

Transforming social structure with ICT in research capacity building at a multicultural university of technology

Dee Pratt
Research and Postgraduate Support
Durban University of Technology
South Africa
deep@dut.ac.za

Abstract: This paper explores the process of transforming the social structure of the teaching/learning process in a series of research capacity building workshops at a multicultural university of technology. ICT components were included in the workshop programme to help to deal with time constraints and the geographical separation of the multi-campus university staff. At a deeper conceptual level, the theory of social structure contained in Margaret Archer's morphogenetic approach shows how the integration of ICT into the programme design has the potential to transform the system of relationships involved in research capacity building.

Introduction

This paper explores the process of transforming the social structure of the teaching/learning process in a series of research capacity building workshops at a multicultural university of technology (UoT). Research capacity building at a university where most staff members do not have doctorates and many do not have master's degrees poses particular problems. The technikon history of the university has meant that many of our staff have a vocational or industry, rather than research, focus. Moreover, the university draws its student intake from a province (KwaZulu-Natal) which has a large number of learners with an historically disadvantaged educational background. This means that our terms and lecture times tend to be extended beyond those experienced by academics at "traditional" universities, leaving staff with heavy workloads and little time, energy or inclination to improve their qualifications (cf. Luckett 2012, p. 346). The issue is complicated further by the fact that the university has seven geographically-separated campuses, two over 90 km away from the main campuses, but does not have the resources (human or financial) for circuit type training on different campuses. Even when staff can be persuaded to commute to workshops, there are problems with transport, parking and venues. Suitable venues are in short supply, and time constraints often mean that staff arrive in groups of over 160 for workshops. These then become more in the nature of college lectures, and thus fail to deal with the specific problems faced by individual staff members. In 2011 the author, a retired professor contracted part time to assist the university with research capacity building, ran five workshops for staff (and higher degree students): one on how software and social networking sites could be used to build research capacity: one on proposal writing, two on thesis writing, and two on supervision. These drew packed audiences, but the "once off" nature of the interventions left no opportunities for consolidation or follow up. In 2012 the author therefore proposed to the university's Research Office the piloting of a programme of weekly small-group workshops in which the development of research competences was scaffolded, with an online component introduced to help to deal with time constraints and the geographical separation of the multi-campus university staff. This pilot project is discussed in this paper, which focuses on the attempt to transform the social structure of teaching/learning in research capacity building workshops by integrating ICT into the programme design.

Overall Approach Used

The pilot project comprised a scaffolded series of mixed-mode research capacity building workshops for staff and students engaged in masters and doctoral studies. In contrast with traditional type research workshops which tended to be top-down presentations with the obligatory glossy folder encasing an impressive

wad of paper content (usually obsolete by the time it was handed out), these were hands-on workshops using digital resources (Internet or computer-based) where the only piece of paper in evidence was the attendance register, and this only because the university auditing system required a hard copy with original signatures. As the whole series of 30 weekly sessions was worked out for the academic year, participants could select sessions which were relevant to both their level of proficiency and the stage they had reached in their research. It was decided not to offer separate sessions for staff and students, as many of the DUT staff members were completing their own doctorates as well as being engaged in supervision, so that the division between staff and students became “academic”. The attendance of other key role players such as IT staff and research librarians enriched both discussion and technical know-how. The programme designer (who was also the presenter, and the author of this paper) combined research leadership, extensive workshop experience and hand-on knowledge of research software with the systemic modelling of research and research writing processes (Pratt 2011b). This meant that, while sessions in the workshop programme focused on specific areas of research expertise, the whole programme represented a continuum of development in the cycle of knowledge construction at master’s and doctoral level. The mixed-mode approach had moved beyond the notion of web-based learning courses geared at developing discrete skills towards the concept of curatorship (Rosenbaum 2012), where internet resources are gathered, assessed, monitored and updated to meet the needs of a specific community of research practice at any given time. At a deeper level, the course designer, whose research approach is critical realism, became aware that many of the elements which contributed to the success (or problems involved) in running the programme could be explained at a deeper level than formerly with reference to critical realist theories of social structure (Bhaskar 1978; 1979; Archer 1995; 1998b). In particular, Margaret Archer’s (1995) morphogenetic approach could be used to explain critical elements in the replication/transformation of the social structure involved in teaching and learning when this is augmented by information and computer technology (ICT). However, Archer herself does not focus on the use or impact of technology on social structure (Mutch 2010, p. 510), and while there are studies exploring Archer’s morphogenetic approach in relation to ICT, up to now few critical realist studies have been carried out in the area of e-learning (but see Gutteridge 2006; Reddy 2012).

Mixed-Mode Course Design from a Critical Realist Perspective

The critical realist philosophy is generally attributed to the British philosopher Roy Bhaskar (1978; 1979), whose main contribution was in “re-thematizing ontology and giving it a certain new content or shape” in *A realist theory of science* (Norris 1999, p.1), although the term “critical realism” itself was coined in a series of essays by Drake et al. (1920, p. iv). Bhaskar’s ontology comprises three domains:

The notion of reality as consisting of three domains – the empirical, the actual and the real – is a central one within critical realism. The empirical domain includes that which we can observe – things that happen and exist according to our immediate experience. The actual domain is a broader one, and refers to that which transpires independently of the researcher or any other observer who might record it. Finally, the domain of the real includes those mechanisms that are productive of different events and other ‘surface phenomena’ (Alvesson & Skoldberg 2009, p. 40).

The concept of “stratification” in the levels occurring in Bhaskar’s ontology is a recurring motif in critical realism, and can also be applied to the inquiry process in which deeper layers of explanation are developed as the inquiry progresses (Dobson 2012, pp.77-71). According to Alvesson and Skoldberg, “It is the interest in mechanisms of a ‘deeper dimension’, which distinguishes critical realism from other traditions” (2009, p. 40). The levels of stratification involved in explaining effective mixed-mode courses, going from surface explanations (I.) to deeper level social theories (IV.), were conceptualised as follows:

- I. Formulaic: List of discrete course elements (e.g. navigation options, course content, discussion tools, assignment tools)
- II. Paradigmatic: On the basis of the evaluator’s preferred teaching/learning approach (e.g. constructivism)
- III. Systemic: Systemic operation of teaching/learning (allowing for diverse beliefs and values)
- IV. Social theories (i.e. at the level of mechanisms explaining causality): Course design as replicating/transforming the social structure involved in teaching/learning

A growing number of information system (IS) researchers, in particular Dobson (2001), Carlsson (2003), Mingers (2000) and Mutch (2010), advocate use of the critical realist orientation for ICT research. It must be noted that, while providing a useful meta-theory for inquiry, the critical realist philosophy does not supply practical guidance as to methodology or, for that matter, the place of technology within its orientation (Dobson 2012, p. 63). However, Mutch suggests that Archer's theory of morphogenesis/stasis provides a substantive theory for social functioning within the critical realist perspective (2012, 508-510). Wong (2005) demonstrates how a morphogenetic approach can be applied to research into organisational innovation, as Mutch (2012) does for research into database storage.

Based on Bhaskar's philosophical meta-theory (1978;1979;1986;1984), Archer's (1995; 1998b) morphogenetic approach provides the theoretical basis for the analysis of both continuance and transformation of social structures. According to Bhaskar (1979, p. 187) social structures are mechanisms with emergent qualities, but the actual processes involved in social consolidation and/or change (which Archer terms "morphostasis" and "morphogenesis" respectively) are complex and occur as cycles in time phases. The meaning of the term social structure in itself poses problems (Porpora 1998, p. 339), but Bhaskar's (1979, p. 186) postscript make it quite clear that it is the "abstract form" to which social structure refers (as with other social mechanisms), although he himself might have used the term ambiguously initially (i.e. to refer also to the materiality of entities involved). According to Alvesson and Skoldberg, the term social structure "is used to capture configurations of causal mechanisms, rules, resources, powers, relations and practices" (2009, p. 42), in other words, it is a *set of relationships* between people and other entities which sets the context for human interactions and can be seen to motivate social activity. Social structures are not directly observable, but manifested only in actual social interactions. As Archer points out, we are born into the social structures set in place by the activities of those in the past, and our continued social interaction further transforms - or consolidates - these structures for those in the future. This means that structure and agency must be separated in analysis (1998b, p. 367) as they operate in different time frames; this is why Archer emphasises the importance of "historicity" (1998a, p. 196), that is the need to analyse social change in terms of the interplay between structure and agency over phases in time.

To apply Archer's approach to use of ICT in forms of e-learning, today's instructors and learners have inherited a set of social relationships for teaching/learning based on past interactions but which now include relationships with the material entities of computers and the Internet. However, the way we deal with this "unseen" but powerful context for teaching and learning is still largely governed by the traditional educational book-based culture, and future generations only will inherit the transformed social structure which can truly exploit today's ICT developments (which will by then, of course, already be passé). Transformation of social structure can be seen to occur over wide epochs in time (hence Archer's focus on "historicity"). However, new technology can trigger dramatic changes in actual social behaviour over relatively short periods, as in the introduction of the mobile phone. The exponential trend in ICT development with the explosion of "rich media" resources may accelerate changes to the extent that even the traditionally conservative social structures in education may transform much more rapidly than in the past.

Key Features of Course Design used in the Pilot Study

In previous publications reflecting on the effectiveness of various eLearning initiatives (see Pratt 2011a for an overview), the author at first had recourse to the usual formulaic evaluations, but resisted the temptation to judge course design based on her own paradigmatic preferences, using instead a systemic model developed in doctoral research (Pratt 2011b). This paper reflects an attempt to move to a deeper conceptual level in suggesting how the concept of social structure might offer insight into effective mixed-mode course design. The hypothesis offered is that the effectiveness of mixed-mode courses can be explained by the extent to which they replicate and/or transform social structures of teaching/learning which are already known to be effective in face-to-face instruction or traditional distance education (i.e. by hard print correspondence). Certain aspects fundamental to the research process would need to be replicated. It was not my intention to change research processes per se, but to transform certain aspects of the teaching/ learning social structure which formed the context for research capacity building, so that my good colleagues, whether in the capacity of supervisor or student, were better equipped to go about replicating and/or transforming the research process themselves (i.e., in terms of their collective impact on the social structure informing research processes for future generations).

As this paper deals with the transformational potential of ICT in research capacity building, it might be helpful to clarify the nature of the mode of “reality” represented by ICT in critical realist terms. According to Fleetwood, “an entity is said to be real if it has causal efficacy; has an effect on behaviour; makes a difference” (2005, p. 2). He cautions us against erroneously equating “real” entities with material entities, and “non-real” entities with non-material entities (an idea - for example, a religious belief - can affect people’s actions just as profoundly as a physical cause). Computers and the Internet are “artefactually real” (Fleetwood 2005, p. 3), which involves a combination of materially, ideally and socially real entities; these refer, respectively, to physical objects, concepts and social relationships (such as those contained in social structures, but also those contained within them, such as the “positions” and “practices” identified by Bhaskar as mediating between social structures and human agents, 1998, p. 221). ICT has a *material* aspect (hardware, material infrastructure), but is “*ideally* real” in the sense of being conceptualised in certain ways by providers and users; according to Fleetwood, while artefacts have a material existence separate from our ideas about them, we conceptualise them in the same way that we conceptualise certain natural objects (e.g. rivers, rocks and trees as a “beautiful view”), and these concepts have causal force. Artefacts are *socially* real in terms of being created for social use; social structures do not just include relationships between people, but also relationships between people and things. To suggest how ICT might potentially transform the social structure involved in teaching and learning in research capacity building, one needs to investigate how the material, conceptual and social aspects of ICT are harnessed to the ends of transformation in course design.

Material Aspects of Integrating ICT into Course Design

In the pilot programme for research capacity building, described above, ICT was used for its potential to increase instructional time, resources and interaction exponentially, as follows:

1. The workshop venue was a computer laboratory with Internet access dedicated for use by master’s and doctoral students (i.e. a Research Commons). This meant that Internet resources as well as research software (e.g. EndNote) were immediately available, and the workshops modelled use of ICT for novice researchers.
2. Use was made of two courses set up on a Moodle server: *The Higher Degrees Research Module* and *Research Matters* (<http://dutmoodle.dut.ac.za/moodle/course/category.php?id=44>). The former had been designed to lead students through research processes from topic exploration to thesis completion, and thus served as a model of research processes as well as containing resources and exercises relating to various phases of research, potentially useful to both students and supervisors. The latter course was designed specifically as the ICT enhancement for research capacity development workshops, and made provision for:
 - Posting of the workshop programme online at the beginning of the year, which meant that staff could anticipate in advance which modules would be of most use to them, and plan their attendance accordingly.
 - Posting of workshop exercises and resources online (or links to resources already online);
 - Posting of workshop PowerPoint slides online (usually immediately after workshops, but these could be used during the workshop when a data projector could not be supplied);
 - A social forum for discussions, used by the facilitator to initiate exercises or to obtain feedback, but which could be used by attendees to initiate discussions, during or between workshops.

The online options were not only used for enhancing face-to-face facilitation, but allowed staff who could not attend workshops to obtain some idea of the main points covered, access the resources provided and participate in forum discussions. The use of online resources mean that resources could be adapted or augmented to suit a specific group or context at a moment’s notice at minimum cost.

Ideal Aspects of Integrating ICT into Course Design

Staff with a strongly professional or vocational background from the former technikons tended to experience research as a form of solitary torture, which insensitive administrative processing did nothing to

ameliorate. Research workshops at DUT pre-2012 were too few, and were delivered mainly as formal presentations, constituting “pseudo-events” with a higher publicity value than actual research worth. There was little or no follow-through or consolidation (a notable exception was the case where individual departments held discipline-specific weekly seminars, which was not the norm, however). Workshops were too few because there existed (and still exists) an obsession with high-profile, off-campus functions, which meant that it was too expensive to hold more than a few per year. Another problem with off-campus workshops was that attendance melted away on day two of weekends because staff showed up dutifully to be counted on the first day but were not prepared to spend the whole weekend away from home and family commitments.

The workshop programme described here, rather than being presented as a series of discrete topics, or a few prestigious “research events”, was designed around the concept that research is not just a once-off ordeal to be avoided once the requisite degree has been obtained, but part of the “Knowledge Cycle”, where the discoveries of previous inquiries provide materials for new research, which in turn feeds back into the body of knowledge which is generally available. This concept was emphasised online by ICT by being included in all workshop PowerPoint presentations, so that there was a motif linking all of the workshops. While there were “live” discussions away from the computer consoles, as well as opportunities for staff to network over tea, setting the workshops in a computer laboratory with research software and access to Internet research resources meant that attendees were offered the opportunity to conceptualise ICT as being an integral aspect of everyday research processes (i.e. the “ideal” aspect of ICT in course design).

Social Aspects of Integrating ICT into Course Design

The key social aspect of integrating ICT into course design in this case was the inclusion of ICT into the web of relationships comprising the social structure of teaching/learning operating in the research workshops. This was attempted by including computers, research software and the Internet (including the online courses) as being materially present in the workshop venue, which in turn offered a re-conceptualization of them as part of the “situational logic” (i.e. common accepted idea, Archer, 1996, p. 145) of not only teaching and learning, but, potentially, everyday research practice. The re-conceptualization of ICT artefacts as “belonging” to research was assisted by the facilitator and attendees using these artefacts regularly in association with the research concepts and practices dealt with in the workshops. Thus there were two main aspects involved in replicating or transforming the social structure of teaching/learning in the actual programme design, the first relating to the *materially* real, the second, to the *ideally* real (see Fleetwood 2005, p. 2). The first was achieved by expanding the relationships in the social structure to include the material aspects offered by ICT and integrating these with face-to-face facilitation; the resulting re-conceptualization meant that the social structure was being adjusted to include relationships with ICT artefacts not only in the social structure of teaching and learning but also in the social structure underpinning research practices. It was therefore important to ensure that aspects of knowledge construction in the teaching/learning situation were congruent with those desired in the construction of knowledge in the research process (i.e. to produce self-motivated, independent researchers).

Conclusion

At the material level, using ICT resources increased instructional time, resources and participant interactions exponentially, and modelled accessing of ICT resources for novice researchers. It thus offered a partial solution to the logistical problems involved in research capacity building. The workshop programme design was based on a systemic model of the research process (see Pratt 2011b, pp. 10-11) showing how research processes developed out of each other rather than as discrete “once off” activities (e.g. reading in the field/area, writing a proposal, writing a literature review). While comprising a sequenced series of research processes, the programme allowed stressed staff and students more flexibility, as they could attend as they chose (some workshops were more relevant for staff, some for students, and some were relevant for both). The real gains were thought to be conceptual and social, however, in a reconceptualising of ICT for knowledge construction in both teaching/learning and research (i.e. changing the situational logics), as well as the setting up of links with ICT artefacts in the relevant social structures. It is not claimed that social change occurred (or will occur) overnight, and the main advantage was to establish a model of weekly hands-on workshops, based mainly

in a computer laboratory, in place of once-off lectures in a traditional lecture setting. This new model was set in place for 2013, and not by my direct intervention, which is encouraging. By engaging in such ventures, we become part of a collective agency transforming social structure for future generations.

References

- Alvesson, M. & Skoldberg, K. (2009). *Reflexive methodology: New vistas for qualitative research*. London: Sage Publications.
- Archer, M.S. (1995). *Realist social theory: The morphogenetic approach*. Cambridge: Cambridge University Press.
- Archer, M.S. (1996). *Culture and agency: The place of culture in social theory*. Cambridge: Cambridge University Press.
- Archer, M.S. (1998a). Introduction: Realism in the social sciences. In M. Archer, R. Bhaskar, A. Collier, T. Lawson & A. Norrie (Eds.) *Critical realism. Essential readings* (pp.189-205). London: Routledge.
- Archer, M.S. (1998b). Realism and morphogenesis. In M. Archer, R. Bhaskar, A. Collier, T. Lawson & A. Norrie (Eds.), *Critical realism. Essential readings* (pp. 356-381). London: Routledge.
- Bhaskar, R. (1978). *A realist theory of science*. Hassocks: Harvester Press.
- Bhaskar, R. (1979). *The possibility of naturalism: A philosophical critique of the contemporary human sciences*. Brighton: Harvester Press..
- Bhaskar, R. (1998). Societies. In M. Archer, R. Bhaskar, A. Collier, T. Lawson & A. Norrie (Ed.), *Critical realism. Essential readings* (pp. 206-257). London: Routledge.
- Carlsson, S.A. (2003). *Advancing Information Systems evaluation (research): A critical realist approach* [online]. Available: <http://www.ejise.com/volume6-issue2/issue2-art3.htm> (Accessed 22 July 2004).
- Carlsson, S.A.(2009). Critical realist Information Systems research. In *Encyclopedia of Information Science and Technology, Second Edition* (pp. 811-817). Hershey, PA: Information Science Reference.
- Dobson, P.J. (2001). The philosophy of critical realism - an opportunity for information systems research. *Information Systems Frontiers*, 3(2), 199–210.
- Dobson, P.J. 2012. Critical realism and IS research: Some methodological implications. In M. Mora, O. Gelman, A.L. Steenkamp & M. Raisinghani (eds.) *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 63-81). IGI Global.
- Drake, D., Lovejoy, A.O., Pratt, J.B., Rogers, A.K., Santayana, G., Sellars, R. & Strong, C.A. (1920). *Essays in critical realism: A co-operative study of the problem of knowledge*. New York: Macmillan.
- Fleetwood, S. (2005). Ontology in organization and management studies: A critical realist perspective. *Organization*, 12 (1), 197-222.
- Gutteridge, R.G. (2006). The myth of panacea: A critical realist exploration of blended course delivery. *NADEOSA 10th Anniversary Conference*, Pretoria, 23-24 August 2006.
- Mutch, A. (1999). Critical realism, managers and information. *British Journal of Management*, 10, 323-333.
- Mutch, A. (2010). Technology, organization, and structure: A morphogenetic approach. *Organisation Science*, 21 (2), 507-520.
- Porpora, D.V. (1998). Four concepts of social structure. In M.S. Archer, R. Bhaskar, A. Collier, T. Lawson & A. Norrie (Eds.) *Critical realism. Essential readings* (pp. 339-355). London: Routledge.
- Pratt, D.D. (2011a) *Modelling written communication: A new systems approach to modelling in the social sciences*. Methodos Series, Dordrecht: Springer.
- Pratt, D.D. (2011b) *Scenarios for learning: An integrated approach*. Saarbrücken: Lambert Academic Publishers.
- Reddy, P. (2012). The development of a language learning object repository (LLOR) for second language teachers in KwaZulu-Natal, South Africa. *6th International Conference of Education Research and Innovation (ICERI 2012)*, Madrid, Spain, 19-21 November 2012. 5454-5462.
- Rosenbaum, S. (2012). *Content curators are the new superheros of the web* [online]. Available: http://www.fastcompany.com/1834177/content-curators-are-the-new-superheros-of-the-web?partner=rss&_amp;_amp;_nbsp (Accessed 20 May 2012).