The impact of socio-cultural factors on blended learning in the development of academic literacy in a tertiary vocational context

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I, Robert Geoffrey Gutteridge, declare that this dissertation is representative of my own work in both conception and execution. The empirical model of blended learning delivery developed during this research project has been published in advance of the dissertation as follows:

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Abstract

This study investigated key factors impacting on blended learning delivery with particular focus on socio-cultural and human-computer-interface issues, in the hope that the outcome of this enquiry might contribute positively towards the empowerment of learners and facilitators alike. The study involved a group of first year students enrolled in a Communications Skills Course offered by the (then) Department of English and Communication at the Durban University of Technology. The PRINTS Project, a webquest around which the course activities were based, provided an example of a blended delivery course in practice. While the teaching paradigm used in the course was constructivist, the research orientation employed in this project was critical realist. Critical realism focuses on transformation through praxis and also lends itself to modelling, which provides a way to understand the factors at play within a social system. In the preliminary stages of the research, an exploratory empirical (i.e. applied) model of blended learning delivery was formulated from a theoretical model of course delivery in order to assess which factors in blended learning were systemic and which were variables. The investigation then sought to uncover key factors impacting on the blended delivery system, utilising both quantitative and qualitative methodologies. The findings were analysed in terms of the empirical model to gain an understanding of any factors that might be seen to either enhance or inhibit learning in blended delivery mode. The result was that certain core issues in blended learning and teaching could be clarified, including the use, advantages and disadvantages of information and communication technologies (ICTs) in a learning environment. The notion of the digital divide could also be reconceptualised, and the relationship between literacy (be it academic, professional or social), power and culture could be further elucidated, drawing specific attention to the South African educational environment. The notion of

culture and its relevance in a blended delivery environment was also further clarified, since the findings of this research project suggested how and why certain key socio-cultural factors might impact, as both enhancers and inhibitors, on the blended learning delivery system.

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List of Acronyms

CACD	computer assisted classroom discussion
CAL	computer assisted learning
CATAC	cultural attitudes towards communication and technology
CHED	centre for higher education development
C+M=O	context plus mechanism equals outcome
C vs I	collectivism versus individualism
DIT	Durban Institute of Technology
DUT	Durban University of Technology
ESL/EFL	English second language / English foreign language
F vs. M	femininity versus masculinity
GDP	gross domestic product
HCI	human-computer interface
KZN	KwaZulu-Natal
ICT	information & communication technology
IS	information system
LAN	local area network
LMS	learning management system (shell)
NADEOSA	National Association of Distance Education and Open Learning in South Africa
PAT	(N. Dip) Performing Arts Technology
P-D	power- distance
PRINTS (Project)	Professionally Relevant Internet Sites (Project)
RRRE	resolution, redescription, retroduction, elimination (Bhaskar, 1979)
SES	socio-economic status
SMS	(cellular telephone) short message system
U-A	uncertainty avoidance
VPA	video protocol analysis
www	world wide web

Chapter 1: Introduction

1.1 INTRODUCTION

The main focus of this investigation was the impact of socio-cultural and computer-human-interface factors within a blended learning environment. In pursuance of this investigation, a tentative empirical model of blended learning was developed in order to clarify the nature of blended learning delivery and to indicate the influence of key factors in terms of enhancing or inhibiting learning. The empirical model was then used as a framework for analysing the data gathered both in the course of an actual academic programme and in case studies conducted with volunteer student participants. It was hoped that the findings of this research might offer valuable insights into the nature of the processes involved in blended learning delivery and how socio-cultural factors may influence the blended learning system. The anticipated value of this research was in its potential application to contribute to enhancing blended learning delivery, thereby improving academic and professional performance. The investigation centred on the PRINTS Project, which is the core of a computer (and web) assisted professional communication skills course for first year/semester students at Durban University of Technology (DUT), a multicultural university of technology.

1.2 INSTITUTIONAL CONTEXT OF THE RESEARCH

DUT was formed by the merger of ML Sultan Technikon and Technikon Natal on 1 April 2002. At the time it was called the Durban Institute of Technology and aspired to be the "powerhouse of technology". The merger joined a traditionally disadvantaged technikon (ML Sultan Technikon) with a traditionally advantaged one (Technikon

Natal). Although there were similarities between the institutions, the many differences in administrative and academic structures, including curriculum, student and staff development, precipitated difficulties. The upheaval resulted in the institution being assessed by the Department of Education and placed under the administration of Professor Jonathan Jansen in 2006. The key challenge identified during the merger process was "the development of a shared institutional culture that valued all staff within the new organisation" (DUT, 2007).

The new institution's vision and mission was launched in 2005. The institution aimed at holistic education and knowledge advancement through enabling the provision of quality, the promotion of values, sustainable partnerships and excellence, and the empowerment of both staff and students. Unfortunately, as noted in the Institutional Audit (DUT, 2007:18, 23), these aims and goals were not further clarified by management, resulting in a lack of shared understanding. (Note: the University vision and mission were restated in 2008.)

The change to a "university of technology" (UoT), following intense parliamentary debate, came in 2006, and necessitated the formulation of a new institutional identity. The transition from technikon to university has similarly been ambivalent and lacking in clarity. In 2007 the Deputy Vice-Chancellor Academic defined a university of technology as:

> A special kind of university whose main or central focus is that of technology as the study of the application of knowledge in the light of, and together with, practice and technique (knowledge, ideas, paradigms, methods) gained from practice. The implications for the core business of a university of technology are that the teaching and learning programmes are geared for practice in careers, professions, technology-transfer, and work-place learning. Research programmes are geared for practice driven research and applied strategic research (DUT, 2007:19).

This may serve to draw the university community out of the ambivalence caused by past upheavals in the direction of clarifying our tasks through praxis. In keeping with the newly-defined role of Universities of Technology, this research investigation was practice driven; it constituted applied strategic research investigating factors that might be exploited to enhance student and faculty staff performance both in the classroom and the workplace. It speaks to empowerment though emancipation of the university community.

1.3 RATIONALE FOR USING BLENDED LEARNING

The staff-to-student ratio recommended by the Department of Education is 1:20, whereas at DUT it is 1:30 (DUT, 2007:23). Given the increasing use of ICT in tertiary education courses at all levels, the role of ICT for academic purposes in multicultural institutions would seem to be a vital one. The literature review, however, problematises the role that ICT can play in an educational context, and how it can be optimized in the context of a tertiary vocational institution, as well as problems that may be encountered. The economy of scale of computer assisted learning (CAL) might address the staff-to-student ratio imbalance, but the lack of suitably equipped and maintained computer laboratories for the number of learners enrolled at DUT suggested, rather, a blended approach.

A web-based course requires computers and an internet connection, which leads to issues regarding access. Up to 6000 students a year must complete a Communication Skills course within their diploma studies, whilst the allocated computer laboratories hold about 50 computers. To overcome this disparity the Communication Skills Online course was developed at DUT and is based around the PRINTS Project. It was developed to meet the challenges precipitated from changes sweeping through the

institution “in an attempt to find creative solutions to problems such as larger classes and diminishing resources” (Pratt, 2003a). The PRINTS Project, although web-based, is an example of blended learning delivery. There is a mix of traditional face-to-face delivery, including overhead transparencies, “chalk & talk” and hand-out exercises, with computer mediated learning. Media and modes are blended to achieve optimal course delivery. Tuition, individual assistance and feedback are available in the traditional classroom setting, while content, guidelines, tests and feedback through discussion and email are available on the learning management system (LMS); additional resources are available on the internet.

Access to hardware, however, has often proved to be less problematic than the participant’s ability to use the technology. This issue is affected by the learner’s background, yet is not limited to the ability to use a keyboard and mouse, for familiarity with the software utilised must also be taken into consideration. Some learners use a computer only as a word processor, whilst others have never before seen one. These are digital literacy issues which must be overcome before academic literacy can be addressed in the online course.

1.4 THE IMPACT OF SOCIO-CULTURAL FACTORS ON BLENDED LEARNING

A consideration of the multicultural nature of the institutional context indicates that socio-cultural factors necessarily impact on the environment. While the institutional mission and vision go directly to the values and ethos of practice driven learning, an unmotivated or hesitant learner is not likely to spend class-time productively, irrespective of the aims and outcomes of the course. In such an environment, socio-psychological and cognitive issues might well impact on the efficiency of the course and its delivery. It was postulated that the issue of student culture needed to be clarified

in order to assess whether and how it might influence the learning process. A review of the notion of culture indicated that it lacks clear definition, and that there is little agreement on its main premises. More seriously, as will be shown in the review on this section, the dominant view of culture is characterised by a positivist colonial mindset which is problematic in the current context. Thus a deeper understanding of aspects of this factor was necessitated. To this end, the inquiry investigated and compared typologies of cultures, as such clarification might shed light on how socio-cultural factors might impact on the learning environment. This knowledge, it was hoped, would contribute to understanding how different cultures might be accommodated within the blended learning environment.

Up to 70% of the student body holds English as a second (or third) language yet the medium of tuition is English. Many of the students come from disadvantaged backgrounds, and most can be classified as previously disadvantaged. The student body is not homogenous, but is as diverse as the mother-tongue languages throughout the country (which exceeds eleven) as well as up to 10% foreign learners. Necessarily there are barriers to learning, but these far exceed language issues, and cannot be reduced to peculiarities of any specific grouping. Rather it should be seen as a combination of a number of factors, including institutional and socio-cultural factors. In this study, an attempt was made to clarify the relationship between literacy (be it academic, professional or social), power and culture, drawing specific attention to the South African educational environment. This was because it is generally acknowledged that improved literacy, at both undergraduate and postgraduate levels, is intrinsic to the educational programmes at DUT.

This study concluded that learner culture is an influencing factor in the learning environment, and that key determining factors are access and affect. These two factors, although influencing the learning outcome, also impact on each other. Access can be achieved by empowering the learners to cross all aspects of the digital divide. The literature review indicated that the notion of affect deals with the issue of how learners respond to the use of ICT for academic purposes, and how people of different cultures regard technology. The research findings suggested that a feedback loop is created between the learner engaging with the eLearning environment and the willingness to re-engage. The results indicated that improved access led to more positive affect in the learners' attitudes to learning.

In multicultural institutions multifarious factors and issues may affect students differently across different socio-cultural groupings. It was postulated that greater understanding of these factors and their interrelations within the eLearning system might aid the further development of blended learning delivery. To gain greater insights there is a "need to engage with and use theories of action which can cope with change, power, variety, multiple influences – including the non-national [culture] – and the complexity and situational variability of the individual subject" (McSweeny, 2002).

1.5 RESEARCH APPROACH

The literature and the researcher's teaching experience indicated that a constructivist eLearning environment produced optimal results, chiefly because of the shared nature of (any) epistemological endeavour. However, drawing on current literature, it can be argued that research constitutes an ontological endeavour which requires a different rigour. The epistemological similarities between constructivism and critical realism indicated that they were compatible for the purpose of this study, and that the

philosophical foundations underpinning the latter served to strengthen the research process. Critical realism "provides a way to examine social phenomena using an objective ontology…and a subjective epistemology" (Farmer & Gruba, 2004).

The critical realist approach lends itself to modelling, which provides a way to understand the factors at play within a social system. It was found that the modelling process described by Franck (2002) complements the research process expounded by Bhaskar (2008, 1979). Franck proposed that a model represents the mechanism within a system, with both a formal aspect representing the theoretical system of functions and an empirical aspect representing the practical application within a context. Pratt's formal model of communicative functions was found to be useful as a theoretical model of the learning process, and was used to guide the development of an empirical model of blended learning delivery (Gutteridge, 2006; Pratt & Gutteridge 2006; Pratt, 2007).

This research project, then, involved an attempt to arrive at the some of the various factors which might be seen to facilitate or hinder effective blended learning within the DUT context. The empirical model of blended learning delivery developed here is central to the research project, in that it assisted in clarifying the processes involved in the blended learning environment as well as the search to identify and explain affect factors. The empirical model thus directed the methodological approach and drove the analysis of the findings.

Both qualitative and quantitative methodologies were used in this study, as, together, they acted as complementary methodologies. Questionnaire and survey results were quantified and compared for statistical purposes. The small sample size and analysis of

the case study allowed for a rich and thick description for purposes of contextualisation and testing against the empirical model.

1.6 CONCLUSION

In conclusion, this inquiry explored what socio-cultural factors might be found to impact on the learning environment at DUT, and with what effect. Because of the critical realist focus on transformation through praxis, it was hoped that the findings of this inquiry might contribute towards the empowerment of all students, but particularly of those DUT students who currently lack access to ICT, are hesitant to use computer technology, or are easily distracted by the diversity of resources on the Internet.

Chapter 2: Literature Review

2.1 INTRODUCTION

The literature is replete with examples and testimonies of how computers and information and communication technology (ICT) in general can enhance learning. "Many universities are now offering courses and programs based on online delivery modes" (Herrington *et al.*, 2001). "With the advent of networked multimedia computing and the Internet, language teachers throughout the [USA] have been warming up to using computers in the language classroom" (Warschauer & Meskill, 2000:303). Indeed, Oliver and Herrington noted great approval and support for online learning and predicted future growth in interest in all sectors of education (2001:1). The new technologies utilised in tertiary education have increased access and improved teaching efficiency (Mashile & Pretorius, 2003:132). Importantly, South African tertiary institutions have shown a commitment in their responses to the changing social and economic conditions, and are using ICT both as an instructional delivery mode and as a means for enhancing student learning and performance (Nel & Dreyer, 2005:129). At the Durban University of Technology the Audit established that "web-based learning is a prominent strategy to enable access, flexibility, interactivity and active learning within a geographically and educationally complex institution" (DUT, 2007:54).

2.2 THREE DRIVING FACTORS IN COMPUTER AIDED LEARNING

Oliver and Herrington (2001) identify the three main driving factors in the uptake of computer aided learning as flexibility, economy and enhanced learning.

2.2.1 Flexibility

Flexibility refers to the ability to tailor online courses for specific needs. These needs tend to be seen as relating to the learner, yet they are equally applicable to the facilitator and administrators of the courses. The PRINTS project is a generic communications skills course that has been used with diverse students from both arts and engineering faculties. Each running of the course may be adapted or modified to suit the respective classes. The differing capabilities (computer/digital literacy) of the facilitators are accommodated by the three differing modes of delivery (totally online, partially online, and optionally online). Equally, administrators may use the report facilities embedded within the Learning Management System (LMS).

2.2.2 Economy

Economy refers to the financial costs of education and how online education may be scaled for mass delivery to provide opportunities for cost savings. The institutional staff to student ratio for DUT during 2005 was 1:30, while the Department of Education target was 1:20 (DUT, 2007:23). Online delivery clearly has the potential to address this disparity.

2.2.3 Enhanced learning

Enhanced learning relates to the empowerment of the learner. Oliver and Herrington (2001) have suggested that computer aided learning can enable the learners to negotiate the discourse of the fields of study, and Warschauer has added that it allows the learners to

"gain apprenticeship" in communication technologies that are becoming "part of the broader ecology of life at the turn of the century" (2000).

2.3 PROBLEMS AND CHALLENGES OF COMPUTER AIDED LEARNING

This is not to suggest that computer assisted teaching and learning are without problems. Warschauer listed three distinct disadvantages: "investment of money, investment of time, and uncertainty of results" (2000). New technologies carry initial start-up expenses which include hardware, software licenses, and staffing. Ideally the computers need to be networked, an issue that is exacerbated by the spread of DUT campuses. The staff will require training and support. The hardware will require maintenance. The software will require updates. It is often the case that funding is difficult to allocate over such a vast spread, with the result that after the hardware is secured, maintenance is often neglected. Associated scenarios are that staff are provided with initial training yet with limited support, or learners are offered out-of-date software packages that are no longer used in their industry.

New technologies take time to learn. The facilitator must master the software and be aware of hardware malfunctions, and then pass this knowledge on to the learners. The facilitator must learn how to make the most of the new technology and optimize output. Yet there are further time burdens inasmuch as the learning environment has to be managed. The online learning environment's advantage of flexibility means that learners may engage at (almost) any time and the facilitator needs to be available for response and feedback. New technologies must nevertheless still be mastered, which leads to the uncertainty of results. The technologies must be optimally integrated into pedagogy. Moreover, the new

technologies cannot be simply grafted onto existing practices but often require a new way of performing old tasks (Warschauer, 1999 & 2000; Chapelle, 1997).

These challenges have been echoed by Patterson who examined the role that information systems can play in newly merged higher education institutions in South Africa (2005). Patterson questions "system reliability" and points to "access bottlenecks", as well as "variation in the sophistication of clients whose competencies are likely to affect their own perceptions of the value of the programmes for which they are registered" (2005). The latter "sophistication" could be extended beyond the use of computer assisted learning by learners to include the use of ICTs by facilitators. Poorly trained staff will struggle to produce or design quality online components or learning environments. This in turn, negatively affects the learning. Patterson makes the point that there is a mutual relationship between the capacity to deliver online learning environments with the capacity to create eLearning environments (2005:37). Thus he stresses not only training but also infrastructure. DUT has made great strides through CHED's (Centre for Higher Education Development) Pioneers Programme which aims to enable online facilitation, yet it could be argued that the infrastructure is not what it should be.

> In general across the university there is an inadequate number of computers, a lack of access to printers and limited access to the internet… students also indicated that support in the computer laboratories and the maintenance of computers facilities [sic] are areas that require improvement (DUT, 2007:40).

To address these issues will require an investment of money and an investment of time; money to purchase the equipment and time to train the support staff in the eLearning environments. The greatest cost in developing online learning environments lies in development time, which can take staff thousands of hours (Patterson, 2005). Patterson

laments that funding in these areas may not be forthcoming as "typically, the formal mechanisms for academic recognition privilege research output, rather than the quality of an academic's commitment to implementing ICT-based courseware" (2005). Be that as it may, he warns that any investment in infrastructure will require perpetual upgrading. In this sense, the return on investment cannot be viewed in fiscal terms, and more money is constantly needed to remain not on the cutting edge of technology but merely adequate.

2.4 ADVANTAGES OF COMPUTER AIDED LEARNING

These drawbacks to the use of ICT in a learning environment do not negate the distinct advantages. Warschauer and Meskill cite numerous studies in suggesting that computer aided discussion has distinct advantages over traditional face-to-face classroom discussions (2000). Computer assisted discussion encourages more equal participation as the teacher and/or more confident students are not able to dominate the discussion session. It also allows the participants to carefully plan their input, and as it takes the form of written communication (as opposed to oral classroom discussion) it usually involves more complex language structures than oral constructs. "Students in CACD [computer assisted classroom discussion] use language that is lexically and syntactically more complex … and covers a wide range of communicative and discourse functions" (Warschauer, 2004:2). Warschauer and Meskill (2000) also note, as does Pratt (in press), that the student input is available for the whole class to review. Warschauer and Meskill suggest that this provides all learners the opportunity to improve their language skills through the learning of new "linguistic chunks (e.g., collocations, common phrases)" (2000). Pratt (in press, 2003b) further suggests that this public display coaxes the learners to put more effort into their posts *because* they know that their comments will be reviewed by the rest of the class. Yet while

sources such as the above suggest that the use of ICT in the classroom can in fact aid the learning of language, it must be remembered that this depends on effective teaching practice and not ICT per se.

Two key issues should be further considered. First is the notion of a learner centred learning environment as opposed to teacher centred. The traditional face-to-face classroom engenders a teacher centred learning environment where the sage on a stage, through chalk and talk, attempts to impart information to the class. Facts are not necessarily translated into competences, however, and thus this teaching method does not necessarily empower the learners. The second issue regards access to the technological developments, that is, bridging the digital divide. Beautifully crafted learning websites, with graphics, sounds and interactive tutorials are of little use if the learners do not have access to the technology. The first of these two issues (learner centred environments) will now be discussed in greater detail (section 2.5), whilst the notion of the digital divide is discussed later in this chapter (section 2.8).

2.5 THE CONSTRUCTIVIST LEARNER CENTRED ENVIRONMENT

Warschauer (1998, 1999, 2000), Corso and Williamson (1999), Warshauer and Meskill (2000), Honey, Culp and Carrigg (1999), Patterson (2005) and Meskill (2005) all stress the point that the computer should not be seen as a "silver bullet" capable of resolving the problems faced in education. "The computer does not constitute a method" (Warschauer, 1998:757), but rather it is a tool that may be used. Thus the output, or end result of using computers in education depends on how the technology is put to use (Warschauer,

1998:757). Similarly, Honey *et al.* (1999) suggest that whilst technology is a crucial aspect of education, it is just one of a host of complex processes:

> Researchers are increasingly asking questions about how technology is integrated into educational settings; how new electronic resources are interpreted and adapted by their users; how best to match technological capacities with students' learning needs; and how technological change can interact with and support changes in many other parts of the educational process (Honey *et al.*, 1999).

Warschauer and Meskill conclude that "humanware" is the key to the successful use of technology in language teaching, that is, the capacity to plan, design and implement efficient educational activities (2000:315). This is because the mere introduction of new machines does not imply that they will be effectively utilised. Human nature tends to take up new technologies in ways consistent with previous methodologies and practices. Rather, new methods should be sought to accommodate not only the changes in technologies but also changes in epistemologies and classroom practices.

As will be shown, current literature and research encourage a constructivist approach to teaching and learning. Although there are several core constructivist paradigms, they will be loosely grouped in the following discussion. For instance, von Glasersfeld and Vygotsky (as mentioned below) may be classified as radical constructivist and sociocultural constructivist respectively. While each of these approaches may have its strengths and flaws, some points can be made about constructivism in general. Constructivism is a philosophy developed from the cognitive psychology and linguistics of Jean Piaget and Noam Chomsky, yet also has roots in the ideas of John Dewey. The constructivist orientation suggests that knowledge is developed, or constructed, by the individual and is socially mediated. Linguists developed the theory that language is not only an individual

phenomenon but also a social one, and that in the context of real language use form and function interact (Warschauer, 2002). Educational theorists such as von Glasersfeld and Vygotsky argue that conceptual structures are built through reflection and abstraction, and stress the "socially and culturally situated nature of mental activities and define learning as getting acquainted with cultural practices, their particular exigencies, limits and possibilities" (Vanderstraeten & Biesta, 1997*)*. With this emphasis on the social aspect of language acquisition, "learning a language is viewed as a process of apprenticeship or socialization into particular discourse communities" (Warschauer & Meskill, 2000:305). Wardekker explains that during this apprenticeship "it is not the social structures themselves that are internalised, but the meaning the individual learns to give to these structures in its interaction with others and in relation to what it has learned before" (1996). The learner does not take on new repertoires, but rather adjusts prior knowledge which then culminates in different (or adjusted) behaviours. This reveals the link with Dewey, who stressed an intrinsic and continuous connection between the world and the organism on the level of action (Vanderstraeten & Biesta, 1997*)*. Knowledge, for Dewey, does not concern itself with experienced objects as much as with "future experiences which might ensue from the present situation" (Vanderstraeten & Biesta, 1997).

A constructivist learning environment is learner centred. This changes the roles of all participants in the learning process. The teacher moves from the "sage on a stage" to the "guide on the side", facilitating the learning process rather than providing instruction. The teacher facilitates at the metacognitive level, providing initiative, guidance, and scaffolding (or bridging) to help extend the learners' zone of proximal development (Herrington *et al.*, 2001:266). Teacher talk is replaced by collaborative work between the learners (and the

learners and the facilitator) who take ultimate responsibility for their own learning. Warschauer (2002) referred to this as "a process of collaborative apprenticeship", with students working together and supporting their own learning and development under the guidance of a facilitator. The learners participate in knowledge acquisition through the construction of new models (of knowledge), refined through cooperative social activity within the class environment. This, rather than traditional instruction, allows the learner to develop metacognitive skills, including problem solving and self-reflection.

Current literature provides a number of characteristics of the constructivist learning environment. Brooks and Brooks (1993) suggest that students should be viewed as cognitive apprentices, that teachers should mediate in the interactive learning environment, and that assessment should be interwoven with the curriculum. Alley (2000) suggests that learning is experiential, spiral, messy, that higher order learning requires reflection, and that learning is more effective when students "take responsibility for [their] own learning" (cited in Herrington *et al.*, 2001:264). Herrington *et al.* stress meaningful assessment, opportunities for collaboration, and authentic tasks (2001:265). Authentic activities may be described as classroom tasks that allow students to practice skills in an environment similar to those they may encounter in their vocational life. Equally, these tasks should not be piecemeal and require ten to thirty minutes for completion. Rather they should require weeks or months, allowing the students to reflect and develop their thoughts and ideas. Such tasks are complex, problem-based tasks, which incorporate assessment: "Complexity of this kind would be extremely difficult without the guidance and support of the teacher and by other students within collaborative groups" (Reeves *et al.*, 2002:563).

2.6 BLENDED LEARNING AND TEACHING

Whilst the PRINTS Project clearly fulfils many of the criteria of a constructivist classroom through its focus on sustained, collaborative, authentic tasks that also account for two thirds of the students' assessment, it is not conducted entirely online. Rather it utilises a "blended delivery" with a mix of online and face-to-face teaching and learning. Blended learning (aka hybrid, and mixed mode) has a host of definitions in the literature, many of which are explicated in Bonk and Graham (2004) and critiqued by Oliver and Trigwell (2005). Blended learning has been described as a combination of media and tools, a mix of didactic methods and orientation, or the integration of number of pedagogic approaches (Whitelock & Jelfs, 2003; Singh, 2003; Kerres & De Witt, 2003, all cited in Oliver & Trigwell, 2005). Examples of such blends may include combining online learning with traditional instruction, mixing instruction within actual jobs or tasks, combining instruction with assessment, or integrating one or more of the theories of learning (such as constructivist, behaviourist or cognitive). Further, there could be mixed contexts, such as classroom, exam or work environment, or mixed objectives, such as skills, competencies or attitudes.

The main criticism levelled by Oliver and Trigwell (2005) is that the focus of these approaches is on teaching rather than learning, that they represent the teacher or instructor's perspective. They concede that Valiathan approaches this focus on learning rather than teaching, yet maintain that philosophical category errors persist and that "the term 'blended learning' is ill-defined and inconsistently used" (Oliver & Trigwell, 2005:24). They argue for a reconceptualisation of the term and a return to a learner-centred analysis, and offer variation theory as a premise upon which to redefine blended learning. Variation theory suggests that students learn through a process of recognizing differences (variations) in the

object of study. "Learning occurs when *critical* aspects of variation in the object of learning are discerned. Discernment is about the experience of difference" (Oliver & Trigwell, 2005:22). Students are given the opportunity to discern difference when they are presented with different views of the object of study, such as through a book, a video or a field trip, or through the use of different teaching media. Oliver and Trigwell concede that this approach may be enhanced through the introduction of information technology and "*blends* of e-learning with other media" (Oliver & Trigwell, 2005:23, my emphasis).

Although the term "blended learning" may be taken to imply different things in varying contexts, it cannot be denied that a mix or blend of different methodological approaches is taking place in these varying contexts. The literature suggests that blended learning has always been intrinsic to teaching through the use of talk, chalkboards and overhead projectors: "Blended learning is more than fashionable; it is [the] training and delivery method of choice … [and] is dominating news in higher education" (Bonk & Graham, 2004:2). NADEOSA dedicated an entire conference to the topic in 2006. According to Aycock *et al.* (2002): "The power of the hybrid course model is its flexibility and its pedagogical effectiveness." To be sure, Oliver and Trigwell acknowledge that it is a valid response to "the failure of purely online learning to meet the training needs of organisations" (2005:21). However, whilst purely online learning has its inadequacies (as has been previously discussed), it has advantages in and of itself. Bonk *et al.* note that "perhaps the fastest growing aspect of this [online training] movement is a blended approach that weaves together multiple training approaches and technologies *as needed* (2002:98, my emphasis).

Herrington *et al.* (2001) advise that technology should not be used for technology's sake, but rather that different modes should be incorporated as defined by the particular context. For instance, if bandwidth is limited there is no point to providing video streaming and similar rich graphics as the learner would not be able to download the files before boredom or a time-out occurred. Similarly, interactive WebPages are wasted if the learners do not have access to the internet or lack the skills to utilise the required programs. According to Mason (1998):

> While the technology tends to support a certain degree of egalitarian participation, and does allow users the freedom to input messages at their convenience, the conditions which are needed to produce good educational discussions are far more complex, more people-dependent and more educationally determined than mere technology will ever influence very significantly.

It is the contention of this study that a blended delivery is greater than the sum of traditional and eLearning delivery, because aspects of each may combine in unexpected ways. A delicate and informed balance between the various modes is required to optimize learning within the particular context. Patterson, in an analysis of South African higher education institution adoption of ICTs, suggests that "the fundamental question underlying the acquisition and development of information systems and learning technology systems is not only technical but also strategic in nature" (2005:38). Whilst his research is broader than this project, the underlying theorem is the same: context and planning cannot be ignored.

2.7 THE PRINTS PROJECT

The Communication Skills Online course at DUT is based around the PRINTS Project and has been conducted for the past six years. It is a translation of the traditional (i.e. face-to-face) scenario project that integrated the different modalities of speech, writing and nonverbal communication, requiring learners to investigate and report on a specific problem which was relevant to their field of study. The course elements weave together small group project work, experiential learning and simulations in an outcome based development of higher order competencies.

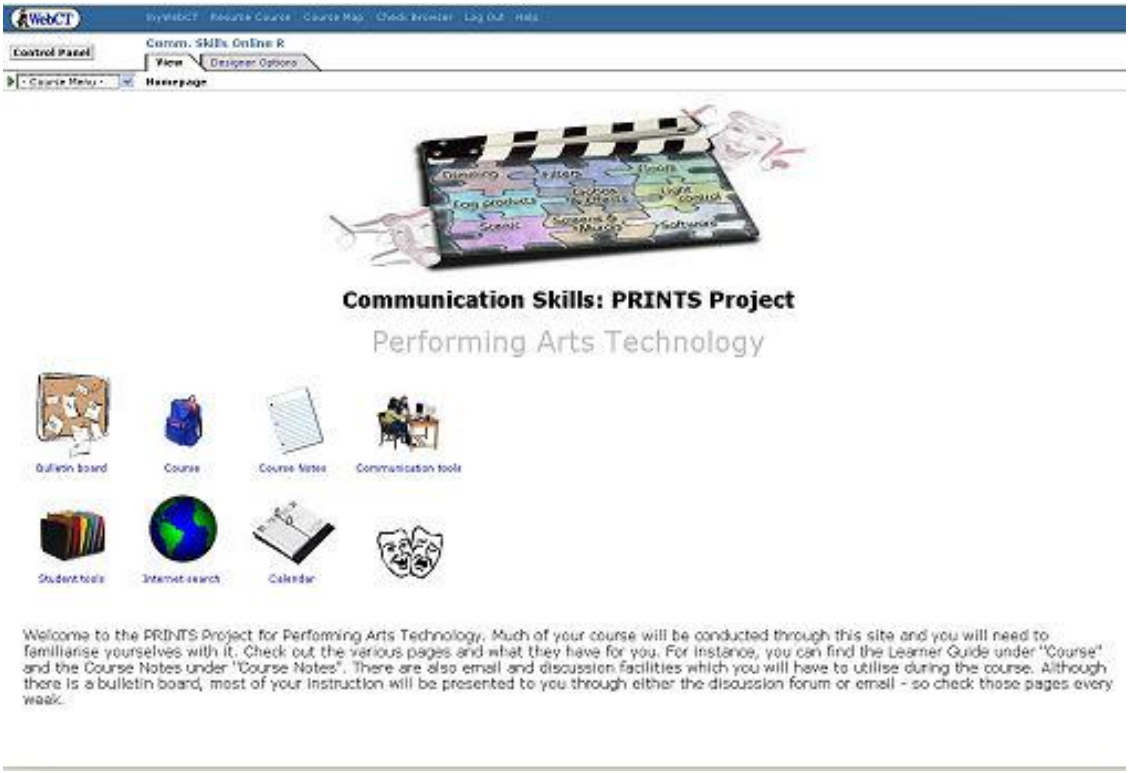

Figure 2.1: PAT PRINTS Project WebCT learning site

In electronic mode (as in the PRINTS Project) the scenarios became more "real" in that the learners are required to conduct an internet search for professionally relevant internet sites, rather than engage in role play. Learners must find a number of sites within a set of themes that have direct relevance to their diploma studies. They describe these sites and indicate their usefulness in terms of the project criteria. Classes are held in computer labs to facilitate access to the internet, and initial instruction on the learning management system (LMS) and general computer literacy scaffolding is provided by the facilitator during class time. Class sessions include a plenary slot and research time. The learners' research is driven by class session tasks which are posted onto the LMS by the facilitator. More individual guidance may be provided through group-facilitator discussion and learner-facilitator email, both via the relevant LMS learning tool. These authentic activities lead to the final presentation of a written formal report which may be uploaded to the LMS. Finally, the learners' research also provides the content for a group oral presentation.

Pratt explains that she needed to "introduce a Communication Skills course in blended learning mode [the PRINTS Project], mainly in the interests of enhanced delivery, but also in an attempt to find creative solutions to problems such as larger classes and diminished resources" (2003a). The Department of English and Communication (later, Media Language and Communication), as a Service Department, ran English/Communication courses for programmes throughout the various Faculties at DUT. The courses needed to have professional relevance for each diploma/degree group. For the online component, lectures were held in internet activated computer laboratories. Many of the learners came from disadvantaged academic backgrounds, meaning that they might not have encountered computers during their secondary education. Thus face-to-face teacher driven scaffolding

was needed to bridge the computer literacy skills deficit. The project itself was enabled by the web-based induction programme introduced at DUT (then Technikon Natal) in 2000 (see Peté *et al.,* 2002 for discussion of the Pioneers Programme at [then] DIT). Thus the PRINTS Project was born out of the specific context, and utilised a blended delivery of face-to-face and online delivery, with much of the course content generated by the learners themselves whilst browsing internet resources.

Another of the driving factors in establishing an online Communications Course at DUT was to increase the access to resources without placing an additional burden on the department's budget. By allowing learners access to the World Wide Web, the PRINTS Project exposed the students to a vast array of resources in all conceivable fields. Warschauer and Meskill suggest that this exposure to international web pages "supports a sociocognitive approach [to language learning] by helping immerse students in discourses that extend well beyond the classroom, their immediate communities, and their language textbook" (2000). They further argue that the web pages represent authentic language use designed for a real audience rather than the mass produced curricula. Authentic tasks were the backbone of the PRINTS Project, requiring students to search the internet for relevant material within the confines of their field of study. This is also supported by Warschauer and Meskill (2000) who note that new ICTs are becoming more important in everyday life. Academic life centres around research, which today is more readily available on the internet. Thus, by using new technologies in the classroom, tertiary institutions can better prepare learners for the type of interactions that are required for academic, professional or social success (Warschauer & Meskill, 2000). This was the aim of the PRINTS Project: the online project was not about transferring knowledge, but rather empowering the learners to

be successful through developing their communication and academic and professional research skills. There is an echo here of Sandholtz, Ringstaff and Dwyer, in that "the benefits of technology integration are best realized when learning is not just the process of transferring facts from one person to another, but when the teacher's goal is to empower students as thinkers and problem solvers" (quoted in Warschauer, 2000). It is possible through the use of technology "to support students in developing capacities to think creatively and critically, and to learn to use their minds well and deeply" (Honey *et al.*, 1999).

An intrinsic benefit of the PRINTS Project was that the content which drove it was necessarily diploma specific and relevant to each different group of learners. Yet there were many more benefits which can be attributed to the online aspect of the project. Course Notes and other project materials could be displayed online thereby avoiding duplication delays, and compensating for faulty audio-visual equipment; links to other educational sites extended the available resources without adding to course costs; learners were exposed to computer mediated communication; LMS facilities allowed for communication between students and students, and students and facilitator across geographical distance (DUT has six campus spread between Durban and Pietermaritzburg) as well as after lectures; LMS resources such as self tests and slide shows compensated for the lack of individual tutor attention; and learner motivation was increased owing to the enjoyment of browsing the internet (Pratt, 2003a).

Academic literacy is undoubtedly the most important aspect of any communications course, and was variously enhanced through the PRINTS Project. Surveys showed that learners

read far more than they would normally have done because of the online availability of texts (Pratt, 2003a). Reading skills were developed because the learners had to review large numbers of texts, thus improving higher order cognitive skills such as analysis and assessment. According to Van Wyk, "academic literacy is taught in context with a focus on the real-world skills learners will need to succeed in the academic discourse community" (2004). The PRINTS Project imitated real world activities not only because of the professional relevance, but also because of the requirement of learners to reproduce, reflect and report upon their findings. The learners engaged in online written forum discussion which constitutes a form of peer review, and were found to "produce better structured and polished written work because it was on public display" (Pratt, 2003a).

2.8 THE DIGITAL DIVIDE

Nevertheless, the digital divide did have an impact on the PRINTS Project. Pratt (in press, 2003a, 2003b) commented on the shortcomings caused by the lack of availability of computer laboratories, the dysfunctional state of computer equipment and intermittent breakdowns in internet connectivity. Yet digital divide issues now reach beyond the scope of mere availability of hardware, software and related resources. Digital divide literature of the 1990s focused on differential access to computer hardware, software and internet connectivity (Warschauer *et al.*, 2004). This is understandable in the face of the high start-up costs involved in acquiring the technology and related (and necessary) propriety operating systems and other programs. Developing countries do not have the same income levels, and thus purchasing power, of the more developed countries. Similarly, telephony infrastructure in the developing world was not (and probably still *is* not) at the same level as the more developed countries. The divide has been named as north-south, or west and

the rest divide because of the economic domination of North America, Europe and South-East Asia (notably Japan). A bipolar split was perceived between the "information rich and information poor countries or more commonly the … *information haves* and *information have nots*" (Guðmundsdóttir, 2005).

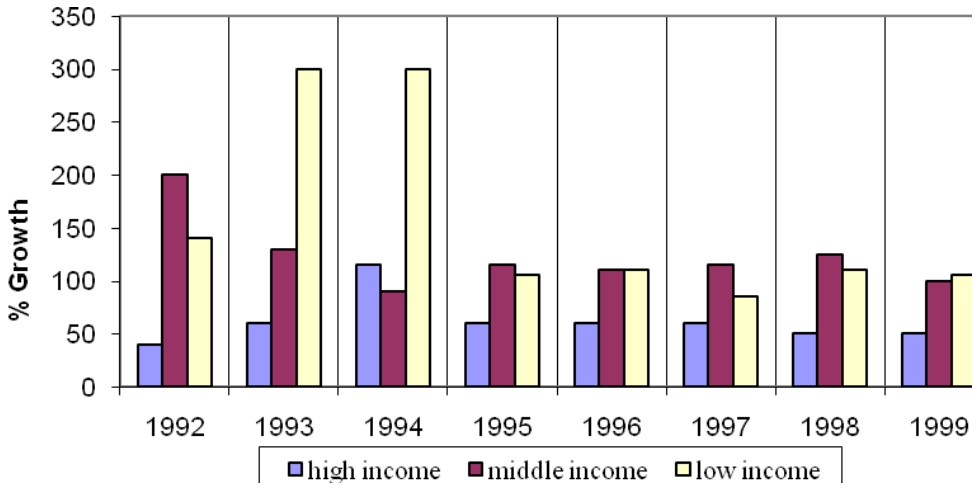

Figure 2.2: Average annual growth of internet users/capita (Fink & Kenny, 2003:7)

Currently this is labelled the "first level divide" because research now indicates that there is no longer such a disparity in physical access to computers and related ICTs. Fink and Kenny provided an in-depth statistical analysis to conclude that "developing countries show faster rates of growth in network development than developed countries" (2003:1). Their research investigated the number of telephone and internet users in high, middle and low income countries. Their focus was ICT access differences between countries. Their initial survey involved "per-capita stock", that is number of computers or telephones. They then measured against GDP, with similar conclusions that there is convergence between the developed and developing countries rather than a growing divide. The findings relevant to this study are reflected in Figure 2.2 (average annual internet growth) and Figure 2.3

(internet users per GDP) below. (Note that the values in Figure 2.2 "low income" for 1993 and 1994 are 752% and 1450% respectively, but were adapted for economy of scale and readability of graph.)

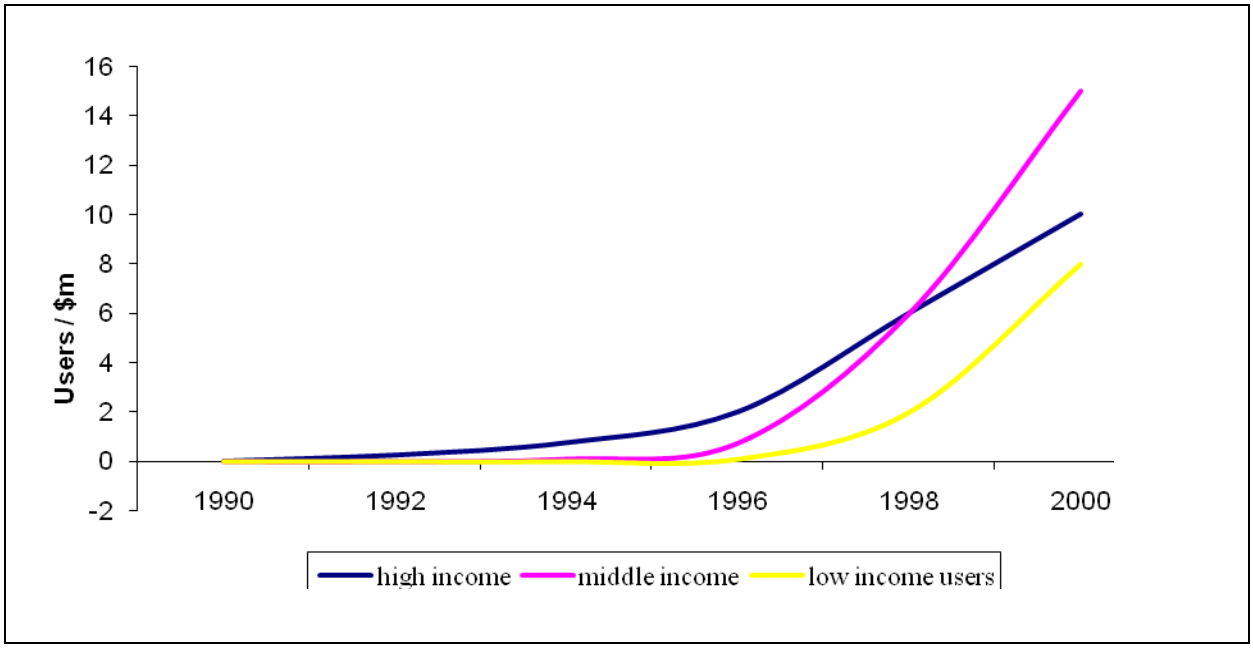

Figure 2.3: Internet users per GDP (Fink & Kenny, 2003:10)

Whilst Fink & Kenny's results may be indisputable, their premises and assumptions should be further questioned. Although they investigated the digital divide, they derided the notion for its lack of "inherent terminological exactitude" (Fink & Kenny, 2003:2). They listed four possible interpretations but chose to focus on the "*impact* of use – measured by financial and economic returns" (Fink & Kenny, 2003:2). Further, their measurement unit was "stock", that is number of internet connected computers, which ignores whether or how those computers are actually used.

On the other hand, Hargittai conducted research to measure the digital divide in a way which negates the bipolar or binary distinction of "the haves and the have nots" (2002). She recommends a more refined understanding of the term digital divide drawn from previous writers such as Kling (1998), Norris (2001) and DiMaggio and Hargattai (2001) who suggest that there are more levels or dimensions. These dimensions are tabulated below for ease of reference (Hargittai, 2002):

Kling

Technical access	Physical availability of technology
Social access	The professional knowledge and technical skills necessary to benefit from information technology

Norris

Global divide	Differences among industrialized and lesser developed nations
Social divide	Inequalities among the population within one nation
Democratic divide	Differences among those who do and do not use digital technologies to engage and participate in public life

DiMaggio and Hargattai

Technical means	Software, hardware, connectivity quality
Autonomy of use	Location of access, freedom to use the medium for one's preferred activities
Use patterns	Types of uses of the internet
Social support	Availability of others one can turn to for assistance with use

Skill	One's ability to use the medium effectively

Warschauer similarly adopts a multilayered view of the digital divide, providing four dimensions in terms of resources, as listed below (2004)

Warschauer	
Social resources	Communities and institutions providing support and assistance
Physical resources	Computer and connectivity availability
Digital resources	Content and language of ICT
Human resources	Literacy and education

The issues suggested in these various dimensions imply there is more to the digital divide than mere access to computers, a modem and a phone line.

Hargittai (2000) disputes that a stock count in the manner of Fink and Kenny (2003) is sufficient evidence of a narrowing of the digital divide, and argues that the digital divide remains if a user gives up in frustration or confusion because of their lack of capacity to effectively engage with the internet. Using a random sample she investigated people's ability to find information on the internet about five different subjects. The sample ranged in age, education, gender and ethnicity. It was found that only 50% of the sample could complete all five tasks successfully, which led to her conclusion that "merely offering people a network connected machine will not ensure that they can use the medium to meet their needs because they may not be able to maximally take advantage of all that the Web has to offer" (Hargittai, 2002).

2.9 LITERACY

Warschauer (2000, 2002, 2004) and Warschauer *et al.* (2004) offer similar arguments for reconceptualising the digital divide. Warschauer argues that "access to ICTs is embedded in a complex array of factors encompassing physical, digital, human, and social resources and relationships" (2002). Elsewhere he advocated a new type of literacy teaching which he refers to as "electronic literacy" (2004). These include *computer literacy*, *multimedia literacy*, *computer mediated communication literacy*, and *information literacy*, the latter of which would directly aim to overcome the digital divide being discussed here. Information literacy is defined as the capability to find, analyse and critique available online information (Warschauer, 2004). This is important because it addresses the user's ability to effectively use the technology, and goes towards the skills necessary to become an efficient user.

Warschauer *et al.* (2004) acknowledge that deficiency in physical access to Internet enabled computers is reducing, yet suggest that *how* technology is used is just as important as who has access to it. Their research indicates that there "is not a single construct of a digital divide [i.e. after the fashion of Fink & Kenny], but rather a number of factors that shape technology's amplification of existing inequalities in school and society" (Warschauer *et al.*, 2004:565). They investigated computer usage in nine different schools; five from low socio-economic status (SES) and four from high SES schools in California. It was found that the introduction of ICTs to these schools sometimes amplified existing inequalities because of the way the computers were used. The researchers identified three patterns of access and use which they labelled performativity, workability, and complexity, and measured the schools' performance in these categories. It was found that in all schools the

focus was on mastering the hardware and software functions rather than learning outcomes. Equally, the educators in these schools lacked confidence regarding the reliability of the technology, leading to their reluctance actually to engage with the technology. Linked to this, the teachers also found it a complex task to integrate the technology into their teaching, especially in the face of other time constraints and in terms of applicability to the students' examinations. The researchers reached two important inclusions. Firstly,

> …that an emphasis on provision of equipment draws attention away from other important resources and interventions, … [and secondly] that technology does not exist outside of a social structure, exerting an independent force on it, but rather that the technological and social structure are highly intertwined and continuously co-constitute each other in myriad ways (Warschauer *et al.*, 2004:580).

Warschauer's model of access to technology helps to explain the relationship between technology and social structures (2002). Whereas Fink and Kenny's (2003) model is based on possession or availability of a commodity, in their case an internet enabled computer, Warshauer shows that such a model ignores extended costs, such as maintenance, upgrades, replacement and training, and barriers such as differential bandwidth, skills, attitudes and content. A conduit model, on the other hand, takes account of the necessity of a supply line (connectivity and electricity in this case). Warschauer notes that the diffusion of conduits, such as electricity supply, is usually slower than that of devices. Such diffusion is also usually the result of social struggle and mobilization, as was seen with the roll-out of electricity infrastructure to rural South Africa. Warschauer's model seeks also to include "people's ability to make use of that device and line to engage in *meaningful social practices*" (2002). He proposes a model based on literacy.

Being literate is more than being able to read and write, and far more than having a book or pen and paper. One uses literacy to engage within a social fabric: read the newspaper, email a friend, fill out an application form. In essence literacy incorporates a set of social practices rather than a just a cognitive skill. It requires skills, knowledge, motivation and an encouraging support structure. Walton and Archer (2004) draw similar conclusions, noting that academic literacy practices include a number of different critical competences. These include the formulation of search criteria, the interpretation of the search findings and the effective evaluation of the available information. Further, they also suggest that an awareness of domain specific discourse is integral to developing academic literacy.

Warschauer (2002) draws six principal conclusions about literacy:

1. There is not just one but many types of literacy;
2. The meaning and value of literacy varies in particular social contexts;
3. Literacy capabilities exist in gradations, rather than in bipolar opposite of literate versus illiterate;
4. Literacy alone brings no automatic benefit outside of its particular functions;
5. Literacy is a social practice, involving access to physical artefacts, content, skills, and social support; and,
6. Acquisition of literacy is a matter not only of education, but also of power.

He emphasizes that "the multifaceted nature of literacy, the range of resources it requires, and the social nature of its practice and mastery all point to [the] conclusion that the acquisition of literacy is a matter not only of cognition, or even of culture, but also of

power and politics" (Warschauer, 2002). These conditions apply equally to electronic literacy as they do to traditional literacy.

This power/political theme is clarified through an examination of a research project Warshauer conducted investigating computer usage at two Hawaiian schools in radically different socio-cultural circumstances (2000). One was a public school in one of the poorest and most economically depressed neighbourhoods whilst the other was an expensive private college preparatory school. Both had reputations for excellent use of ICT and educational reform, and each had set up special programmes for multi-disciplined teacher participation and collaborative apprenticeship learning. The learners engaged in collaborative project work, with autonomous learning, whilst the staff had opportunities for development. Both schools produced graduates who were computer literate and worked well in teams.

It was found "at the surface level, [that their success] would seem to support the discourse of reform, indicating that educational restructuring necessary for appropriate use of technology is possible at both rich and poor schools alike" (Warschauer, 2000). Yet whilst the rich school graduates went on to college, the poor school graduates entered the lower end of the job market. The explanation of this difference was linked to the change in the American economy over the past twenty years, and drew on the ideas of Cuban (1993; cited in Warschauer, 2000). Fordist, vertically hierarchied companies of the post-industrial era became too inflexible in the *new capitalist* knowledge economy. Nowadays companies need flatter hierarchies, teamwork, and exchange of information between workers and management alike. Management consultants call these *learning organizations*. "So

whereas a generation ago, a restructured classroom might have been at odds with the needs of the broader economy (focused then on mass production, narrow application of skills and vertical hierarchies), today, a restructured classroom exactly fits the needs of the emerging economy" (Warschauer, 2000). Cuban suggests that instruction is steered by policymakers' conceptions of content and how teaching should occur, and that its role is to "inculcate into children the prevailing social norms, values, and behaviours that will prepare them for economic, social, and political participation in the larger culture" (1993; cited in Warschauer, 2000). The study concluded that the introduction of computers did little to improve the academic skills of the students at the poorer school. Rather it was the purpose and content of the education, dictated through social factors, that affected the outcomes. This is also the implicit conclusion reached by Walton and Archer: the critical factor in accessing wealth, power and knowledge is the ability to use and adapt information technology (2004:13, citing Castells, 1998).

According to Ravjee:

> ICTs do not operate outside of dominant socio-economic, ideological and educational contexts, which determine the rules governing how they will be used, and by whom, and argues that ICTs cannot effect change independently of the broader context of its application, which today is largely defined by a dominant neo-liberal economic order (2006:5)

Ravjee therefore urges researchers to problematise key aspects of access patterns, and to approach them discursively, questioning assumptions, roles, effects and meanings. Whilst applauding the South African Department of Education's national plan for higher education which supports the introduction of blended learning to higher education as a way to increase access, she is cautious of the role that technology-led approaches may have in reshaping higher education. She specifically questions low participation rates among

African students, leading to differential employment access and "the narrow focus on 'delivery' at the expense of critical thinking, curriculum transformation and academic development" (Ravjee, 2006:9).

This sentiment is echoed by Guðmundsdóttir, who claims that "socio-cultural and political factors are responsible for limited impact of ICT in education in some developing countries" (2005). She argues that the technology and capacity of expertise must be adapted to a developing country's particular economic, cultural and political environment. This can be achieved through greater research on the influence of language and background of student computer users, and their attitudes to and skills in these technologies.

Whilst Fink and Kenny (2003) hold that the digital divide is decreasing, data drawn from "Internet World Statistics" suggest that a vast chasm persists, as can be seen in Figure 2.4 (adapted from Guðmundsdóttir, 2005).

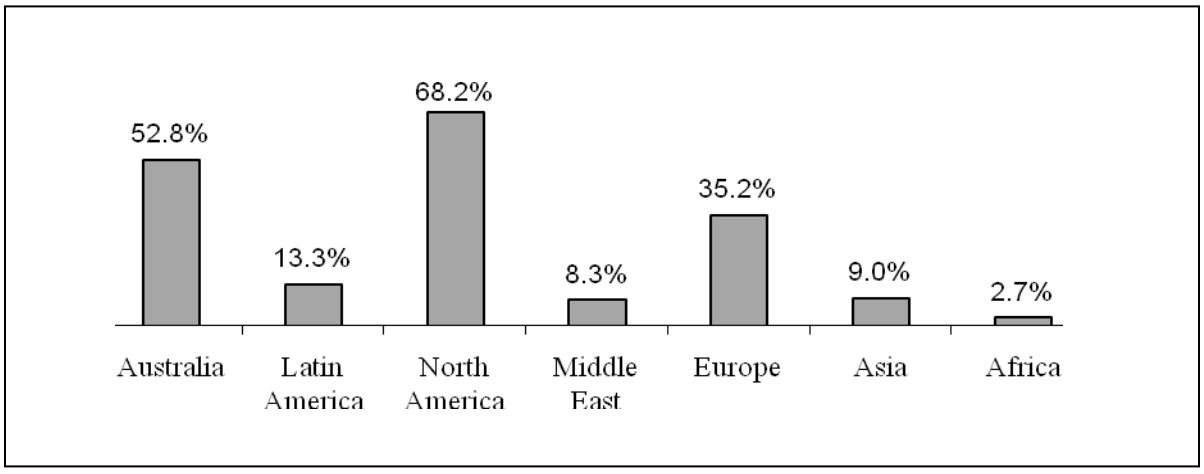

Figure 2.4: World users of internet by population diffusion (Guðmundsdóttir, 2005, adapted)

It has been suggested that the exponential growth rate in ICT diffusion in Africa is the result of a late introduction of the technology to the continent. Nevertheless, Guðmundsdóttir concludes, whilst physical and material access may be improving, users' attitudes and digital skills to use ICT for their own benefit, as well as cultural appropriateness of content, and is still a hindrance. WWW content and delivery language often lack relevance and meaning in developing countries, and because of the lack of skills these countries may increasingly find themselves on the wrong side of an ever increasing digital divide. Lack of language relevance is clearly the case in South Africa where less than a tenth of the population are English first language users. Because of the lack of socio-cultural relevance and digital literacy skills, ICT that is not adapted to the local context may itself prove a hindrance, or, as expressed by Ravjee, "may function to stigmatise and exclude people" (2006:5).

This fear was also raised by Mashile and Pretorius who implemented an online module to their distance M.Ed degree. They considered the allegation that "online learning in South Africa … perpetuates distance (physical and psychic) between races [and that it] stands to create a digital divide among South Africans" (Mashile & Pretorius, 2003:133). It was found that many of their learners did not have access to computers or the internet outside of their teaching school (i.e. work) environment, and thus that few of them engaged with the module. They too cited access problems as well as language and content problems as central barriers, but stressed that research should focus on how to empower low socio-economic communities to take advantage of the internet. They found that their learners did *read* the online module, but that they did not actually participate, except for one learner who had an administrative query. That is, the learners did have physical access, yet lacked

the confidence to participate in online discussions. Mashile and Pretorius' conclusion was that, by making the online module compulsory, they would be providing opportunities for their students to see and engage with ICT, thus increasing their confidence and adding to the digital skills base which might improve the overall functioning of their graduates.

2.10 THE IMPACT OF CULTURE ON A BLENDED LEARNING ENVIRONMENT

Recently the literature has become replete with support for the suggestion that a relationship exists between computer use and the culture of the users (cf. Bassett, 2004; Burn & Thongprasert, 2005; Cronje, 2006; Graff *et al.*, 2004; Lal, 2002; Leonardi, 2003; Novak & Hoffman, 1998; Yacob, 2004); and the CATAC (Cultural Attitudes Towards Communication and Technology) conferences are in their second decade. However, there tends to be a plethora of foci among the writers. Tylee (2001) stresses different learning styles and the users' perceptions of the learning environment in considering the links between culture and online access. She notes the important point that much research in this area is written from within a cultural perspective, and thus the interface itself is often a barrier. Hugo, writing from the perspective of a HCI specialist and focusing on the users' perceptions of technological devices and their interfaces, concludes that "designers and most developers of new technology have been making too many assumptions for too long about user prejudices and preferences in the adoption of innovations [and that] they either ignore these perspectives entirely, or they *over-compensate*" (2002:5, my emphasis). Von Brevern also explores user perceptions but suggests that "pedagogical and psychological construction and delivery of contents rather than the actual content are major key issues" (2004:6).

Two points are clear from a review of the literature: there is little agreement on a definition of culture, and the majority of writers relied heavily upon Hofstede's (1980) cultural dimensions. This discussion will now search for clarity on the notion of culture and will incorporate a critique of Hofstede's cultural dimensions. This will lead to a consideration of two other typologies of culture. It will be argued that whilst there are indeed differences between the definitions and typologies, they fall into only one of two perspectives on culture: static and value based, or fluid and emergent. This idea will be pursued to explore the possibilities of an alternate perspective of culture.

2.11 THE CONCEPT OF CULTURE

Samuel Butler suggested that "a man should be just cultured enough to be able to look with suspicion upon culture", while Mary Pettibone Poole advised that "culture is what your butcher would have if he were a surgeon". In view of the above, I tend to agree with Ralph Waldo Emerson when he observed that "culture, with us, ends in headache" (fiction quotes drawn from Learning Commons). The definition of culture is no less obscure in the non-fiction literature. Stahl suggests that "culture can be defined as the quintessence of the physical resources and perceptions, of the physical and mental techniques which allow a society to persist" (2003:1019). Such a definition, being based in communication, suggests a sharing of meanings, ideas, beliefs, and of course, language and signs. Similarly, Hugo accepts a definition of culture as "the shared patterns of behaviours and interactions, cognitive constructs, behavioural norms, expectations and affective understanding that are learned through a process of socialization" (2002:2). Tylee (2001) draws on Trompenaars (1993), Hofstede (1997) and Marcus and Gould (2000) to determine culture as patterns of thought and values, and the way in which groups solve problems. In doing so, she takes

culture to be stable over time but adds that "some cultural relativism is necessary" (Tylee, 2001:1). Taylor incorporates Powell (1997) to suggest that culture is "'the sum total of ways of living, including values, beliefs, aesthetic standards, linguistic expression, patterns of thinking, behavioural norms and styles of communication' created, maintained and modified by a particular group" (Taylor, 2004:5). The underlying theme in such definitions is of "culture as a process" (Lawley, 1994), and that it "is an abstraction from concrete behaviour but is not behaviour itself" (Chanchani & Thievanathampillai, 2002:1). These definitions tend to have strong normative aspects and are based in concepts of value. Such is the case with Hofstede's cultural dimensions which he determined through extensive attitude surveys with IBM employees throughout 66 countries conducted between 1967 and 1973. For Hofstede, values are the core element in national culture. His analysis revealed "that there are four central and 'largely independent' bi-polar dimensions of a national culture and that 40 out of the 66 countries in which the IBM subsidiaries were located could be given a comparative score on each of these four dimensions" (McSweeney, 2002:91). The four dimensions (Hofstede later introduced a fifth dimension of long vs. short term time orientation) are:

- Power-distance: The extent to which society members accept the unequal distribution of power.
- Collectivism versus individualism: The extent to which individuals in the society are integrated into groups.
- Femininity versus masculinity: The extent to which individuals fulfil gender type roles (that is, not physical attributes) such as the feminine orientation to family,

home and tenderness as opposed to the masculine orientation towards competition and assertiveness.

- Uncertainty avoidance: The extent to which uncertainty and ambiguity are (are not) tolerated.

As an illustration of the type of analysis afforded by Hofstede's cultural dimensions, index scores for South Africa are tabulated below. East and West Africa, Australia and UK are included for comparative purposes.

Table 2.1: Hofstede's cultural dimension indices (from Tylee, 2001:11)

	P-D	**C vs. I**	**F vs. M**	**U-A**
South Africa	49	65	63	49
East Africa	64	27	41	52
West Africa	77	20	46	54
UK	35	89	66	35
Australia	36	90	61	51

Key to table 2.1:

P-D = power distance

C vs. I = collectivism vs. individualism (high score indicates individualist)

F vs. M = femininity vs. masculinity (high score indicates masculinity)

U-A = uncertainty avoidance

For Hofstede, then, national culture is relatively stable, territorially unique, shared, and systematically causal. McSweeney (2002) criticized Hofstede's work on two grounds: flawed assumptions and flawed methodology.

> The generalisations about national level culture from an analysis of sub-national populations necessarily rely on the unproven, and unprovable, supposition that within each nation there is a uniform national culture and on the widely contested assertion that micro-local data from a section of IBM employees is representative of that supposed national uniformity (McSweeney, 2002:111).

Although at first glance it seems that Hofstede undertook survey research on a large scale, consisting of 117 000 questionnaires, a closer analysis reveals that "the average number per country was small, and that for some countries it was minuscule" (McSweeney, 2002:94). The methodology was further compromised by the narrowness of the sample in that all respondents were members of the same organization (IBM). It may be argued that each respondent is similar in that they share a common organizational culture. Chanchani and Thievanathampillai (2002) argue that Hofstede's methodology lacks confirmability and replication, as triangulation via different research methods is almost impossible. That is, the same results could not be achieved by the use of experiment or field research. They also suggest that Hofstede's framework does not allow for the study of cultural change, because the methodology produced a snapshot at a specific point in time.

Albeit that much research is based in Hofstede's dimensions of national culture, there are alternative typologies. Triandis (1994) proposes three "elements" to his "cultural syndromes", these being cultural complexity, tight and loose cultures, and individualism vs. collectivism (cited in Chanchani & Thievanathampillai, 2002). Triandis suggests that culture comprises those elements which have increased the probability of the survival of the

group, and have thus been shared among the group. The elements may be subjective or objective. Subjective elements include concepts, values, norms and roles, whilst objective elements include such artefacts as tools, roads and institutions.

Cultural complexity relates to the level of sophistication of the society; hunter-gatherer groups are simple whereas industrial societies are more complex. Tight cultures exhibit clear norms, shun deviations, and tend to be relatively homogenous. Loose cultures may have unclear norms, or be more tolerant of deviance, and are generally the result of heterogeneous or mixed cultures. Individualism and collectivism are much the same as with Hofstede, where individualists are self-reliant and independent and collectivists are interdependent with other group members. However, in contrast to Hofstede, Triandis cedes that the two are not necessarily mutually exclusive. Triandis' syndromes have been criticized for being inexact or vague: "unless clearer, more precise characteristics are established to identify and order syndromes, meaningful analysis will remain a matter of subjective application" (Chanchani & Thievanathampillai, 2002:8). As such they also lack the ability to explain or account for cultural change.

Fisk's (1990, 1991, 1992) elementary forms of social behaviour provides a psychological model which suggests that people in all cultures use four elementary mental modes in their relationships with each other (cited in Chanchani & Thievanathampillai, 2002). These are communal sharing, authority ranking, equality matching, and market pricing. Communal sharing indicates a close kinship and sense of national identity. Authority ranking describes the social hierarchy, and also implies the superiority inherent in higher rank orders together with associated prestige, privileges and responsibilities. Equality matching involves

oscillation around a notion of balance. These relationships invoke notions of distinct yet equal individuals and the expectation of reciprocity. Market pricing proposes interactions "based more or less on rational calculations of cost-benefit ratios in self-interested exchange" (Chanchani & Thievanathampillai, 2002:12).

Fisk's elements are useful because they are able to transcend levels of analysis; that is, they may be applied to individual relationships, familial groups, corporate groups, and nations. However, whilst the concepts employed are clearly described, they lack instruments for measurement. Unlike many other typologies, Fisk's is able to explain cultural change internally, yet this may be another inherent weakness. Fisk asserts that social groups proceed from communal sharing to market pricing. Whilst this seems intuitively consistent, it also appears determinist and unappealing (that is, positivist).

Thus far the definitions, descriptions, classifications and topologies view culture as normative, if not prescriptive. It is taken to represent patterns of behaviour, thought and communication, all of which aid its transmission. In this view "value" is emphasized as one of the building blocks of culture. It informs both the individual and the collective. Chanchani and Thievanathampillai (2002) state that this perspective is flawed because it presumes culture to be stable and manifest or visible to the researcher. They claim that "an individual's preferences, cognition and awareness may change depending on a number of internal (e.g., sleep, mood) or external (e.g., weather) conditions" (2002:2). It is as latent, they claim, as the concept of collective values. Chanchani and Thievanathampillai (2002) distinguish between desired and desirable values to represent what individuals desire as opposed to what they think they ought to desire.

Lawley comments on the shift away from the perspective of culture as latent value, that is, "from an objectively oriented, positivistic approach to a subjectively oriented, relativistic approach, [which] has been as significant in the field of cultural studies as in any other branch of social science research" (Lawley, 1994:4). In this perspective culture is variable, evolving within a context, and is thus historically situated. Chanchani and Thievanathampillai describe an ontological view which "draws upon the cognitive processes of information gathering and decision making as the basic unit of analysis of culture" (2002:2). The cultural researcher's focus should be on the interaction of shared cognitive structures and environmental phenomena to find the mechanisms by which culture shapes and is shaped by the individual membersip (this interactive relationship between society and the individual is further expanded in Chapter 3, Research Orientation).

The various views explored above suggest that culture is not stable, but rather is variable and contentious. This research project further argues that the researcher ought not be examining the individual's preferences, awareness and cognitions, but rather the relationship between the user and the system. Chapter 3, Research Orientation, will substantiate that an analysis of outputs in relation to inputs will allow the researcher to determine the factors at play in developing the learner culture and how these might impact on the learning system.

2.12 CONCLUSION

This literature review indicated that although computers will not of themselves provide the solutions to current problems in education, they can assist if they are correctly utilised. A

blended delivery was explained to be a mixture of traditional and online modes. However, this is problematised because of digital divide issues. The chapter explained that this divide is not limited to access to hardware but also includes cognitive access – the ability and requisite skills to engage with computer systems; that is, literacy. It was suggested that learners' access may be affected by their culture. The concept culture was found to be elusive, although characterizations of culture have improved from the eighties to now include typologies that can accommodate cultural change. It was also hypothesised that a learner's culture may be impacted by literacy issues and (institutional) power factors, which served to further complicate issues. The literature did not provide definitive explanations of the relationships between the learning system and the learners in terms of the effect of such cultural issues. This research project investigated these issues with the aim of identifying, and clarifying the impact of these important relationships within a blended learning environment.

This study set out to investigate the impact of socio-cultural factors on blended learning in the development of academic literacy in a tertiary vocational context, that is, in the context of the PRINTS Project run at DUT. In order to so, an attempt was first made to clarify the nature of blended learning delivery as a system, so that the factors impacting on it could be clearly distinguished from the system itself. Such clinical (that is, not ontological) isolation of the cultural input factors allowed for the exploratory identification of enhancing and inhibiting factors, which may be used to improve the efficiency of the blended delivery course.

The following research questions guided the inquiry:

1. What is the nature of the blended learning delivery system?
2. What significant cultural factors can be observed to impact on the system, more specifically:
    a) Enhancing factors
    b) Inhibiting factors?
3. What are the implications of the answers to the above for running courses in mixed mode delivery in multicultural tertiary institutions?

Chapter 3: Research Orientation

3.1 INTRODUCTION

This chapter clarifies the research orientation. This will entail an explanation of critical realism as a philosophical position and its impact as an analytic tool on aspects of this research. However, whilst the chapter begins with a discussion that will sanction the adoption of a constructivist learning orientation, it will justify a critical realist research orientation. The chapter also discusses modelling as a research tool, which is considered important in light of the research orientation. The formulation of an empirical model of blended learning delivery, which, although previously published, is the result of this current inquiry, is explained. This model was intended to clarify the nature of blended learning delivery so that the factors that impact upon it might be delineated more clearly.

3.2 THE CONSTRUCTIVIST TEACHING ORIENTATION

Chapter 2, Literature Review, noted that current literature and research encourages a constructivist approach to teaching and learning. Constructivism is a philosophy which suggests that knowledge is developed, or constructed, by the individual and is socially mediated. The constructivist classroom is a learner centred environment where knowledge is constructed through student interaction with materials, other students and the facilitator. The facilitator "facilitates at the metacognitive" level, providing initiative, guidance, and scaffolding (or bridging) to help extend the learners' zone of proximal development (Herrington *et al.*, 2001:266). Warschauer referred to constructivist learning as "a process of collaborative apprenticeship, [where] students

work together, under the guidance of a teacher, to support their own learning and development" (2002). Learners participate in knowledge acquisition through the construction of new models of knowledge, refined through cooperative social activity within the class environment. This allows learners to develop metacognitive skills including problem solving and self-reflection. The course material, its discourse, its theories, presuppositions and goals constitutes a valid field of study. The learners are both exposing themselves to and engaging with the subject field. It will be seen that this is a valid area of study as it constitutes a transient object of reality, yet it introduces problems of reconcilability within a research paradigm.

3.3 CONSTRAINTS OF A CONSTRUCTIVIST RESEARCH ORIENTATION

A constructivist worldview represents a reaction to the perceived difficulties in sustaining a positivist outlook. The positivist focus is on experimentation, which produces descriptions rather than explanations of a predetermined event under closed experimental conditions. It lacks real world application. Farmer and Gruba suggest that "positivism promotes a naïve view that knowledge directly corresponds with truth" (2004:1), whilst Carlsson charges it with "stripping away the context and yielding results that are only valid in other contextless situations" (2005:16). Constructivism, rightly so, aimed to reintroduce contextual meaning. It allows for the negotiation of meaning and relevance to enter the process of understanding and interaction with the social world, or computer mediated learning intervention. According to Carlsson, "the major problem with the constructivist IS evaluation approach is its inability to grasp those structural and institutional features of society and social organisation which are in some respects independent of the agents' reasoning and desires but influence (affect) an IS initiative and the negotiation process" (Carlsson, 2005:17). This means that the

constructivist focus is too often limited to the individuals (agents) within the research area. Within the complex research field, it is often able to explain what, but less so explain why, and that it frames truth relative to a particular community of practice (Farmer and Gruba, 2004:1). Farmer and Gruba (2004) point out that this leads to scepticism and severely limits the applicability of constructivist research findings because it culminates in an incommensurable plurality of worlds.

Smith (2005) concurs when he questions the relevance of constructivist research. If theories are neither correct nor incorrect, if there exists a plurality of realities, then there is no rational basis for justifying any learning intervention or change to existing practice:

> If there is nothing objective outside of human subjectivity (or intra-subjectivity), then an ICT for development researcher must deal with the intuitively and empirically contradictory position that research cannot incorporate situations and concepts like poverty, social inequity, and power relations as objectively real and in some way causally efficacious phenomena (Smith, 2005:3).

This philosophical contradiction is a result of the constructivist denial of an objective reality beyond human knowing, where "objects cannot be understood in any other way than through their discursive articulation; unless they are discursively articulated then one simply cannot say anything about them" (McAnulla, 1998:7). A critical realist orientation is able to unravel this contradiction because whilst it suggests a subjective epistemology it insists on an objective reality.

3.4 A CRITICAL REALIST PHILOSOPHICAL ORIENTATION

Critical realism is a philosophy developed by Roy Bhaskar which posits a subjective epistemology yet insists on an objective ontology. That is, we may know something

and our knowledge is fallible and stands to correction (following immanent critique), yet it nonetheless refers to a reality that exists and acts independent of our knowing. Bhaskar argues "that knowledge is a social product… but that the objects of which, in the social activity of science, knowledge comes to be produced, exist and act quite independently of men" (2008:6).

Whilst our knowledge is "real", he suggested that it is transient and occupies a different dimension (and domain) of reality from such enduring intransient objects of knowledge. Objects in reality may occupy the transient or intransient dimension. In theorising, social scientists are participating in the discourse of their field which attempts to explain a pre-existing reality. Past theories constitute an object of knowledge as much as the item in itself.

> These two aspects of the philosophy of science justify our talking of two dimensions and two kinds of 'object' of knowledge: a transitive dimension, in which the object is the material cause or antecedently established knowledge which is used to generate the new knowledge; and an intransitive dimension, in which the object is the real structure or mechanism that exists and acts quite independently of men and the conditions which allow men to access it (Bhaskar, 2008:6).

Table 3.1 illustrates Bhaskar's three domains of stratified reality. Our knowledge of events and objects occupies the domain of the empirical, in that they represent our experiences. Our experiences also have an "actual" (as well as mental) reality, and, together with events, occupy the domain of the actual. The domain of the real houses the intransitive objects of reality (i.e. not the objects of human thought), which comprise mechanisms, events and experiences. Generative mechanisms are the tendencies of objects to behave in a certain way, and they "combine to *generate* the flux of phenomena that constitute the actual states and happenings of the world" (Bhaskar, 2008:37). "Happenings" are events that take place irrespective of our perception or

knowledge of them, yet some are experienced. Bhaskar (2008; 1979) argues, in reaction to positivist experimentation with closed systems, that reality is stratified and layered, a complex open system where objects, and indeed generative mechanisms, inter(re)act, enabling or inhibiting the outcome or event. Morgan clarifies that "events are variable, systems are open precisely because given causal powers may not be activated or may be offset by others or may act in combination in a way that they do not in other combinations or alone" (2005). The event is itself the result of emergent generative mechanisms within a specific context.

Table 3.1: Bhaskar's three domains of reality (2008:2)

	Domain of real	Domain of actual	Domain of empirical
Mechanisms	✓		
Events	✓	✓	
Experiences	✓	✓	✓

The critical realist argument is transcendental in that it asks what the world must be like in order to make sense of human cognition. It is a type of classical induction where the structure of the system is inferred from its properties. This justifies a subjective, socially constructed epistemology yet simultaneously stresses the realist ontology, because it begins with a query regarding the nature of the world. Asking, after the fashion of positivist and constructivist research, *how* we can know something is to fall foul of the epistemic fallacy. This is when statements about being are reduced to statements about knowing, and ontology is thus dissolved into epistemology. Critical realism's transcendental argument is able to avoid the epistemic fallacy by basing

knowledge on a real world which is independent of thought (yet which includes the phenomenon of thought). "This argument shows that real structures exist independently of and are often out of phase with the actual patterns of events. Indeed it is only because of the latter that we need to perform experiments and only because of the former that we can make sense of our performance of them" (Bhaskar, 2008:2).

3.5 THE RELATIONSHIP BETWEEN SOCIETY AND THE INDIVIDUAL

Bhaskar (1979) notes that society as an object of study represents a special case, as the investigator necessarily partakes of that being studied. This forms an important axiom of the structure-agency debate within a critical realist orientation, as:

> …it [critical realism] can sustain the *transfactuality* of social structures, while insisting on their *conceptuality* (or concept-dependence) [and] it can sustain the *intransitivity* of both beliefs and meanings, while insisting on their susceptibility to scientific explanation and hence *critique*, in a spiral (rather than circle) which reflexively implicates social science as a moment in the process that it explains (Bhaskar, 1979:28).

Society, the critical realist argues, is not analogous to the individuals who constitute it, as its structures, institutions and conventions necessarily precede all individuals. Rather, society is an expression of the sum of the relations between individuals and groups. However, neither does society dictate or determine the actions of individuals: there is, instead, a relationship between the two where social structures emerge over and through time, and influence or "condition (not determine) social interactions" (Mutch, 2005:783). Figure 3.1 reproduces Bhaskar's transformational model of the society/person connection which illustrates these relationships:

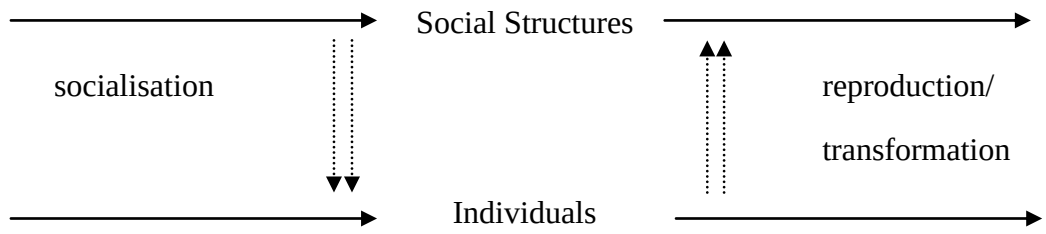

Figure 3.1 Bhaskar's transformational model of the society/person connection (1979:46)

Archer's argument is to "insist that how the world is has a regulatory effect upon what we make of it and, in turn, what it makes if us. These effects are independent of our full discursive penetration, just as gravity influenced us, and the projects we could entertain, long before we conceptualised it" (Archer, 2000:12). In turn, individuals may transform social structures. Bhaskar (1979) provides the example of language, suggesting that whilst speech is governed by the rules of grammar, grammatical rules do not dictate what is said. It could be further suggested that general language usage transforms the language, such as when sub-culture language permeates into mainstream. The point being made is that, whilst individuals are partly formed by social structures and institutions, they also have the capacity (over the *longue duree*) to transform or modify those social structures and institutions. "Structure, it is argued, necessarily predates agency, and elaborations of structure necessarily post-date these actions" (McAnulla, 1998:7).

In this model, "society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce or transform, but which would not exist unless they did so" (Bhaskar, 1979:45). Archer is more explicit in accommodating such change over time and her "morphogenetic cycle" (see Figure 3.2) "incorporates time as

a theoretical variable in its own right, rather than merely as a medium through which events take place" (McAnulla, 1998:7).

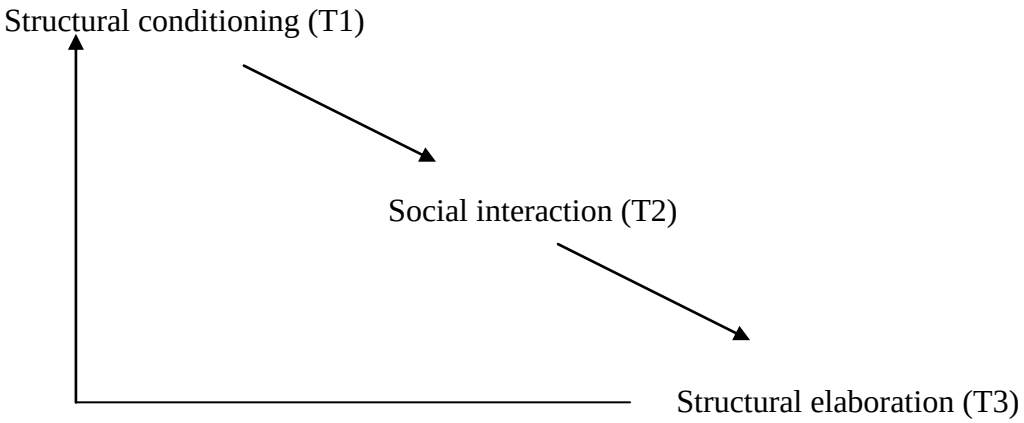

Figure 3.2: Archer's morphogenetic cycle (McAnulla, 1998:9)

One strength of Archer's model is that the ideational aspects of social life are given a clearly defined and significant function in that culture, together with structure and agency, are key meta-theoretical concepts (McAnulla, 1998). Archer argues that the culture-agency relationship is analytically similar to the structure-agency relationship, but stressed that they are ontologically different. Thus, both (structure and culture) should be seen as relatively autonomous, and conflation between the two must be avoided. McAnulla clarifies this further by developing the morphogenetic cycle into "a combined three part cycle of change" (illustrated in Figure 3.3).

In summary thus far: critical realism as a philosophy insists on an objective ontology and a subjective epistemology. Reality is stratified into three domains of the real, the actual, and the empirical. Through our senses we experience events and using *a posteriori* reasoning can conclude that they are the result the generative mechanisms of

actual objects. More correctly, the emergent properties of the objects of the real are the result of a myriad of generative mechanisms, enabled or otherwise, within an open system. Social systems are similarly structured and exhibit similar mechanisms, yet they are also further perpetuated and transformed through human agency. An eLearning environment is an example of such a social system and it might therefore benefit from a critical realist analysis.

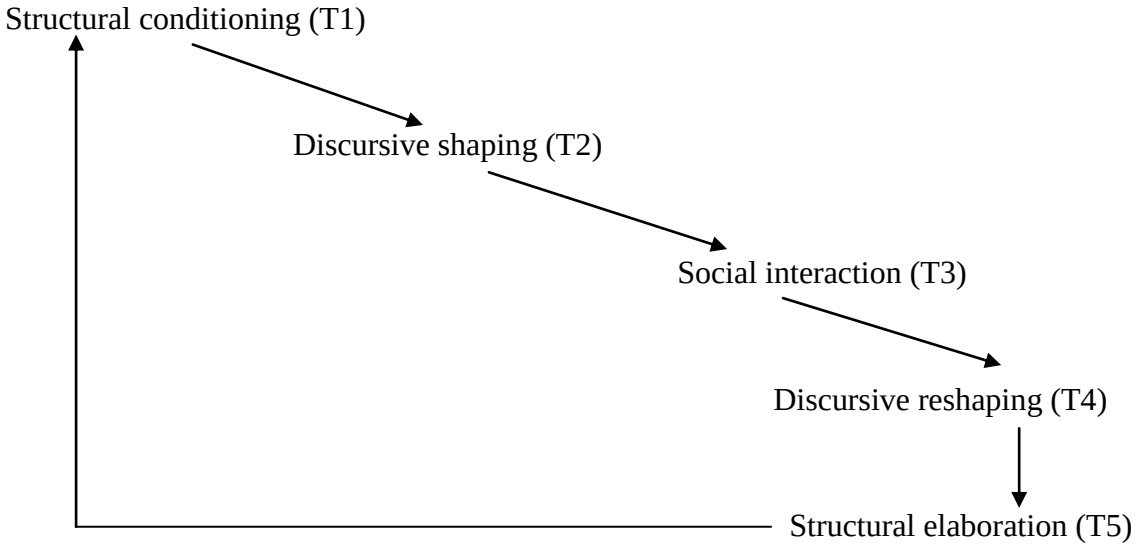

Figure 3.3: McAnulla's combined three part cycle of change (1998:11)

3.6 CRITICAL REALIST RESEARCH

The overall goal of critical realist research is an understanding and explanation of the generative mechanisms at play within a given context. This can be achieved through an analysis of the emergent properties of the enduring mechanisms. "The aim of realist research is to develop a better understanding of these enduring structures and mechanisms" (Dobson, 2002:10). Bhaskar characterises science as "concerned with both taxonomic and explanatory knowledge: with what kinds of things there are, as well

as how the things there are behave (2008:8). Carlsson (2003) develops the leitmotif "perspicuity of explanation" in characterising critical realism as an attempt to understand the social world through the identification of the structures at work in the events and discourses we experience. Bhaskar's transcendental argument suggests a retroduction from an unexplained phenomenon to a hypothesis about a mechanism which might be present to generate it (Smith, 2005). He explains this as a cyclical process where a dialogic relationship is developed between theory and empirical data with the purpose to test and refine the theory. The process itself creates understanding through clarifying explanations of the underlying structures and mechanisms that co-determine a contextualised empirical outcome. Bhaskar explains this schema of scientific development as follows:

> Typically, then, the construction of an explanation for, that is the production of the knowledge of the mechanism of the production of, some unidentified phenomenon will involve the building of a model, utilising such cognitive materials and operating under the control of something like a logic of analogy and metaphor, of a mechanism, which *if* it were to exist and act in the postulated way would account for the phenomenon in question (a movement of thought which may be styled "retroduction") (1979:15).

Explanation is vitally important for the critical realist researcher as it is through clarifying, refining and developing (social) scientific explanations that theory is itself advanced. Bhaskar argues that science does not amount to the gathering or falsifying of facts, but rather concerns itself with the "understanding of the different mechanisms of the production of phenomena in nature" (2008:153). Such explanations constitute one of two kinds of science work:

> …practical (experimental and technical) work, in which the scientist's causal and perceptual powers are augmented (the latter with the aid of the construction of sense-extending equipment, such as microscopes); and theoretical work, in which the scientist's conceptual and descriptive powers are augmented. It is the aim of the former to produce the object, i.e. to render the thing or behaviour directly accessible to the scientist's senses (so that it becomes the possible object of an act of immediate demonstrative

> reference). And it is the aim of the latter to produce the concept of the object, so that the scientist is capable of an adequate description of it (Bhaskar, 2008:169).

3.7 MODELLING AS A RESEARCH TOOL

Bhaskar's (2008) notion of explanation is important for two reasons. Firstly, it distinguished the scientific endeavour as "work" (or praxis, to be discussed later in this chapter), and secondly it categorised that work as "creative model-building and rigorous empirical-testing" (Bhaskar, 2008:163). Bhaskar views models as a necessary part of science, not only as heuristic devices but also to aid the development and growth of theory (2008:147). "The subject of such models is the unknown but knowable intransitive structure of the world", which become known through scientific research (testing) (Bhaskar, 2008:151). Bhaskar has been criticised in that his use of concepts such as "structure", "mechanism" and "law" are unclear or ambiguous (Baëhr, 1990:771). This may be because of his use of metaphor and analogy, or that he is discussing very complex issues in a complex philosophical treatise. Franck's (2002) multidisciplinary work develops the modelling process described by Meehan, who suggests that "a system explanation can be viewed as a formal pattern, a map that can be imposed or overlaid on the empirical world" (Meehan, 1968:63). Although Bhaskar would use the term "domain of real" rather than "empirical world" (which is not in any way related to Bhaskar's "domain of empirical"), the process involved is similar: the postulated or theorised pattern or model is empirically tested. Franck also drew on the map metaphor in using the example of the London Underground line maps to clarify the notion of a model (2002). Whilst the line maps look nothing like the actual track topography, they do enable the user to understand the underground mechanism and to use it successfully to travel from one point to another.

Franck describes a model as "the architecture of functions" (2002:88), which would represent the hypothesis of present and active mechanisms. He suggests that social mechanisms generate observed properties, and thus a system's formal structure can be inferred from observed properties (Franck, 2002:234). Franck's modelling process is summarised as follows:

> (1) Beginning with the systematic observation of certain properties of a given social system, (2) we infer the formal (conceptual) structure which is implied by those properties. (3) This formal structure, in turn, guides our study of the social mechanism which generates the observed properties. (4) The mechanism, once identified, either confirms the advanced formal structure, or indicates that we need to revise it (Franck, 2002:295).

This bears a striking similarity to Bhaskar's RRRE model of explanation in open systems:

1) Resolution of a complex event into its components (causal analysis);
2) Redescription of component causes;
3) Retrodiction to possible (antecedent) causes of components via independently validated normic statements; and
4) Elimination of alternative possible causes of components (1979:165).

It has been argued that Franck's (2002) work on modelling clarifies the term social mechanism by representing it as having both formal and practical aspects (Pratt & Gutteridge, 2006). The formal aspect is characterised as a system of functions without which the phenomenon will not take place, whilst the practical aspect shows the means whereby these functions are carried out in an actual social situation. Again, this is a clarification yet not a departure from Bhaskar. Bhaskar refers to the powers of mechanisms and objects as tendencies (1979; 2008), yet uses the term in two distinct senses. In the primary sense tendencies referred to powers which may or may not be exercised (fire), or may be exercised unrealised, yet it is used in another sense:

> …not just to normically qualify the exercise of a power; but to say that some of the intrinsic enabling conditions of a relatively enduring kind for the power's exercise are satisfied; that the thing is predisposed or oriented towards doing it, that it is in something of a state or condition to do it (Bhaskar, 2008:222).

He tries to clarify this with the metaphor that all men have the power to steal, yet kleptomaniacs have the tendency to do so. The important point is that the complexity of open systems is being highlighted, and that generative mechanisms require further contextual conditions to induce their firing. Both Franck and Bhaskar indicate the importance of context in the modelling process. This echoes Smith, who suggests that a critical realist approach allows for "non-Humean non-universalistic theories that explain and are generalisable while *insisting on the importance of the local context and social diversity*" (2005:4). In a sense, in an eLearning environment there is an interaction of systems, where mechanisms combine and either enhance, enable, or disable, triggering emergent properties.

A central tenet of critical realism is that an understanding of the complex underlying mechanisms allows the researcher to work sensitively towards transformation. According to Bhaskar, social science "always consists in *practical intervention* in social life" (1986:169). Smith (2005) (who also cites Pawson and Tilley, 1997) and Carlsson (2003) posits "context-mechanism-outcome configurations", where the researcher postulates the working of a mechanism firing within a particular context. It is represented by the formula: Context (C) + Mechanism (M) = Outcome (O).

> In an eLearning environment critical realism aims to expose the working of the processes with which the *actors* must engage. The researcher, then, seeks to determine what works best for whom in which environment, the designer implements (builds) the suggestions (hypotheses), whilst the learner interacts with the course as an eLearning environment (Gutteridge, 2006).

Thus the eLearning researcher investigates the learning environment in a cyclical process where the learning environment is refined through a dialogic relationship (critique) between theory and empirical data. How the mechanisms under scrutiny work, and within which contexts constitute underlying themes throughout Patterson's (2005) search for the functions of mechanisms within each context. Indeed, it echoes Carlsson's approach: "the aim of IS [information system] research is to produce ever more detailed answers to the question of *why* an IS initiative works (better) for *whom* and in *what* circumstances" (2003:11).

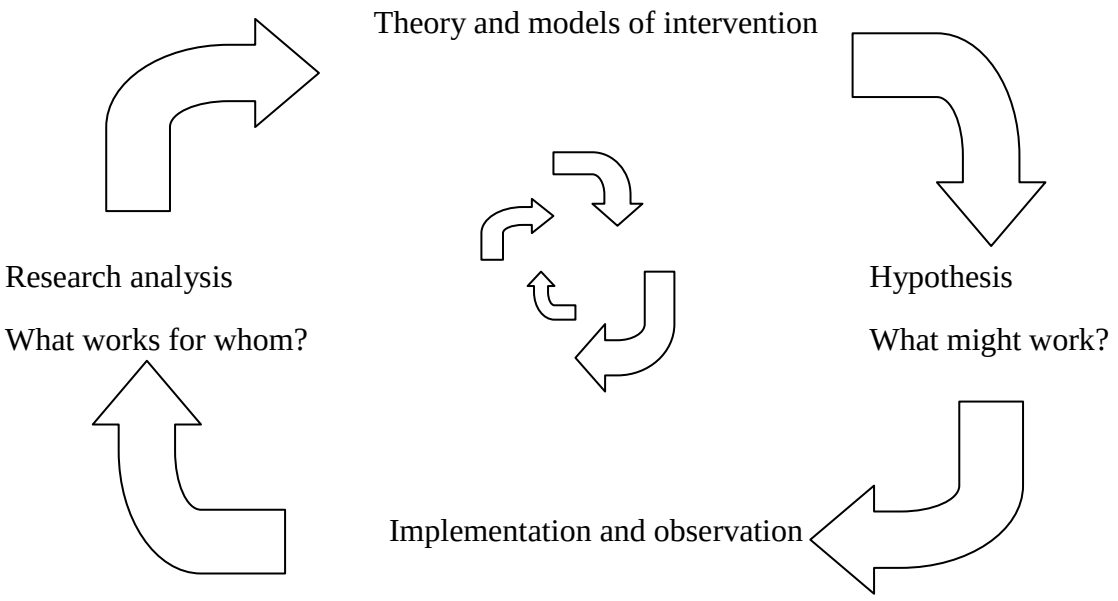

Figure 3.4: Critical Realist Research

The CMO configurations also drive action research, as a refined CMO configuration is the result or output of realistic evaluation research (Carlsson, 2003). Research is a cyclical process where we refine our learning environments through a dialogic relationship between theory and empirical data. The "CMO abstractions can be used as analytic frameworks which then can be tested and refined in a new case study situation"

(Smith; 2005). This is represented in Figure 3.4, which draws on Carlsson's (2003) multi- method data collection.

To gain an understanding of the mechanisms in the eLearning process it is necessary to model the process. This would entail hypothesising functions inferred from the properties of the system. Following Franck (2002), Pratt and Gutteridge (2006) suggest that two models are necessary: a theoretical model showing the general social functions, and an empirical model showing the means whereby these functions are carried out in actual eLearning environment.

3.8 AN EMPIRICAL MODEL OF BLENDED LEARNING DELIVERY

This research project built upon the theoretical model of communicative functions developed by Pratt (2007). Her model is descriptive rather than prescriptive in that it shows *what* functions are carried out rather than *how* they are carried out, and it may be adapted for use as a theoretical model of learning. Pratt posited five communicative functions which can be generalised for a learning process:

- **Contextual:** This function relates to the social context in which knowledge is constructed, and requires the course designer to decide how learning is to be contextualised.
- **Ideational:** This function relates to the source of the knowledge to be constructed, or the process whereby knowledge actually comes into being (it also raises the question of course content).
- **Interactive:** As knowledge is constructed in learning interactions (including interactions with resources), the course designer needs to anticipate how participants will interact in constructing knowledge.
- **Social:** The social parameters, conventions or constraints operating in a given learning situation need to be identified and made explicit to learners, particularly in respect of local assessment criteria.
- **Reflexive:** This relates to how participants will reflect on and assess their performance in constructing knowledge, and includes the issue of formal

assessment (if any) and how it will be carried out, as well as course assessment (Pratt, 2007:712).

An empirical model of a blended learning delivery system built on the above should not only reflect the five theoretical functions (postulated above), but also the myriad of inputs brought to the system by the learner. In this sense the empirical model is laid over the theoretical model (see Figure 3.5) such that the empirical model describes how the functions are achieved within the particular context, yet also necessarily takes account of the user's input factors.

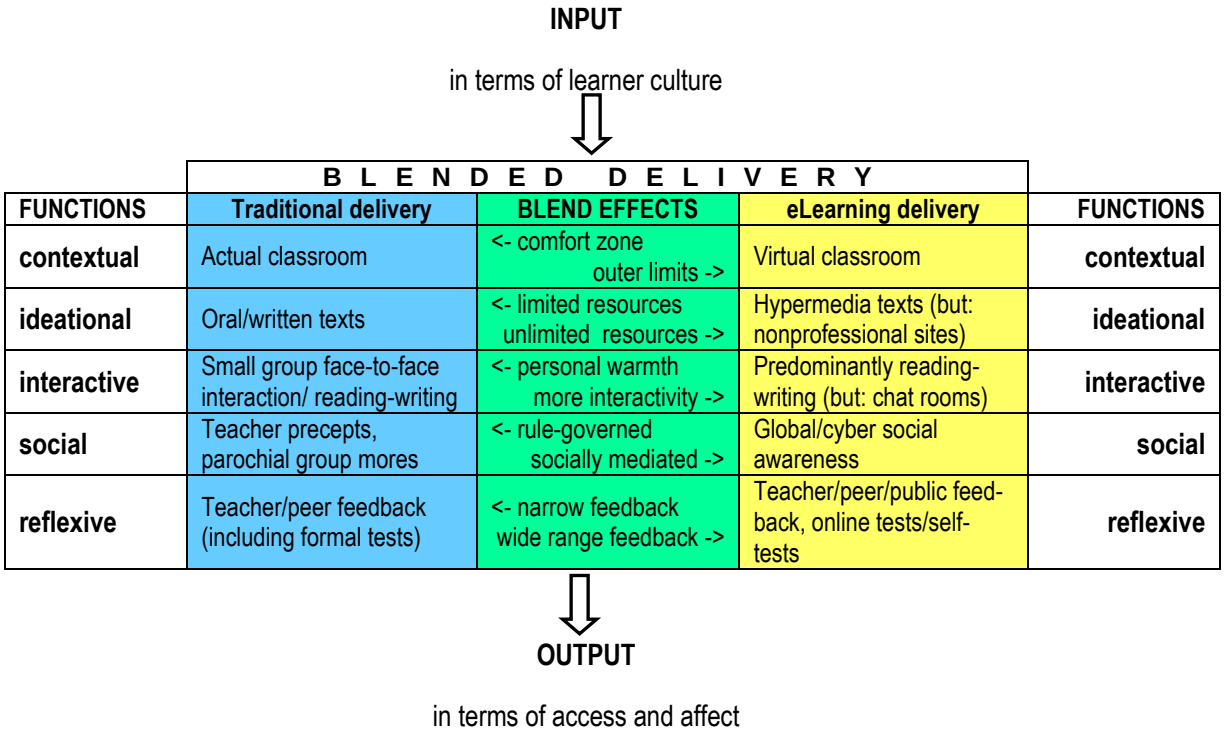

Figure 3.5: (Draft) empirical model of a blended learning delivery system (Gutteridge, 2006)

Chapter 2, Literature Review, indicated that the effect of the blended delivery is more than the sum of its parts as aspects may combine (influence) in unexpected ways. Thus,

an exhaustive model is improbable, yet in the pursuance of this research project the author suggested a tentative hypothetical model to illustrate some of the main effects of the blended delivery system in terms of influences that might be enhancing or inhibiting, or complementing or compensating (Gutteridge, 2006). The model attempted to map the functional value of the systemic influences within the context of the PRINTS Project. It was thought to improve on previous models of blended learning "as it postulates particular cultural influences measured against access to learning resources and affect (i.e. emotional response to the learning experience)" (Pratt & Gutteridge, 2006:8). The model enabled the identification and explanation of mechanisms through an analysis of the functions of the system. Furthermore, it accommodated both intrinsic and extrinsic factors in that the input is informed by the learner's own values within the compulsion to complete course tasks or engage in a socially acceptable manner.

3.9 CONCLUSION

This chapter explained that a constructivist teaching and learning orientation enhances the process for the learner, and therefore represents an improvement from the positivist paradigm. However, from a research perspective constructivism poses problems, notably its focus on individuals and the epistemic fallacy. The ensuing plurality of worlds is unable to support justification for the introduction of teaching enhancements (i.e. interventions). Critical realism was proposed as a research orientation that can overcome such contradictions. Proponents of critical realism claim that its transcendental argument avoids the epistemic fallacy by positing an objective ontology and allowing a subjective epistemology. Bhaskar's stratified view of reality suggests we experience events that are the products of generative mechanisms, admitting that the mechanisms are categorically independent of us and may be unknowable, meaning that

there may be unperceived instances of their properties. A critical realist research orientation seeks to explain generative mechanisms so as to foster a better understanding of the emergent properties and thereby further knowledge. In an eLearning environment the aim is to expose the working of the processes with which the *actors* must engage. The researcher seeks to determine what works best for whom in which environment, and the designer implements the suggestions by applying what has been learnt so as to transform and enhance the eLearning environment. "Critical realism is highly compatible with the scaffolded constructivist approach which has proved so effective in the Comm. Skills Online course, but has additional ontological dimensions which are helpful in pointing the way to social transformation" (Pratt & Gutteridge, 2006:2). It allows for the possibility of known properties through perspicuity of explanation which can be aided through a modelling process. Testing, it was argued, affirms the positive ontological status of the research model. A transformational model of society was explained through a brief discussion of the structure-agency debate. An initial empirical model of blended learning delivery was illustrated and clarified. The modelling process employed in this research project was guided by the philosophical orientation explained in this chapter, whilst the empirical model informs the methodology and directs the analysis. The empirical model is further discussed and developed in Chapter 5, Findings and Data Analysis, and Chapter 6, Conclusions.

Chapter 4: Methodology

4.1 INTRODUCTION

In elucidating the methodology used in this research project, this chapter discusses the relationship between quantitative and qualitative research methods. The general discussion will suggest that social researchers are not left with a choice between the two methods, but may adopt elements of both. The methodology utilised in this research project is clarified towards the end of the chapter.

4.2 THE RESEARCH PROCESS

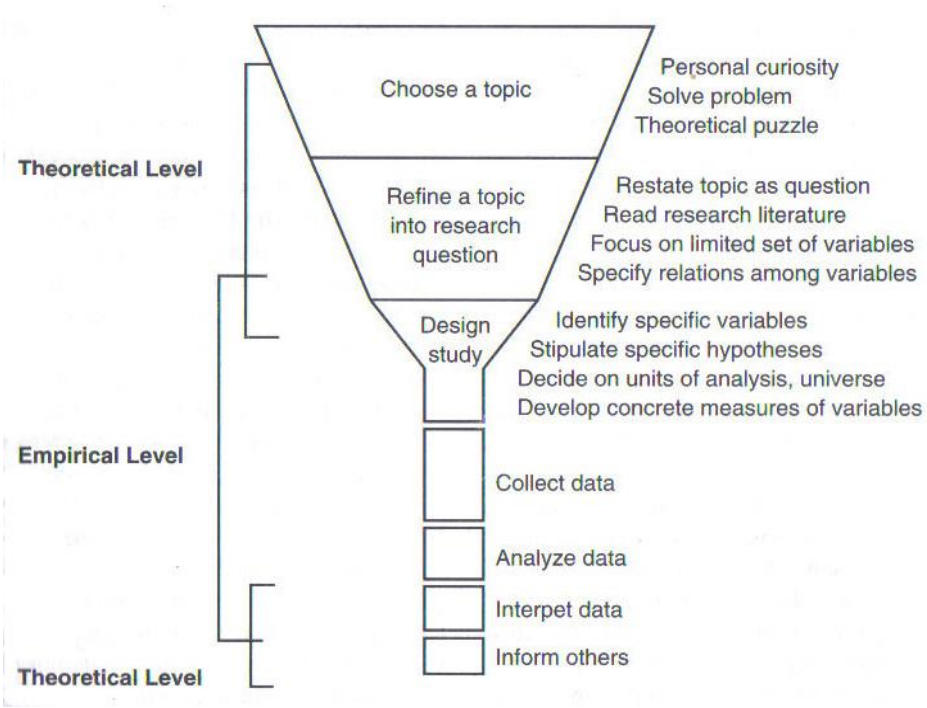

Figure 4.1: The research process (Neuman, 1997:125)

Neuman explains that whilst research is not a "mechanical process", it follows accepted general principles (1997:xiii). The researcher aims to uncover knowledge through a

process that is valid and reliable; the results of research must be objective and generalisable. In this way knowledge is advanced and understanding is enhanced. Figure 4.1 suggests how the research process is developed. Much of the literature from a decade ago displayed a dichotomy between quantitative and qualitative research methods. Before addressing that issue it is necessary to clarify each in turn.

4.3 QUANTITATIVE RESEARCH

Quantitative research uses (hard) scientific experimental methods and measures to test hypothetical generalisations (Hoepfl, 1997:47). It employs a "positivist approach, with its goal of discerning the statistical regularities of behaviour, … oriented toward counting the occurrences and measuring the extent of the behaviours being studied" (Olsen, 2000). The central focus of quantitative research methods is on "variables, hypotheses, units of analysis, and causal explanation" (Neuman, 1997:106). A research problem is developed into a hypothesis which is then tested under experimental (i.e. closed system) conditions. These conditions aim to isolate the variable(s) under scrutiny so as to exclude the influence of any other factors. The experimenter hopes to determine a relationship, usually causal, between two or more variables. Quantitative research uses deductive logic; it starts with theory, develops a hypothesis and uses experiment to confirm the hypothesis. Quantitative research is premised upon conceptualising sociological factors as variables and the development of objective, precise measures that can depict crucial features of our world (Neuman, 1997).

4.4 QUALITATIVE RESEARCH

The qualitative researcher primarily utilises inductive logic and data analysis. Through detailed observation (empirical data), the qualitative researcher moves toward abstract

ideas and theories. Qualitative research is non-positivist, relying mainly on interpretive and critical approaches characteristic of both the constructivist and critical realist orientations (Neuman, 1997:328). It "seeks to understand phenomena in context specific settings" rather than under experiment conditions (Hoepfl, 1997:47). In this way it accepts that the social world is complex and dynamic, but through the understanding provided by theories, may be extrapolated to similar contexts and settings. Olsen noted that the early literature defined qualitative research in opposition to quantitative research, but that it has more recently been described as "holistic, environmental, or contextual; inductive or dialectical; pluralistic or relative" (2000). Table 4.1 summarises the differences between quantitative and qualitative research methods.

Table 4.1: Differences between quantitative and qualitative research methods (Neuman, 1997:329)

Quantitative	Qualitative
Test hypothesis that the researcher begins with.	Capture and discover meaning once the researcher becomes immersed in the data.
Concepts are in the form of distinct variables.	Concepts are in the form of themes, motifs, generalisations, taxonomies.
Measures are systematically created before data collection and are standardised.	Measures are created in an ad hoc manner and are often specific to the individual setting or researcher.
Data are in the form of numbers from precise measurement.	Data are in the form of words from documents, observations, transcripts.
Theory is largely causal and is deductive.	Theory can be causal or noncausal and is often inductive.
Procedures are standard, and replication is assumed.	Research procedures are particular, and replication is very rare.
Analysis proceeds by using statistics, tables or charts and discussing how what they show relates to the hypothesis.	Analysis proceeds by extracting themes or generalisations from evidence and organising data to present a coherent, consistent picture.

4.5 COMBINING QUANTITATIVE AND QUALITATIVE METHODOLOGIES

There are distinct differences between quantitative and qualitative research, especially in terms of approaches to the research project, data collection methods, and tools of analysis. Nevertheless, Hoepfl cites Patton (1990), Strauss and Corbin (1990), and Russek and Weinberg (1993) to suggest that quantitative and qualitative methods can be effectively combined in a research project (1997:48). To justify that they are complementary, Neuman explains that "the logic of qualitative research does not forbid the use of numbers, statistics, and precise quantitative measurement; such quantitative data can be a source of information which supplements or complements qualitative data" (1997:335-336). Olsen maintains that data "can be analysed in either a quantitative or qualitative manner" and cites Fidel (1993) to suggest that verification can be achieved through measuring the same qualities with multiple methods (2000). Quantitative analysis might then add depth to a qualitative survey inasmuch as rigorous statistical data qualitatively interpreted could be used as a form of triangulation, adding to the validity and reliability of the qualitative research project.

Whilst the research process may not be mechanical it is nonetheless informed by the philosophical foundations (i.e. theory) of the field of study. Neuman describes theory as "a system of interconnected abstractions and ideas that condenses and organises knowledge" (1997:37). His argument in the early chapters of his work introducing social research methodology suggests that the choice between qualitative or quantitative methods hinges upon the basic philosophical framework of the researcher. Such theories contain a discourse of concepts, classifications and relationships, but also core assumptions. Neuman (1997) considers the positivist, interpretive and critical stances to show how each has different fundamental notions, such as the nature of reality, truth,

and knowledge, as well differences in approaches or preferred methods. In this way the methodological approach is often influenced by the orientation or paradigm of the researcher. Hoepfl agrees, stating that each theoretical paradigm embodies an intrinsically different enquiry paradigm, and that the researcher's actions are based on the underlying assumptions of each paradigm (1997:47).

Whilst Hoepfl (1997) recommends a qualitative approach and Neuman (1997) is content to advocate a pluralistic blend of approaches, Olsen (2000) suggests that the debate in the choice between quantitative and qualitative methods is clouded by weak definitions and a focus on methods rather than basic assumptions. She asserts that "methodology and epistemology are wedded together [and that] methodology develops from the researcher's ontological and epistemological stance" (2000). Olsen argues that the quantitative approach is problematic because of its (Cartesian) dualistic nature; positivist research separates the researcher (as subject) from the object of study because of the ontological and epistemological assumptions of that paradigm (2000). This is apparent in the quantitative researcher counting occurrences of an event or variable among the sample within a controlled environment. Olsen argues that qualitative researchers avoid the subject/object split by immersing themselves into the context of the project, and the methodology follows. The approach to the project is determined by the assumed meta-theoretical underpinnings. She concludes that rather than declare a quantitative or qualitative methodology, researchers need to clarify their epistemological and ontological stances. That is, "as researchers we need to define, however fleeting our beliefs in reality/ies and how we come to know" (Olsen, 2000).

This implies that an astute awareness is required on the part of the researcher, yet such awareness goes beyond meta-theoretical issues. Irrespective of the stance or paradigm chosen, the researcher should also be aware of any shortcomings or problematic areas inherent in the methodology. Some issues are relevant to both quantitative and qualitative methods, whilst others are more relevant to one or the other. Some problematic areas relevant to this research project will now be discussed.

A researcher employing a quantitative method should beware of the ecological fallacy, where the unit of measure does not match the unit of analysis. Neuman explains this as being "due to imprecise reasoning and generalising beyond what the evidence warrants" (1997:114). Such reasoning is fallacious because what happens at one level of analysis may not hold true for another level. For example, if the researcher wishes to understand the behaviour of an individual, then she or he should not measure groups of people or entire populations. A related problem is the error of reductionism where the extrapolation is from the lower, or micro, unit of analysis to conclusions regarding higher, or macro levels. Both of these errors can be avoided through careful matching of units of analysis with the units of explanation or conclusions.

The quantitative researcher is constantly striving for objectivity, creating a myriad of checks and balances to ensure that it is achieved. The closed system experimental condition of such research is aimed at excluding researcher bias. The qualitative researcher, on the other hand, acknowledges that the inquirer is part of the research process, and needs to "shift the focus from eliminating researcher bias to developing the relationship with the respondent" or object of research (Olsen, 2000). This is a corollary of qualitative research focusing on context: the researcher is part of the

project. Furthermore, Neuman stresses that social research is rarely able to discover "objective facts" as social contexts contain much ambiguity (1997:72). There are many authors who questioned the very concept of objectivity or value-free research (Mannheim, 1936; Weber, 1949; Moore, 1973; Gouldner, 1976 [cited in Neuman, 1997]; Lincoln and Guba, 1985; Patton; 1990; Eisner; 1991 [cited in Hoepfl, 1997]). Neuman clarifies the fact that, given that the research process relies upon preceding theory, it cannot be value free, and thus all researchers should make their values explicit: "researchers *must* be unbiased (i.e., neutral and devoid of personal opinion and unsupported views) when applying accepted research techniques and focus on the means or mechanisms of how the social world works, not on ends, values, or normative goals" (1997:471). Hoepfl (1997) adopts Patton's (1990) "empathic neutrality" which strives for empathy towards the objects of study and neutrality towards the findings of the study, and suggests that "a researcher who is neutral tries to be non-judgemental, and strives to report what is found in a balanced way" (Hoepfle, 1997:60).

Both Neuman and Hoepfl imply that the issue of researcher bias can be overcome through validation and confirmability, which constitute terms or criteria for judging qualitative research (Neuman, 1997:369 - 370; Hoepfl, 1997:60). Qualitative research cannot rely upon the same quality criteria as quantitative research which by its nature is confirmable through experiment replication. Replication in qualitative research is not possible because of its focus on context, yet that is not to say that the quality of the work cannot be assessed. Neuman describes validation as the ability of the research to accurately depict or represent the social world of the object of study. Hoepfl draws on Lincoln and Guba (1985) to describe confirmability as the degree to which the research findings and conclusions can be demonstrated as neutral. To achieve this it is necessary for the researcher to carefully document the context, setting, procedure and other

methods, and these field notes can form the basis of "an 'inquiry audit' in which reviewers examine both the process and the product of the research for consistency" (Hoepfl, 1997:59).

4.7 RESEARCH VALIDITY

Triangulation is a concept that adds validity to quantitative data and dependability and credibility to qualitative data. Within a quantitative methodology triangulation refers to the replication of an experiment by another researcher to confirm the original research findings. Because a qualitative methodology precludes experiment replication, triangulation within this paradigm takes a different route. The qualitative researcher can make use of multiple data sources to enquire whether the same findings are reached. Similarly, a qualitative research project may also employ multiple analysts, or make raw data available to outside analysts (Hoepfl, 1997:58).

Whilst quantitative researchers strive for generalisability (prediction), the qualitative researcher aims for transferability. In essence qualitative research is not generalisable because of its focus on context; no two settings are the same. However, the findings may present a limited transferability inasmuch as a reader may determine whether they are applicable in a new setting. Again, meticulous recording of the context and procedures will enable any such reader to make this determination.

4.8 METHODOLOGIES EMPLOYED IN THIS PROJECT

This research project employed both quantitative and qualitative methods in terms of data collection techniques and data analysis techniques. Data collection techniques included:

1. Surveys
2. Case studies
3. Interviews
4. Observation
5. Document analysis

4.8.1 Surveys

Surveys are able to provide both quantitative and qualitative data depending on the type of analysis employed. They are able to supply statistical data as well as lending themselves to rich interpretive analysis. This project used survey data to indicate respondents' demographics, prior computer usage and current perceived expertise. Two formal surveys were conducted: an initial survey, and a final survey. The survey data were also qualitatively interpreted to find any underlying factors that might be relevant to this research project.

4.8.2 Case studies

The case studies required self-selected respondents to complete a list of tasks at an internet enabled computer. The researcher was not present during these tasks but the respondents' activities were video-recorded for later analysis. A video protocol analysis (VPA) is able to record the computer-human interaction through showing both screen shots and the participants' non-verbal communications. One of the main purposes of this observation was to measure actual competencies against perceived expertise; however, it also yields rich data within a narrow sample. After completion of the protocol, the respondents were interviewed to address any issues raised during the completion of the tasks. The VPA play-back was particularly useful in aiding

participant recall. The data yielded by the VPA provided a valuable adjunct to the data gleaned from surveys, interviews and general observations.

4.8.3 Interviews

The interviews employed in this research project were individual interviews, semi-structured and generally open-ended. They were aimed at covering aspects required or considered important by the researcher and also to allow the respondents to provide their own feelings and opinions. The interviews were audio-recorded.

4.8.4 Observation

Observation of the study group took place in the classroom (computer lab) settings, and allowed for full description of the context of the study and the activities of the respondents. Hoepfl explained that "observation can lead to deeper understandings than interviews alone, because it provides a knowledge of the context in which events occur, and may enable the researcher to see things that participants themselves are not aware of, or that they are unwilling to discuss" (1997:53). Researchers cannot be unobtrusive when acting as facilitators within a classroom setting, however.

4.8.5 Document analysis

Document analysis was conducted by way of reviewing the participants' scores in the course. These were compared to average scores attained by similar groups who were exposed to the traditionally delivered course. The similar groups included Engineering students and the previous year (2005) PAT students.

4.9 CONCLUSION

The above data collecting methods were applied within the philosophical stance and modelling process described in Chapter 3, Research Orientation. The (draft) empirical model of a blended learning delivery system (Figure 3.5) informed and guided the analysis of data. In the course of this process, the empirical model was refined and further developed, as key factors which impacted on the blended course delivery mechanism were identified. The research was aimed at identifying the socio-cultural input factors, in terms of enhancing or inhibiting attributes, by mapping the output properties of the empirical model.

Chapter 5: Findings & Data Analysis

5.1 INTRODUCTION

This chapter initially discusses findings from the quantitative methodologies, that is, the initial and final surveys, the assessment comparisons and the VPAs (case studies using video protocol analysis with ensuing interviews). A discussion accompanies the statistical data, and thereafter a more qualitative analysis will also incorporate the classroom observations and other discussions. Chapter 4, Methodology, explained that quantitative and qualitative methodologies might serve to complement each other. To this end, this chapter interprets and attempts to explain the significance of the statistical findings. Further, the rich and detailed data collected during interviews, informal discussions and classroom observation are discussed. All discussion in this chapter is informed by the researcher's readings (included in Chapter 2, Literature Review), and guided by the research orientation (the philosophical position discussed in Chapter 3, Research Orientation). The aim was to test the empirical model, both in terms of general validity and to discover cultural input factors in relation to this model and thereby uncover the operation of the mechanism/s involved in a blended delivery in the learning environment. To achieve this, it was necessary to hypothesise the nature of the mechanism/s as existing within a model (as discussed in Chapter 3, Research Orientation). Thus this discussion will attempt to add to the empirical model (Figure 3.5) and thereby further develop it. It will include hypothesising the firing (enabling) of enhancing or inhibiting factors within a blended learning delivery system.

5.2 OVERVIEW OF DATA ANALYSIS

Figure 5.1: PAT class 2006

The initial survey was conducted during the second week of term and was completed by fifteen respondents. It served to determine demographic data indicative of cultural background and the respondents' perceived competencies over various platforms. The final survey, completed by twelve respondents, sought collaboration of the initial findings, and further probed the students' thoughts on computer assisted learning. All fifteen students successfully completed the course assessments, and the average scores were compared to those in other traditionally delivered courses. The surveys indicated that the majority of the students were non-English mother-tongue users schooled in a major city, had adequate previous exposure to ICTs at their school, professed confidence in using a computer and the Internet, and showed high perceived abilities in performing ICT related tasks. The case studies involved seven respondents and aimed to review the students' performance in completing basic learning tasks utilising a

computer and the internet. The latter, together with the associated interviews, do not readily lend themselves to quantitative analysis, although some findings are able to be listed (quantified) in this chapter.

5.3 INITIAL SURVEY

All fifteen respondents were registered for a National Diploma in Performing Arts Technology, with two females and thirteen males (see Figure 5.1).

5.3.1 Area of schooling

Area of schooling is significant because a major centre has greater infrastructure than secondary towns, which would therefore influence school ICT provision. Durban is a major centre in the province and it is expected that school ICT infrastructure would be comparable to that found at DUT. Table 5.1 therefore indicates that the majority of the students probably had previous exposure to ICTs at their school.

Table 5.1: Area of secondary schooling

12	Durban	80%
1	Pietermaritzburg	6⅔%
1	Ladysmith	6⅔%
1	Non-response	6⅔%

5.3.2 Learners' mother tongue

The mother-tongue of the research group could be viewed as a clear cultural marker. The learners' mother-tongue tended towards the two main languages of the province.

English, the dominant language of ICT and the internet, was fairly strongly represented in the research group (see Table 5.2). Nevertheless the majority were non-English mother-tongue users. This would indicate that the students do not engage with the ICT system in their home language, and it would be expected that this would detract from the efficiency of the eLearning exchange.

Table 5.2: Students' mother-tongue

7	Mother tongue is isiZulu.	46⅔%
5	Mother tongue is English.	33⅓%
1	Mother tongue is isiXhosa,	6⅔%
1	Mother tongue is Afrikaans.	6⅔%
1	Non-response	6⅔%

5.3.3 Perceived ICT accessibility

All students had access to computers and the internet at the university, yet not all students had the perception that computers were easily accessible (see Table 5.3).

Table 5.3: Perceptions about computer accessibility

6	Computers are accessible.	40%
6	Computers are not accessible.	40%
3	Students were neutral.	20%

The fact that less than half of the research group perceived computers to be accessible to them indicated that the majority of users may approach ICT with hesitation. It is

expected that this too would inhibit the learners' engagement with the learning environment.

Fewer students believed that the internet was accessible to them (see Table 5.4). Because this response tends to neutrality, it becomes very difficult to interpret. The response may be due to a lack of internet skills, or a lack of internet experience. Be that as it may, this finding suggested that a totally online course may be problematic.

Table 5.4: Internet accessibility

4	The internet is accessible.	26⅔%
4	The internet is not accessible.	26⅔%
7	Students were neutral.	46⅔%

5.3.4 Site of ICT access

Whilst all students accessed computers and the internet on campus, more than half of the students also accessed computers elsewhere, as shown in Table 5.5.

Table 5.5: Site of computer and internet access

4	Students access a computer and the internet at home.	26⅔%
2	Students access a computer and the internet at an internet café.	13⅓%
2	Students access a computer and the internet at a public library.	13⅓%

This is a positive indicator, as it showed that more than half the students had accessed ICTs away from their school or university, which would require a higher level of ICT

skills. This analysis was corroborated by the fact that almost half of the students chose to not use the campus computer LANs (see Table 5.6).

Table 5.6: Preferred site of ICT access

3	Students use computers only at home.	20%
1	Students use a computer only at an internet café.	6⅔%
3	Students use the internet only at a public library.	20%

5.3.5 Learner confidence with ICT

The majority of students professed confidence in using a computer, as shown in Table 5.7. Similarly the majority of students professed confidence in using the internet, as shown in Table 5.8.

Table 5.7: Students' perceived computer confidence

10	Students are confident in using a computer	66⅔%
2	Students are not confident in using a computer	13⅓%
3	Students are neutral.	20%

Table 5.8: Students' perceived internet confidence

10	Students are confident in using the internet.	66⅔%
1	Student is not confident in using the internet.	6⅔%
4	Students are neutral.	26⅔%

5.3.6 Perceived ICT abilities

It was expected that the respondents would overestimate their abilities with both computers and the internet. Table 5.9 represents the respondents' perceived abilities on a more specific scale. The students generally showed high perceived abilities in performing an array of ICT related tasks.

Table 5.9: Students' perceived abilities with specific ICT tasks

Task	Unfamiliar		Help needed		No help needed	
Word processor	1	6⅔%	6	40%	8	53⅓%
Spreadsheet	3	20%	9	60%	3	20%
Presentation	4	26⅔%	5	33⅓%	6	40%
Email	2	13⅓%	4	26⅔%	9	60%
Online chat	4	26⅔%	3	20%	8	53⅓%
Games	1	6⅔%	2	13⅓%	12	80%
Web browser	2	13⅓%	3	20%	10	66⅔%
Search for music on internet	2	13⅓%	3	20%	10	66⅔%
Online shopping or banking	5	33⅓%	3	20%	7	46⅔%
Download picture or music	3	20%	2	13⅓%	10	66⅔%
Use antivirus	5	33⅓%	4	26⅔%	6	40%
Send SMS on cell phone	1	6⅔%	3	20%	11	73⅓%
Download ringtones to cell phone	2	13⅓%	2	13⅓%	11	73⅓%

It is noteworthy that the tasks traditionally associated with academic activity, that is word processing, data analysis via spreadsheets, and presentations, showed a lower perceived ability than recreational activities such as internet browsing for music or graphics. The vast majority of students showed a strong perceived ability with cell phone technology. This suggested that the students may be less comfortable in performing formal academic tasks.

5.3.7 Frequency of ICT usage

Although few students used a computer and the internet daily, the majority used them at least weekly, as shown in Table 5.10.

Table 5.10: Frequency of student ICT usage

Computer usage	Daily	4	26⅔%
	2-3 times per week	6	40%
	Weekly	3	20%
	Monthly	0	0%
	Rarely	2	13⅓%
Internet usage	Daily	0	0%
	2-3 times per week	7	46⅔%
	Weekly	5	33⅓%
	Monthly	2	13⅓%
	Rarely	1	6⅔%
Cell phone usage	Daily	14	93⅓%
	Weekly	1	6⅔%

The frequency of computer and internet usage is considered sufficient for students at first year level, as it indicates adequate exposure to ICT. These findings are considered to corroborate the students' perceived ICT abilities. The two students who rarely used a computer spoke either isiZulu or isiXhosa and were schooled in a major city (Durban). This contradicts the expectation of a correlation between area of schooling / previous exposure and the infrequent use of a computer. Similarly, two students claimed to have never used a web browser. Strangely, one of these claimed to use the internet two to three times per week. This is probably the result of not understanding the term "web browser" or the name of the program used in the survey question (Internet Explorer). The student who rarely used the internet claimed to have not used a web browser, which is within the researcher's expectation.

5.3.8 Mother-tongue support on ICT

Whilst almost half the students indicated a belief that the internet supports their mother-tongue, the overall response could be considered neutral (see Table 5.11). This may be because the survey question was not sufficiently clarified in terms of defining "support", or because the respondents represented a limited array of mother-tongue languages.

Table 5.11: Mother-tongue and the internet

7	Internet supports mother-tongue.	46⅔%
6	Internet does not support mother tongue.	40%
2	Neutral	13⅓%

It might seem problematic that less than half the students believed that the internet supported their mother-tongue. Whilst search engine Google accommodates languages such as isiZulu and isiXhosa, there is not much internet content in those languages. This indubitably restricts access to students from such languages. The students were divided on whether the internet favours Western culture, with slightly more (40%) believing that it is. As shown in Table 5.11, one third of the group believed that the internet does not favour Western culture, and one fifth were neutral. In the research group, all students who did not list English as their first language listed it as one of the second languages. Home language, therefore, did not seem to be an inhibiting factor for this group.

5.4 FINAL SURVEY

The final survey, as shown in Figure 5.12, had twelve respondents representing a similar cultural demographic spread to the initial survey.

5.4.1 Learners' home language

Table 5.12: Learners' home language

6	students' home language is isiZulu	50%
4	students' home language is English	33⅓%
1	students' home language is isiXhosa	8⅓%
1	students' home language is Afrikaans	8⅓%

Although half of the students were isiZulu speakers, almost as many listed English as their home language. Only one learner spoke a language not indigenous to kwaZulu-Natal (KZN), although it is a major national language. The four English speaking

students spoke no other languages, whilst all eight others listed English as a second language. This corroborated the previous findings indicating that the users found few language barriers in ICT as most of the students had the ability to understand English.

5.4.2 Previous exposure to ICT

The majority of the learners were schooled in a major city, with only two being schooled in smaller, more rural cities. The majority of the students had previous exposure to a computer and the internet, and used a computer at least once a week. Over 90% of the students used a cell phone every day, with the balance indicating weekly usage. This indicated that the students were not adverse to ICT in general. Although the majority of students had been exposed to computers and the internet, they nevertheless believed that the course helped improve their computer literacy (see Table 5.13).

Table 5.13: Previous usage and improved computer literacy

2	Students had not used a computer before the course.	16⅔%
3	Students had not used the internet before the course.	25%
10	Students believed the course improved their computer literacy.	83⅓%

The students who had no previous exposure to computers were from the isiZulu language group and they were schooled in rural KZN. It is perturbing that these two learners also indicated that they did not believe that their computer skills had improved during the course. Fortunately one of these did indicate that the computer made the course more enjoyable. However it indicated that there is a positive correlation between previous computer usage and area of secondary schooling. This, together with the class

results, is indicative of the success of the course, and more specifically that the PRINTS Project is achieving the goal of improved academic literacy.

5.4.3 Skills development

Only one student indicated that the material on the internet was not always easy to understand. Although one student claimed that the use of computers did not make the course more enjoyable, all of them indicated that the skills learnt in the course would help their future studies. Two thirds of the class (eight) stated that the use of computers and/or internet during class was the "best aspect of the course". Only two students mentioned computers in response to the worst aspect of the course. Interestingly this was not the use of the computers or the internet per se. Rather, one student expressed novice fears, whilst the other complained of insufficient computers available at the university. This is indicative of the computer being an enhancement to the delivery of the course.

Most respondents in the final survey indicated that they believed the online course helped improve their computer skills (see Table 5.13). Further, they also revealed that they were confident in using the computer and internet in their future studies. Hence it may be suggested that the PRINTS project served to enable their further learning through improving both computer and academic literacy.

5.5 ASSESSMENT RESULTS

While improved course marks cannot always be attributed directly to the effectiveness of the particular delivery method used, they do give some indication as to whether the delivery method is working for that specific learner group.

5.5.1 Comparison of results

Class averages are reflected below for the three legs of assessment (being class test, report writing, and oral presentation). For comparison purposes, averages are also reflected for the previous year's class (PAT 2005) and an Engineering class which completed the Communication Skills traditional delivery course. It should be noted that the Engineering class had two thirds English first language users. Table 5.14 shows that the overall final mark was higher in the blended course than in the traditionally delivered courses. This adds weight to the supposition that a blended delivery in the DUT context may be more efficient and more successful than a traditional delivery. Although the research group assessment results were slightly higher than traditionally delivered courses of the same year, they showed significant improvement over the same group (PAT) in the previous year.

Table 5.14: Comparison of mark averages

Class	PAT 2006	PAT 2005	Engineers 2006
Test	67%	49½%	65%
Report	61%	36%	67%
Oral	81%	61%	73%
Final mark	70%	49%	68%

5.5.2 Reflections on assessment

Some students seemed to enjoy the online test, as evidenced from the following discussion message excerpts:

Message no. 207

Sent by ******* on Thursday, September 7, 2006 9:25am

Subject: Feedback on the test

Howzit Rob?

Doing it on line was very exciting,there's no scribling on the page...jus ticking on the right answer,I think it saves time if you know work.After that go to some XXXciting websites.

Message no. 247

Posted by ******* on Thursday, September 7, 2006 9:24am

Subject: feedback on the test

Dear Rob

The test was alright,l didnt have problems with the test,the test was staight forward l was a bit slow when writing online but overall l had no problem.l must get get used to writing online so l can be more quick.

l liked the layout of the test,its easy to follow and l ended up enjoying it.

Message no. 248

Posted by ******* on Thursday, September 7, 2006 9:26am

Subject: Feedback Task 3

Confident that I passed.I did not find any section realy difficult because the instructions were clear.I feel this was an efficient way of doin the test because it saved time and was easy to understand.

It could be argued that the academic formality of the test and the report assignment served to hinder the learners' performance. The results of these two forms of assessment were generally lower than the results for the oral presentation. The students were very animated during their oral presentations, and spoke about their selected websites with ease. Be that as it may, the research group's overall performance was impressive as there were no course failures and the students showed greater attentiveness during classes.

5.5.3 Formal academic literacy conventions

Formal academic literacy conventions were not maintained by the participants during informal online messaging. Spelling, a vestige (or marker) of academic and professional literacy, became virtually unimportant. None of the participants appeard to have checked the spelling in their email message, as evidenced in the following WebCT discussion message excerpts:

> Message no. 153
> Sent by ******** on Thursday, August 24, 2006 9:28am
> Subject: Me,Myself&I
> 'Supp Rob?
> I'm *****...I entered this course cos I wanted 2 B'come a livesound engeneeror a producer maybe then a DJ.I love music,going 2 clubs,2 clubs,music,music,music...Fashion,cars&girls

> Message no. 203
> Sent by ******** on Thursday, September 7, 2006 8:59am
> Subject: test
> the test was ok..im not that confident i passed but i know that if i learn for the test then ya i will pass.the tes questions were easy to understand ut i did get a lo9w mark

This is to be expected in the less formal context of a private email to a friend. Yet whilst one would imagine the correct spelling of search terms to be important, it was found that the search engine always offered the correct spelling of any miss-spelt words (see Figure 5.2), even for names of local contemporary musicians. This encouraged the user and enhanced the experience by increasing comfort levels.

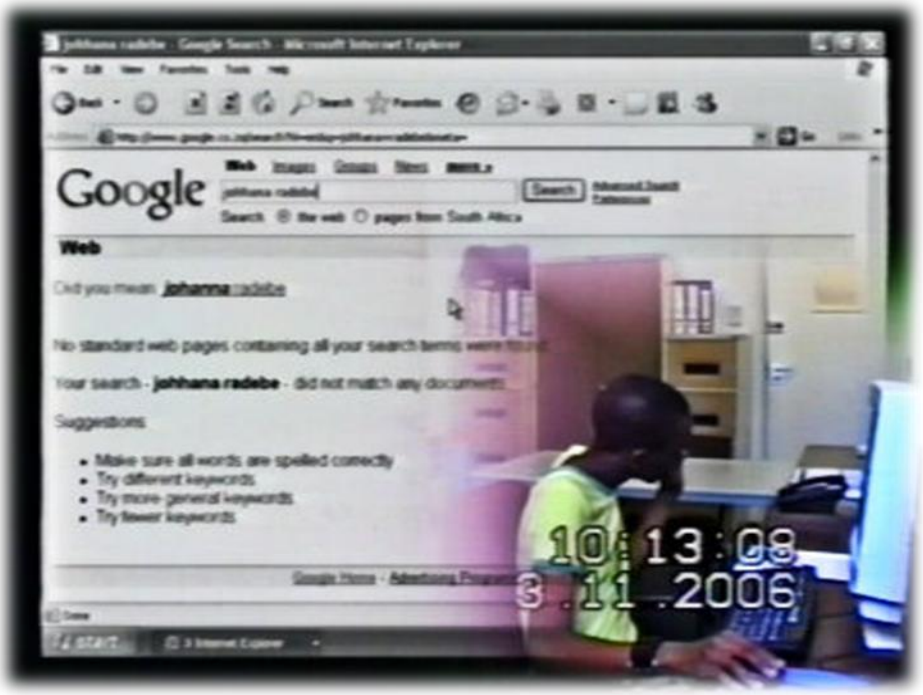

Figure 5.2: Spell-assist by Google

5.6 CASE STUDIES AND GENERAL OBSERVATIONS

The data from the case studies carried out using the video protocol method will be discussed after an overview of the results has been provided. The emphasis will be on any inhibiting and enhancing factors found to be impacting on blended learning delivery, bearing in mind the tentative conclusions which could be drawn from the surveys, namely, that that home language did not seem to be an inhibiting factor for this group, and that the area of secondary schooling influenced ICT competences. The surveys had also suggested that the formality of ICT tasks might enhance as well as inhibit eLearning, and that the use of ICTs in the course contributed to improved course assessment scores.

5.6.1 VPA overview

The total number of participants was seven. Table 5.15 shows a summary of the tasks successfully completed as well as deviations from the set tasks. The video protocol

analyses and subsequent interview provided richer and thicker findings than the surveys. Five of the seven participants were isiZulu speaking with the balance being an isiXhosa speaker and an English speaker. Five were schooled in Durban (a major city) with the balance being schooled in Pietermaritzburg (KZN midlands) and Butterworth (inland Eastern Cape). Thus the case study group filled similar demographics to the (larger) research group. It may be worth noting that none of the participants would have been previously designated white, and none were Indian.

Table 5.15: VPA summary

5	Students successfully completed all tasks within 30 minutes	71½%
1	Student successfully logged in to the LMS on the 1st attempt	14%
4	Students required their password to the LMS to be reset	57%
1	Student required technical assistance midway through the tasks	14%
4	Students utilised "history" in the web browser address bar	57%
5	Students strayed or deviated from the set tasks:	71½%
	1 student listened to music from the web	
	1 student used his mobile phone	
	1 student read incoming email (recipient was not the student)	
	2 students read and responded to their own email	
1	Student correctly logged out from the LMS	14%

5.6.2 Inhibiting and enhancing factors

The students were hesitant in finding a definition from the online course notes. This may be explained by the nature of the task which is formal academic. Students were also seen to be reluctant to complete formal academic tasks during class; they would rather search for relevant websites than send a discussion message or note minutes of their meetings. However, there is a strong argument suggesting that the initial hesitation may have been the result of being unfamiliar with the position and layout of

the online course notes. The participants indicated that they had not previously used the online notes, preferring the hardcopy booklets.

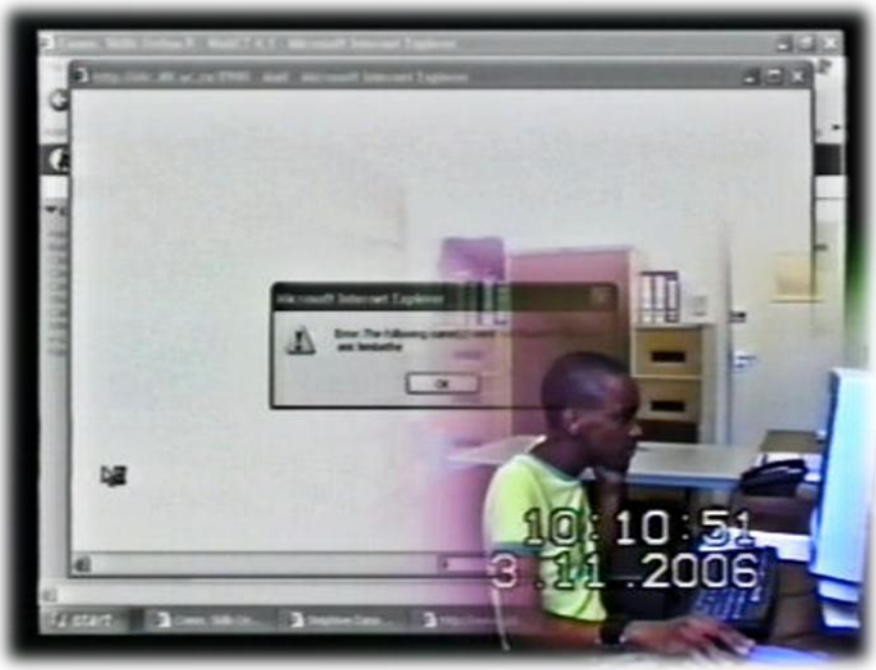

Figure 5.3: WebCT email error message

Uncertainty or hesitation seemed to be linked with unfamiliarity with the environment. Few participants used the browse button to enter the name of the recipient of their mail message, as is required by WebCT. They were confidently able to correct this error when prompted by the error dialog box (See Figure 5.3). Many students omitted a subject line in their message which again produced an error dialog on sending. Again, the students could confidently correct their error. During the course, the students were not all required to use the LMS communication tools each week. Because the students worked in small groups, it was sufficient for one group member to post their weekly update. Thus these tools may not be very familiar to the students.

The majority of the participants utilised the back button and history on the internet browser rather than enter or re-enter the required web address on the address bar. This might be a crumb trail which would reinforce the notion of familiarity, and enhance the user's confidence with the environment (see Figure 5.4). On the other hand, it might be indicative of the participants' lower level of skills in utilizing hypermedia, which would represent an expected position at the beginning of a learning path.

Figure 5.4: History crumb-trail

Be that as it may, formal tasks appeared to inhibit the participants. Only one participant was able to correctly log in to the LMS, as the rest had forgotten their password. Over half of the participants required their passwords to be reset (See Figure 5.5). All but one of the participants were able to update their password on the first attempt. This is probably because the update password screen is extremely uncluttered and provides the user with no distractions and only options to type old and new passwords.

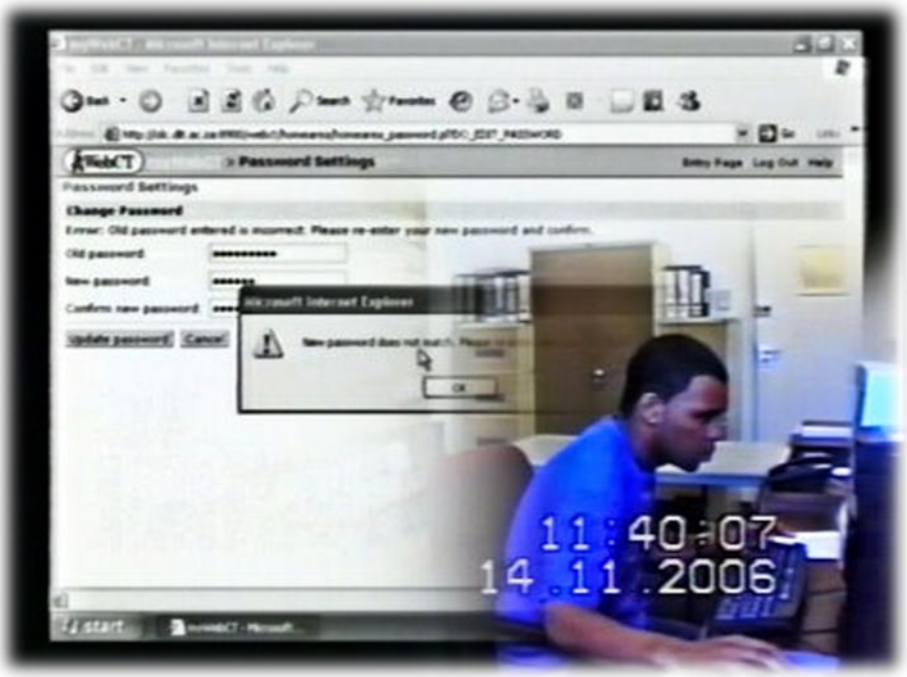

Figure 5.5: Reset WebCT password

Conversely, familiarity appears to have induced the students to act with certainty. Students searched for a website using Google, which was the search engine explained during class tuition. Most students were easily able to browse their selected site and seemed familiar with the site environment. They took little time to find their preferred musician and favourite album.

Generally, more proficiency was shown searching the internet than with using the LMS. Familiarity seemed to be an enabler and most students showed less familiarity with the LMS than with the internet browser. In most cases intuitive (familiar) links and buttons, such as those items and components commonly found on popular internet sites helped them through. It indicated that levels of digital literacy are developed in areas where they are needed by the user.

Excluding password issues, very few participants required technical assistance during the protocol. The one participant that requested help had been flooded with multiplying pop-up dialog boxes. Such invasive advertising often proved a stumbling block for the participants, although, with the exception already noted, the participants were able to remedy this by completely closing the web browser in response to error messages (see Figure 5.6).

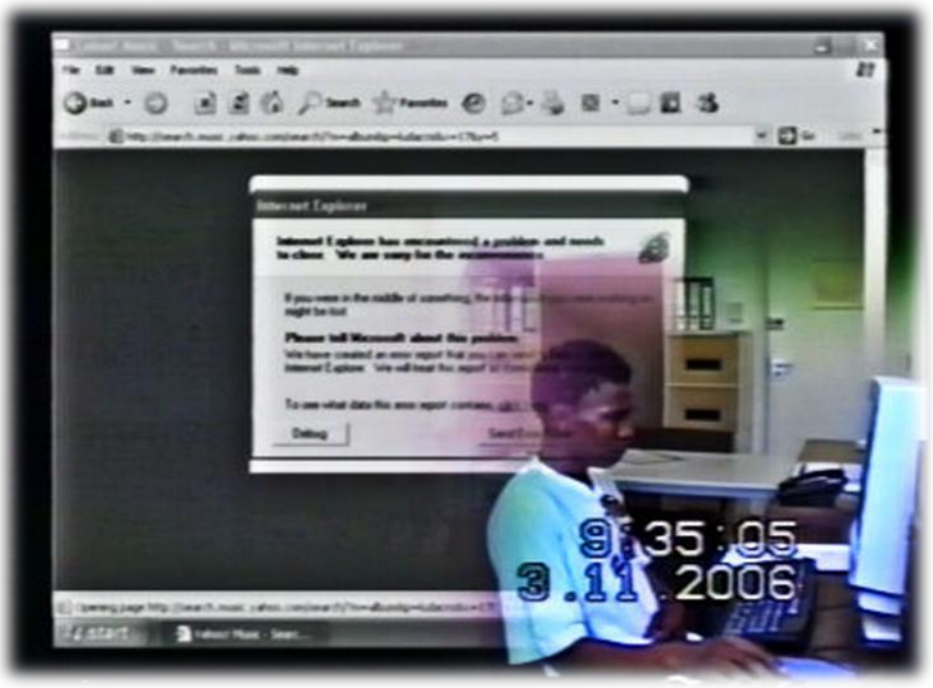

Figure 5.6: Windows error

Be that as it may, a small percentage became ensnared if the advert covered something of interest to them. They found the path to be endless or dead (see Figure 5.7) and would eventually also exit the web browser program. This distracts the learners and steals their time. It is an extrinsic inhibitor as the stimulus is generated in the internet.

Both during the protocols and during class, invasive advertising clogged the interface, subtracting from efficient engagement with the learning system.

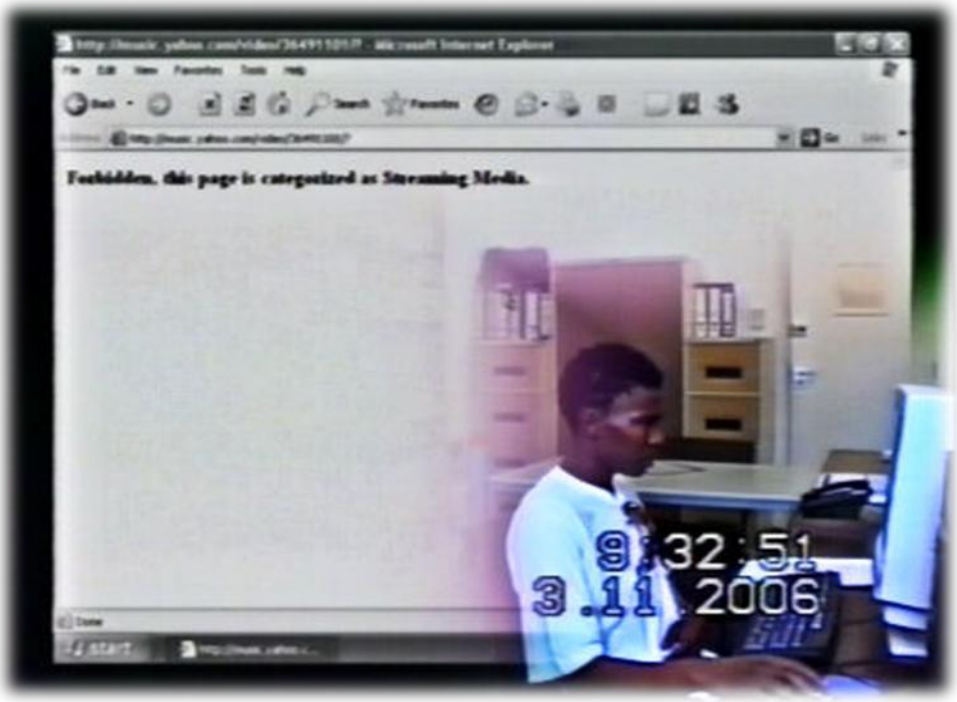

Figure 5.7: Forbidden site

An intrinsic inhibitor can also be noted. Almost three quarters of the VPA participants strayed from the set tasks or were detracted in some sense of their own volition. Given the previously noted rate of cell phone usage, it is perhaps remarkable that only one participant engaged in an SMS type dialogue on his phone. The SMSer deftly used one hand on the mobile device and one on the computer mouse (see Figure 5.8). Three participants read email messages, whilst one downloaded and listened to music (see Figure 5.9).

Figure 5.8: SMS texting

Figure 5.9: Listening to music

Students similarly strayed from the set tasks during class. Figure 5.10 shows a digital photograph taken of a candidate checking hotmail after the test session.

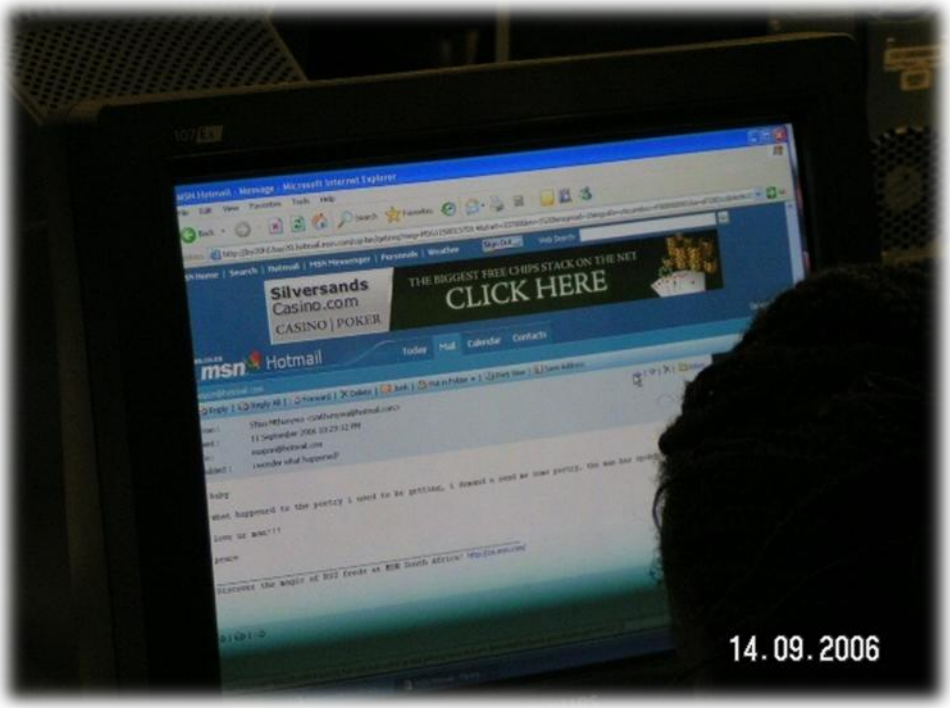

Figure 5.10: Checking hotmail

All of these stray-actions required the user to choose to click to continue rather than complete the required tasks in as short a time as possible. It could be argued that these deviations are inherent in the respective tasks, which included "find a site where you can download music" and "send a friend an email message" (see Figure 5.11). Yet the students nevertheless indicated an ability on the part of the user to make the conscious choice and correctly follow the desired path. One participant who read email responded off default to a GroupWise message of an incoming email to the staff member's mailbox (see Figure 5.12). The participant was able to find and access that email.

Figure 5.11: Sending a picture to a friend

Figure 5.12: Reading email

All of the participants displayed a proficiency in engaging with the computer systems beyond the scope of the protocol tasks. These deviations further indicated the participants' comfort levels outside of the formal tasks. That is, not only are they capable of engaging with the computer interface yet it could be argued that they enjoy it. Whilst emotions cannot always be clearly identified in the video-taped sessions, the participants were visibly more anxious whilst finding the required definition and sending the email to a friend via WebCT.

The participants showed very little patience with the computer system. Anxiety levels were seen to increase after repeated login failures and long page loading times (see Figure 5.13).

Figure 5.13: Password frustration

The respondents were quick to blame most difficulties on the computer system, suggesting that the system had forgotten their password or that the internet connection

had temporarily failed. This constitutes only a temporary inhibitor as confidence levels resumed once the problem was remedied and the system worked as the participants anticipated.

5.7 MAPPING AND TESTING THE EMPIRICAL MODEL OF BLENDED DELIVERY

The above analysis was used to map and test the draft empirical model of blended learning delivery discussed in Chapter Three: Research Orientation.

5.7.1 Incorporating inhibiting and enhancing factors

The analysis suggested the flexibility and informality associated with the web search to be enhancers to the blended delivery. The research group seemed to be at ease in the online classroom, which may account for their increased confidence. Formality and unfamiliarity are hypothesised as inhibitors. However, the unfamiliarity dissolved through the completion of the weekly tasks and adequate formal academic literacy was attained by the end of the course. Yet formality goes beyond spelling, structure and style, and includes course requirements and prescriptions, classroom conventions, and institutional rules. Thus, although formality may be an inhibitor it can also serve to compensate the overwhelming freedom associated with ICT. This serves two purposes: it narrows the learner's focus by providing parameters thereby making the task more attainable, and it arms the learners with the necessary discipline to navigate the internet.

If figure 3.5 (draft empirical model of a blended learning delivery system) is now reconsidered, it should become clear that inhibitors and enhancers have an impact on the reception of the blended delivery. So, for example, downtime on the LMS server will be an inhibitor on the PRINTS Project as the students will not read and respond to

instructions and other communications. Any such impact is not an all-or-nothing firing, but rather it could be isolated at a specific functional level, or generalised over two or more.

5.7.2 Input factors and output affect

For purposes of clarification, sections of the model will be analytically isolated and discussed. It should be stressed that these are not ontological divisions in a closed system, as the emergent properties are the result of the interaction of various generative mechanisms across all levels (strata). Not only is the blended delivery more than the sum of the online and traditional components, but the blend effect is also influenced by the user's socio-cultural factors.

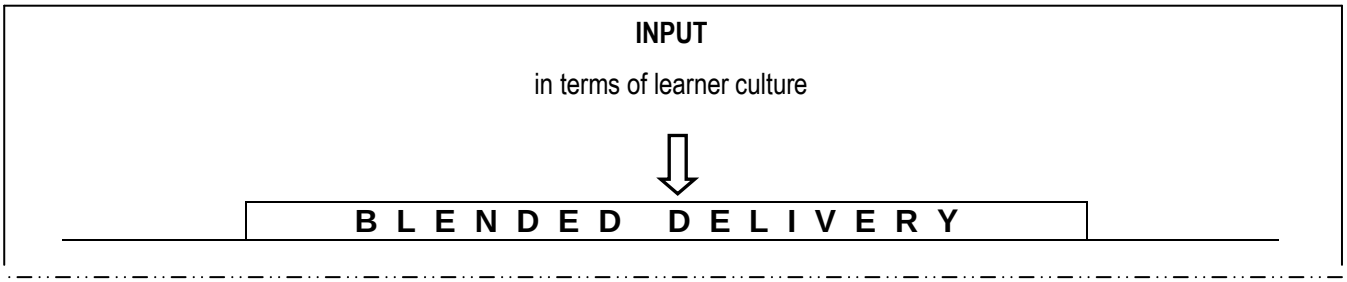

Figure 5.14: Upper-zone of empirical model of blended delivery

The emergent properties of this system as a whole are affected in a complex interrelated system of interactions; this is congruent with Bhaskar's transformational model of society (Figure 3.1), as developed through McAnulla's combined three part cycle of change (Figure 3.3). The effects resonate through one or more or all of the five functions, moulding the output in terms of access and affect (attitude) which develops the learner's culture as input in a morphogenic relationship. Input here (see Figure

5.14) may include skills and abilities gained through prior learning and familiarity but could also include access to hardware and an internet connection. It is one thing if the university's Steve Biko Campus has internet connected LANs, but it is of no significance if the learner is compelled to use City Campus LANs, which are generally not available as they are over-subscribed. Input also includes the user's mixture of skills, beliefs and fears as well as institutional structures and mechanisms, and thus includes both learner culture and learning culture. That is, the user's attitude affects, and is affected, by the interaction with the complete system, and emerges as output, as shown in Figure 5.15.

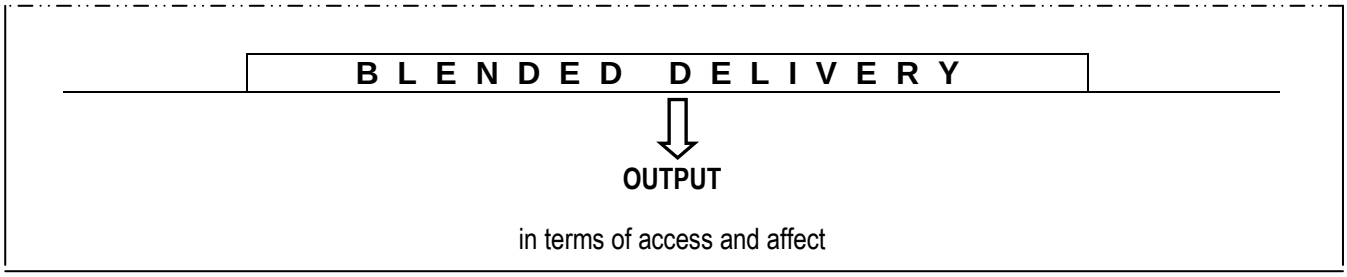

Figure 5.15: lower-zone of empirical model of blended delivery

Output, specifically in terms of access, refers to the user's cognitive access to the technology. If the learner does not have the required skills (levels of literacy) and motivation to utilise the facility, then it may as well not be there. The output is influenced by the result of the blend effect interacting with the input. The emergent property, again, is more than the sum of the resultant mechanisms from the five functions. The mechanisms together may be complementary, compensating, inhibiting or enhancing. An understanding of the impact of the various inputs allows the

researcher to exploit the elements which make the blended delivery effective, thereby affecting output. The output may be observed in terms of user reaction to the computer and internet, user reaction to the LMS and class tasks, user attendance, and assessment results.

The draft empirical model of a blended learning delivery system (figure 3.5) may now be refined through the identification and description of input functions in relation observed outputs. The blend effects are re-described and refined in Figure 5.16. The postulated inhibitors and enhancers are listed in parenthesis at their functional levels.

It is postulated that the blend effects constitute not only a continuum between the two delivery modes (traditional and eLearning) but also inter-react across different functional levels and differentially with the input. For example: the traditional restrictions associated with the formal traditional contextual function may appear inhibitive to the learning experience, yet they serve to guide and restrain the unlimited eLearning ideational function and texts. Similarly, traditional classroom social conventions and parameters may prevent a possible decay of the interactive function of the learning experience.

5.7.3 Mapping and testing

The researcher's task then is to map the input properties through the functional continua as complementary, compensating, inhibiting or enhancing factors. The model itself may function at different levels, such that general enhancers and inhibitors can be determined for a generalised group or fine tuned blend mixes can be exploited for specific cases based on perceived learner cultural input.

	B L E N D E D D E L I V E R Y			
FUNCTIONS	**Traditional delivery**	**BLEND EFFECTS**	**eLearning delivery**	**FUNCTIONS**
contextual	Actual classroom	<- restrictive zone (formal) comfort zone if familiar (informal) ->	Virtual classroom	**contextual**
ideational	Oral/written texts	<- limited prescribed resources (unfamiliar) unlimited user-chosen resources (familiar) ->	Hypermedia texts (but: nonprofessional sites)	**ideational**
interactive	Small group face-to-face interaction/ reading-writing	<- formal group-work (formal/unfamiliar) more interactivity (informal/familiar) ->	Predominantly reading-writing	**interactive**
social	Teacher precepts, parochial group mores	<- rule-governed and inflexible (formal) socially mediated and flexible (informal) ->	Global/cyber social awareness	**social**
reflexive	Teacher/peer feedback (including formal tests)	<- narrow feedback wide ranging (more immediate) feedback ->	Teacher/peer/public feed-back, online tests/self-tests	**reflexive**

Figure 5.16: Mid-zone of empirical model of blended delivery

For example, at a generalised level it may be postulated which of the delivery modes entice learners across the various learning functions (see Figure 5:17). The exaggeration of those modes will captivate the learner group, thereby enhancing learning. So if the learner group has little previous exposure to ICT and are nervous and hesitant, then a more traditional mode combined with digital literacy scaffolding will remove their avoidance of the resource that can enable them to develop.

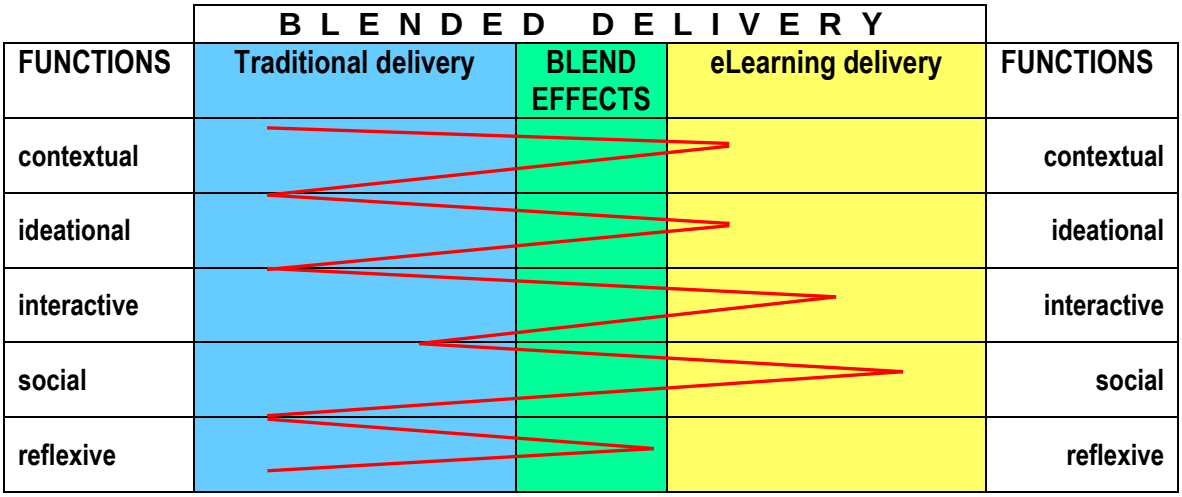

Figure 5.17: hypothetical generalised mapping

Alternatively, investigation may reveal specific learner inputs which may be mapped in terms of their complementary, compensating, inhibiting or enhancing qualities (see Figure 5.18). In this instance, specific non-symmetrical interventions may provide a catalyst or restraint where required.

An optimum blend would enhance the output in terms of improved user access through scaffolded computer skills and improved attitude to the use of ICT. The enhanced overall effect itself brings increased access through further skills development as

required (or perceived to be required) by the user. Once identified by the facilitator/researcher, the relevant factors can be exploited to enhance learning.

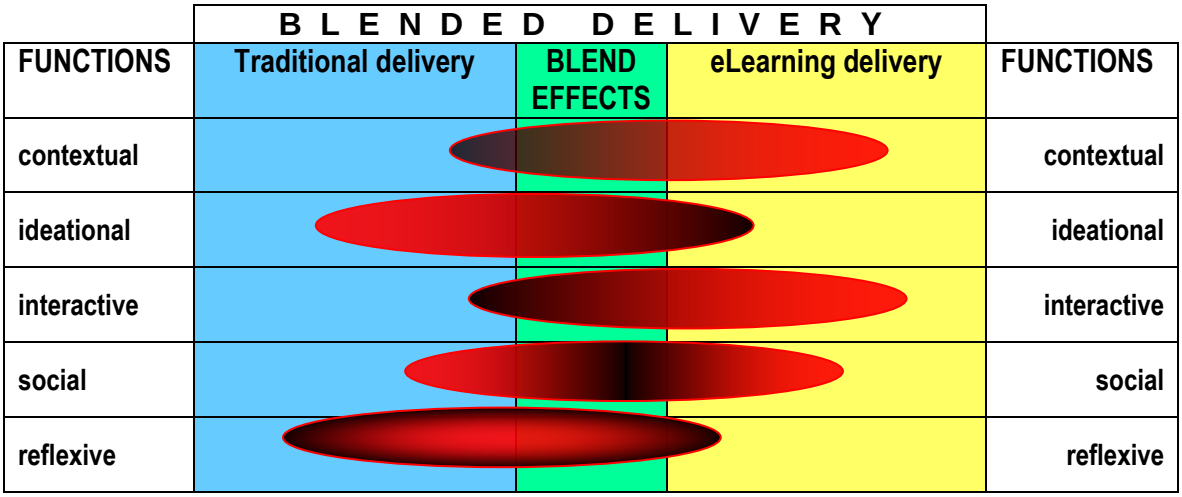

Figure 5.18: hypothetical specific mapping

5.8 CONCLUSION

As mentioned above, the aim of this chapter was to test the empirical model, both in terms of general validity, and also to identify cultural input factors and thereby uncover the operation of the mechanism/s involved in a blended learning delivery. In particular, the focus was on the enabling of enhancing or inhibiting factors within a blended learning delivery system. It was found that the empirical model allowed the complex system of checks and balances to be assessed in terms of the essential system of learning functions (i.e. theoretical model) underpinning the model. The issue of cultural input into the blended learning system was shown to be far more complex and layered than a matter of ethnic identity or mother-tongue. Moreover, it was found that supposedly inhibiting factors (e.g. formality, distractions) could also, paradoxically, support learning in unexpected ways (e.g. by channelling focus and developing ICT skills). Finally, it was suggested that the empirical model could offer guidance as to

how researchers or educators might map the input properties so as to achieve optimum learning for specific groups in different learning contexts.

Tentative conclusions could be dawn, namely, that home language did not seem to be an inhibiting factor for this group, and that area of secondary schooling influenced ICT competences. It was further noted that formality of ICT tasks might enhance as well as inhibit Elearning, and that the use of ICTs in the course contributed to improved course assessment scores, and made students feel more confident about using ICTs in further study.

Chapter 6: Conclusions

6.1 INTRODUCTION

This research project hoped to identify functions or preconditions for blended learning to successfully take place. A greater understanding of the underlying patterns and how socio-cultural factors impact on the social processes involved in a blended delivery learning environment might allow the educational researcher to exploit not only the best of each delivery mode, but also to achieve an optimal blend to enhance the overall learning experience and thereby contribute positively to social transformation.

6.2 ENHANCING AND INHIBITING FACTORS IN BLENDED LEARNING

The data analysis indicated that the students were not adverse to ICT in general. Unexpectedly, home language did not seem to be an inhibiting factor, yet this could be attributed to the fact that the research group were sufficiently multilingual. The main inhibiting factor was indicated as being hesitation or lack of confidence due to unfamiliarity with the environment. This applied to both unknown technologies and unknown sites. A positive correlation between previous computer usage and area of secondary schooling was noted.

An analysis of the research data suggested a group of enhancing factors as well as a group of inhibiting factors. Enhancing factors included the confidence levels achieved through familiarity and informality. Inhibiting factors included the uncertainty associated with unfamiliarity and formality. This is not to imply that all inhibiting factors are to be avoided. On the contrary, the inhibiting factors can be utilised to a

degree by the facilitator or course designer to restrain the unfettered learner's wanderings.

6.3 LITERACY DEVELOPMENT IN THE PRINTS PROJECT

The analysis indicated that formal academic and professional tasks can further inhibit engagement. However, it was apparent that the PRINTS Project served to enable the students' further learning through improving both computer and academic literacy. It was suggested that a seemingly adverse action such as deviating from a formalised task could result in a positive outcome, as levels of digital literacy were developed in areas needed by the participant. The cycle then perpetuates itself: exposure leads to familiarity which increases confidence levels allowing for skills development which will permit greater access and greater scope of familiarity, as illustrated in Figure 6.1.

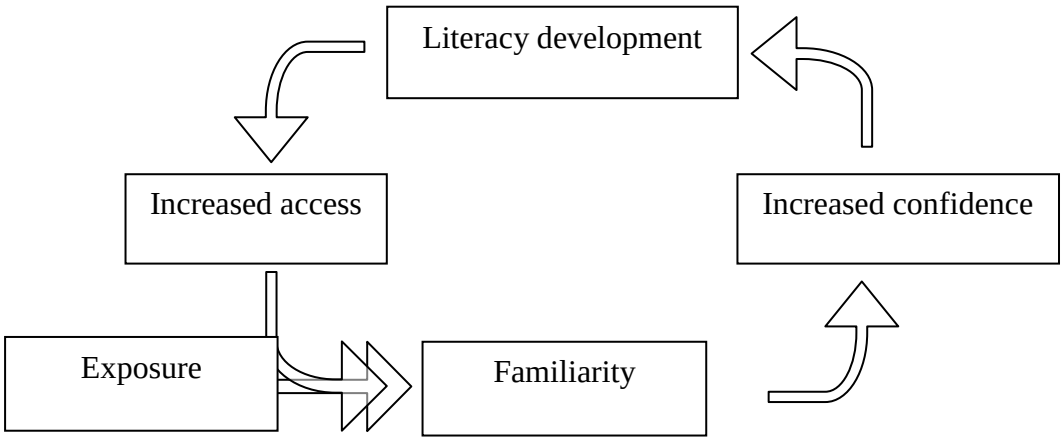

Figure 6.1: ICT skills development cycle

6.4 THE EMPIRICAL MODEL OF BLENDED LEARNING DELIVERY

The analysis suggested that the interaction of the various agents and factors within the multifarious system might also affect learner outcomes. The analysis and modelling attempted to clarify both the social functions performed and the practical means whereby these are effected. The empirical model of blended learning further developed in Chapter 5, Findings and Data Analysis, is still neither prescriptive nor exhaustive, yet it can account for both contingent and intentional factors. Illustrated in Figure 6.2, its purpose is to describe the contextual factors at play with the aim of identifying the various mechanisms, whether firing or not. The two dimensional page is insufficient to depict the perceived relations between the factors at play, for there exists a constant interplay between user input and output across all strata of the system.

This follows Bhaskar, Archer and McAnulla's transformational social models, where social mechanisms are both reproduced and transformed over time and through the systems. The model should be cyclical, dialogic, morphogenic, and under perpetual review and testing (as per Figure 3.4: critical realist research). This research nevertheless indicated that it is possible to identify the mechanisms involved in blended learning, and to determine what factors within and outside of the blended learning system serve to enhance, inhibit, complement or compensate. The critical realist researcher can then exploit the enhancements both in terms of quality and efficiency of the learning process through a matrix of complementing and compensating effects between the enhancing and inhibiting factors.

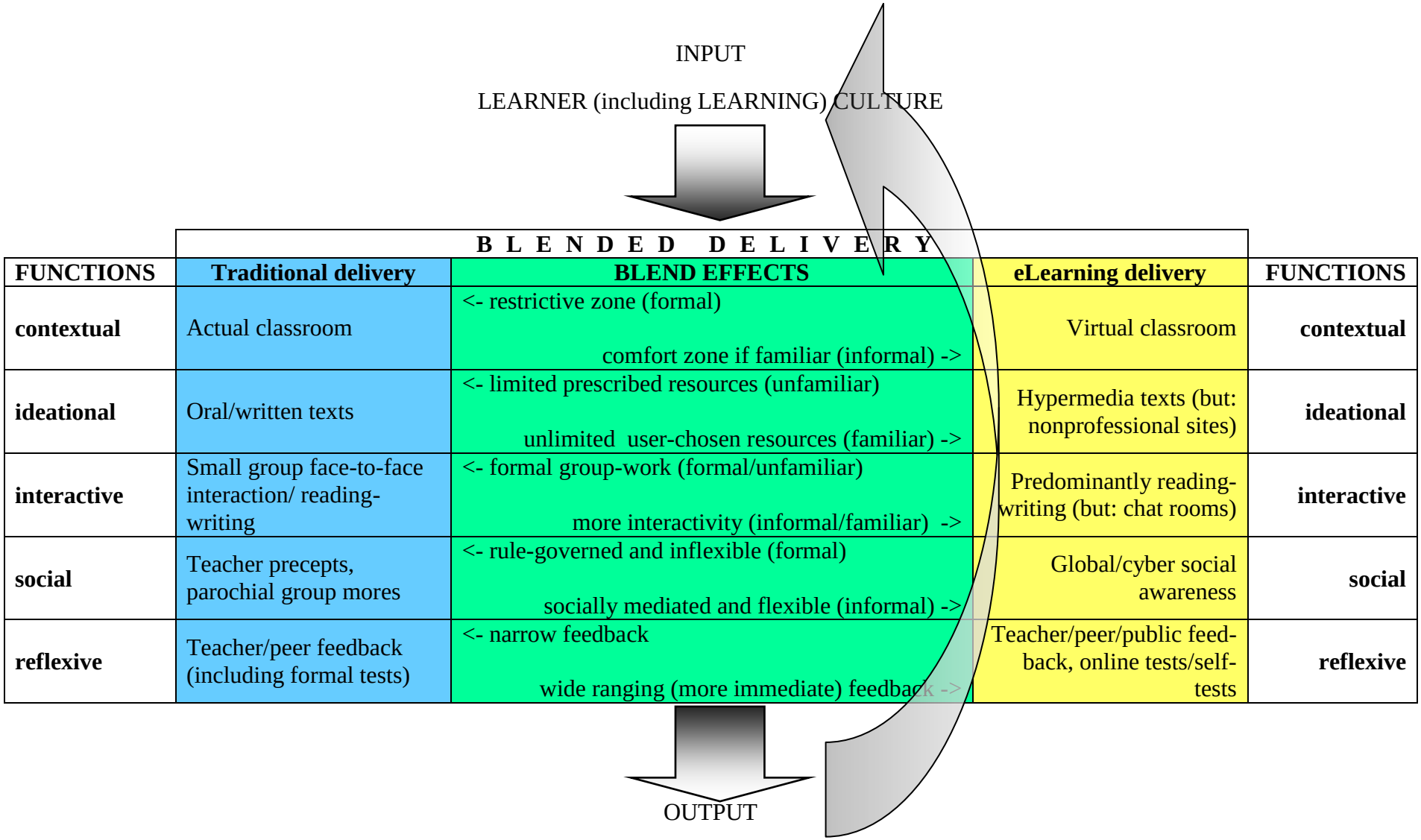

Figure 6.2: Empirical model of a blended delivery learning environment

Such an investigation produced a complex picture of interrelated factors, which themselves could be seen either to inhibit or enhance emergent properties. The nature of the effect of the factors might be mapped through the modelling process, and previously unknown input factors might be hypothesised through a retroductive analysis of the output factors in relation to the functional dynamics. Affective factors influencing the user might be observed and traced through the model to determine their effect in terms of their enhancing, inhibiting, complementing or compensating qualities. This would improve student performance and increase the efficiency of the blending learning delivery.

6.5 RECOMMENDATIONS

The findings indicated that basic skills need to be scaffolded where required to enhance the learners' efficiency. This enables the learner to develop further skills either through self or peer teaching. In turn, this develops academic quality because the learner's time and effort is more productively spent fulfilling the task, be it academic, professional or social.

To achieve this, it is suggested that the institution must ensure that all administrative functions are in place. This is not only internet connected computer LANs available to all students, but it also means that internet based malware needs to be precluded to aid efficiency, and individual course designers must develop and build effective online classroom environments. It is the facilitators who must effect the overall enhancements. They must capture their audience, both in terms of class attendance and the willingness to follow through, be it in skills development of just clicking [or avoiding!] "next". The empirical model of blended learning can assist the researcher to understand and explain

which factors are at play within a specific context, so as to determine *what* works best, for *whom* within what *context*.

6.6 BLENDED LEARNING SUPPORT FACTORS

This research project hoped to identify the factors or preconditions for blended learning to successfully take place. The following three general sets of support factors can be postulated:

1. Institutional support
2. Learning programmes
3. Learner support

Institutional support includes providing access to hardware and reliable internet connectivity, technical support, cooperative management and staff, and induction, training or primer programmes in computer assisted learning. Learning programmes refer to blended eLearning courses and classroom shells, which need to be appropriate, relevant and well designed, as well as accommodated within the institutional syllabi. They require effective administration and facilitation. The learner support factors might be considered as the focus of this investigation. Whilst the first two sets of factors might be considered contingent (yet necessary), this last set describes intentional user factors. Such motivational issues include the requirement for enthusiastic and cooperative learners, who have access not only to hardware but who also possess the cognitive skills to effectively engage with the learning environment. In so doing, literacy is developed.

All three sets of factors are co-dependant and co-determinate: within an institutional system they influence and transform each other (as per Figures 3.1 – 3.3). If there were no learners then learning programmes would have to be adapted to gain enrolments. The programmes require institutional support: financial, technical, administrative and managerial. Further, the institutional support afforded to the learners has a (psychological) affect that might either enhance or inhibit learning. This researcher found DUT bureaucratic hindrances detracted from the efficiency of the learning process provided by the learning programme and its staff. They had a stultifying affect which necessitated acute intervention on behalf of the supervisory staff. This would be considered a compensation factor. The institution could benefit from a sustained critical realist analysis of all its functions to improve the institutional learning environment.

6.7 CRITIQUE OF THIS STUDY

The limitations of this research project lie primarily in the narrow scope of the research group. Although the research methodology allowed for rich and thick data, the small number of respondents limits generalisability. The research group lacked demographic spread and showed strong ESL skills. These qualities might not be present in other more popular diploma groups. Nevertheless, it can be postulated that the diploma programme group is itself a cultural category, and this might guide further research. Larger sample groups could be investigated across the spectrum of DUT and other tertiary educational institutions' course offerings. This would add to generalisability, and the investigation itself might further clarify and refine the empirical model of blended delivery and associated explanations as further aspects of the mechanism - and key impacting factors - are uncovered. It was mentioned above (in Chapter Three) that formulating an exhaustive model was considered improbable. However, it must be remembered that models gain their explanatory power by focusing only on essential

elements of a phenomenon (Franck, 2002:5-6), and that refining a model would involve further testing of which elements were essential and which were variables. Refinement of the hypotheses and the empirical model might enhance and enrich course delivery, aid curriculum development and increase academic throughput.

6.8 CONCLUSION

The critical realist analysis of blended delivery revealed a complex interaction between the various agents and social mechanisms within a layered and dynamic social structure. Nevertheless, it suggested that an understanding of the mechanisms that trigger events can be achieved through ongoing dialogic critique. The empirical model of blended learning delivery developed here identified functions of the various factors and allowed for the mapping of their impact on the learning outcome. It offered an explanation of the learners' socio-cultural impact within the system, and in so doing might suggest methods of enhancing academic and professional literacy and the learning process through unlocking the learner's unique potential.

Appendix 1

DURBAN UNIVERSITY of TECHNOLOGY

27 July 2006

Research Information Letter

This class is to be used as a study investigating key mechanisms which impact on effective blended learning. It aims to highlight computer-human-interface issues and the factors which impact upon them. The outcomes of this inquiry could contribute positively towards the empowerment of all students.

This project is supported by both the Department of Education and the Department of English and Communication at the Durban University of Technology.
Your availability is highly appreciated.

There will be no change to your curriculum and no additional course expectations, tasks or assignments. Rather, the investigation wishes to observe you naturally as you participate in the class.

You will be asked to complete anonymous questionnaires and participate in surveys. After this initial round of observation, it may be necessary to request volunteers to participate in interviews and video protocol analyses.

The researcher commits to the following:

- To ensure that the rights and welfare of participants are protected
- To protect the identities and interests of those involved
- To guarantee the confidentiality of the information given

Thank you for your time.

Sincerely,

Rob Gutteridge

Rob Gutteridge
Department of English & Communication
2042830
robg@dit.ac.za

Appendix 2

27 July 2006

Letter of Consent

Dear Participant

Thank you for agreeing to participate in this research study. The study, towards an MTech degree, is investigating various factors and their impact on blended learning in the development of academic literacy in a tertiary vocational context.

This project is supported by both the Department of Education and the Department of English and Communication at the Durban University of Technology.
Your availability is highly appreciated.

The researcher commits to the following:

- To ensure that the rights and welfare of participants are protected
- To protect the identities and interests of those involved
- To guarantee the confidentiality of the information given

Please return this letter after signing below.

Thank you for your time.

Sincerely,

Rob Gutteridge

Rob Gutteridge
Department of English & Communication
2042830
robg@dit.ac.za

Signed: ……. Date: …….

Name: …….

Appendix 3

Survey on Information & Communication Technology (ICT) Use and Culture

Diploma : ……... Name the city or town where you attended high school : ……...

gender : ……... What is your home language / mother tongue? : ……...

In the questions below please rate your response, where 1= not very much, and 5= very much.

		1	2	3	4	5
1.	How well can you use the internet?					
2.	How much access do you have to a computer?					
3.	How much access do you have to the internet?					
4.	Do you think that the internet is biased towards Western culture?					
5.	Does the internet support your mother tongue?					
6.	How confident are you at using a computer?					
7.	How confident are you in completing your diploma?					

The following questions ask you to indicate how often you use computers, the internet or cellphones:

		Rarely or never	Monthly	weekly	2-3 times per week	Every day
8.	How often do you use a computer?					
9.	How often do you use the internet?					
10.	How often do you use a cellphone?					

In the following group of questions please indicate your ability to complete the listed tasks:

		I have never done this type of task.	I would need some help.	I can do this easily by myself.
11.	Use a word processor. (Word)			
12.	Use a spreadsheet (Excel)			
13.	Use a presentation (PowerPoint).			
14.	Send an email.			
15.	Participate in online ‘chat’.			
16.	Play computer games.			
17.	Use a web browser (Internet Express).			
18.	Find hit songs on the internet.			
19.	Online shopping or banking.			
20.	Download a picture or music to your computer.			
21.	Use antivirus software.			
22.	Send an SMS on your cellphone.			
23.	Download ringtones to your cellphone.			

Please indicate where you mostly use a computer or the internet. You may indicate more than one location.

		I don’t.	Public Library	At Tech	Cybercafe	At home
24.	Where do you use a computer?					
25.	Where do you use the internet?					

Appendix 4

PRINTS Project

Final Survey

Please respond to the following questions as honestly as you can.

1. What diploma are you studying towards? _____
2. Where did you attend schools? _____
3. What is your home language? _____
4. What other languages do you speak? _____
5. Had you used a computer before this course? _____
6. Had you used the internet before this course? _____
7. Has your computer literacy improved? _____
8. Did the use of computers make this course more enjoyable for you? _____
9. What for you was the best aspect of this course? _____
10. What for you was the worst aspect of this course? _____
11. Are you confident that you could use the internet to assist in your future studies? _____
12. Did you find the material on the internet easy to understand? _____

    Please explain your response: _____

    _____
13. Please add any other comments regarding this course, computer technology, or the internet.

    _____

    _____

Appendix 5

9 November 2006

Dear participant

Thank you for volunteering to participate in this part of the research. You will be filmed whilst completing this protocol, yet your right to privacy is reiterated and you are again assured that any reference to your input will be purely academic. Do not hesitate to ask any questions, although the researcher cannot assist you in completing any required tasks. There is a thirty minute time limit yet there is no right or wrong response to the tasks. If you are unable to complete any individual task please move on to the next task item.

Please follow the instructions contained in this letter before signing the bottom and returning it to the researcher.

Instructions:

1. Log on to the internet and access your WebCT Communication Dynamics module.
2. Access the Course Notes and go to the section on Meetings. Note a definition for "point of order".
3. Find a website featuring your favourite song or musician.
4. Send a message to a classmate about the website you found.
5. Log off the internet.
6. Complete the attached questionnaire.

Your participation is highly appreciated, and I wish you every success with your studies.

Rob Gutteridge

~~~~~~

Student signature

Student name

Date
~~~~~~

Appendix 6

Survey on Information & Communication Technology (ICT) Use and Culture

Name the city or town where you attended high school : …….

What is your home language / mother tongue? : ……

The following questions ask you to indicate how often you use computers, the internet or cellphones:

		Rarely or never	Monthly	weekly	2-3 times per week	Every day
1.	How often do you use a computer?					
2.	How often do you use the internet?					
3.	How often do you use a cellphone?					

In the questions below please rate your response, where 1= not very much, and 5= very much.

		1	2	3	4	5
4.	How good are you at using WebCT?					
5.	How well can you use the internet?					
6.	How useful is WebCT in your studies?					
7.	How useful is the internet for your studies?					
8.	How much access do you have to a computer?					
9.	How much access do you have to the internet?					
10.	Do you think that the internet is biased towards Western culture?					
11.	Does the internet support your mother tongue?					
12.	How confident are you at using a computer?					
13.	How confident are you in completing your diploma?					
14.	Has this course improved your computer literacy?					
15.	Has this course improved your language use?					
16.	Can your brothers and/or sisters use a computer?					
17.	Can your parents use a computer?					

In the following group of questions please indicate your ability to complete the listed tasks:

		I have never done this type of task.	I would need some help.	I can do this easily by myself.
18.	Use a word processor. (Word)			
19.	Use a spreadsheet (Excel)			
20.	Use a presentation (PowerPoint).			
21.	Send an email.			
22.	Participate in online ‘chat’.			
23.	Play computer games.			
24.	Online shopping or banking.			
25.	Download a picture or music to your computer.			
26.	Use antivirus software.			
27.	Send an SMS/MMS on your cellphone.			
28.	Download ringtones to your cellphone.			

Please indicate where you mostly use a computer or the internet. You may indicate more than one location.

		I don’t.	Public Library	At Tech	Cybercafe	At home
29.	Where do you use a computer?					
30.	Where do you use the internet?					

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