

SECTION 5: UNDERSTANDING ICT CHANGE AND HIGHER EDUCATION

This paper has thus far sketched the terrain of ICTs in higher education in South Africa in terms of policy frameworks and organizational forms, the language and understandings of ICT and the emerging research domain. ICTs are being taken up in a higher education context characterized by change, change with which ICTs are almost inevitably associated. The following section therefore explores the ways that the intersections of ICTs and higher education change are being understood and constructed.

These notions of change are interpreted as ‘clusters of meaning’, which are represented in formal texts, reported practices, and emergent meanings. In attempting to understand how meanings emerge and how meanings are learned, dominant meanings in specific local contexts, in networks of institutional actors are explored. The way in which contested meanings of ICT within and between groups both shape how institutions use (or do not use) particular ICTs is also examined. These different meanings both influence how institutions use ICTs and give rise to new practices (for example, prioritization of funds) and new issues (for example, choices of software).

Three clusters of meanings of the relation of technology to higher education change emerge from the empirical research: first, ICT and higher education change as improvement; second, ICT and higher education change as innovation; while the third locates ICT change in and as transformation (in different ways). The first two meanings seem to be located firmly in the overarching globalization discourse on higher education change – evident in the language of improvement and innovation in associated policies, structures and practices – and generally tend to present an unproblematic view of the relationship between ICTs and change in higher education. The third meaning seems to oscillate between an optimistic view of technology in transforming higher education, and a critical perspective that problematizes certain aspects of the higher education space.

The first cluster of meanings, of ICTs as improvement, was the least common one. The second two sets of meanings of change – as innovation and as transformation – were more dominant, with both emphasizing local contexts as determining the extent to which ICTs will enhance the quality of the educational experience. Of the various approaches identified in the introduction of this paper, these views coincide most strongly with the social shaping approach to the relation between technology and social context. The third meaning evident in the data corresponds, in addition, although not strongly so, with aspects of critical theories of technology which problematize technology in its different contexts.

These three meanings co-exist and overlap, contradict and compete, at different times. They jostle with one another and are foregrounded at different times, at different levels within institutions and at meso-levels and macro-levels, often operating within the dominant meanings of the globalization discourse, but also intersecting with other subaltern discourses to form various clusters of associated meanings and practices.

5.1 CHANGE AS IMPROVEMENT

The idea that the recent ICT inspired changes leads to various kinds of improvements in higher education – from increasing access to higher education, reconfiguring libraries and institutional management and administration, to improving the quality of teaching and learning – is evident in institutional policy documents, in the interviews with key institutional players, and in the local literature. It is also

to be found in some national policy texts. Key terms in this discourse include ‘enhance’, ‘improve’ and ‘added-value’. This perspective is expressed in the progress-linked metaphors respondents used to describe e-Learning as described earlier in this paper – door, horizons, staircase – which suggest an improvement in the form of a movement to a better place. This discourse is also generally underpinned by a notion of technology as a tool (either neutral or imbued with human value), which can be used to positive ends. Two quotations exemplify this view:

... if anything it [e-Learning] is a staircase I suppose, you know because it is a difficult uphill struggle but you get there in the end. [This is both] a positive and a negative metaphor. [It is] hard but rewarding work, a staircase with a great shining light at the end. (I.B.)

The University’s Virtual Campus, which was established some years ago, has proven to be a very effective mechanism for enhancing the learning experiences of both residential and distance students. (University of Pretoria Strategic Plan Inspiring the Innovation Generation 2002 – 2005)

In the above meanings of change, existing relationships and activities within the institution and within pedagogy remain fundamentally the same. There is neither a threat, nor a fundamental challenge to a sense of identity or an existing notion of what higher education or pedagogy comprises. However, prevalent institutional and pedagogical activities can be accomplished more speedily, or more efficiently, or to a greater extent, via technology. Rather than a fundamental shift in pedagogy or in the higher education space itself, there is rather some kind of added value. The meaning of ‘change as improvement’ is evident in ways that include increased access to content and better communication, and forms part of an efficiency paradigm.

5.1.1 Increased access to content

Networked computers are often advocated, because they increase access to information. Increased access to content was emphasized in the interviews:

... but technology will give you access to additional information and that is where the quality comes in. (I.D.)

... as we know our library is under-resourced and has been for a long time so you don’t typically accept if it is a strong research area you don’t have access to the latest information but if the subject is what technology enables is for you to not only have input but to give output to outside as well so the ecosystem becomes bigger. (I.H.)

... we want to become competitive, if we want to have access to this global library of knowledge we’ve got to have the right tools, and I feel one of those tools that everybody should be empowered with today, is that they can get access to this information...If I had to rely on journals and uh, dusty books in the library I wouldn’t have the breadth of knowledge that I have on a number of different subjects. (I.D.)

Having access to more content is prioritized here. Who uses that information, what skills are needed to enable successful access and use of the content, and even the quality and appropriateness of that content are discussed later in the section on access.

5.1.2 Extended communication

There is consensus in South Africa and beyond that ICTs extend the possibilities of communication.

OK, let's put it this way, a computer is a machine, it has no life to it, it has no personality to it, it's a creation of man, ok. All that a computer has done, it has made communication a lot more effective. (I.D.)

The possibilities of extended communication occur in two ways: by collapsing distance and by compressing time.

... distributed learning is basically where you broadcast your lessons to students and then they can use it at any time that is convenient for them. (I.D.)

The most common manifestation of extended relationships is the fact that technology facilitates relationships across distance. Not surprisingly, the way that technology opens up distances was mentioned as central. Not only does it effectively offer a bigger classroom, but it can also take students beyond the classroom:

To me the real difference between e-Learning [and] network learning is the fact that it opens up; it knocks down the walls. You are not restricted to the library, you are not restricted to your classroom; you are not restricted to interacting with your classmates in this physical building. We have 50 people [in a project] that are spread all around Africa and they are interacting with one another, they would not be able to do that in the same way without physically moving their bodies and they will have to physically move their bodies all to one location whereas what the E-part of it allows is it allows the ecosystem to be not just a classroom in the institution but a kind of virtual classroom around multiple institutions. (I.H.)

Well, it offers a huge amount, I mean it offers access into the real world and which you can use, which you can create, and the second order representations of that, I mean it can certainly be a very dynamic and very exciting and very interesting learning environment. (I.M.)

This 'anywhere anytime' language has become commonplace, but its realization is conditional upon other factors, which determine whether there is a real shift in practice. Therefore the opening up of distance was described as being experienced in both a positive and a negative light, with explicit links being made to costs and pedagogical approaches. Two respondents commented that extended delivery across distance might be meaningless in isolation:

So now you take those notes and put them on the Web, all you have done is you have stopped the writing out of the information and now you are using a very expensive media to deliver content, put that content onto a CD and give the CD to the student, why do you want to use a Web server, why do you want to be connected to a Web server to deliver it, because in South Africa that is expensive. Maybe it is not so expensive in Europe or America, but in Africa and India and all those places it is expensive to send it, so what benefit has technology given to you if all it does is give you information. (I.K.)

Yes, I mean it is just the exporting of a face-to-face classroom to an online environment with talking heads and so on.... I said to a few people that I was talking to that my mental picture

then became a student falling asleep in Internet cafés and at home and all the rest of it because that is exactly what is happening; it is the same boring old stuff that is being sent out over the Internet. (I.M.)

At the same time, there was a sense that opening up relationships across distance provides opportunities for new models that provide increased control and power:

...maybe you can't get to some people without technology, I am thinking here for instance of the Medical Schools and the way they are starting to train people, they are starting to use the whole [geographical] area as a means and students go into hospitals all over the place right from their own yard and the way they communicate is using technology so if you took that away, that model would fail, so there would be failures in that sense and I would not like to go back to a world without technology because it gives us power. (I.K.)

The way that technology shifts experiences of time was also mentioned in terms of immediacy and the ease of updating recent material:

I think the other thing that the lecturers really appreciate and why they would go for the Web environments – two other aspects is the immediacy, that means if they find something this morning, a good article that they want their students to have this afternoon, they can post it immediately and the other aspect is also the use of updating material on the Web, so if you use the multimedia, the CD, the stand alone and you go into production and that's it, it is very difficult to then go back and change... (I.H.)

Under what conditions these extended possibilities can enhance pedagogical communication and how online communication is being used, are the subject of a growing research area, as described later in this report, bearing in mind that the costs of this medium do not automatically lead to relevant educational use.

5.1.3 Efficiency paradigm - more of the same

Improvement approaches are often associated with an efficiency paradigm that does not seek to transform existing practices, but rather to make them more efficient. The fundamental nature of the system is not seen as problematic, only inefficient, and technology is seen as a useful tool in this regard. ICTs allow teaching to continue in ways that are already taking place, but make these ways more efficient. The efficiency paradigm can also be both positive and negative. For some, efficiency means lightening teaching and administrative burdens so that the real pedagogical issues can receive attention:

What's in it for the lecturers I think is to make their teaching and learning situation easier and more comfortable; a lecturer, she is one of my colleagues now that used WebCT, the one way she used it was to lessen [her] administrative load.... Instead of having 50 students in front of her office, she used the bulletin board quite extensively to post notices and to get replies and ... that freed her up much more to do the "stuff" that she was really interested in doing instead of just answering queries the whole time. So I think those types of things are good, if you can show lecturers that it makes their life easier, just their general day-to-day administrative life easier. If you can also show them that it adds value to the teaching and learning experience for the students; that is what I found was a number one motivator to actually show and I think show ...the way it works. (I.H.)

In this example, a lecturer's time is made more efficient by the use of technology; thus teaching and learning needs are enabled by the technology. ICTs can assist academics with increasingly demanding workloads by reducing the administrative load through, for example, placing frequently asked questions on a Web site thus freeing them to concentrate on in-depth instruction. ICTs can be used in carefully targeted ways to assist with aspects of teaching and learning, for example, by using automated feedback, drill and practice where appropriate.

Opposition to the efficiency paradigm commonly arises, however, if technology begins to determine and set the parameters of higher education change, rather than the other way round. Concerns are expressed that the introduction of ICTs into higher education is part of and supports increasing outsourcing, increasing centralization and lack of consultation.

The suggestion is that incremental changes in teaching and learning processes occur as more ICT components are added to existing courses and programmes. However, some argue that common practices are simply add-on approaches, which include using technology for the delivery of course content without adding value in the form of follow-up, interactive learning activities, or without addressing issues of curriculum transformation. This argument is in line with remarks that e-Learning is currently 'merely an enhancement of existing practices' (see, for example, Garrison & Anderson, 2004). Some regard this as a simplistic view of e-Learning. This perspective – more of the same – may suggest a linear notion of change supporting an 'add-on' view without any major changes. This perspective is not dominant in the interview data, and indeed references to this point of view usually appear in the form of a critique of constant improvement that does necessarily question the nature of that change.

I remember saying to people in the opening keynote address that there was a slide of a student falling asleep in the classroom and I said to a few people ... I was talking to that my mental picture then became a student falling asleep in an Internet café and at home and all the rest of it, because that is exactly what is happening. It is the same boring old stuff that is being sent out over the internet and so the process that I take staff through when they go online is very much aimed at changing pedagogy or at least [at] making people think, because a lot of people who come on the course have a huge amount of teaching experience and I am not saying to anybody, "Just throw that away or throw it out [of] the window"; that is the last thing I want to do. Your courses must reflect who you are and where you come from and all the rest of it, but just start thinking a little bit out of the box and try and see how you can ... (I.M.)

There is an increasingly common acknowledgement that ICTs, or any other technology, cannot improve teaching and learning or effect change independently of the context of its application. Thus, the degree to which Web-based teaching enhances learning depends on the context. For some, the context rather than the medium determines the effectiveness and the extent of added value. Dutton and Loader (2002: xxii), for example, argue that the value to higher education added by ICT is not 'predetermined by the features of the new media', but can enhance existing programmes and institutions by making them more efficient, and by increasing access to more students.

In summary, on the positive side, ICTs are seen as providing the tools to make higher education more efficient in various ways – by reducing administrative work and assisting with repetitive teaching activities. On the negative side, efficiency can become an end in itself at the expense of other educational values.

5.2 CHANGE AS INNOVATION

ICTs and innovation are often spoken of in one breath as twinned concepts, inextricably linked to the idea of a knowledge society, as can be seen in South African policies at the national and institutional levels:

The role of higher education in a knowledge-driven world – production, acquisition and application of new knowledge: national growth and competitiveness is dependent on continuous technological improvement and innovation (National Plan for Higher Education, 2001: 10)

The University of Pretoria is devoted to quality education aimed at the enhancement of student learning. The environment in which the University operates, including the educational environment, is experiencing rapid change in many aspects. These changes are driven by many factors, with developments in information and communication technology (ICT) and the associated emergence of the knowledge and information society being very prominent. (University of Pretoria Strategic Plan, Inspiring the Innovation Generation, 2002 – 2005: 6)

In contrast to the ‘improvement’ paradigm’s focus on adding-on new elements to make the existing system more efficient, innovation approaches emphasize ‘doing things differently’ and are more likely to pay attention to the teaching and learning contexts of technology. The various examples discussed below suggest the concept of ‘something new’.

5.2.1 Reflective practice: doing things differently

The meanings of ICT-enhanced change as innovation stress the original and the unique, that which was not previously possible. They focus on what is afforded by the different forms of new media, arising from and part of ICTs. They also refer to doing something original, using artefacts for purposes for which they were not originally designed. As more than one respondent suggested, change is about innovation. It is not more of the same thing in a different way, “like putting existing stuff behind glass” (I.O.), but is about doing something new.

I think it is opening new doors in terms of learning, in terms of teaching, in terms of opportunities, challenges, everything. ... I think really it is new horizons. (I.O.)

Trying something new moves people beyond add-on approaches by facilitating ongoing change:

... I think in this case we have an opportunity, at least I see it as an opportunity to go back to the people and say, “Listen, let’s just rethink this whole thing; there is a medium that we can use that can open up a whole different approach and support is relatively easy, so you can get away from this chalk and talk, which nine times out ten is totally mindless and let’s try and see if we can use it in another way and see what happens”. The interesting thing about it is that [for] those who have done it, their experiences have been so positive and they have become so excited by it that it just keeps driving them on and on to change more and more and to keep rethinking the whole thing; that has been the interesting part. (I.M.)

Another view emphasizes the role of technology as ‘forcing’ a kind of reflective practice, leading to positive educational outcomes. For example, the requirement in some institutions (locally and else-

where) for a significant per cent of courses to have an online ‘presence’ means that all course outlines are now open to public scrutiny (including that of other lecturers and students). It has also led to changes in practice, as one respondent observed. However, it can also be experienced negatively as an imposition with ‘online presence’ requirements at some higher education institutions being met by strong faculty resistance to this kind of mandatory use of ICTs, which are perceived as diminishing faculty autonomy and independence.¹¹

ICTs are understood to offer something new to teaching and learning in higher education. Pedagogical practices are understood to comprise three key agents: teacher, student and content (Lusted, 1986; Bernstein, 2001). Practices are about interrelationships among those three agents. Pedagogical practices also consist of a repertoire of teaching and learning activities. Reported practices (from both respondents and the literature) focus on new activities and new relationships, as discussed below.

5.2.2 New kinds of teaching and learning activities

This study cannot begin to capture the large and growing international literature, samples, databases, Web sites and so on, which demonstrate all the kinds, possibilities and experiences of new teaching and learning activities that exist because of ICTs. The examples in the data collected are discussed briefly. In this study, there was mention of activities to do with content presentation, practical activities, simulations and real life activities, as well as activities which benefited from anonymous learning environments.

New kinds of ICT enhanced activities described novel ways of presenting content, such as online animations, which in one example helped explain a complex concept which the student only understood when presented with it in an animated format. Another respondent similarly commented that presentations can be made less static:

... I have always battled to understand Vygotsky’s zone of proximal development and to really get a grip of it, and I saw it once in an e-Book available online and in it they’ve got a Flash animation illustrating it just like a sliding scale with a little window that moves and things that pop up and it really brought the message home; so, sure, people definitely learn from media in other ways than [those] you can learn from text. (I. J.)

... obviously there is the dynamic thing of certain constraints of certain knowledge and very dynamic things that you find very hard to explain with words. We have diagrams, the flows and processes and ... animation is a very important thing again to make things unpack in different orders and obviously if your design evolves you can manipulate those things, and unpack it in different orders and then depending on your simulation I think it is a very, very important part. (I.L.)

Technology provides the second set of activities – practical application – with opportunities for safe, self-paced and varied activities not possible in a non-digital context. Ironically, in a medium criticised for policing (Noble, 2002), the opportunity for anonymity as a safe learning experience was noted in a few cases, for instance:

¹¹ For example, the recent two-month long faculty strike at the University of York in Canada and the similar faculty and student resistance at UCLA provide two comparative cases of resistance to requirements imposed by university administrators to put aspects of courses online. For a further discussion of this see Noble (2002).

We have an example of a lecturer that is teaching a very sensitive topic on HIV Aids and he made one of the bulletin board areas anonymous and for the first time he had comments from the students that he has never had [before], just because they felt safe in that type of environment, something that they did not feel safe with ... in class. (I.I.)

Similarly, a class of students who were able to practise academic questioning skills in an anonymous Web-based environment, were able to take risks, reveal ignorance and assist one another without having to reveal who they were (as described by Hardman & Ng'ambi, 2004). These examples provide a glimpse of the prevailing practices in South Africa, as do other studies, such as online debating at Rhodes (Hodgkinson & Mostert, 2004); and a computer supported reasoning skills development initiative at the UKZN (2004), among others. The opportunity provided by networked computers for students to lead productive activities, usually in 'real-life' was also noted:

...you know I think that the technology, the research is certainly showing that the best use of technology is in those sort[s] of environments in sort of creating these micro-worlds, in creating these authentic learning environments, etc. (I.M.)

These examples provide a glimpse of prevailing practices in South Africa. It is clear, however, that there is a need for detailed investigations of these kinds of ICT-enabled activities in South African education with regard to their extent, nature, quality and effectiveness.

5.2.3 Increasing interactivity: online communication and collaboration

Interactivity is believed by many to lie at the heart of the educational experience. It is therefore perhaps not surprising that several respondents mention the possibilities of ICT-enabled interactivity:

A lot of these students I don't see for four months; the whole course is online but we interact with a small core, 10 students and of course the interaction I achieve with those students [is] far higher than anything I am used to, so the interaction thing is important and the interaction is normally a good thing. There is a lot of trivial interaction; there is lots of off task interaction, but there is also on task interaction and those are the beautiful things....(I.L.)

In fact interactivity forms a part of a whole range of different activities online:

Why I teach online is because we have so many tools available to us to help the learning process. The learning that I create has very little to do with me creating content; they get content from the Internet, they [synthesize] it; we look at it from different perspectives; everybody is involved in peer reviewing, co-writing and co-development. There is no closed book examination and we use threaded discussions for problem solving, we use chat instead of tutorials, and what it does is it makes a permanent record, gives you a record that you never had before, so it makes the interactions more real, I think, and I enjoy them more because I get to know the students better... (I.K.)

Indeed, it is argued that ICTs make it possible for universities to get back to the interaction that should be central to its work. ICTs are seen to offer tremendous possibilities in improving communication and a sense of presence in large undergraduate classes:

When you are sitting with big classes it is very difficult not to fall into a trap, because quite frankly the easiest way of teaching 400 people is to sit them down in a room and "blab" at them and then

give them some garbage at the end of the term, an exam. or a test and then put a tick or a cross next to it. I mean, it is actually quite easy but it has pretty little educational value in my opinion particularly at an academic institution, but I think technology allows us to create this sort of environment that universities grew out of in the past and so we have to go back to the future; we can go back to that sort of environment and then go into the future with those. (I.M.)

You are probably aware of Moore's theory of transactional distance.... He says we are tricked into label[ling] distance education as "rubbish" and as one directional, unidirectional and not interactive at all, but he says just compare it with [a large lecture theatre], and our university says something when it builds a lecture hall that can seat 800 people; you are saying something to your students when you do that and we have classes that are so large that they go from the A's to the G's and from the G's to the M's and the M's to the rest so they have to redo the lecture three times, because the 800 lecture hall can't accommodate those students – so you are talking about distance in that situation. (I.L.)

Not only does the technology enable lecturer-student communication, but the way that it enables peer communication in large classes is also specifically highlighted:

It adds value in the type of communication that I have with these students. [In] some of the big classes (1 800 students), they say it is contact education, but it is not. I mean those students are incredibly anonymous when they sit in a class of 1 200 students. Suddenly some of those lecturers realized, "Wow, these students actually have voices, they will act on the bulletin board, they have things to say..., they want to say things, they want to share". So I think that is one way both between the students and the lecturer, but I think also what they realized was these students actually share with each other as well. (I.I.)

The observation is also made that technology makes it possible for different kinds of students to communicate:

I have examples of somebody who was dead quiet in class and became a really verbose list contributor and somebody who was very verbal in class and does not exist on the list.... You get those that are quiet in the class and quiet on the list.... Exactly, there is a whole spectrum and then you get those who are noisy in class and noisy on the list. I think there are people who just do it when the urge takes them so it is hard to [generalize] – but those are the dynamics that one can look at. (I.J.)

You know, there's more active participation of students. Perhaps it might break the barriers of the communication aspect. If a person finds it difficult, especially in an institution like [ours], there may be inabilities that certain students may have in terms of communicating. So they may not be very good at communicating in a classroom environment, but if you put them behind a computer and you say you've got a newsgroup or a user group that communicates, then they could be very good at the keyboard and ... communicating that aspect. So in that way you're going to get those students becoming developed much more, faster as well. And as they adapt to the use of the technology and what they can acquire from it, you'll find that, you know, students may feel very comfortable that way. (I.A.)

While this has been a research area internationally for some time, it has also become a growing niche area locally. Examples include one local study exploring how computer conferencing is opening up

new possibilities for making learning interactions more dynamic, cognitively stimulating and challenging (Kizito, 2002).¹² Other local studies explore modes and methods of participation with a view to identifying the nature and extent of participation (Carr et al., 2004); and evaluate the educational effectiveness, course design, group dynamics, and facilitation style in the collaboration in blended learning courses (Cox et al., 2004). Clearly online communication and collaboration is an important new practice, one that is also acknowledged at the South African policy level.

ICT has created one specific new form of contact...Online communication allows learners and educators to remain separated by time and space (although some forms of communication assume people congregating at a common time) but to sustain an ongoing dialogue. In online discussion forums for example, spatial separation between educator and learner is removed by the “virtual” space of the Internet but temporal separation remains.... This suggests that there may be cause to suggest a new descriptor of educational methods of educator-learner contact that are not face-to-face but are mediated through new communications technologies. (CHE, 2004: 76)

5.2.4 Changing roles of staff and students

New roles for staff and students alike may arise from ICTs. On the one hand, it is noted that staff, such as tutors, can play an enabling or monitoring role. At the same time, it is emphasized that ICTs do not mean that there is no longer a role for staff.

I also invited the coordinator to begin to work to [the idea] that we design our own program that would help learners learn at their own pace and that would involve perhaps, if you take something like topic analysis in essay writing or in text writing and we would do topic analysis like breaking up the question and asking questions etc. And I said let’s put that on a computer and let the learner be able to log in into a theme-like topic analysis and she’s got a number of examples that she can have and she can have a number of topics that she can analyse and respond to on her own and work independently. And then the role of the consultant will be to monitor.... (I.N.)

Research also shows exporting classrooms to the Web is counter-productive and it is not long before you get student resistance and student backlash and all the rest of it, because as soon as you take the lecturer out of the whole equation, which is what people are doing by putting their classroom online, there is very little contact with the student and [students] need nothing else there, needing no sense of community there, then you are just pulling the rug out from underneath them, your group of students, and leaving them to flounder; that does not work. (I.M.)

Student roles are also changing, as “this [e-Learning strategy] puts much more learning in the hands of the student” (I.D.) ... and, with experience, students are able to take control.

I did that with my very first Web-based classroom in ‘90 whatever when I suddenly discovered that the students knew much more than I did and all I had to do was get them to talk to each other and prompt that conversation but I needed to prompt that conversation. I sent as many messages as all the students together, but as mailing list etiquette and mailing list knowledge of students is growing, so they are beginning to take over and run the list independently, and we are finding that at Master’s level, [with] bright students, the list starts getting a life of its own and runs. (I.J.)

¹² The study concludes that potential sources of barriers to effective adoption include macro contextual issues, institutional issues and pedagogical issues. Once again context is acknowledged as crucial.

To summarize, new practices are emerging and unanticipated effects are being identified, as the innovative possibilities are explored by the enthusiastic (and sometimes, by mistake by, the unenthusiastic!). The meaning of technology as innovation in higher education change tends optimistically to focus on exciting possibilities and has been critiqued for underplaying existing power relations. This lack of attention to issues of power, knowledge, institutional cultures, and the dynamics of historical redress is also part of a general critique of the information society argument. For example, it can be argued that participation in innovation processes depends both on access to state-of-the-art communication resources, and on the power relations that structure communication patterns and access to resources (for example, the gross inequities in access to resources across and within nation states, or across and within institutions in any one region). So participation has both a distributive and a relational dimension, and will be limited to those in society having access to these resources (Ravjee, 2002). Some of the specifics of these criticisms are discussed in the issues section on access later in this paper.

5.3 ICT CHANGE AS TRANSFORMATION

In this study, ‘clusters of meanings’ of change as transformation occurring in two dimensions have been observed. The first emphasizes ICT in relation to institutional transformation, while the second is about the relation of ICTs to the transformation of pedagogies.

5.3.1 ICT-Enhanced Institutional Transformation

This meaning emphasizes integrating ICTs into the very fabric of the institution. Thus, as ICT-related learning structures continue to expand – with differential levels of funding across different institutions – they raise new issues that intersect with existing issues facing higher education institutions. ICTs are therefore more likely to form one thread in a complex net of transformation, including historical redress, curriculum transformation, diversity, equity and so on.

Interestingly, terms like ‘pervasive’ and ‘total’ are observed, forming part of the argument that the introduction of ICTs is extensive and systemic. This understanding is alluded to in a comment made on the inter-connectedness of the various elements of the work of the university, how changes in one element inevitably cause changes elsewhere:

You see we realized already then that infrastructure, all of these old elements are like a spider’s web, you pull on one little aspect and all the others start moving, so there was no way we could have done just e-Learning ... that is what we found. It was just amazing what jumped out of the cupboard when you start moving the one little piece and still does and it is just amazing... So teaching and learning impacts on research impacts on admin impacts on.... Incredible. (I.H.)

This view is evident in some policies and structures. For example, the National Plan sees ICTs as playing a central role in the post-apartheid reconstruction of South Africa. This is evident in a number of key initiatives listed in the National Plan, such as prioritizing the telecommunications sector and the creation of new structures, such as the Presidential National Commission on Information Society and Development and the Presidential International Task Force on Information Society and Development. As a second example, the Foresight Report explicitly associates technology with transformation:

An investigation of institutions, which are now world leaders in technology-enhanced learning, showed that the introduction of technology went together with transformation:

- Planning began to focus on the needs of the learner rather than the institution.
 - A mix of technologies was used, depending on the unique needs of the learner.
 - A total transformation of institutions was needed so pervasive is the effect of ICTs.
 - Content needs interdisciplinary teams (educationalists, specialists, Internet experts.
- (Foresight ICT Report, 29)

This understanding of ICT-led transformation can also be associated with a developmental approach, evident in some institutions in the strategic location of new structures which support the overall aims of the institution. In three cases (UCT, UFS and DIT), the e-Learning structures are part of a Centre for Higher Education Development characterized by an attempt to understand the systemic implications of change and ICTs. This choice of structures also suggests an integrative approach to institutional transformation.

MEG aims to research and harness the potential of interactive computer based technologies and approaches (ICBTA) to support effective learning and teaching. Our work focuses on meeting the needs of South African students from diverse backgrounds, particularly those at the University of Cape Town. (www.meg.uct.ac.za)

and

We are part of the Centre for Higher Education Development and at the moment the Centre for Higher Education Development has got overlapping projects of which ICT is one, Technology in Education is one, so we would foreground the technology, but we would also participate in and feed into the other projects, for example, Curriculum Development, Recognition of Prior Learning and Foundation Programmes and so forth. (I.C.)

Evident in the meanings of understanding ‘change as transformation’ is an attention to the power relations within higher education institutions. Research and reflections published by South African academics consider the tensions implicit within such transformation. For example, one study critically investigates the implementation of online learning technologies at higher education institutions, with the accent on the needs of society and the role of business. The conclusion is that the process may be directed towards the needs of business, while the overarching needs of society are neglected (Heydenrych, 2000). Another explores the dilemmas of distributive justice with regard to whether South African universities should introduce or develop online learning for flexible mode delivery under circumstances in which some students do not have access to Information Communication Technologies (Broekman *et al.*, 2002). And yet another provides some sober reminders of the difficulties dictated by context, in the form of enabling or constraining conditions:

... we worry that idealistic uptake of the idea of a networked society obscures the very real challenges involved in accomplishing inclusive education and a sustainable civil society in most African countries. It also obscures the dilemmas of justice that must be addressed by nation states with severely limited resources and populations living below the poverty datum line. ICT can only contribute to education and democratization in Africa if social capacity is developed to a sufficient level on the continent.

The context of reception needs to become a context of production that is responsive to local requirements and accountable to citizens. This in turn calls for lecturers, teachers and citizens who have the skills, understanding and confidence to engage with national policy and strategy deliberation and implementation. In the absence of these conditions, the educational and democratic goods of ICT are a chimera (Lelliot *et al.*, 2000).

This stance is useful in understanding both how contested meanings of ICT actually shape everyday, normal practices – for example, the choice of what type of technology to use, and what kind of practices emerge to support that choice – and also what power relations are in place to either support or challenge these choices and related practices.

For some, ICT-led transformation is useful ‘at the level of techniques’, but is unable, if isolated from other transformation initiatives, to speak to the ‘essence of transformation’:

Can ICTs contribute to transforming higher education? Not necessarily. Not transformation in the SA context. It may be transformation in so far as it may challenge people to think of different methodologies, so at the level of techniques, but at the essence of transformation? In fact, it can actually suffer from the digital gap that people are talking about in terms of the poor being disadvantaged because the technology is becoming more and more expensive to access. You have a computer now, the next time you are told that it’s outdated, it’s obsolete. (I.N.)

And for others, there is simply no choice. The generally accepted view of technology is the idea that ICTs are necessary if institutions are to survive:

... quite frankly, I don’t think if this place has to say we will no longer use ICT technology so then this place might as well shut down. (I.P.)

5.3.2 ICT change and the transformation of pedagogy

As explained earlier, there has been a shift in the use of ICT in higher education institutions, from the initial emphasis since the late 1980s/early 1990s on the administrative environment, to an expansion into the academic environment, accompanied by e-Learning policies, structures, and new academic related practices. While further empirical studies into the history of these new structures and their emergence out of existing IT or non-existent IT, or teaching and learning structures, would clarify the understanding of these changes, there is a strong view, derived from the findings in this study, that these shifts towards supporting teaching and learning require a change in focus, and a change in mindset regarding the new functions of ICTs.

Among key writers in the international literature, there is a determinist strain, which confidently asserts causal relations between ICT innovations and changes in teaching and learning and in peoples’ behaviour. It is stated, for example, by the authors of a recent influential book on e-Learning, that that ‘e-Learning will inevitably transform all forms of teaching and learning in the twenty-first century’ (Garrison & Anderson, 2003:2), while a well known researcher, the Chief Scientist at Xerox and Director of its Research Centre, asserts that the new information and communication technologies are changing peoples’ behaviour, and ‘In quite the same way, the World Wide Web will be a transformative medium, as important as electricity’ (Seely Brown, 2002:2).

Little evidence of this deterministic view was found in the data assembled. To a large extent, respondents and local researchers perceive ICTs not as the inevitable cause of change, but rather as an opportunity for rethinking practice. The argument is that it is not technology *per se* which causes change in pedagogical practice. Rather, it is the act of using a new kind of technology (usually networked computers), which provides an opportunity for academics to reflect on their practice. For a sizable group, ICTs play the role of a catalyst for pedagogical transformation. This group views technology as neutral, with change occurring in the pedagogy, because of a disruption, rather than because of the nature of the technology itself. This view is strongly located in the social shaping approach, one that locates all impetus for change in the social dimension rather than ascribing any causative effects to technology itself.

Technology thus provides an opportunity to rethink current ways of learning and teaching:

... and so the process that I take staff through when they go online is very much aimed at changing pedagogy or at least making people think, because a lot of people who come on the course have a huge amount of teaching experience and I am [saying] just start thinking a little bit out of the box and try and see how you can do things differently....(I.M.)

Using the same pedagogical practices in a different medium can show those practices up in a new light, or it may be the examination of and focus on the new medium that provokes the attention to existing practices:

... a lot of the lecturers basically just do exactly what they do in class on the internet so if they were to go to class and just deliver the notes and speak to the notes, not even speak to the notes, read the notes, they would do exactly the same on the Web environment and what is one of the big concerns on campus for some of the lecturers is that the students are not coming to class anymore because why go to class if you can get the stuff on the web and what you get in class is just exactly the same. So I think in that sense I do see there is a lever of change, very effective educational change because for the first time [we have a]...roundabout way of trying to get into conversation, a conversation that we probably would never have had with that lecturer because he or she would have happily gone along up to 65 doing the stuff that they had been doing for the past 30 years, or 10 years or two years, because some of the young lecturers also just do what they have seen being done to them so I... so I think that really has started a discussion on campus about what do we do in our classes and that is something different, that is not technology, that is something else. (I.I.)

... at least I see it as an opportunity to go back to the people and say, "Listen, let's just rethink this whole thing, there is a medium that we can use that can open up a whole different approach ... so you can get away from this chalk and talk, which nine times out ten is totally mindless and let's try and see if we can use it in another way and see what happens", and the interesting thing about it is that those who have done it, their experiences has been so positive and they have become so excited by it that it just keeps driving them on and on to change more and more and to keep rethinking the whole thing, that has been the interesting part....

I love playing with technology but it really is to my mind a change agent and a supporting agent and helps you to do things that might be a little bit more difficult in other circumstances and that is why I promote it with great emphasis on the change environment because I want people to think about their teaching, I want them to think about what they are doing. (I.M.)

The difficulties of this approach, often due to inherited conservative approaches, are also acknowledged:

... but that is not always very easy and you talk about different learning styles as well so you always have to think about incorporating that in your design so we are trying on campus now to make it more of an interactive process and what I have found is that first year students are battling with taking responsibility for their own learning. They come from a system that is still spoon-feeding, I think and hopefully it will change in the near future and they want to really just sit and get the notes and that's it and you know, "Let me write my test" but now they have to work really actively and that is quite a mind shift and paradigm shift and the lecturer as well because it is a new way of teaching and some of them are really used to just providing traditional lectures face-to-face and they don't do it in this new way, so they also have to change and think new about this as well. (I.O.)

There was also a rarely expressed view that the use of ICTs changes the way not only activities, but also indeed the way that thinking itself happens.

I think it changes the way some people think. (I.L.)

A lot of people wear glasses permanently and it is a prosthesis to help them see and they don't think about it anymore; when they wake up in the morning, the glasses are on the face, they don't think about that act consciously, they just do it, they just use this prosthesis to get on with what they have to do, which in this case it is to see and it becomes invisible to them, their own glasses become invisible until they lose [them], till they can't find their glasses and it becomes a huge issue for them. The same with technology, I don't think about my computer anymore, I don't think of it as my computer, I am going to do my computer, I am thinking I came into the office today to write my new study material and all of these tools, the Word tools, keyboard, all of these things are becoming invisible for me unless I can't do something and then it becomes an obstacle, it becomes visible, I need to learn how to use a feature and I learn it and I move on, so it always fades back into invisibility but it is a prosthesis, it is just something that I am using for my mind, for constructing my thoughts, for instruction. (I.L.)

This perspective is in line with learning theories that argue that activity and cognition are interrelated, thus the social and mental cognition cannot be separated, and tools (such as ICTs) form a mediational link between the two. The growth of such theories is important and is being explored by local researchers (such as Frith *et al.*, 2004, Hardman, 2005) following activity theorists (such as Wertsch and Engestrom) to understand cognition, tools and context.

This attention to pedagogical change in context can be observed in all the studies which support the idea that ICTs will enhance teaching and learning if certain other things are in place, particularly if there is a paradigm change (King, 1993; Rogers, 2000) from traditional ways of teaching, and if they are linked to the overall instructional design (Cronje, 1997; Baldwin, 1998; Czerniewicz, 2001) as a central part of the course, not an 'add-on' (Green & Gilbert, 1995; Coetzee & du Bruyn, 2003). There are also local publications which explore how 'modern offerings of programs can be enhanced [by technology] considerably if planned and implemented properly as long as critical conditions to integrate technologies into teaching and learning are adhered to ensure optimal application in HE' (Broere, *et al.*, 2002). It is illuminating too to review the statements in the National Plan that follow –

Some institutions see information technology-related approaches as the central solution to the problems experienced by disadvantaged students. While the innovative use of technology is to be welcomed, there is a strong risk that approaches which focus only on improving delivery through information and communication technology, and which leave traditional curricular structures unchanged, will not provide a comprehensive solution. (National Plan, 2001: 2.3.2)

The various interpretations of pedagogically led ICT transformation described in this section indicate that the plea made in the National Plan in 2001 for ICT innovation to be closely aligned with curriculum transformation has been heard, at least by some.