The role of the social mechanism in social transformation: a critical realist approach to blended learning

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Abstract
This paper deals with ongoing curriculum development in mixed mode, focusing in particular on student response to blended learning at a multicultural University of Technology. This is currently the subject of a masters research project investigating the possible ways in which learner access and response to blended learning might be affected by socio-cultural elements. The research investigates the impact of socio-cultural factors on blended learning in the development of academic literacy in a tertiary vocational context, and, it is hoped, will identify some of the factors which contribute positively or negatively towards blended learning in multicultural settings. The research orientation is critical realism, which is highly compatible with the scaffolded constructivist learning approach used in the Department of English & Communication's *Comm. Skills Online* course, but has additional ontological dimensions which are helpful in pointing the way to social transformation. A key concept in critical realist research is that of the social mechanism, which can be seen as having two aspects, formal and practical: Franck's modelling process represents these as theoretical and empirical models respectively. A tentative empirical model of blended learning based on a theoretical model of course design is discussed: socio-cultural factors impacting on both affect and access issues in blended learning can be represented as input into the system inherent in the social mechanism. The merits and disadvantages of the video protocol analysis as a possible research tool for capturing data on student response to blended learning are also discussed, and the paper concludes with the implications of this type of modelling for social transformation.

Keywords: blended learning, course design, modelling, social mechanism, critical realism.

1. Introduction
This paper deals with ongoing curriculum development in mixed mode, focusing in particular on student response to blended learning at a multicultural University of Technology. By "blended learning" or "mixed mode" we refer to course delivery which combines both traditional classroom instruction with learning via the medium of the Internet. Until now our preoccupation has been with blending what we have found to be the most effective approach to vocational communication (i.e. integrated group work set around professional scenarios) with the quality and efficiency enhancements offered by ICT. Currently we are focusing on learner reception to the mix, with the intention of further refining our approach to blended learning. One of our concerns is the possible ways in which learner access and response to blended learning might be affected by socio-cultural elements. While previously we attempted to monitor student access and response in an ad hoc way, this has now become the focus of a masters research project initiated by one of

the *Comm. Skills Online* staff (Rob Gutteridge) and supervised by the course Programme Leader (Dee Pratt). The research focuses on the *PRINTS Project*, around which the *Comm. Skills Online* course is based (Pratt, in press). The research investigates the impact of socio-cultural factors on blended learning in the development of academic literacy in a tertiary vocational context, and, it is hoped, will identify some of the key factors which contribute positively or negatively towards blended learning in multicultural settings. The research orientation is critical realism, which is currently under-represented in ICT research, but which has attracted growing support in recent years. Critical realism is a complex and profound philosophy developed mainly by Roy Bhaskar (1978,1979, 1986,1989,1994) but with significant contributions by Rom Harré (1979,1986) and Margaret Archer (1995,1998). It is anti-positivist, and works sensitively towards social transformation by exploring the complex system of social forces underpinning everyday social functioning. Critical realism is highly compatible with the scaffolded constructivist learning 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. It is compatible with a "soft" constructivist teaching approach (see Sayer, 2000) because, while critical realism has a realist ontology, its epistemology is constructivist.

A key concept in critical realist research is that of the social mechanism, that is the complex combination of social forces which can be hypothesised to underpin everyday social functioning (Bhaskar, 1978). Social mechanisms have two aspects, formal and practical, which are explicated in some detail in Robert Franck's seminal work on modelling in the social sciences, the formal aspects being represented as a theoretical model, and the practical aspects, as an empirical model (Franck, 2002:149-150). This paper discusses a tentative empirical model of blended learning based on a theoretical model of course design. It shows how the socio-cultural factors impacting on both affect and access issues in blended learning can be represented as input into the system inherent in the social mechanism, and will look at the merits and disadvantages of the video protocol analysis as a possible research tool for capturing data on student response to blended learning. The paper concludes with the implications of this type of modelling for social transformation.

2. Critical realism and social transformation

As mentioned above, critical realism has a realist ontology, but a constructivist epistemology. 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. Each has different experiences, hence a subjective epistemology. However, critical realism is not compatible with a "hard" constructivist position, as it does not hold with the view that reality is a social construct, a position based on the notion that we can know about the world only in terms which have been represented to us. From a critical realist perspective this constitutes "the *epistemic fallacy*, the definition of being in terms of knowledge … or, in displacement of this, in terms of 'language or discourse', the *linguistic* fallacy" (Bhaskar, 1994:48). As shown in Table 1, while the realist ontology includes an external reality (the "domain of real"), and suggests that we cannot know all aspects of this reality directly, it takes cognisance of human experience (the "domain of actual") as well as human reflections and theorising (the "domain of empirical", which includes theories about the nature of the "real"). According to Bhaskar, humans can achieve an approximate view of reality by using transcendental argument. The "domain of real" in critical realism is not comparable to the accumulative sense-data of positivism,

where causal relations operating in closed systems tend to be deduced statistically. By contrast, critical realist researchers model open-ended social systems operating in real-world situations (Bhaskar, 1979:45). The postmodern argument that all models are by necessity ideologically-biased does not hold true for critical realism, and the inclusion of an external reality in the critical realist ontology makes it possible to validate models with reference to actual events (Bhaskar, 1978:145). Observation of social processes is not necessarily compromised by being directed by theory (Sayer, 1992:73): Bhaskar suggests that some prior level of theory is actually necessary in order to make sense of the confusing mass of detail observed in social practices (1979:62).

Table 1: Bhaskar's three domains (1978:56)

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

There are areas in critical realism which are problematic, such as the nature of the causality provided by human agency (Archer, 2002; Hodgson 2003), or the vagueness of Bhaskar's description of social mechanisms (Baëhr, 1990:771). The first problem can be addressed by distinguishing between contingent (i.e. incidental) and intentional (i.e. purposeful) causality (Pratt, 2006). The second problem is not specific to critical realism, as social science literature in general contains somewhat vague definitions of the term "social mechanism" (see Mahoney, 2003:14-15). Franck's (2002) work on modelling goes some way towards clarifying the term by representing a social mechanism as having both formal and practical aspects, reflected in a theoretical and empirical[1] model respectively. The critical realist preoccupation with mechanisms (i.e. complex systems of forces) is an attempt to understand the deep structure or "essences" of things (Bhaskar, 1978:19), including the complex social processes in which humans are involved on an everyday basis. But understanding is not enough: according to Bhaskar, social science "always consists in a *practical intervention* in social life" (1986:169). While an idea can be a powerful motivating factor and have true causal force, it is doing - praxis - which transforms social structures, as it is human agency which keeps these in place. As Archer points out, human agency has the potential to transform not only our own lives but the lives of those around us (2002:19).

Figure1: Bhaskar's transformational model of social activity (Bhaskar 1994:92)
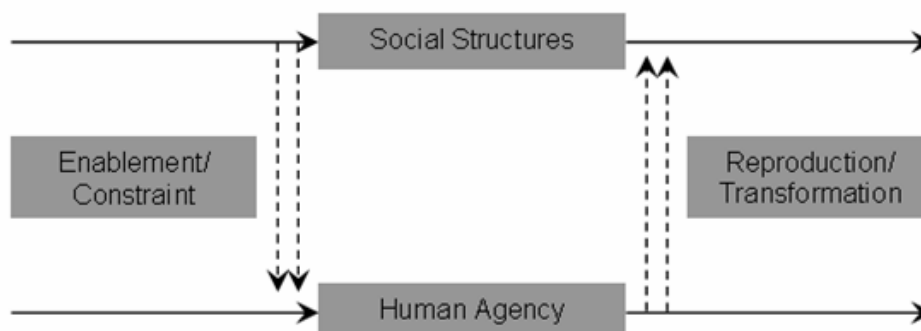
If the social structure of education is to be transformed rather than merely replicated (see Figure 1), it is by means of human agency or social production (Judd, 2003:56). The focus of this research is therefore on the *delivery* system involved in blended learning: this will enable the researcher to determine what works best for whom in which environment, and to monitor and adjust the system so as to result in optimum learning. The delivery system is then a type of social mechanism as described by Bhaskar (1978:51-52), and, later, by Danermark (2001:4), Franck (2002:234) Mahoney (2003:14-15) and Morén & Blom (2003:55). Identifying the mechanism is the first step in transforming social practice: the next step is to apply what has been learned in such as way as to transform social practice. Bhaskar has been criticised for treating society as a holistic entity (Baëhr, 1990:771), a "complex and causally efficacious whole" (Bhaskar, 1979:54). This is not problematic, however, if one adopts the realist view that mechanisms are systemic and generic, that is, typical features of a complex, layered, evolving social reality. Different socio-cultural settings - and participants - can then be viewed as "input", lending a unique local flavour to specific instances of a social process. This brings us to a consideration of the nature of culture and how it might impact on the social mechanism involved in blended learning delivery.

3. The impact of culture on social mechanisms

Culture seems an evasive concept and carries different connotations depending upon the context within which it is used. Thornton suggests the concept emerged from the Romantics where "each nation or national language possessed its special character, flavour, or *geist* (spirit) that summed up the experience and history of a people" (2000:37). This implies a sense of human universality, and, simultaneously, particularity of each cultural grouping. Such a definition is frequently adopted across many disciplines, citing Geert Hofstede[2] whose "four or five dimensions have become part of intercultural training programs and of textbooks and readers in cross-cultural psychology, organizational psychology and sociology, management and communications" (Hofstede, 2002). Hofstede researched IBM employee attitudes in 66 countries to conclude that there are four central cultural dimensions, namely *Power Distance, Uncertainty Avoidance, Individualism versus Collectivism,* and *Masculinity versus Femininity*, and that different nations assign markedly different values to each dimension (2002). His analysis claims culture to be territorially unique and that there exists a systematically causal relationship between *a* national culture and *its* society. As stressed by McSweeney, such an analysis ignores the impact of different levels or types of culture, non-national culture, administrative formalities or coercion. We are in agreement that "the limited characterization of culture in Hofstede's work; its confinement within the territory of states; and its methodological flaws mean that it is a restricter not an enhancer of understanding particularities" (2002:115).

Closer to home, our English & Communication Course Notes avoid addressing the issue of culture head on, but rather talk of "a person's **cultural background** [which] is usually formed from an accumulation of characteristics which are specific to the group to which they belong", and include language, clothing, ceremonies, norms and values (Nel, 2005:17). This is significant in our context because, although we are South African by nationality, our people are as diverse as our eleven official languages. It brings into question the nature of Hofstede's key concepts (the particulars) as well as the overall validity of his analysis. Cultural characteristics ought to be included in any analyses in the social sciences, yet we realise that our research cannot be all inclusive. Figure 1 suggests not only a bilateral interaction between social structures and human agency, but also that the nature of the relationship is dynamic. This goes a long way to explain what Thornton

means by "the ironic belief that all cultural and social reality is always just what it is but also always somehow other than it seems" (2000:34). To be sure, if we could define culture we would have a focus for our investigation. ERICDigest (n.d.) suggests that "attention-getting strategies, ways of responding to questions, and ways of interacting are examples of actions which are influenced by cultural background", whilst Carla advises consideration of "the shared patterns of behaviours and interactions, cognitive constructs, behavioural norms, expectations and affective understanding that are learned through a process of socialisation" (http://carla.acad.umn.edu/culture.html in Hugo, 2002). Thornton's list of definitions of culture runs from civilisation and the literary canon, through race and gender, to folk and popular culture. Spitzberg (2006) laments the lack of comparative, inter-cultural or cross-cultural research, yet can offer no more specific a description of culture than variable patterns of behaviour, attitude, belief, value which are the result of nationality, ethnicity, race, religion, gender and socialisation (including familial guidance). Our student body at DUT is as diverse.

A critical realist analysis suggests an investigation of the functions of cultural factors (or, their emergent properties), the effects of which are visible to the constructivist and the determinist positivist alike. The difference between each approach is the level of acknowledgement of the input of the investigator. In our instance this is to include both the researcher and the course facilitator. What is the impact of a learning module designed by a middle-aged white male on the education of an 18 year old African female raised in the rural KwaZulu-Natal midlands? How much study time is lost by a 20 year old male "technocrat" searching porn sites? Can we get learners to engage with CMC through a medium which is their third language? We therefore suggest, with Thornton, that "an appropriate cultural analysis, then, looks at the ways in which cultural expectations can be said to 'discipline' the subject into culturally expected modes of behaviour" (2000:40). It allows for both contingent and intentional inputs to be examined through an analysis of the outputs.

4. An empirical model of blended course delivery

This section will firstly deal with Franck's (2002) modelling process, next, describe a theoretical model of course design, and finally, discuss work-in-progress on an empirical model of blended learning delivery.

4.1   Franck's modelling process

The modelling process described by Franck (2002) is based on the kind of systems approach described by Meehan:

> A system explanation can be viewed as a formal pattern, a map, that can be imposed or overlaid on the empirical world. If the pattern fits the empirical data, it serves as an explanation or guide to the empirical events that fall within the pattern (1968:63).

Working with researchers operating within thirteen different social science disciplines , Franck arrived at a summary of the modelling process as follows:

> (I) 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 (2002:295).

The above process can be seen to involve a type of reverse engineering, or classical induction, where a (hypothetical) formal structure is inferred from the properties of a system, making it possible to distinguish the applied aspects of the mechanism more clearly. It also facilitates model validation, as the applied aspects can be tested out in actual data, and the theoretical aspect can be matched against the data-validated applied model.

A social mechanism, which is sometimes described as a "generative process", is not just a description of a social process, but has a distinct formal structure (Danermark, 2001:4). Franck's modelling process offers a more precise definition of a social mechanism in suggesting that it has an applied as well as a formal aspect. Franck characterises the formal aspect as a system of the functions "without which" the social phenomenon cannot take place, and the applied aspect as an empirical (or practical) model showing how the aspects are carried out in everyday social life. As the system of functions is a theoretical construct, Franck terms this a "theoretical model". To understand a social process, then, we need to formulate two models: a theoretical model showing the social functions which are being carried out, and an empirical model showing the means whereby these functions are carried out in actual social situations. These two models represent different aspects of a social mechanism and together can be said to constitute the mechanism.

4.2   The theoretical model of blended learning

A theoretical model, or "architecture of functions" (Franck, 2002:88) was already available as the potential formal structure of the social mechanism involved in blended learning delivery. This was a theoretical model of five essential communicative functions providing felicity conditions for successful communication: the contextual, ideational, interactive, social and reflexive functions (Pratt, 2005:4). Because knowledge is constructed in learning interactions, and can be viewed as a more specific and rule-governed type of communication, the essential functions involved in communication could be seen to have relevance for knowledge construction, and might play a part in effective course design, as suggested in an earlier paper (2005:4-5):

- 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, and raises the question of what course content/materials are to be provided, and how.

- Interactive: As knowledge is constructed in learning interactions (including interactions with course materials and other 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 and how it will be carried out, as well as course assessment.
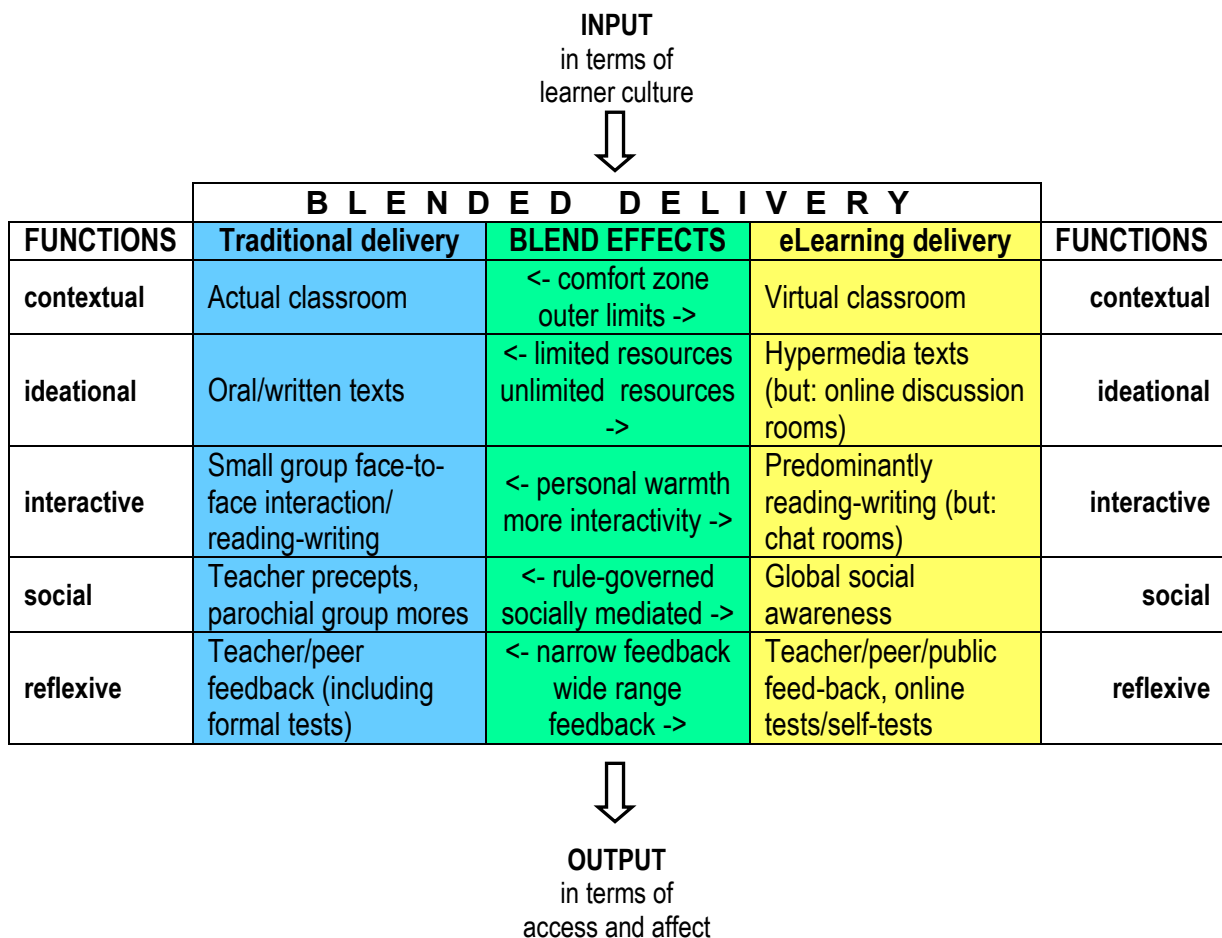
The above five functions could in fact be viewed as a "generalizable principle of course design" (2005:5). In the current research project they were considered as providing a possible theoretical model of blended learning, as they identify the functions which need to

be carried out in course delivery in either mode. An advantage of using such a system is that, while it is not value-free, it is descriptive rather than prescriptive, and does not show a cultural bias in indicating *how* the functions should be carried out in diverse socio-cultural contexts. The next step was to formulate an empirical model of blended learning delivery showing how these functions were carried out in mixed-mode courses, as will be shown below.

4.3 The empirical model of blended learning

A blended delivery is more than the sum of traditional and eLearning delivery, as aspects of each may combine in unexpected ways. What we are left with are blend effects which may be complementary, compensatory or enhancing influences. Knowledge of the impact of the various inputs allows the educator to exploit the elements which make the blend effective. However, how does one measure the impact of cultural influences on a course delivery system? The plethora of definitions of culture and the lack of descriptive particulars in cultural research necessarily preclude exhaustive analysis, whilst the variety in the cultural backgrounds of the actors engaged in our blended learning environments makes it difficult to isolate cultural factors clinically for specific investigation. This is not problematic in a critical realist approach as a modelling process such as that suggested by Franck (2002) allows for the identification of mechanisms through an analysis of the functions of the system. To this end we postulate an empirical model based on the above described theoretical model and which takes account of various cultural inputs as they are seen to impact on the blended delivery system.

Table 2: Empirical model of a blended learning delivery system

INPUT
in terms of
learner culture
⇩

FUNCTIONS	B L E N D E D D E L I V E R Y			FUNCTIONS
	Traditional delivery	BLEND EFFECTS	eLearning delivery	
contextual	Actual classroom	<- comfort zone outer limits ->	Virtual classroom	contextual
ideational	Oral/written texts	<- limited resources unlimited resources ->	Hypermedia texts (but: online discussion rooms)	ideational
interactive	Small group face-to-face interaction/ reading-writing	<- personal warmth more interactivity ->	Predominantly reading-writing (but: chat rooms)	interactive
social	Teacher precepts, parochial group mores	<- rule-governed socially mediated ->	Global social awareness	social
reflexive	Teacher/peer feedback (including formal tests)	<- narrow feedback wide range feedback ->	Teacher/peer/public feed-back, online tests/self-tests	reflexive

⇩
OUTPUT
in terms of
access and affect

Spitzberg (2006) distinguishes between the utopian or dystopian affect that computer usage may have on a user. In a learning environment this may be aligned to enhancements or inhibitors. His extensive research reveals contradictory positions in the literature and he suggests that an appreciation of the complexity of the systems may be improved through examining individual differences. In applying this caveat we have found that each aspect of the blend, that is the traditional and the eLearning delivery, has both positive and negative influences, and that the blend effect may serve to soften, heighten or otherwise modify these influences. Table 2, an empirical model of a blended learning delivery system, attempts to illustrate this complexity. It maps the functional value of the systemic variables within our context. The model is tentative, and does not claim to be exhaustive. Rather, it tries to show the main effects of the blend in terms of either complementary, compensatory or enhancing influences. The "comfort zone" of the actual classroom balances the "outer limits" weirdness of Internet exploration, the blend effect working to encourage students to explore from a safe base. The unlimited, easily-accessed resources of the Internet compensate for the limited resources of oral or written texts in the classroom and libraries. The personal warmth and immediacy of small group face-to-face interaction is complemented by the heightened (but relatively cold) interactivity of electronic communication. The narrowness of classroom rules is tempered by the growing global social awareness resulting from netsurfing. While classroom assessment is more personal and directed, the Internet offers multiple chances for feedback, and self-testing gives the learner more control and independence.

The model accommodates both intrinsic and extrinsic motives, where the former are informed by the user's own values whilst the latter imply a sense of compulsion (Spitzberg, 2006). Although our learners are obliged to complete class tasks, assignments and control tests, they also seek the immediate gratification of net surfing and webmail. The model is thought to improve on previous models as it postulates particular cultural influences measured against access to learning resources and affect (i.e. emotional response to the learning experience). The masters research project is designed to refine this model further as input functions are identified and described in relation to their observed outputs.

5. Video protocol analysis as a research tool

Video protocol analysis (VPA) is being used more and more frequently for software evaluation (Macleod & Rengger, 1993) and to analyse interactions between people and machines (Cockburn & Dale, 1997). Apart from providing a record of computer-human interaction via screen shots, the nonverbal cues offered by the body language of participants can trigger detailed recall of complex cognitive processes. VPA is a useful way of recording behaviour which is partly unconscious, as is most social behaviour, and particularly in establishing any cultural bias, which is so "normal" to the participant as to pass unnoticed when recall alone is relied on. At present funding is not available for digital cameras and VPA software, and analog cameras and a digital mixer will be used to capture split screen recordings on DVD+ disks (the computer screen display is fed though ATI card into the mixer via RGB cable). Figure 2 illustrates use of this setup in testing out student responses to educational software. A similar setup will be used to record the eLearning activities of student volunteers, with the recordings then being played back to assist learner recall of the activities taking place during eLearning. The advantages of using VPA for this purpose are that, without this kind of prompt, most learners do not actually remember what they are doing when their attention is focused on using the Internet, and cannot recall the time spent on various activities, let alone what they were

thinking (or feeling) at the time. Moreover, analysing the time spent on various activities is pointless without some clarification as to why time was structured in this particular way. Finally, the camera does not lie, hedge or prevaricate, and students have found this kind of non-judgemental feedback useful not only in revealing non-effective learning behaviour but also in identifying and reinforcing effective behaviour.

Figure 2: Frame from a video protocol used to test out educational software
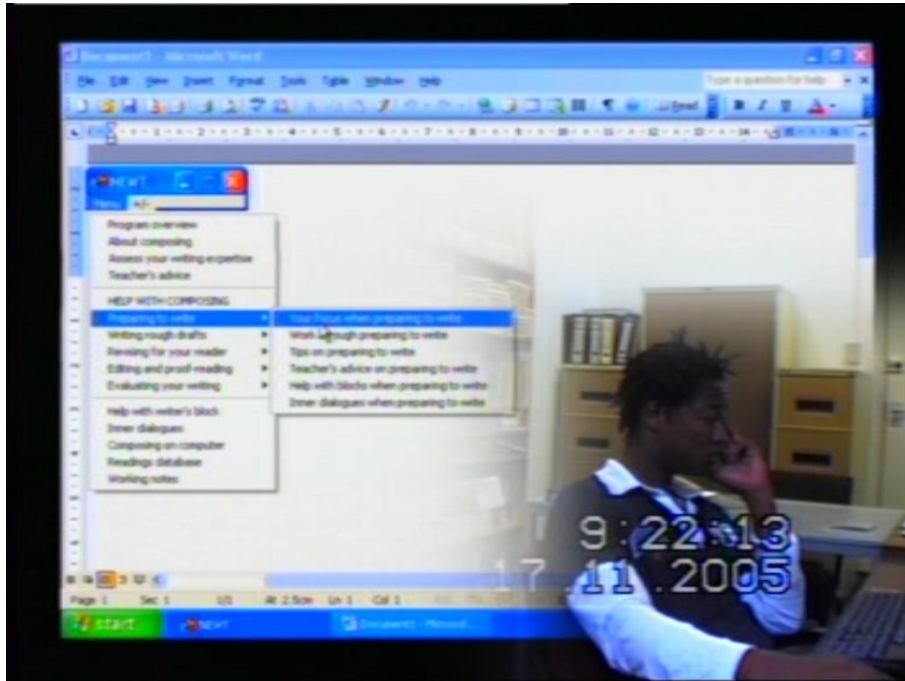
It is already apparent from WebCT discussion forum records that our ESL learners engaged in web searches start posting some time after MT English speakers, and post much less frequently; it is hoped that the VPAs will reveal cultural influences which might impact on time taken to post and frequency of posting. Because we are looking at cultural influences as input into a system of blended learning delivery rather than as ad hoc random data, we hope to arrive a composite picture which will help us to design courses which take cognisance of cultural influences, and which will give us more insight into how to administer the courses to accommodate cultural diversity. The VPA yields rich data with a fairly narrow sample of learners. Its main disadvantage is that it is not feasible to administer more than a small sample of VPAs because of the time taken to explore individual activities, thoughts and feelings: the small-scale sampling may not be representative of the majority of students in a group. Moreover, while VPAs do not seem to inhibit illicit composing behaviour (e.g. plagiarism) they are very likely to inhibit illicit Internet activities (e.g. browsing porn sites). Finally, as the composite picture given by VPAs is qualitative rather than statistical, the task of analysing and displaying the data for even a few samples is extremely time-consuming (Macleod & Rengger, 1993:2). In spite of these problems, the data yielded by VPAs are considered to be a valuable adjunct to the picture obtained from mass questionnaires, observation and interviews, and potentially to offer valuable insights into the actual workings of the general trends revealed by the latter methods.

6. Conclusion

It remains to discuss the implications of this type of modelling for social transformation. As mentioned above, the critical realist position is that it is human agency which both sets in place and transforms social structures: social mechanisms are the complex, layered and dynamic processes in which humans engage as we replicate/transform these social structures. The kind of modelling described in this paper attempts to explain both the social functions performed and the practical means whereby these are effected. The mechanisms themselves change relatively slowly as human society evolves: they have a "venerable history" in terms of relating to age-old human activities such as courtship and marriage, child-rearing, education and civic functioning (social psychologists have referred to these patterns as "social algorithms", see Blunt Bugental, 2000). While there is much that is ephemeral about human social behaviour, these basic patterns persist over eons without changing materially, and are part of what makes us human. What makes us unique, however, is the evanescent patina of rich socio-cultural overlay, combined with the multifaceted diversity of individual experience and personal response of each human being. We believe that discovering the underlying patterns, as well as gaining some insight into how socio-cultural factors impact on the social processes involved, is the key to unlocking the learner's unique potential, no matter what cultural differences or changes in social context may apply in any given situation. If we can design and administer courses in blended learning delivery to exploit not only the best of each mode but to celebrate (instead of lamenting) cultural diversity, we will, it is hoped, be contributing positively to social transformation.

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[1] Franck's "empirical model" shows the practical aspect of a social mechanism and is not related to Bhaskar's "domain of empirical", i.e. the realm of ideas and theories.

[2] According to McSweeney (2002): "Hofstede's main descriptions of his national culture research are in Culture's Consequences, 1st edition (1980), abridged version (1984), second edition (2001) all published by Sage and in Cultures and Organizations: Software of the Mind, McGraw-Hill, (1991)."