

Presentation Emerge Conference

Dynamic Innovative Strategies of Application of ICTs for Flexible Delivery in DE Institutions

INTRODUCTION

ICT models COOL & DVC as Tools for Distance Educators and Learners at Unisaⁱ

Information and communication technologies (ICTs)ⁱⁱ dominate our lives these days. In fact, they have ushered in a new era known as the knowledge economy. In the context of education, particularly distance education (DE), efforts have been made to enhance teaching and learning through the application of these ICTs. If correctly applied, proponents argue that ICTs could help eliminate some of the debilitating factors in distance education, such as time, space and pace. What is even more appealing about using ICTs is their decentralised nature, which could free the learner from the educational provider, thus providing the learner with a great variety of learning resources (Khan, 2000:2). Not only that, according to Tinio, 2002 they have the potential for increasing access to and improving the relevance and quality of education. As such they represent an equalising strategy of knowledge for developing countries if properly fully integrated.

The worldwide fascination with ICTs did not escape the attention of the former Technikon SA (now the New Unisa) in Florida, Johannesburg. As early as 1997, this institution decided to introduce ICT models in the form of COOL (Co-operative Online Learning) and DVC (digital videoconferencing) under the auspices of the Integrated Technology Centre (ITC). The DVC model was introduced to increase the level of social interaction among learners and to help eliminate the sense of isolation associated with DE. It was intimated that these ICTs would also provide a solution to some of the common technical problems associated with distance education, e.g. lack of speedy responses to queries, posting printed courseware, costly telephone calls (due to capacity allowing for group interactions), unreliable faxes, and bungled communication with learners. These problems had a resultant increase in client dissatisfaction, dropout rates, poor examination results, as well as increasing competition from other DE institutions, both nationally and internationally (ITC Advisory Committee Minutes, 1998). These preceding aims and objectives are likely to be achieved when using the DVC medium to complement COOL. The use of such technologies would even make it possible for lecturers in the sciences and related fields to invite their distance learners into their laboratories (to see how experiments/practicals are conducted).

Capacities of COOL and DVC and how they have been used

To carry out its mandate, ITC put together a team of highly qualified IT professionals ranging from programmers, multimedia experts, graphic artists and web designers to audiovisual and DVC experts. Administrative communication, Academic communication Content delivery - a few courses were loaded in the form of pdf as the bandwidth was said to be low (i.e. 1997). However, the network capacity has since changed, in other words COOL technological development has been overtaken by the institutional capacity of the network. In no time, the COOL prototype which was written in HTML (and now FLASH) was up and running. Being the customised institutional online tool it was, COOL was received warmly in many quarters.

To justify the institutional expenditure for the acquisition of the cutting-edge technologies, senior management decided to treat the ITC directorate as a business centre – in other words, ITC was tasked to charge its services and products to the institution at a profit so that it should be able to sustain itself. The various academic departments and administrative directorates were supposed to present requisitions for the use of the ITC technology. Directorates would then use their approved budgets to acquire the required services or products from ITC. This contentious policy created conflict among the staff as the users; with some of the departments claiming that they could not increase their budgets sufficiently to meet their technological needs, and others deciding to outsource their ICT related projects as they felt that some of the services and products were excessively priced. Others still, used technological budgets for reasons other than technology, and they seemed to get away with it.

Despite the initial teething problems with both COOL and DVC, their early mark was noticeable as some Programme Groups tended to rely heavily on them. For example, DVC was used extensively by both Business Management, IT and Real Estates lecturers to conduct contact sessions throughout the nine regional sites for two or three sessions per year (1999 - 2001, 2004), lasting 4 to 5 days per week. Normally these sessions would be complementing print based courseware or discussions initiated through COOL. Apart from course delivery, DVC enjoyed much popularity in administrative delivery such as meetings regarding Human Resource related issues, Corporate Centre for Marketing events, Principal's Staff Assemblies, etc.

Interestingly enough, the infatuation by some of the researchers with the ICT's development, or their dire need for self-improvement or even their concern for appropriate use of these ICTs, made COOL (Cloete, Lazenby, Odendaal, Jared, ITC Research Team Unit, Phaahla) and DVC (Sekgwelea, 1999) their happy hunting ground. The cited reports give detailed accounts of the highs and lows, merits and demerits achieved through applying these models (COOL and DVC) for flexible delivery and to merely repeat such accounts here would be nothing more than a futile exercise.

As a result of their advantages, both DVC and COOL are considered to be catalysts in achieving Unisa's mission, namely to provide a more flexible, client-centred environment for its learners, as well as presenting exciting and engaging opportunities for both teaching and learning.

Unfortunately, the fascination with ICTs does not automatically translate into their optimal use in education. With all the flexible resources at its disposal, Unisa appears to be well placed to address the problems associated with levelling the playing field in education through improved technology. However, having the right formula in place is one thing; applying it effectively is quite another – hence the objectives of this research, namely to determine the effectiveness of using ICTs, and to also come up with a dynamic innovative approach to applying ICT models to ensure successful flexible learning at Unisa.

PROBLEM STATEMENT

In view of the assessment of the prevailing conditions by the researcher, as well as the research conducted by Cloete (2000) about COOL, Sekgwele on DVC (1999), and others, Unisa's ICT models seem to be currently underutilised by educators and learners. This could have serious negative consequences for Unisa as a teaching and learning institution. A dynamic innovative approach to the application of the current ICT models could also serve as the remedy to averting what appears to be an impending disaster.

Purpose and Aims of the Study

The main purpose of this study is to determine best practice for flexible learning through support of ICT models applied in an innovative way. It is envisaged that the outcome of this research will contribute positively to the process of the design, development and application of ICTs for the enhancement of teaching and learning in the DE context and the solution of identified problems.

The **specific aims** are as follows:

- To establish whether ICT modules, as applied in the DE context, positively enhance the teaching and learning process in general by evaluating an ICT-based course's impact on teaching and learning
- To determine whether the clients' needs for top-quality service are met, e.g. specific attention will be given to a sampled group in the academic division of Applied Natural Sciences and Engineering (ANSE) at Unisa and selected institutions
- To identify any problems or obstacles hampering users of ICTs in effectively enhancing the teaching and learning processes within the UNISA flexible learning context
- To test the proposed solutions for feasibility and practicability

Motivation/Rationale for the Study

Teaching/lecturing is an art/profession that is not easily mastered even in a face-to-face setting. In distance education this skill becomes even more difficult “as the teaching and learning behaviours are separated” (Keegan, 1980:50). An additional obstacle arises when trying to achieve the product of this noble profession through the use of technology (as in ICT models), as this approach calls for the application of tried-and-tested instructional designs.

More academic research needs to be undertaken by Unisa to evaluate the effectiveness of ICTs in enhancing teaching and learning. The innovative approach to the application of ICT models for educational delivery should make a major difference in the DE context.

Improving quality and service to satisfy clients (learners, lecturers and administrators) is what ICT-based course designers and developers (or educators) should be striving to achieve. In the face of government subsidy cuts and rising costs that increasingly have to be borne by learners, the least that educational institutions can do is to provide their learners with high-quality course materials.

The findings of this research are likely to help save Unisa a considerable amount of money through better utilisation of ICT models and resources for flexible learning.

Fundamental Paradigm – Constructivism

Constructivism is essentially learner-centred, with the emphasis on the problem approach. Problematic scenarios are sketched and the learners must come up with solutions; these problems are chosen according to the learners’ needs and interests. Learners learn how to construct meaning from the learning situation.

ICTs are essentially aligned with constructivist pedagogy – where the emphasis is on individuals constructing their own truths in new learning models from the interactive lesson. It is for this reason that Hills (in Abbott, 2001:6-8) feels that future courses may not test the learner’s memory limit; rather, they will provide learners with strategies for obtaining information quickly and ordering it into a logical sequence.

RESEARCH DESIGN AND METHODOLOGIES

According to Welman and Kruger (2002:46), the research design is a plan used by the researcher in testing the hypothesis or deriving the answer to the research question. It also compels the researcher to consider carefully the orientation of his/her research study in terms of the great dichotomy – quantitative versus qualitative approaches.

The integrative approach is the researcher’s choice for research methodology. It is encapsulated by social researchers as programme evaluation. Rossi and Freeman (in Babbie & Mouton, 2001:335) define programme evaluation as “the field of social science utilising the whole range of social science in assessing or evaluating social or intervention programmes”.

Undoubtedly, the application of programme evaluation methodology should help unravel and answer the following key research question and its subsidiaries: Does the application of ICTs (COOL and DVC) facilitate and enhance flexible learning as envisioned by Unisa?

Demarcation of study: In the context of Unisa, examples of ICT models to be examined are COOL and DVC. Samples are to be selected from users: learners, academics and administrators, — designers and developers of these models — instructional designers and programme developers through stratified randomised sampling technique.

To a great extent the main sample has been selected from Dept of Engineering. Engineering is chosen as Science for testing the ICT models under investigation. Previous researches conducted were done with the predominant samples chosen from courses in Social Sciences. Further, it is hoped that more studies of this nature (with the focus on scientific areas) could also help demystify the Sciences, as the Sciences are not popular with previously disadvantaged groups as result of the uprooted apartheid laws and education.

Programme Evaluation is Conducted in Phases

Formative evaluation is undertaken to provide feedback whether there is any change needed to improve the programme's worth or value. The emphasis is on establishing the weaknesses, flaws and strengths, how different components fit together, and if there are any deviations from the original planning of the programme intervention (Clarke & Dawson, 1999:7).

Preliminary Findings

It has been mentioned in passing that COOL and DVC have been fertile ground for in-house, national and international researchers. Undoubtedly these researchers' work (see literature review below) have resulted in a lot of data in terms of both COOL & DVC users' and learners' background information, behaviours, perspectives and attitudes towards these models. It is the researcher's good intention through this journey to cover aspects that have not been covered by the previous research, and to use raw secondary data that is applicable and relevant to this study (with acknowledgement).

Literature Review

- Early studies about COOL paints a rosy picture about its future.

The studies about COOL conducted by Cloete and Odendaal (around 2001) based on samples taken from Library Science and Business Management III (respectively), highlight the promising future for COOL in the former TSA community, in particular learners and academic staff. The praise includes the potential that COOL has as

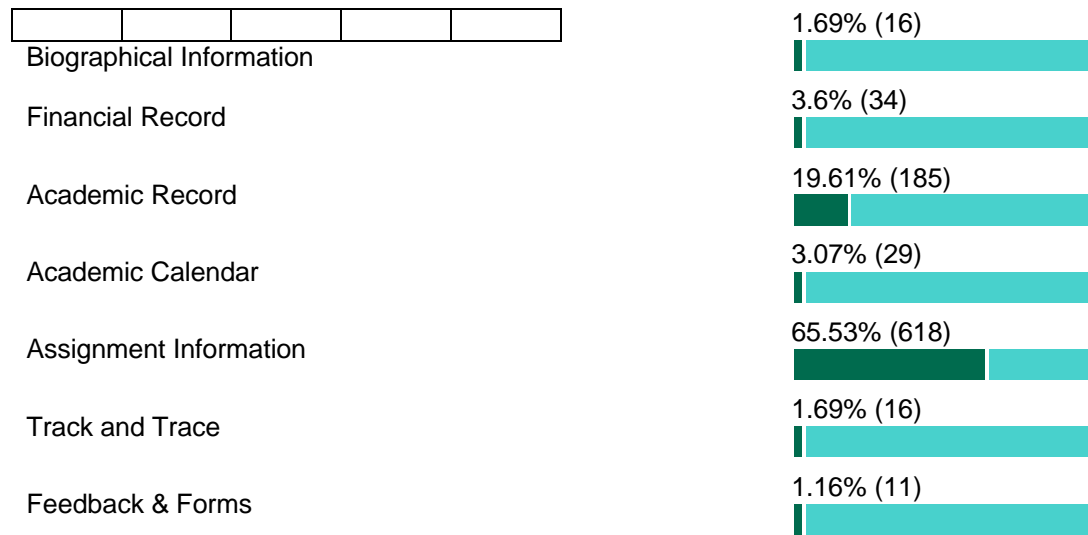
ICT model in flexible delivery and learning. Further, these studies suggest how both learners and academics are enthusiastic over the vast potential available through the application of COOL.

- Are the users receiving the learning materials as promised by COOL?

Studies conducted by ITC Unit (2001) & Phaahla (2002) highlight the underutilisation of COOL. They clearly show COOL to be mainly used by both learners and academics as an administrative tool in the distribution of information about the courseware, tutorials, and access to learners' personal administrative information, rather than the effective learning tool which it can be. Tables 1&2

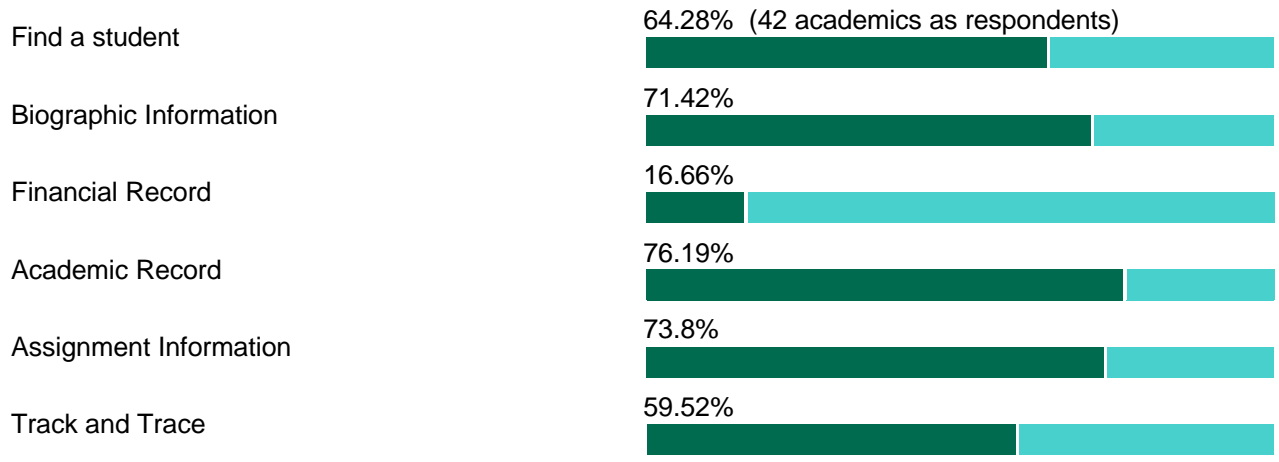
- Another drawback highlighted by the same studies is the fact there is little content that is available online in the form of course modules.
- Minimal participation by the academic staff in group discussions
- Lack of meaningful interaction in the form of student-to-student interaction (group discussion)
- Consequently, there are no meaningful interactions between the students and academic staff (lecturers and tutors)
- No students and industry specialist interactions
- No students and interactive content (as was originally planned for COOL)

Table 1 Learners: What is your favourite current administrative feature?



Learner respondents 942. (ITC COOL research unit 2001)

Table 2. Academics: Which features do you use to support your students/yourself?



Learner respondents 942. (ITC COOL research unit 2001)

Observation: Students' and academics' records of their subject/module transactions of COOL suggest no meaningful usage of COOL for academic purposes. Academics ratio discussion vs others (administrative) 11 :

89

Learners ratio discussion vs others (administrative) 32 : 68, consistent with the students' complaints about rare lecturer participation in COOL discussions.

Academics COOL Module Transaction Breakdown for SSO1M2S

Module	Transactions
Booklist	15
Calendar	39
Discuss	56
Faq	9
Onguide	312
Onquiz	2
Publish	119
Studlist	8
Total Transactions	560

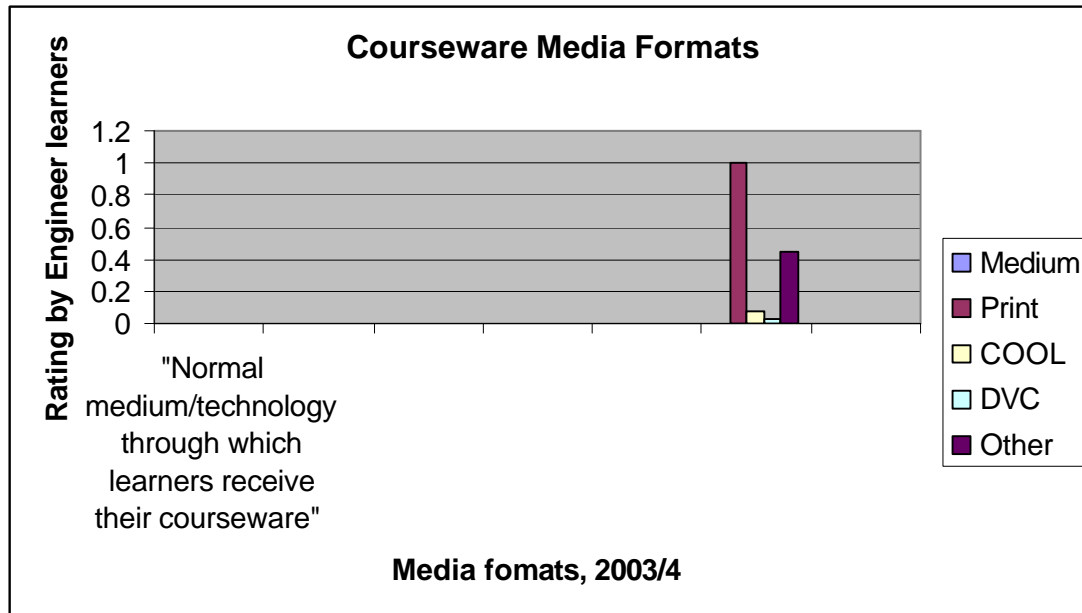
Table 4, Academics

COOL Module Transaction Breakdown for SSO1M1S

Module	Transactions
Lfeedback	1167
Booklist	1304
Contact	2206
Discuss	12911
Faq	2739
Notes	976
Onguide	25774
Onquiz	2989
Studlist	2620
Total Transactions	52686

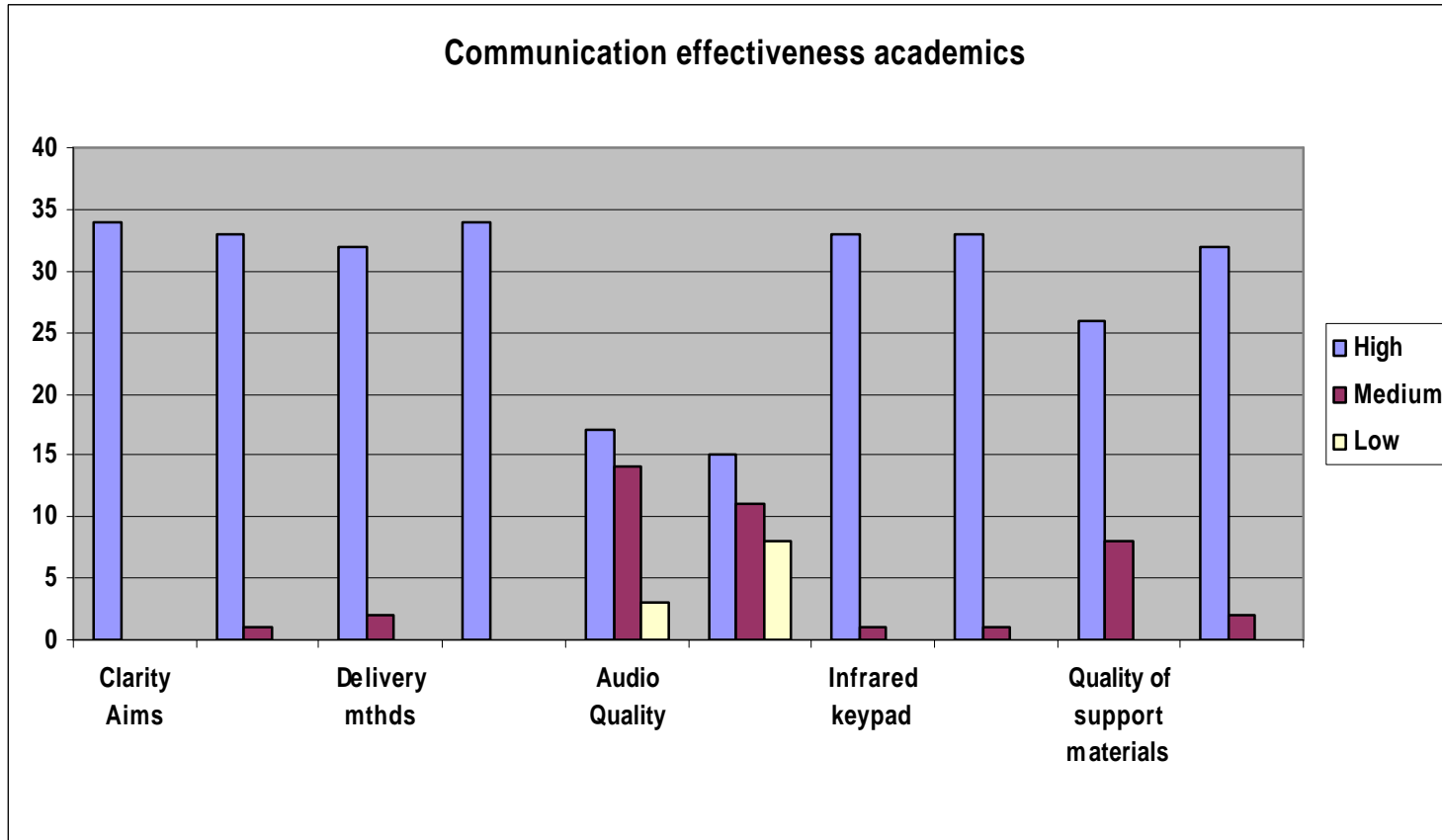
Table 5, Learners

Pilot study undertaken by the researcher’s assistant with sample of Engineering students (2nd-3rd year levels) suggested that there is a chance that some of the students are likely to complete their studies without any knowledge that there is an institutional technological enabler such as COOL & DVC, if status quo prevails. See Graph 6 (Pilot study). In answer to the use of different formats of receiving/sending study materials: sample size is out of 100. Further, it confirms that the overwhelming majority of the learners are still dependent solely upon print as medium of delivery.



Graph 6

In similar fashion to COOL, Digital Videoconferencing (DVC) had its occasional pioneers singing its praises (that is during early days). Many (see Graph 7), plus 70%, consisting of head-office and regional sites, academic staff, (Bus. Management) hailed it as quite effective in communication.

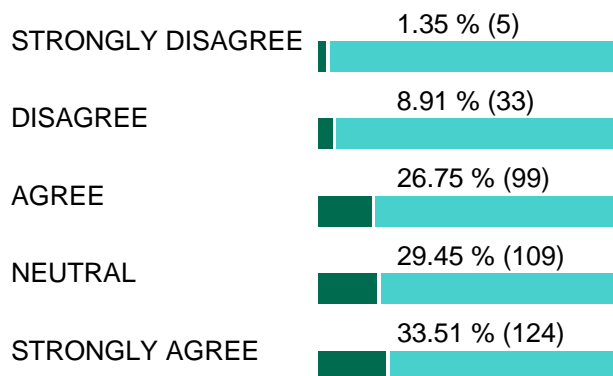


Graph 7

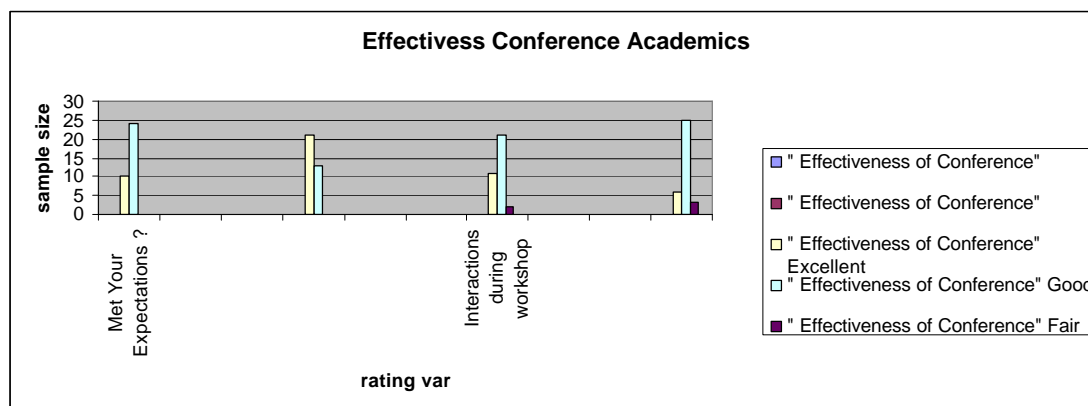
Almost identical sentiments were repeated by 59% of learners (Table, 8).

Regarding the effectiveness of DVC as interactive medium, again plus 70% of Business Management & regional sites academics and learners expressed great satisfaction with DVC. (see Graphs 8 & 9)

DVC effective interactive medium



Graph 8 (Jared, O 2001) Learner Rating



Graph 9

Most unfortunately, instead of capitalising on the early passion shown by both academics and learners for the use of DVC, several problems were allowed to drag on e.g. bandwidth size, ageing technology and lack of maintenance resources (Sekgwelea, 1999:3-4).

Sadly, as in the case of COOL, DVC has plummeted in popularity. A burning desire by some former TSA staff and their learners to use this technology for various academic purposes has simply waned due to problems that plagued its use. Lately, as in the case of COOL, the use of this technology has simply been down graded to a

few administrative meetings, workshops and seminars, e.g. Corporate Centre for Marketing & Rectorate events, ICT & Learner Support's administrative meetings with staff.

ANALYSES OF PRELIMINARY FINDINGS

Now that we know more about the problem of underutilisation of ICTs, several options present themselves of how to obtain a realistic solution to the identified problems:

What caused them and how do we solve them? Underutilisation, due to provision of admin information at the expense of the content delivery and the lack of essential interactivity that would be fostered by the discussion over elaboration, discussion, debates over the pertinent issues arising out of the content.

The main logical conclusion which seems inevitable is that not all the avenues were covered during the implementation phase of the ICT based models: evidently, bandwidth excuse no longer seems relevant; both costs of technology and bandwidth service have since been lowered and improved respectively. It would be more than a morale booster if Telkom could further reduce costs of lines. Hopefully, the arrival of the new players as competition to Telkom will encourage further reduction. The unrealistic policies, lack of planning in some respects; failure to respond adequately to identified problems as there were no pilot or trial-runs; not all the relevant stakeholders have been meaningfully engaged and a lack of clear policy exacerbated the situation by allowing conflicts of interest to prevail. These errors in judgement must be corrected at the earliest possible time.

Secondly, the underutilisation ripple-effects are very harmful: the untold damage manifests itself in the form of the New Unisa not getting real value for its money; it causes irreparable damage to the institutional reputation and goodwill, the competitive edge that the New Unisa and its products would command over competitors and partners is gradually dissipating. How can this deterioration be upstaged?. On one side of the coin at least, acquisition of the technologies (COOL & DVC) amount to some sort of investment – even though technology once off the shelf, is in a perpetual race against becoming obsolete. The invaluable experience accumulated so far, should be more than half the battle won. What needs to be kept in mind is that lost opportunities are never regained. These models must be used profitably for flexible delivery and learning.

Failure to exploit available ICTs for flexible delivery amounts to a denial of learners of the optimal exposure to a constructivist model – as the ICTs have been proven to be an indispensable medium for this task. Advocates of constructivism argue that the linear print-based products are very superficial in relation to providing a

realistic learning environment. The realistic environment should be non-linear, complex and ill-structured as in appropriate online websites or the Internet. Such online features are deemed suitable to pose a challenge to the human mind which functions in a multi-processing mode. The implication of keeping our learners hooked onto print-based materials simply means ill-preparing them for the future real world. Worst, they (learners) may not be able to cope with the challenges of the lifelong learning and information age if the status quo is allowed to persist. The immediate task facing New Unisa and her compatriots is ensuring that transition from teacher-centredness to learner-centredness is practised in word as well as in deed.

The implications of failing to adequately prepare learners for the 21st Century are too immense to contemplate: in essence, it is tantamount to denying the affected learners the ability to work and lead a productive fruitful life in a digital world accessible through acquaintance with technological literacy. The other highly remunerative skills required for the global digital economy are “digital age, functional literacy, visual literacy, scientific literacy information literacy, cultural literacy, and global awareness, inventive thinking, higher-order thinking and sound reasoning, effective communication, and high productivity” [Tinio, 2002:7 from EnGauge of the North Central Regional Educational Laboratory (U.S.)]. The key to the majority of the latter skills remain with the ICTs..

Undoubtedly, failure to integrate available digital technologiesⁱⁱⁱ into the educational lives of learners is as good as deliberately instituting the global divide – which is likely to be manifested by current and future socio-economic-politico inequities.

Realistic solution: it is not dependable simply on resorting to a new and innovative approach. One needs to get the basics right in the search for a solution to the problem of underutilisation.

One needs to review the whole ICT model against the backdrop of the integration process as suggested by Tinio, 2002. She sees the integration process as the backbone of the well-established technological model. The essential requirements according to Tinio, 2002 are policy, specific objectives and their outcomes, guidelines, time-bound targets, mobilisation of required resources, political commitment at all levels to use the ICTs in education, and involvement of all the key stakeholders.

To kick off the process, project implementers/planners/policy-makers/stakeholders must conduct a rigorous analysis of the current institutional practice e.g. drivers and barriers to the use of ICT, including those related to curriculum, pedagogy, infrastructure, finance, and content.

The educational goals intended and the different types of technologies to be employed in pursuit of such goals must be clearly spelt out. The best performing models in some parts of the world might need some modification before application to suit local context. This leads to another critical point, simply called media selection. Normally, a medium is selected for its capacities and appropriateness in presenting, demonstrating, drill/practice, interaction, collaboration, or even storage/retrieval capacities. Media selection involves also the targeted audience's interests and understanding of such media.

Presentation demonstration drill/practice interaction collaboration

MEDIA FORMAT

USE/BENEFIT

Print

delivery, storage, distribution

Audio/Video cassette

delivery (audio/visual/graphic) storage, practice

Asynchronous Online

delivery, storage, two-way communication, collaboration, drill/practice

Synchronous Videoconferencing

delivery, two-way communication, collaboration

Identification of key stakeholders and grouping (harmonising) them into project team(s) according to key identifiable interests.

Last but not least, it is crucially important to pilot the innovative ICT model(s) as a prerequisite to iron out possible flaws in implementation strategy of flexible delivery and learning.

Flexible learning – what are the critical factors for consideration? In a nutshell, flexible learning is about changes in Higher Education. Key questions to be asked are: What is the institutional perspective to driving such change? In fact, it requires more collaborative institutional effort than that put up “by occasional pioneers”. Critical questions to be posed are -

What factors have influenced those institutions that have successfully embraced the flexible use of learning and technology? What motivates their policies? (Collis & Moonen: 2001)

Flexible learning is about learner choices – in fact, it is phasing-out situations in which key decisions are made by instructors for their learners. In flexible learning the learner has a choice to make about the content, instructional methods, practical/theoretical, media, location, and language (Collis & Moonen, 2001: 5).

Will they (clients and academics) use the technology to bring about the desired change? Often colourful visions and missions are advanced, but converting them through strategic plans, often prove tricky for the organisers/project managers. Various detractors are often blamed for the shortfall in achieving the targets as is the case with COOL and DVC. Maybe the weakness lies in the expectancy to achieve tangible results immediately. Collis & Moonen warn that the lifespan of the implementation cycle model should be more than 5yrs. During such period, it is critically important to remember that pioneers will be replaced by newcomers, the original innovations will be modified through new innovations or sub-innovations. Simply put, collective memory will be hard to exist, as there is a likelihood that deviation from original aims/objectives may occur. Another oversight occurs as a result of the failure to institutionalise the project teams as spear headers as the life-cycle of the project shortens. Sadly, this oversight often influences the project workers negatively as they tend to concentrate on extending its life-cycle rather than the project outcome. Caution must also be exercised not to alienate educators – in fact, they must be featured as playing meaningful roles as part of ICT project teams.

CONCLUSION

In conclusion, an innovative approach to the use of ICT models for educational delivery and learning amounts to brighter prospects for would-be lifelong learners: Dynamic innovative application of the ICT models for flexible learning needs to be conducted occasionally. It is for that reason that innovation forms a substantial part of the solution mooted here. Why innovation? On one hand, there is the increasing demand by learners on their institutions to better prepare them for the future and concomitant challenges posed by globalisation. As a result, there is the problem associated with massification, whereby (lately) numbers of learners at tertiary level have quadrupled while the number of academics and physical buildings has remained unchanged. How would one ensure equity and quality in teaching and learning, particularly in the face of a lack of resources prevailing among poorer communities?

The global divide is touted as the greatest enemy of this era; i.e. the gap between those who have access and control of technology versus those who do not have access due to lack of financial resources. This lack of

access to technology is seen as leading to a lack of knowledge and as such is leading to social inequalities. According to Lallana, 2002, if not carefully handled, the global divide could annihilate the new democracies emerging in developing or Third World countries. Hence the crucial importance of exploiting all means of exposing the current and future generations irrespective of the background and socio-economic position, religion or creed, to digital technology use. Again, caution must be exercised as to what sort of knowledge our learners are exposed to – therefore the facilitation role, i.e. guiding them regarding selectivity, to be played by lecturers, must never be taken lightly.

It raises hope to note that the quantum leap in technological development has provided a platform to better deal with constraints of lack of resources, time, pace, and place. In the same vein, the dramatic ICT developments have emerged in trends such as convergence, miniaturisation and multifunctionality which serve as fertile grounds for innovation, and concomitant reduction in costs of digital technologies. To a large extent, innovation in this instance will not be restricted to coming up with new inventions only, but will also be characterised by trying known solutions proposed and tested elsewhere, in our context, and even experimenting with the known models in a novel way.

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END NOTES:

¹ 1 January 2004 was the official launch of the new Unisa, which is the result of the merger between Technikon SA and the old Unisa, as well as the incorporation of Vudec (the distance education wing of Vista University). The activities & results of this research will be relevant to the new Unisa institution.

ii. ICT is information communication technology which applies the logic of digitisation to overcome the constraints of time, place and own pace that have been a menace to distance education planners, learners and practitioners. "Online course materials, (as in the case of COOL), may be accessed 24 hours a day, 7 days a week." (Lallana, 2002:5-6) Digital Videoconferencing (DVC) can transmit/receive real live image and audio simultaneously and synchronously to multiple locations throughout the world. Given reasonable bandwidth connection, it (DVC) heightens the meaning of meaningful interaction between the participants.

iii. Digitisation is seen by some educational technology analysts as the foundation for a new revolution – likely to emerge in digital economy, its concomitant products and way of life. Its origin lies in computer technology that sets it a world apart from the analogue. Analogue is described by Lallana, 2002 as technology consisting of "combination of light and sound waves to get messages across", "while digital technology", is defined as a "system of discontinuous data or events, creat'ing' a universal model to represent information that is expressed by almost anything using light and sound waves.

Character of digitisation: An information exchange through different digital formats is mind-boggling.

"To use an analogy, a digital world is a world united by one language, a world where people from across continents share ideas with one another and work together to build projects and ideas. More voluminous and accurate information is accumulated and generated, and distributed in a twinkling to an audience that understands exactly what is said. Take this scenario to a technological level — all kinds of computers, equipment and appliances interconnected and functioning as one unit." Lallana, 2002:6

It is here, it is happening now, and it feels good to be part of it – "telephones exchange(ing) information with computers, and computers play(ing) compressed audio data files or live audio data streams that play music over the Internet like radios." ⁱⁱ

"ICTs stand for information and communication technologies and are defined, ... as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony." Tinio, 2002:4
