content and makes the content livelier. The graphic designer will support you in the development process.
p. Think about how you will allocate time for lecture hours and lab sessions/tutorials/practicals. You might want to reduce lecture hours and increase lab hours (if this is allowed) if you provide eLearning opportunities in your lab sessions/tutorials/practicals. Consider that one lecturer hour is the equivalent of a 2-3 hour lab session/tutorial/practical.
q. Be aware that using eLearning will require more time than face-to-face teaching. Just logging in will require some time at the start of sessions.
r. Be creative and playful, eLearning provides many opportunities to enhance your teaching and to make it more interactive
s. Relate content to contemporary, relevant issues

t. Be aware of intellectual property and copyright issues, especially if you are providing offline web content
u. Set specific timeframes for assignments and assessments and make sure these are reflected in the online environment

II. The course development process

a. A group development process for eLearning is most effective. Various multi-disciplinary roles are necessary within an elearning development team. Team members, however, should have the freedom to support and build each other up according to their strengths.
b. Possible roles can be:

- The role of the sponsor is necessary for the provision of necessary funding, wider support and overall project control. This will be, in most cases, your Head of Department.
- You as the subject matter expert (SME) are integral in the development process by providing content but also in developing materials electronically. The eLearning support team takes over different tasks: instructional design, graphic design, and multi-media development.
- Ideally you should organise a peer review by colleagues, otherwise try to get feedback by colleagues, students, the Academic Programme Review Unit, EduTec, etc.

c. Use the official UB Learning Management System for your online course, e.g., currently UB employs WebCT.
d. Select media to be developed based on your skills but also on the skills you would like to acquire
e. Keep ease of updates in mind: online content/html pages are easier to update than, for instance, videos
f. Use benefits of online content, e.g., pictures, colours, animations
g. If you develop online content make sure you follow online editing guidelines, e.g.,

- Divide content into small “learning nuggets”, don’t put too much content on one page
- Put the most important information on top (content bubbles to the top)
- Don’t use long sentences, use a conversational style, avoid technical terms and language
- Use colours & graphics
- Use structured content, like bullets
- Use headings and put keywords in bold font
- Embed questions, assignments, case studies, examples
- Define a common structure for your modules

h. If you have decided on a specific sequence for your online material, keep to it. Students get used to it and know what to expect (e.g., introduction, contents, links, self-tests)
i. If you provide downloadable content make sure it is printer-friendly and your students know how to download it and have the resources to print documents
j. Start developing content in advance, it might take time at the beginning to develop online content, e.g., use the long break before new academic year starts
k. Consider providing the content also offline, e.g., download websites, save content on a floppy disk or on paper in case the network fails you
l. Be aware of file sizes, the network might be very slow at certain times

III. The Course delivery and management (including online communications)

a. Use a blended learning approach so that you do not depend entirely on electronic media and so that each technology is being used for its strengths
b. Have contingency plans in case the network fails you
c. Think of how your students will access your eLearning course, e.g., in the SMART classroom (book in advance) or in their independent learning time. If you have to rely on students finding access independently consider that you might not be able to rely on them getting access
d. Be specific at the start of the course about expectations, objectives, assessment strategies and the eLearning aspects of the course
e. Book EduTech staff for one or more orientation classes for your students or teaching assistants in the lab that they will be using
f. Consider a progressive use of tools and give deliberate guidance
g. Ideally, meet with students regularly in a laboratory
h. At the beginning of the course make sure that all your students are able to log on
i. Decide carefully whether to use the WebCT e-mail tool or your UB mopipi e-mail address. Using both can lead to confusion. We suggest you use WebCT, but make sure you regularly check your inbox and reply to students' e-mails in time (feedback time should not exceed 48 hours)
j. If you use the online discussion forum you need to make it an explicit part of the course expectations, including assessment, where appropriate, giving clear guidelines on what students should do (e.g., length and frequency of postings, topic definition, how to do a summary effectively, etc.)
k. Consider using a paced rhythm of delivery, upload content week by week
l. Update content regularly, specifically check if links are still available
m. If you use online quizzes provide your students with a possibility to try it out first
n. Mix different kind of question sets, e.g., multiple choice and open-ended questions based on your content and objectives.
o. Provide a questions bank for random generation of question sets if you want to offer multiple attempts to submit quizzes.
p. You can use eLearning for managing large classes, e.g., submission of assignments and for ensuring standardised content, but you need to plan it very carefully and involve teaching assistants
q. Don't raise expectations you are not absolutely sure one can guarantee
r. Pair students, where possible, that are more computer savvy with students with less computer skills
s. Constantly refer/remind/motivate students to access online content; integrate online content in your face-to-face classes.

IV. Support required: EduTech, Library, Information Technology (IT), Head of Department (HOD) and other Faculty members

a. EduTech provides the following support:

- Training through the CAD eLearning Certificate
- Instructional design
- Media development
- Graphic design
- Induction classes for online students
- Teaching and learning equipment where possible
- Bookings in the SMART Classroom

b. Approach EduTech in time for any support that you need
c. Approach other faculty members who have already utilized eLearning strategies
d. Make your HOD aware of your work in eLearning and get support from your HOD
e. The library can help you in finding resources in the library and on the WWW through your subject librarian
f. IT: Know in advance who is responsible for the laboratories you are using and inform this person in advance of your needs. Check in advance whether technology is working in your laboratories.

V. Infrastructure and equipment

a. Use lab sessions to provide adequate computer access
b. Ideally use department/faculty labs
c. Schedule lab sessions when computer labs are likely to be free

VI. Evaluation / Quality Assurance

a. Use standardised online student questionnaire at end of the course, you can add questions if you want
b. Consider a focus group discussion with selected students
c. Consult the Academic Programme Review Unit to perform an eLearning course quality review using the Quality Assessment for Online Learning Rubric for feedback on overall quality of the course

Original article at: http://ijedict.dec.uwi.edu//viewarticle.php?id=31&layout=html

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The Caribbean Universities Project for Integrated Distance Education (CUPIDE)

Project Title:	Caribbean Universities Project for Integrated Distance Education
Implementing Agency:	The University of the West Indies
Funding Agency:	Japanese Funds-In-Trust for Capacity Building
Executing Agency:	UNESCO
Project Start Date:	January 20, 2003
Completion Date:	December 31, 2006
Project Director:	Professor Stewart Marshall <stewart.marshall@uwichill.edu.bb> Director, Distance Education Centre, The University of the West Indies.
Project Operations Manager:	Ms. Christine Marrett <christine.marrett@uwimona.edu.jm> Distance Education Centre, The University of the West Indies.

Background:

In January 2003, The University of the West Indies (UWI) signed an agreement with UNESCO to implement the "Caribbean Universities Project for Integrated Distance Education (CUPIDE)". The project is funded by the Japanese Funds-in-Trust for Capacity-building of Human Resources and is a collaborative initiative involving UWI as the implementing agency and the University of Guyana, University Quisqueya (Haiti), Anton de Kom University of Suriname, University of Technology, Jamaica, as co-beneficiaries.

A Project Advisory Committee chaired by CARICOM[1], comprising one nominated representative from each university, UNESCO as an ex officio member, and the UWI project manager as secretary to the committee, monitors the project and enables the smooth integration within each university of programmes developed under the project.

The development objective of the project is to develop the human resources within the region through enabling each of the five participating universities to develop and deliver quality distance education programmes using information and communication technology (ICT). In this way, the competitiveness of the region in general and the institutions in particular are to be enhanced, participation in the knowledge society increased – not only as users, but also as generators of knowledge – and cost savings realised in the use of the technology for distribution of the course materials and the teaching and administration of programmes. Collaboration among the participating institutions is also to be enhanced.

The CUPIDE project as it was conceived and designed in 2001 did not have the benefit of the commitment of Regional Governments to a connectivity agenda and a holistic Regional approach to the delivery of distance education. This change, coupled with the adoption of Internet and web based technologies as the platform for the delivery of distance education, provided the rationale

for the CUPIDE project to be revisited in 2004 with regard to the choices of technologies in delivering on its purpose and to seek the benefits through synergies within the overall umbrella of the CARICOM agenda and in particular the Caribbean Knowledge and Learning Network (CKLN) and E-Links Americas[2].

Immediate objectives:

The immediate objectives for the remainder of the project are:

- To collaboratively develop the pilot course on distance education;
- To (further) develop the institutional strategic plans for distance education incorporating the use of ICT;
- To develop and implement a mechanism for electronic distribution of materials;
- To develop a Web portal;
- To implement the VSAT[3] network based on E-Link Americas;
- Based on the strategic plan of each institution, to identify specific programmes and staffing requirements and training for each of the universities;
- To identify appropriate personnel (academic, administrative, technical) in each institution to be trained in ICT for teaching, administration, and materials delivery, thereby building the human resource capacity in the provider institutions;
- To provide where necessary technical assistance in the development of the technical, administrative, and educational systems based on the use of ICT;
- To train the persons who have to use the technology including students;
- To identify the requisite recurrent budgetary support;
- To establish with the support of CARICOM and other such bodies strategic linkages with providers and manufacturers;
- Working with CARADOL[4] to continue to strengthen the links among the universities and other institutions;
- To develop projections of prospects for expansion to other institutions at different levels of the educational system;
- To evaluate the project.

Endnotes:

[1] The Caribbean Community and Common Market (CARICOM) was established by the Treaty of Chaguaramas and came into effect on August 1, 1973. The CARICOM members are: Antigua and Barbuda; The Bahamas; Barbados; Belize; Dominica; Grenada; Guyana; Haiti; Jamaica; Montserrat; St. Kitts and Nevis; Saint Lucia; St. Vincent and the Grenadines; Suriname; and, Trinidad and Tobago.

[2] E-Link Americas is an initiative that was launched by the Institute for Connectivity in the Americas. The operationalization of E-Link Americas in the Caribbean is linked with the Caribbean Knowledge and Learning Network (CKLN), a project which supports the same objectives as CUPIDE, but extends to some thirty-three (33) Caribbean tertiary institutions.

[3] Very Small Aperture Terminal (VSAT) - an earthbound station used in satellite communications of data, voice and video signals, excluding broadcast television.

[4] The Caribbean Association for Distance and Open Learning (CARADOL) is a regional association that aims to: promote and advance the use of Open and Distance Learning as a means of contributing to the developmental goals of the Caribbean; foster an understanding of the theory and practice of Open and Distance Learning; and facilitate research and disseminate information within the Caribbean on Open and Distance Learning.

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E-Link Americas

Title: E-Link Americas

Objective: To provide high speed satellite Internet service for social development in Latin America and the Caribbean

Status: Incorporated as a Canadian not-for-profit corporation in March of 2004. Will be operational and offering service by summer 2005. Rollout will be done gradually starting with the Caribbean and Central America

Supporting Agencies: World Bank, the Organization of American States, the Institute for Connectivity in the Americas, the International Development Research Centre, and the Canadian International Development Agency.

Project Director: Carlos Muñante, Vice President Sales and Marketing

For more information: Visit: www.elinkamericas.net
or contact: Jill Watson, jwatson@elinkamericas.net
Marketing Analyst, E-Link Americas

Making satellite-based connectivity affordable:

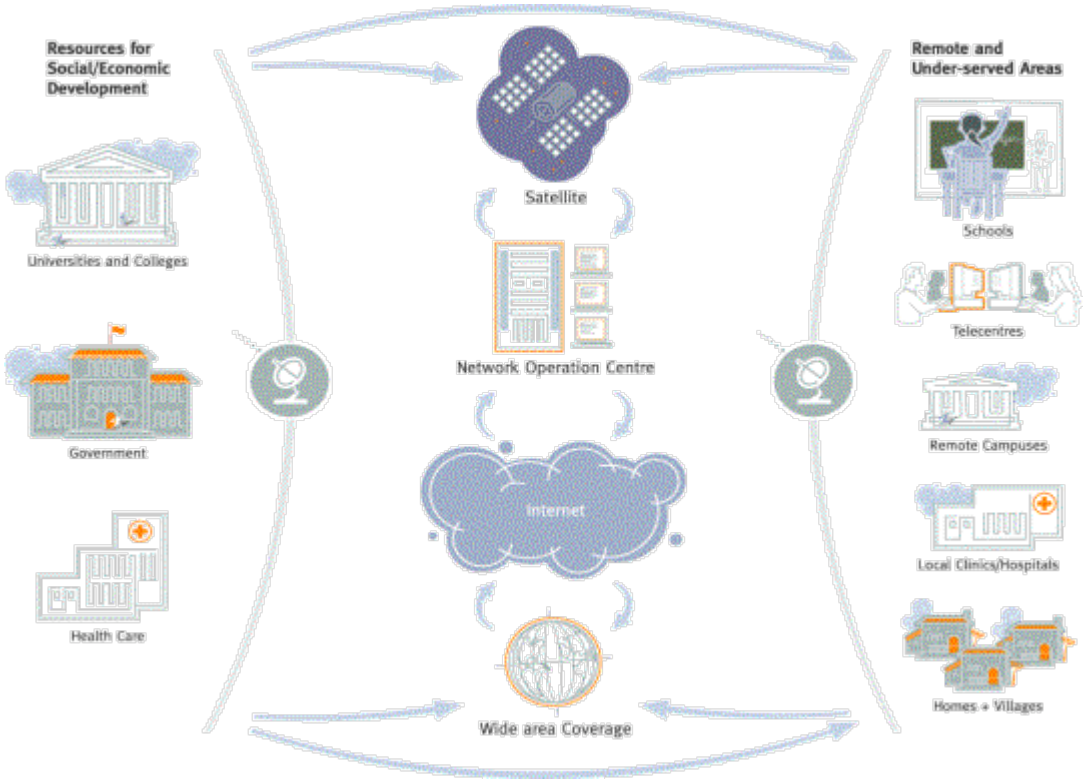
E-Link Americas has a social mandate to provide affordable connectivity for social and community development in Latin America and the Caribbean where it is currently unavailable or available at such a high price to restrict its use for social and economic development. Using satellite and terrestrial wireless technologies, E-Link Americas creates regional infrastructures in unserved and underserved areas. It does this by delivering affordable, financially self-sustaining, high-speed (broadband), Internet access to municipalities, universities, schools, hospitals, telecentres and other community-based organizations for social and economic development. E-Link Americas is able to offer affordable services by aggregating demand in the target region to create economies of scale.

The E-Link project is being managed through the headquarters and a central satellite gateway in Canada and local service partners located in various regions of Latin America and the Caribbean. Existing infrastructure in hospitals, schools, and other community-based organizations will be leveraged using wireless fidelity (Wi-Fi) technology.

E-Link Americas and education in the Caribbean:

E-Link Americas will provide the infrastructure allowing the Caribbean Knowledge and Learning Network (CKLN) to harness state-of-the-art Satellite and Internet technologies to provide a virtual learning network between Caribbean tertiary education institutions. CKLN, partnered with E-Link Americas, will provide students, colleges and universities in the Caribbean with cost-effective access to high quality e-learning content and other knowledge resources drawn from the Caribbean and around the world. E-Link Americas will provide a Caribbean-wide satellite network that will connect all tertiary institutions in the region wishing to join the network, to allow partnering and collaboration amongst themselves and to provide access to other global networks and knowledge databases. Primary connectivity will be through the use of satellite via DVB-RCS (digital video broadcasting – return channel satellite), a highly efficient, easily scalable and easily

upgradeable technology. The infrastructure will facilitate knowledge generation and sharing (open distance teaching and learning) on a regional basis which was previously restricted by the high cost of connectivity. As such E-Link's initiative is meant to address specific needs of the Caribbean nations, which are currently lacking cohesion in implementation of specialized institutional networks. High level Internet service will be available through E-Link Americas at an affordable cost - substantially less than what these tertiary institutions are currently paying.



Progress to date:

In the first phase of this project, a regional study was carried out to determine the optimal type of service, solution, and vendor. In the second phase, a needs assessment for different communities throughout the region was conducted. In the third phase, the business plan was approved, E-Link Americas was incorporated as a not-for-profit corporation, and began preparing for regional rollout.

Immediate objectives:

- Installation of Equipment in Canadian Teleport;
- Hub Commissioning and Service Trials;
- Provide connectivity to CKLN project;
- Full Service rollout mid 2005.