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**The New Higher Education?
Learning and Teaching in a
“Knowledge Society”
with the Emphasis on Online Environments**

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ABSTRACT

As global societies brace themselves for the 21st century, the skills and the knowledge required to work, learn and communicate are changing at an extremely rapid pace.

The impact of information technology on society and education is profound and has long-term effects on the global society as a whole. New terms such as ‘groupware’, ‘intellective skills’ and ‘online learning’ have been coined to describe the tools, behaviours and processes unique to the emerging knowledge-based economy.

This paper explores the theoretical intricacies of online teaching and learning using the Technikon SA scenario as an example for the investigation. The theoretical enquiries of other countries in relation to our unique situation in South Africa will be compared and discussed.

South African institutions have to be seen as being responsive to higher education's imperatives and global and economic requirements, as well as promoting the notion of bridging the digital divide.

Therefore, this research will examine the enormous challenges facing institutions, academics and students. The purpose of this research is two-fold:

Firstly, to answer the question: Is employing online teaching and learning contingent on practicality and expense especially for distance learning in Southern African higher education?

Secondly, to answer the question: Are academics and students at Technikon SA ready to embrace the new notion of online teaching and learning and, if they are, do they use the learning and teaching environment effectively and optimally?

1. INTRODUCTION

The impact of information technology on society and education is profound and has long-term effects on the global society.

The knowledge economy is being built upon a broadband telecommunication infrastructure, the 'information highway', with interactive multimedia for communication and access to data sources. This network offers access to a wide range of Internet resources and advanced computing operations that support knowledge building and management in a variety of ways.

The infrastructure of the information highway also allows users to create environments for learning and training based on networking, communities of students and access to knowledge and information in various multimedia formats.

By reviewing a questionnaire conducted by ITC and using TSA as a case study, it is evident that employing online teaching and learning is contingent on practicality and

expense, especially for distance learning in Southern African higher education. Most academics and students are not as ready as expected to embrace the new notion of online teaching and learning.

2. AN OVERVIEW

In my quest to find the meaning of the expression ‘knowledge society’, as used by [Carl Bereiter](#) (1997) in his keynote address entitled “*What does a Knowledge Society require beyond Infrastructure?*”, I ran a simple AltaVista search and, to my astonishment, found that it could be located in 21 454 591 documents.

In support of Carl Bereiter’s assertion of what a knowledge society is, listed below are some of the notions I selected from the host of information I received.

- A society that enables personal empowerment by providing the means by which people can become more self-dependent, self-governing and more involved with community-controlled organisations or institutions and processes
- A society of the imagination and intuition, where artistic and innovative initiatives and approaches are fostered and encouraged
- A society that facilitates more interpersonal discussion; that makes it easy for people to talk to one another, individually and in groups; that encourages the sharing of ideas, experiences and solutions
- A society that is closer to an ‘ideal society’ characterised by communities of informed, active, healthy people, with low levels of unemployment and crime, and high levels of achievement, accomplishment and life satisfaction
- A society where the opportunities for exploitation of the have-nots by the haves are minimised because of a decrease in the number of have-nots
- A society where decisions are made from a global perspective, and implemented on a local level; where individuals in a community work together to think globally, but plan and act locally

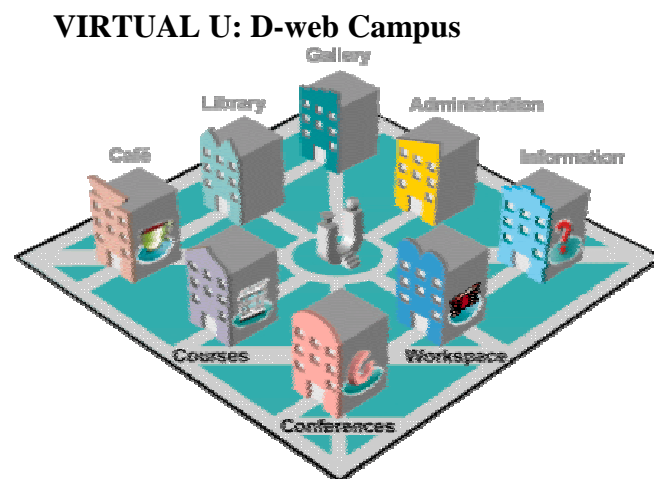
Although this is a commendable vision, Carl Bereiter thinks that what is defined above is not a knowledge society but a utopia. I cannot help but agree with his assertion. For the society I come from, this utopia is an illusion.

A knowledge society requires:

- just-in-time delivery of knowledge that is up to date and appropriate to the task at hand
- skills at knowledge search and retrieval
- thinking skills and creativity
- lifelong readiness to learn and unlearn

To be able to achieve the above, one has to wonder whether an ideal framework for online teaching and learning is adequate or an answer to the problem facing us.

2.1 An ideal framework for online learning: The virtual U



D-WEB TELES COURSE (UNIVERSITY OF CANADA)

2.1.1 Structure of such an ideal online classroom

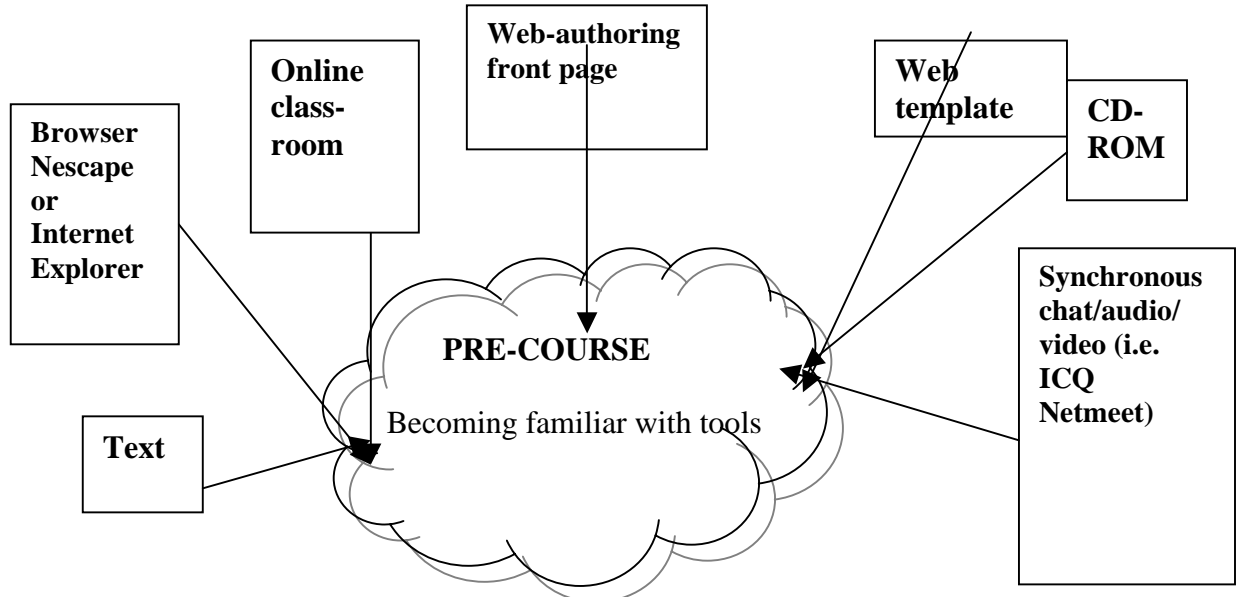
Online classrooms are designed through computer application programs commonly known as groupware, teamware, or computer conferencing systems. Some of the application programs currently available are Lotus Notes and Learning Space, Electronic Information Exchange System (EIES), Caucus, Collabra from Netscape, Virtual-U, First Class, TopClass, blackboard, WebCT3™, HyperNews, and many others. Most groupware systems are asynchronous (not real time), and also have other tools for real-time (synchronous) interaction, i.e. chat, whiteboard, or video conferencing.

Groupware technology has several features that allow an instructor to shape the learning environment according to a particular learning theory and a specific learning approach. The course structure may highlight exploratory and individualised learning approaches, or it may emphasise group tasks, role-playing and collaborative work, taking a more constructivist approach to learning.

Groupware features also give the instructor the ability to create ‘online rooms’ for different purposes and with different levels of access and privileges. For example, there may be a room for assignments, another for interaction with the instructor, one area for informal discussion and other areas for particular group tasks.

The function of virtual learning environments is to provide pedagogically sound technology tools for instructors to use to design and deliver effective online instruction.

2.1.2 Didactic Model

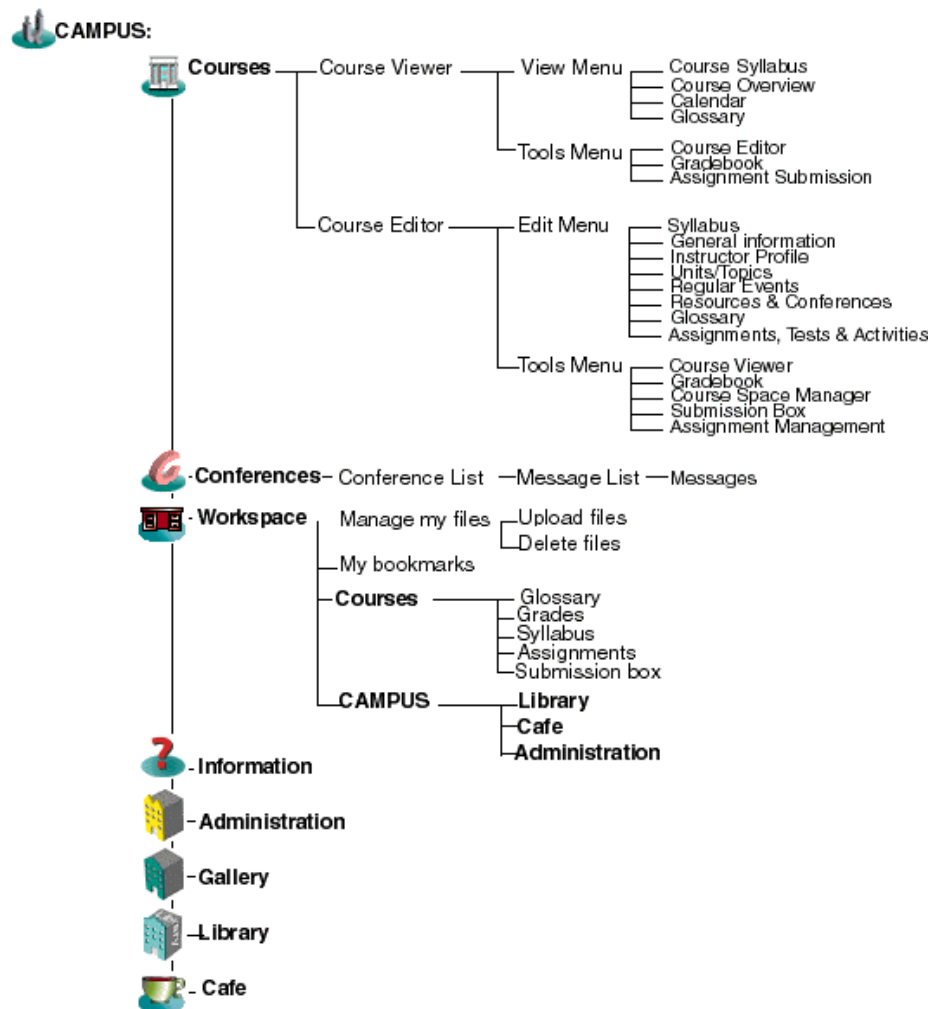


- Self-paced - asynchronous system
- Collaborative - active participation and student-centred
- Role-playing, case studies, etc.

- Uses a variety of instructional strategies to explore the impact of Internet-based technologies on the conceptions of pedagogy
- Implications of using new pedagogical approaches such as problem-based learning and constructivism for online learning and its associated technologies

2.2 The online campus

The metaphor of a physical campus can be used to build a bridge between physical and virtual learning environments. The D-WEB Campus displayed by a telelearning university in Canada is an example of this ideal campus.



The campus is the first screen each person sees when he or she logs onto Virtual-U. It introduces the various areas of navigation, and provides a consistent set of icons

across the top of the screen to reach the key areas of the campus at any time. On the left of the screen, each user can set their own language preference with a single click.

These are ideal tools that each and every institution would love to have. Unfortunately, there are many challenges facing these institutions, and this will be explored further on in this paper.

3. METHODOLOGICAL STRATEGY

3.1 Purpose of this research

The purpose of this research is two-fold. Firstly, it is to explore whether employing online teaching and learning is contingent on practicality and expense, especially for distance learning in Southern African higher education. Secondly, it is to establish how ready academics and students are to embrace the new notion of online teaching and learning and how institutions can bridge the digital divide.

3.2 The research method

An analysis was made of the research questionnaire survey conducted by ITC. This type of analysis is termed secondary data analysis. TSA COOL, the virtual campus provided by Technikon SA (TSA) for students, was used as a case study and compared with other learning and teaching online environments currently available in the market today. The research also involved looking at whether institutions should go out of their way to acquire such ideal environments and the conceptualisation of the current literature in this regard.

4. CHALLENGES FACING ACADEMICS AND INSTITUTIONS

Is employing online teaching and learning contingent on practicality and expense, especially for distance learning in Southern African higher education? This is a question frequently asked in developing countries where poverty is the order of the day.

A question that most of these institutions ask is how they should bridge the gap of the digital divide between the student population and academic staff.

Jacques Bonjawo, Program Manager, Microsoft Corporation, in his speech delivered at a conference held at Sheraton, Vancouver Wall Centre Hotel, in Vancouver, BC, Canada on 12 November 2001, argued the following:

The Digital Divide is a contemporary expression, which cleverly bundles together all of the problems associated with access to the Internet. Until this term came into being in the United States around 1999, the Digital Divide had been known as universal, equitable or affordable access to the Internet, public space, e-democracy, and a whole host of other related issues. As the Internet matures, its many social and economic issues cut across all sectors of society – from the not-for-profit sector to communities, to government and to education, to the private sector. The fact is that Digital Divide reports and surveys indicate that, while Internet use is growing generally, a plateau effect has formed thereby disenfranchising between 40-50% of the overall population. The Digital Divide then is complex and will be a difficult challenge to solve – for everyone.

Online training and education delivery offers significant opportunities for disadvantaged communities. Disadvantaged students gain access to electronic educational resources, interact in virtual peer learning communities and can learn in their communities through remote teaching.

Serious challenges and questions exist in the form of insufficient technological infrastructures, the ability of students and educators to use technology effectively, and the relevance of learning technologies to disadvantaged communities, context and learning styles. In this paper the idea is not to dwell on learning styles as such, but to look at challenges facing developing countries like South Africa, where disparity is still at its peak between the haves and have-nots, and perhaps compare that with some of the educational institutions in developed countries.

4.1 Challenges facing academics, students and the institution - TSA case study

The most challenging issue for institutions today is to achieve a more perfect fit of the learning environments and educational provider which both students and academics can utilise optimally. Institutions willing to use this mode of learning and teaching have to make tough decisions.

TSA's virtual campus is called TSA COOL, which is an acronym for Technikon SA Co-Operative Online Learning.

"COOL" can be found at this URL address: <http://cool.tsa.ac.za>

This is in accordance with Technikon SA's mission to provide a more flexible, client-centred, environment for our learners. As far as we know, it is the only virtual campus developed in Africa for Africa. Not only has it become a useful distribution tool for courseware and tutorial letters, but it also enables two-way communication between:

- learners (group discussions)
- learners and academic staff (lecturers and tutors)
- learners and industry specialists
- learners and interactive course content

Learners are provided with the following information in their tutorial letters pertaining to COOL:

"Administrative assistance and details are available at your fingertips, reducing the need for costly telephone calls.

Advantages of TSA COOL

- 24-hour access to resources and current information from anywhere on the planet
- The ability to communicate with people with similar interests
- Reduced turnaround times for communication
- A personalised, simple-to-use interface that caters for both the first-time and advanced user
- Immediate access to courseware (where available) – select [Courseware]
- Immediate access to tutorial letters and additional information – select [Academic Guidance]
- A non-intimidating section where you can evaluate your progress by testing yourself – select [Online Self-Assessment].
- The possibility of discussions with fellow learners, tutors and lecturers – select [Discussion Group]
- A [Frequently Asked Questions] option to save time and effort – if you have a generic question, there is a good chance that someone else has already asked it

- The availability of a number of lecturers for online support – consult the academic [Contact Details] to see if your lecturer is available
- The facility to view the [Book List] section for recommended or prescribed books for your subjects
- The facility to get in touch with your fellow learners by means of the [Student List] section
- You can voice your opinion by utilising the [Feedback to Lecturer] option
- Access to personal administrative information such as your exam timetables and results, assignment status and results, and your financial and study records
- An academic calendar, and much, much more!”

TSA had 64 000 students last year. Interestingly, according to recent research conducted by the department responsible for ITC (Integrated Technology Centre), only 13 117 had registered on COOL by the end of 2001.

The following figures were supplied by ITC:

COOL Stats Page

Student Registration Stats

Number of students registered for COOL – **13 117**
 Number of students registered for COOL Mailing List - **7 628**
 Number of students registered for COOL Student List - **9 114**
 Number of transactions for COOL – **1 801 432**

Academic Registration Stats

Number of academics registered for Academics COOL - **334**
 Number of academics registered for Academics COOL Contact List - **225**
 Number of transactions for Academics COOL – **214 017**

COOL Stats	Academics COOL Stats
Registrations per Week	Registrations per Week
Registrations per Month	Registrations per Month
Logins per Week	Logins per Week
Logins per Month	Logins per Month
Transactions per Week	Transactions per Week
Transactions per Month	Transactions per Month
Module Transaction Breakdown	Module Transaction Breakdown
Subject Transaction Breakdown	Subject Transaction Breakdown
Who's Registered?	Who's Registered?
Where Are They?	Where Are They?

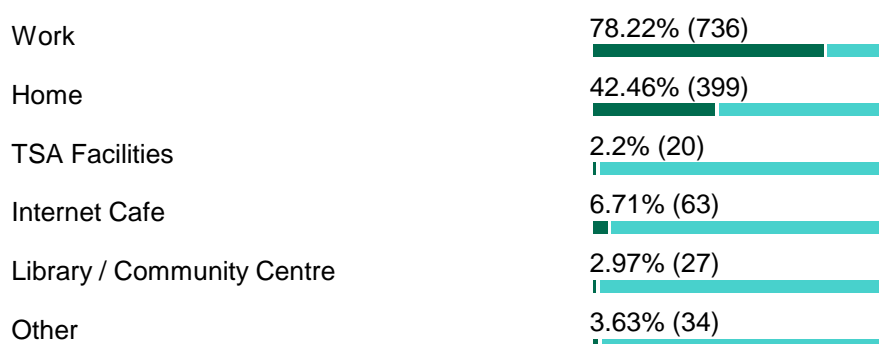
A survey was conducted in which students were asked to complete an online questionnaire. The results are discussed below.

4.2 Students' questionnaire results

A few questions from the questionnaire were selected and they are as follows:

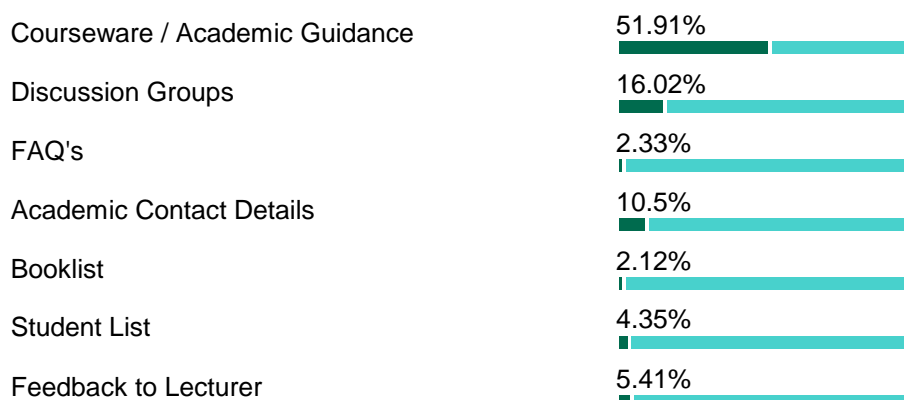
The results of question 5 are as follows:

5. Where do you access the internet from?



Most of our disadvantaged students are not working. If the bulk of the students access computers at their places of work, then it is evident that TSA is facing a serious computer access problem. If, out of a student population of 64 000 less than 736 can access a computer at work and 460 fall under the category of 'others', only 2,2% students are able to visit e-learning centres provided by TSA. This figure, which is the lowest of those given above, reflects directly on the institution itself. It is abundantly clear that these centres are inaccessible to the students they are meant to serve owing to proximity and other socio-economic factors of which the institution is losing sight.

10. What is your favourite current academic feature? (i.e The feature you use the most)



Notes

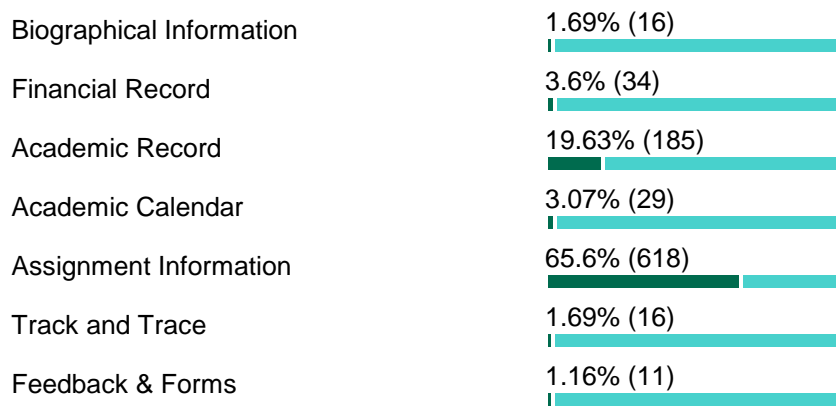
3.82% (36)



In question 10, it stand to reason that a feature reflecting academic guidance would receive an overwhelming response from the respondents and disappointing to recognise a feature were reflective learning is suppose to takes place earns 5.41% of all response.

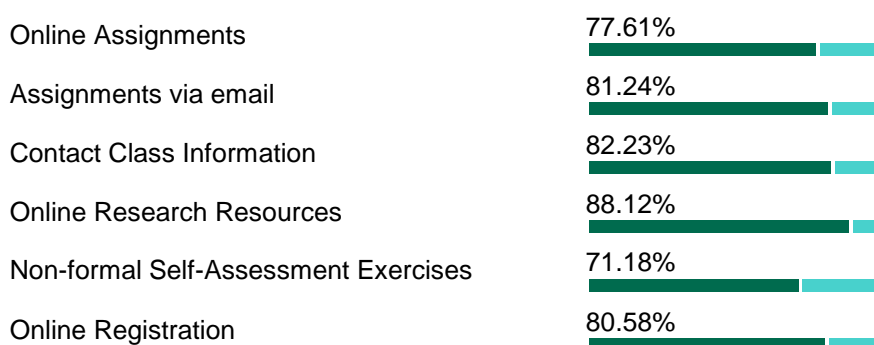
Question 11 assumes that students have access to at least a computer of some sort. Hence the following question was asked:

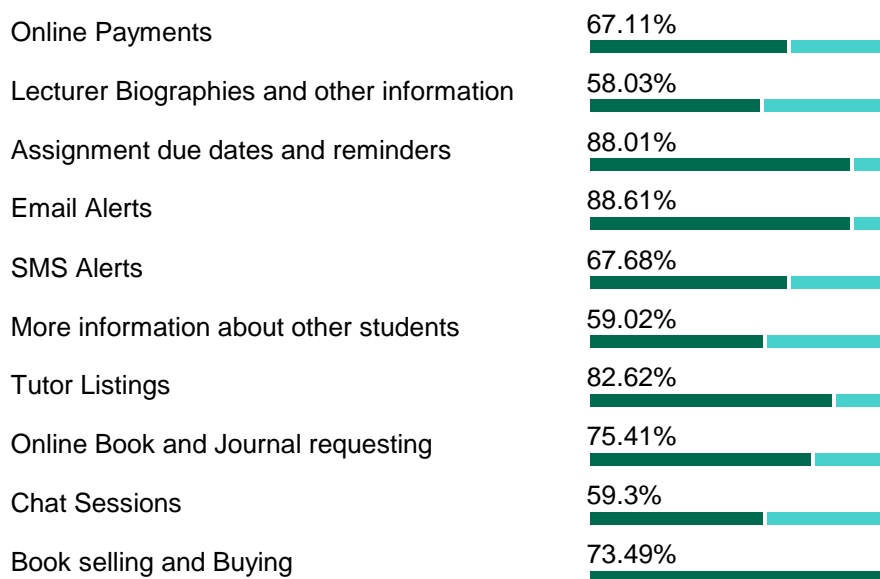
11. What is your favourite current administrative feature? (i.e The feature you use the most)



The percentage for assignment information is very high. This implies that the students are more interested in getting feedback on their assignments and marks awarded to them than in worrying about tackling an assignment online. On the other hand, when question 16 is considered, which reflects important online features, these are the responses that were obtained:

16. The following is a list of features that are currently being considered for the new version of COOL. Please rate how useful you feel each of these features could be :





The results indicate that 88,61% of students want e-mail alerts, 88,12% want online research resources and 88,01% of students want to be reminded about assignment due dates.

From these responses, one gains a sense that students' preferences reflect their immediate needs. Most are administrative in nature. Their concern is not about superior features an online environment can offer, for purposes of teaching and learning, but what the environment can do at the moment when a need arises. Some mature students, on the other hand, are up to date on issues concerning online learning and teaching. This is evident from the synopsis of some of the students' answers taken as they were from the survey:

I think it will be nice for you to show us a demo(prototype) of the new cool site before starting with the real project. We cannot put more comments from what we will be seeing.

Feedback on assignments via e-mail is essential. Arrangement for extension of assignments.

1) Online communication possibilities with tutors. 2)Tutors could otherwise be more involved with students by facilitating contact or discussion classes on regular basis.

Can you start the above considered features as soon as possible – since I only have one more year to use them!!!

Information should be updated regularly(at least once a week). It seems that it takes very long for assignment and exam results to appear on the website. My financial record, however still correct, is full of forward and reverse transactions

I guess we are getting closer to an e-learning environment. That would be sweet.

Online chat sessions with the tutor of your course will be essential seeing that it will be more cost effective than an telephone call.

I am happy to be part of Technikon SA. KEEP UP THE GOOD WORK!

Means of changing biographical information on line. Help desk on line.

Chat sessions can be constructive if they deal with academic matters, or anything that has to do with the upliftment of TSA. It must not be like a play ground where people find space to write anything irrelevant!

Cool site. I last studied here in 95, wow what a difference, much improved. Now we just need to get the assignment e-mailed or on line thanks guys, great job

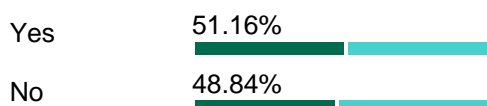
I would appreciate if the marks on the Internet will be updated on regular basis.

I think we also need to have SRC issues that is dates of students meeting, Reports, activities etc. Further more some of the books or tutorials to be accessible through the network/TSA Cool.

It could also be very nice if not essential to be able to write examinations online for open book exams. Technology makes it possible. You can be allocated 3hrs to write and perhaps extra 15 min of grace to finish up, then submit your paper.

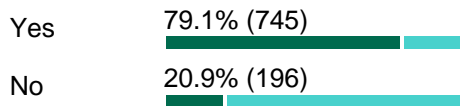
Tsa cool is cool

14. Do you feel that your lecturer participates effectively in your online studies? (i.e In discussion groups, providing academic guidance, etc.)



The response to the above question is interesting. Since it only refers to lecturers already involved in “Cool.” The rest who are not involved at all are not counted at all.

15. **If available, would you prefer to conduct your studies completely online?**



This answer is really encouraging but we should not lose sight that still thousands of other learners do not have computers and still access to resource centres is still a bone of contention.

ACADEMICS

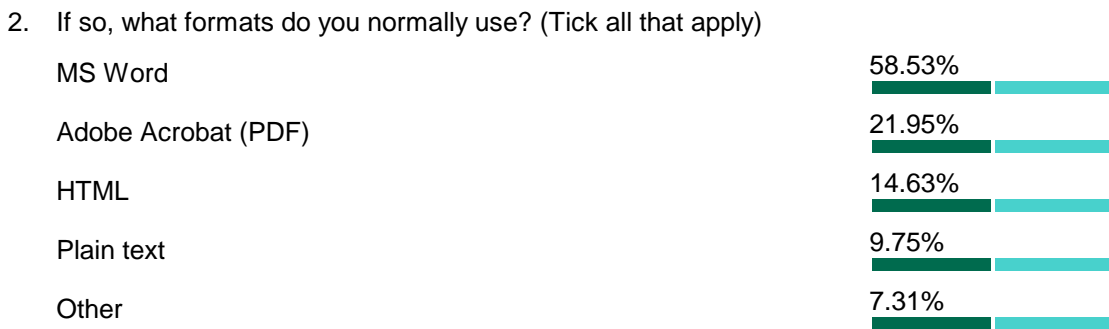
A small percentage of the academic staff seem to be geared up and facing the new challenge head on, but the rest are still lagging behind. This is evident from the following analysis of the questionnaire:

Technikon SA has an academic staff complement of 230. Only 39 staff members, which is 17% of the academic staff, completed the questionnaire. 191 staff members did not complete the questionnaire.

Some of the questions posed to academics were as follows:



From the responses received from the academics, it is clear that a high percentage of staff are aware of the importance of giving guidance by uploading it on the Web for students so that it can be readily accessible. However, there needs to be clarity about what is meant by support.



Question 2 is technical. Evidently, most lecturers would opt for MSWord rather than HTML format. Specialised skill and training are needed to work with an object-oriented language instead of a simple high-level fourth generation language. Hence 59% of the respondents chose MSWord as the format they use. In any case this is a format to which they are exposed.

3. How frequently do you contribute to the COOL discussion groups? 19.51%

Question 3 above reflects a vital feature in any online environment, i.e. encouraging interaction between students and lecturers/facilitators and among the students themselves. In the TSA scenario COOL takes the distance out of distance education. If this feature scores such a low percentage, i.e. 21%, it really does not paint a good picture of TSA.

Question 4 is a follow-up question for those who answered “frequently” to question 3.

4. What is the nature of your contribution to the discussion groups?
(Tick all that apply)

Initiate discussion regarding course content	14.63%
Answer student queries	36.58%
Announce or inform students regarding administrative issues	19.51%
Provide academic support (eg. Explaining course content or difficult topics)	24.39%

It is encouraging on the one hand to see that those academics who use the above feature use it optimally, since the highest percentage on this score is 23,07%. On the other hand, it is disappointing to realise that most academics selected an administrative feature, Academic record, as the prominent feature they use the most and as an important aspect in order to give support to students.

5. Which administrative features do you use to support your students / yourself? (Tick all that apply)

Find a student	65.85%
Biographic Information	73.17%
Financial Record	17.07%
Academic Record	78.04%
Assignment Information	75.6%
Track and Trace	60.97%





Question 9 below received an overwhelming response from the respondents. This kind of response suggests that members of staff require a faster and more efficient system for serving students and for operational purposes.

9. Would you be prepared to receive, mark and return assignments in a completely electronic format? (i.e No printing or paper involved) 75.6% answered Yes
-

Presumably, both students and lecturers view TSA COOL as one of the administrative tools with features that are not essential but that are user-friendly, nice to have for their immediate need and easy to access. It seems like a duplicate of applications such as CRT or Zulu, which are object-oriented and lower level languages. However, TSA COOL, which functions as a fourth generation language, is user-friendly.

Question 10 is as follows:

10. Of the list of envisioned features, how do you rate the importance of each?
- | | |
|--|------------------|
| a. <i>The submission of assignments via online forms</i> | 50% important |
| b. <i>Submitting and returning of assignments via email</i> | 50% important |
| c. <i>Contact class information (dates, times, venues, etc.)</i> | 67.07% important |
| d. <i>Online research resources (Digital Libraries, Online Journals, etc.)</i> | 60.97% important |
| e. <i>Informal Self-Assessment Exercises</i> | 42.68% important |
| f. <i>Online Student Registration</i> | 57.31% important |
| g. <i>Online Payments</i> | 52.43% important |
| h. <i>Lecturer Biographies and other information</i> | 34.14% important |
| i. <i>Assignment due dates & reminders</i> | 69.51% important |

j. <i>Email alerts with assignment dates, assignment marks, examination marks, contact classes, etc.</i>	62.19% important 
k. <i>SMS alerts (as above)</i>	50% important 
l. <i>Tutor listings with contact details</i>	70.73% important 
m. <i>Chat sessions</i>	47.56% important 

Similar to the responses from the students, the feature that scored the highest percentage was assignment due dates and reminders. This function can be found in any ITC system. It is a typically administrative function. It is not supposed to be an important feature of TSA COOL.

The general comment from one of the academic staff members in response to the questionnaire on TSA COOL is as follows:

Question 11 (General Comments)

Many of the students for my subject do not have access to this technology and would not benefit by any improvements to the existing system. This does not mean to say that we should not cater for those who are fortunate enough to have the facilities.

Access to technology is a problem and with the falling rand, computers in South Africa are becoming extremely expensive, whereas in countries like America they go for a song.

6. CONCLUSION

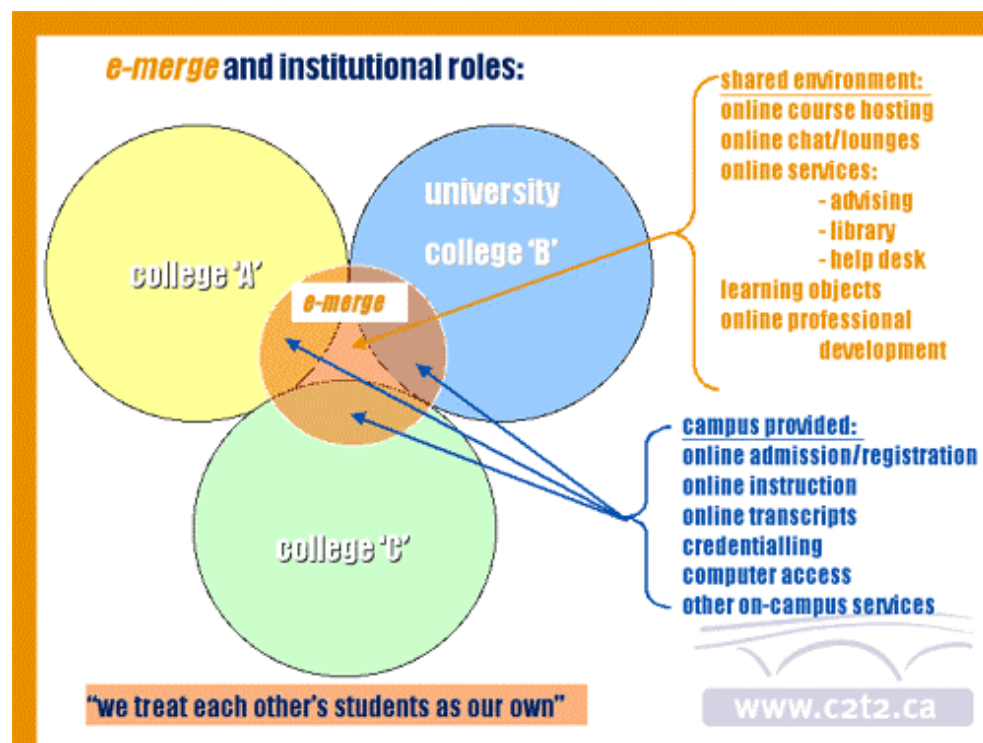
Is employing online teaching and learning contingent on practicality and expense especially for distance learning in Southern African higher education? The answer to this question can be argued as follows:

Cost and expenditure in Southern African institutions is a bone of contention. In my institution, this aspect is dealt with as a strategic thrust.

Access to technology is a problem and with the falling rand, computers in South Africa are becoming extremely expensive, whereas in countries such as America they go for a song.

The costs that the institutions have to incur in order to meet the new challenges that are changing higher education's landscape are enormous. These include acquiring more powerful mainframes of a world-class calibre and establishing e-centres accessible to all students throughout the country. To most institutions, this seems to be an extremely daunting task and contingent on practicality and expense.

The resolve for this challenge is to call for fostering collaboration and partnerships between institution and business, or what we can term an e-merge of resources by institutions of learning.



The e-merge model was presented by Terrie McAloney, Coordinator of Applied Business Technology – Online Development at Northwest Community College, and Jane Munro, Associate Dean of the Open Learning Agency, when delivering their joint paper entitled “Collaborative teaching/collaborative learning online: Out of the classroom and into something completely different” at a pre-conference workshop on **10 November 2001** at [TeleLearning 2001: The Future of \(e\)Learning](http://www.c2t2.ca) co-organised by the TeleLearning Network Inc. and the Canadian Association for Distance Education.

Another factor that institutions must consider in order to overcome the financial constraints they face is to foster collaboration and partnerships between themselves and business. This venture is not an easy task. Nor is it a unique South African challenge - it is also a British problem. According to the *Chronicle of Higher Education* dated 17 August 2001, Winton says that: “[s]ome of the private-sector partners are red meat-eaters, looking for how much they can make, how quickly and for how long” (Winton, 2001).

Even though these institutions can acquire these sophisticated and advanced machines, another problem confronting them is the competency and skills of their staff and students, and this is the answer to the second question: “Are academics and students at Technikon SA ready to embrace the new notion of online teaching and learning and, if they are, do they use the learning and teaching environment effectively and optimally?”

From the analysis we can conclude that most academics and students log into COOL to find administrative features which are provided by Zulu and CRT and which are common information technology features. They neglect the learning enhancing features such as academic guidance, discussion groups and online assessment, which are important features for learning and teaching in an online environment.

By using online learning environments, educational organisations can equip students with lifelong learning skills for today's society, providing them with self-directed and collaborative learning skills as well as problem-solving strategies in a technological environment.

In order to participate fully in a knowledge society, people must learn to see knowledge as a constructed part of the real world - a society where decisions are made from a global perspective and implemented at local level; where individuals in a community work together to think globally, but plan and act locally.

In terms of skills required to operate fully and effectively in online environments, institutions should equip their staff and students by giving them proper training in this regard and acquiring appropriate platforms and applications which will be perfect fits for teaching and learning environments.

TSA COOL should be replaced by a more integrated and interactive teaching and learning environment which will ultimately serve this purpose.

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