1. Introduction 1

2. Re-imagining teacher education: connecting the spaces between vision, context and curriculum design 3
   Maureen Robinson and Nici Rousseau

3. Using focussed free-writing as a pedagogical ‘multi-tool’ to overcome barriers, empower student writers and access the student voice 17
   Bernie Millar

4. Developing locally attuned and responsive curricula 27
   Rael Futerman, Andrea Grant-Broom and Bruce Snaddon

5. Thinking About Thinking in Industrial Design 36
   Veronica Barnes and Vikki du Preez

6. Think tank: Assessing the Industrial Design learning environment 47
   Vikki du Preez and Veronica Barnes

7. Postgraduate Learning: pushing the boundaries through Academic Development (AD) 57
   Thami Tisani

8. Student experiences of the communication demands of the workplace 65
   Shairn Hollis-Turner

9. Evaluation of RPL applicants’ knowledge claims into BTech: project management 72
   Frederika de Graaff

10. Learning at “frikking four in the morning”: Using Facebook and Blogs to enhance student engagement 84
    Eunice Ivala, Daniela Gachago
11. Transforming assessments: an investigation into the assessment strategy for Commercial Law for Accountants
   Noleen Leach

12. The implementation of a continuous assessment strategy for determining learners' terminal attainment in higher education
   Eugene Fester
Introduction

Paradigms aims to promote and disseminate innovations in teaching and learning within the CPUT community. The journal thus forms just one leg of the overall CPUT initiative of improving students’ learning environments and hence throughput. As such the journal attempts to promote the CPUT mission statement of ‘we will be known for the high quality of our teaching and learning and the relevance of our curriculum’. This edition of Paradigms is an edited version of the papers presented at the 2010 Research into Teaching and Learning (RITAL) conference held at Granger Bay. Subsequent editions will also draw on papers presented at the RITAL conference as the main article source, but staff wishing to submit articles who have not presented at the conference may send them to garrawayj@cput.ac.za for consideration.

The first paper by Robinson and Rousseau reports on an innovation in teacher education curriculum design in the primary sector. The paper describes how the project involved teachers in action research of their own practices with the focus on connectedness, transformation and ‘more is less’ towards a curriculum that develops professional identity. Millar reports on using freewriting approaches in teaching language in order to access students’ ‘voice, thinking and strengths.’ This, she believes, promotes reflection and other forms of higher order thinking, thus providing access to success in academic writing.

The next three papers are from the design field. The paper by Futerman et al. reports on using transdisciplinary design projects in order to better prepare students for the realities of modern design. Furthermore, they report on the fascinating field of biomicry – imitating processes and designs from nature - as potentially providing for more naturally aesthetic and environmentally responsive form of design. The next two papers by Du Preez and Barnes report on a project to examine design students’ level of critical thinking – understanding and evaluating experience and information – and how critical thinking can best be enabled in the design environment through problem based learning exercises. The articles describe an initial (focusing mainly on diagnostic testing) and subsequent (testing and teaching) report on the critical thinking project.

Tisani discusses the importance of extending academic development work into post graduate education. The focus up until now has been mostly on transforming undergraduate development yet the post graduate level also requires extensive transformation, as senior graduates form a vital component of socio-economic development.

Hollis Turner’s paper describes the interface between university teaching and work practice through the lens of communications studies. She identifies that communication studies may have become too highly ‘pedagogicised’ and increasingly unrelated to actual work practices; this has implications for curriculum renewal in professional/vocational studies. De Graaf’s paper will be of interest to those involved with RPL, particularly those who examine the ‘knowledge’ claims
made applicants and how these relate to the more canononical knowledge of the curriculum; the author examines these through a Bernsteinian lens.

Ivala and Gachago suggest that social media – Facebook and blogs – have an important role to play in increasing students’ engagement with their academic work. They show this through interviews with student and staff and suggest how such media, as well as engaging students, have the potential to improve students’ academic performance in part through dissolving boundaries between social and academic life. Two papers on assessment in Business education by Leach and Fester look at different types of assessment – summative, formative and continuous – and how these may contribute to student engagement and learning. The latter paper also examines how staff often confuses the purpose and structure of these different forms of assessment.

Deyi and Wium highlight the importance of students' learning concepts in mathematics in their first language in order that they gain understanding. Furthermore, such an approach can have a knock-on effect of improving academic language related to the field of study, particularly when students attempt in groups to translate understandings into the target language.

James Garraway,
Paradigms Series Editor.
Re-imagining teacher education: connecting the spaces between vision, context and curriculum design

Maureen Robinson and Nici Rousseau

Introduction

The importance of quality education for all has been forcibly argued from a global perspective (see for example UNESCO, 2007). Yet, while such influential forums offer powerful vision statements for education, it is in the enactment of such visions that the greatest challenges can be identified. Even where policy statements offer a clear direction and vision for educational reform, the actual spaces in which practitioners act may be defined more by local capacities and priorities, and particular contextual conditions.

In this article we focus on one example of such a locally defined space. We discuss the journey of a group of teacher educators who were involved in a far-reaching curriculum reform process at a university in South Africa. Working in a changing policy context, these teacher educators set out, via a process of scholarly inquiry and participatory action research to revise their curriculum within a particular vision of professional practice. In documenting this journey, the article builds on an emerging body of work on the challenges of curriculum reform in initial teacher education in the early period of South African democracy (see for example Carl, 2008; Kruss, 2009; Pournara, 2009; Samuel, 2009; Samuel, 2010).

The article begins by outlining the origins and main features of this curriculum journey. It describes the pressures of the teacher education curriculum at the time, the motivation for change, and the reasoning behind the scholarly and collaborative approach to curriculum re-design. Key international, national and institutional contextual factors are described, as well as the conceptual underpinnings and design principles of the new curriculum. In outlining the dilemmas confronted, as well as the growth path of those involved in the process, we illustrate how this group of teacher educators sought to connect the spaces between vision, context and curriculum design in ways that they hoped would promote coherence and synergy in the process of teacher learning.

The curriculum journey begins

The curriculum revision described here took place within the Faculty of Education at the Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa. CPUT came into being in 2005, as a merger between the former Cape Technikon and Peninsula Technikon. Cape Technikon had itself in 2001 incorporated two major colleges of education, themselves a conglomerate of about fifteen former colleges, all of which had merged over the previous fifteen years. The Faculty was physically located on three campuses, across a distance of about seventy kilometers. This history of mergers and incorporations meant that
the Faculty was characterized by complex administrative and managerial arrangements, as well as differing ideological histories.

The curriculum process was aimed at the four year undergraduate Bachelor of Education for the General Education and Training (GET) band, which trained teachers for the Reception Year (Grade R) to Grade 7 in two phase specializations: Foundation Phase (Reception Year – Grade 3) and Intermediate/ Senior Phase (Grade 4 – 7). These two B Ed programmes were offered at two of the three campuses of the Faculty, to about 1 500 of the nearly 4 000 students in the Faculty in 2010 and were taught by a staff complement of nearly fifty lecturers.

The review was preceded by the identification of a number of problems in the existing curriculum. The original design process had taken place during the incorporation of the colleges of education into the Cape Technikon and had been very rushed. The emphasis at that time had been on conformity with existing and inappropriate qualification structures, and on staff rationalization, rather than on academic or professional principles of curriculum design.

The national school curriculum for the General Education and Training band, with its eight interdisciplinary learning areas, was a central driver of the problems experienced in the B Ed. Time limitations did not allow for sufficient exposure to such a vast range of academic disciplines, a problem compounded by the poor foundational knowledge of many entering students. An additional concern was the awareness that students needed time to develop their academic reading and writing skills. Assessment requirements tended to absorb most of the students’ time not spent in lectures. While the Intermediate/ Senior Phase students needed time to become specialists in their major subjects, the Foundation Phase students were generalists with Literacy, Numeracy and Life Skills as the core of their curriculum. Life Skills comprises a wide range of components, including the arts and sciences, while Literacy and Numeracy teaching are regarded as national priorities. Student evaluations revealed severe timetable cramming and staff expressed concern with fragmentation and students’ apparent inability to go beyond surface learning.

Arising out these concerns, a plan of action for a revised curriculum was tabled during 2008. At an early stage it was agreed that the process should be viewed as an academic exploration. A visiting professor acted as an academic adviser and a study visit was undertaken by the course coordinators to five other South African universities to compare the purpose and structure of their B Ed.

As the process evolved from identifying design principles to underpinning theoretical principles to a framework for action, so the participants expanded to include a variety of subject groupings. The two most prominent were those lecturers responsible for the generic subjects Education and Professional Practice, as these formed the backbone of the new curriculum. Various Faculty-wide workshops and meetings were held, to report on the study visit, to present student and staff evaluations of the ‘old’ curriculum, to share emerging principles, to learn from other institutions, to debate topics like brain-based learning and character transformation and to share views on the social and educational challenges facing teacher educators in South Africa. Finally, the ‘new’ curriculum was introduced to the first year of the B Ed in 2009.

The context

Grossman and McDonald (2008) argue that research should foreground how factors like national policies and institutional contexts play a role in the organization and practice of teacher education. International, national and institutional contexts each played a
fundamental role in defining the direction of the curriculum development exercise under discussion here.

At an international level, the process of redesign was inspired by contemporary thinking around the dynamic nature of knowledge, where learning should be preparing young people to be active social agents in a constantly changing world. A key example here was the report to UNESCO of the International Commission on Education for the Twenty-first Century (Delors et al. 1996) which argues the underpinning pillars of modern education to be learning to know, learning to do, learning to be, and learning to live together. While the first two pillars would be conventionally incorporated into teacher education, it was the last two pillars that inspired the imagination. ‘Learning to be’ encompasses the development of core values of autonomy and personal responsibility, while ‘learning to live together’ refers to the development of democratic citizenship and an appreciation of the ecological, economic and social interdependence of individuals, communities and nations (UNESCO, 2003). Both these pillars spoke directly to the historical location of the CPUT student teachers, as they prepared to take their place in an education system still suffering the effects of decades of entrenched racism, poverty and youth alienation, within a constitution that asserted the importance of human rights and values. Other influential authors included McWilliam, who asserts that teaching should provide “a disposition to learning that maps directly on to the ‘unfixed’ social world for which young people will be learning (2008:264) and Barnard, Muthwa-Kuehn and Grimmett who ask how pre-service teachers can “transcend the limitations and constraints of the histories and biographies that have shaped them” (1997:894). How this thinking impacted on curriculum design will be described later.

Various studies have outlined the nature, range and intensity of national policy change in teacher education in South Africa and their associated challenges (Carl, 2008; Kruss, 2008 and 2009; Robinson & Christie, 2008). All these policy challenges impacted on the Faculty of Education at CPUT. The already-mentioned institutional mergers and incorporation of colleges of education meant there was a need for alignment across a multi-campus institution, with different histories, philosophies and ideologies of education. In addition, the Faculty had to work with a new qualifications structure, the upgrading of the primary school teacher qualification from a diploma to a degree, the introduction of external quality assurance reviews, and a changing national school curriculum. The combination of these policy changes had led to the need to establish a shared professional purpose for teacher education, to build a research identity and culture of scholarly enquiry and to reconsider levels of cognitive demand expected from the B Ed. All of this needed to be addressed in a context of high teaching loads and the many demands of assessment, administration, student support, professional engagement and staff members’ own further studies.

An action research methodology

While the impetus for the curriculum change arose from a concern with overload and fragmentation, the decision was made to base ‘solutions’ on a conceptual analysis of the issues, rather than on just a pragmatic adaptation of time and credit allocation. Working within the framework of a scholarship of teaching, where “faculty frame and systematically investigate questions related to student learning” (Paulsen, 2001:21), an action research approach was adopted, so that questions and dilemmas of practice could be discussed and improved against the backdrop of international thinking on teacher education. This approach meant that assumptions could be made explicit, links could be established between research and teaching, and data and evidence were central to the investigation and revisions (Hughes, 2007).

The curriculum development process thus combined literature reviews, visits to other universities, the study of policy documents, questionnaires to students and staff, reflective
reports of curriculum officers, staff presentations and departmental discussions. This took place alongside course development, so that action and reflection were inextricably linked.

The issues highlighted in this paper were distilled from the same sources of information. Recurring as well as contrasting trends were identified, in order to outline general themes and significant dilemmas, both in respect of the internal design process and in respect of broader debates. Issues were then ‘fed back’ to staff, for validity checks and to gather further insights.

Roy, Borin & Kustra (2007) argue that, to be sustainable, curriculum change must be based on departmental consensus, so that people work in teams, understand the rationale for change, and are able to state their own role in the process. The participatory process of curriculum design attempted to be inclusive, build capacity and establish professional learning communities. The motivation for this approach arose in part out of the nature of the curriculum change itself, as the coherence, connectedness and synergy of the new curriculum would by definition require coordination and collaboration among colleagues. In addition, due to the different histories and contexts of the two campuses, extra effort had to be made to ensure ongoing dialogue and sharing of views. Finally, with the need to move fairly quickly from conception to execution, the practicalities of implementation (timetables, assessment calendars, etc.) needed to be organized for the following year.

The vision

From the early stages of the initiative, the group driving the process was united in a commitment to academic depth, while maintaining a strong practical component. High on the agenda was the need to reduce fragmentation, a concern that had been articulated in feedback from both staff and students over a period of time. A deeper dimension to the vision of the curriculum arose from questions about whom the curriculum was for and what knowledge, skills, competences and values graduates needed to develop to meet the needs of a rapidly changing society. Against the background of wanting to address the educational crisis in South Africa, and to contribute to nation-building, it was felt that the vision needed to be a long-term one, rather than be based on short-term innovations.

Adopting the principle of the need to educate teachers instead of simply training them, the challenge was therefore to go beyond changing the superficial or outer aspects of the curriculum and to address deeper levels of learning. The process became one of reconceptualization rather than reconstruction and the architecture began to resemble the kaleidoscopic phenomenon of curriculum development in the postmodern era, consisting of interrelated ideas, texts, personalities, structures and narratives (Briggs, in Slattery, 2006).

Underpinning principles

The four pillars underpinning education for the 21st Century as identified by the Delors et al. report (1996) provided a useful foundation. In addition, three principles - less is more, connectedness and transformation - were finally selected to underpin the vision and guide the design. These principles emanated from debates informed by national and international literature focusing on the educational needs of the target group in relation to the context.

The principle of ‘less is more’ was the first to be selected. It was argued that spending time “filling a space with data” and the thoughts of the lecturer, should translate into “opening a space where students can have a conversation with the subject and with each other” (Palmer, 1998:123). McWilliam calls this “value creation rather than knowledge transmission” (2008:266). In a teacher education programme, bounded by a timetable and defined years of study, the question was: ‘What is the optimum use of the brief time my students and I share
in the space called the classroom?” (Palmer, 1998:124). Nearly thirty years earlier Ryle (1968:223-225) had already distinguished between what he called a “museum possession” of knowledge and a “workshop possession” of knowledge, warning against an assumption that “knowledge-how” can be built up by the accumulation of pieces of “knowledge-that”.

Different authors describe this identification of core concepts in various ways. Palmer (1998:125) refers to the “laser act of teaching”, while Pournara (2009:299) talks of “exemplarity”, where “one can come to appreciate and understand the complexity of a phenomenon or problem by engaging deeply with a smaller part of it.” The notion of a “threshold” concept is used by Meyer and Land (2003) to describe those concepts difficult to master, yet fundamental to understanding a particular subject.

The principle of ‘connectedness’ derived from the fragmentation of learning mentioned earlier where, seen from the students’ perspective, the academic day consisted of a number of unrelated and disconnected knowledge worlds. This, according to Hammerness (2006) seems to be a central concern in the field of teacher education. The challenge goes beyond effecting coherence between the theoretical and the practical, to creating “patterns of meaningful connection” (Palmer, 1998:130), through carefully constructing and integrating learning experiences while being informed by a cohesive vision of teaching and learning.

The third principle was that of ‘transformation’ understood as preparing teachers to create learning opportunities in an ever-changing world (Darling-Hammond & Baratz-Snowden, 2005:6). It was felt that the challenges awaiting novice teachers in South African schools necessitated a teacher education curriculum that would address both student teachers' levels of competency, as well as their “inside qualities” (Seligman cited in Korthagen, 2004). Such an approach would encourage them to become active participants in their world, reflecting upon it, reconsidering and revising their understanding of it, so that they could prepare their learners at school to become change agents themselves. Shulman and Shulman call this the “heart of teaching” - a capacity for intelligent and adaptive action” (2004:263). Thus the curriculum journey was not only about engaging students in deep learning, but also about assisting them in actively mapping their own understandings (Rogers, 1997), maintaining a balance between a focus on the self and the other (Korthagen, 2004), expanding personal boundaries and enlarging a sense of community (Palmer, 1998) and linking cognition with emotion and affect (Lovat, Toomey, Clement & Nielsen, 2009).

Graduate attributes

The next challenge was the identification of a set of graduate attributes, to be developed in student teachers through the four years of the B Ed. The specification of these attributes was inspired by the Delors report and other contemporary authors on transformation through education (for example Campbell, 2008; Christie, 2008; Slamat, 2009; Waghid, 2003), all of whom emphasize the moral, cultural, imaginative and compassionate dimensions of education.

The original need for change therefore required a pathway that could look beyond short-term solutions. The vision would have to incorporate both the “being” and the “becoming” of both students and lecturers, as Ruth Mansur (2009) advocated so passionately in her paper, Being and becoming: living the curriculum of teacher education. The vision needed to adopt a generative agenda rather than a purely prescriptive one; viewing teachers not only as ‘those who know’ or ‘can do’, but ‘a way of being’ – a third space between theory and practice.
Schulman and Shulman’s (2004) clusters of attributes were felt to be most appropriate since they encompassed both the epistemological and the ontological elements of teacher education. These attributes were analyzed with regard to the specific context of the Faculty and the core design principles, a process which resulted in the selection of specific applications for each of the attributes. Each cluster of attributes is briefly described here:

Firstly, the cognitive cluster which incorporates, for example, the ability to develop a deeper understanding of connections between things, and how they function within a systemic relationship.

The dispositional cluster describes, amongst others, an ethical course of action, continuously questioning and adjusting enterprise and thought in relation to the common good of society.

The third cluster is the motivational cluster, referring to, for example, the capacity to stay focused and committed to best practice.

The fourth cluster is a performance cluster. This includes the ability to demonstrate effective reading and writing skills in different contexts, allowing for fluent, appropriate and accurate communication.

The reflective cluster refers to standing back and reflecting on own and others’ thinking processes in order to articulate, monitor and evaluate these processes. This is not necessarily an individual task and in fact, joint reflection allowing for diverse opinions and experiences can generate shifts within a community of learning, so necessary for transformation.

The overall conceptualization of the vision is summarized in Figure 1.
Conceptual models

It is helpful to locate the vision articulated above within different conceptual models of teacher education. Samuel (2010) identifies a master-apprenticeship model, where a novice teacher learns by imitating an expert teacher; an applied science model, where student teachers first learn theory and then apply it in context; a reflective practitioner model, where novice practitioners draw on their own resources and learn through personal self-reflection; and a critical reflective-practice model, where teachers seek better forms of social justice through their actions and practices. Carl (2008) adds to this an inquiry-oriented/ critical social tradition paradigm, which develops prospective teachers' capacities for self-reflection, particularly towards making social justice a reality; a behaviourist model which focuses on developing specific skills of teaching; and a personalistic paradigm, where personal development is seen as a central part of teacher preparation. Both these authors agree that teacher education programmes mostly contain a hybrid of the different features and in this respect the CPUT curriculum was no exception.

Scott’s (2008) outline of different curriculum theories provided a further frame for understanding how teaching and learning would be designed. The emphasis lay on learning as an active and deep process of meaning-making and action (Stenhouse, Giroux), where, through individual and collective reflection, problems of practice could be framed and re-framed (Bruner, Schon) and where students were deliberately taken beyond where they already were in their development (Vygotsky).

The curriculum design

In the next section we look more specifically at what this vision meant for curriculum design.

Less is more

The importance of academic depth and quality education remained non-negotiable. This first principle could therefore not simply be translated into ‘achieving more with less time’. Technically the timetable did cut back on contact time, but increasingly the staff also realized that trying to cover the whole field in each of the disciplines, was just not a realistic option. Each designer/ subject specialist needed to find the “internal logic” (Palmer, 1998:125) of the discipline – that critical part of the discipline that relates to the greater whole and will allow learners to understand the role it plays within a dynamic system by examining the patterns within the critical sample.

This principle meant re-looking at the structure of the course, modes of delivery, selection of content as well as forms of assessment. At a special workshop, lecturers teaching various subjects were asked to elaborate on how they understood and worked with the concept of ‘less is more’. They talked about the need to have fewer topics but to ensure that these have meaning and relevance (History) and to be able to identify big mathematical ideas and open up new ways of thinking about something (Mathematics). Reasons for selecting particular content included focusing on topics that were not covered by the school (History) curriculum, basing teaching on research and theories of Mathematics teaching, and understanding the nature of the student body (Art). Lecturers indicated that they linked to the overarching principles of learning to know, to do, to be and to live together through identifying, for example, with the ‘ordinary’ people of History, building mathematical confidence, getting students thinking and embracing challenge.
Connectedness

Having identified the critical core or internal logic deemed necessary to represent the essence (depth) and vastness (breadth) of the particular field, the scope for exploring the connectedness between different disciplines and their role within the greater whole became more obvious.

Such an approach encourages prospective teachers to look beyond the here and now and to use a pedagogy which scaffolds the crossing of boundaries. Through an emphasis on connectedness, it was hoped that student teachers would learn to engage actively with their subject matter, acknowledging not only the connections between domains of knowledge, but also the role of their own autobiographical experiences in the meaning-making process. Methodologies such as portfolios and reflective journals provided the tools to inquire about and probe the interconnectedness of past, present and future experiences.

Transformation

Teachers “are entrusted with the care of producing the next generation of thinkers, doers and shapers of all our future” (Samuel, 2009:756). Through their studying of the global vision for education (e.g. in the Delors et al. report, 1996), as well as through the process of designing intentionally for connectedness and less is more, it became clear to the CPUT group of curriculum designers that the process embraced another distinctive operation, namely to design for a “reform environment” (Shulman & Shulman, 2004:265) where the combined community of student teachers and teacher educators could actively and interactively engage with the educational challenges facing them.

An example of a subject designed around this vision of creating a “reform environment”, was that of Professional Practice. This subject acted as a bridge between the ‘theoretical’ and the ‘practical’ aspects of the B Ed, including both the content subjects and the methodologies. It offered the ideal position for foregrounding the clusters of graduate attributes and for going beyond the purely rational and structural by starting with the autobiographical in order to work towards ethical responsibility and dialogic consciousness.

An Art lecturer involved in the subject Professional Practice talks about the module “Constructing your identity as a teacher”. Her thinking illustrates some of the personal and professional aspects of the reform environment, as well as some of the design dilemmas:

“During the introductory workshop for the proposed new curriculum, I was both delighted and appalled. Much of the approach is one that we have been using in the arts, and so conceptually, it was not such a sweeping change for me. I could embrace the connectedness across the curriculum, and the notion of student agency towards transformation. Learning through art exists in the journey from the experience of the world, through the experience of the art-making process, and then in the return to the world that is possibly transformed. This shifting must include an element of awareness so that meaning influences the interpretation (Räsänen, 1999; Wilson, 2003). The challenge came from the frequent use of the words “Less is more”. In the arts, this translated as less time for the vital act of art-making, a process slow and thought-ful.

When I was approached by the course coordinator to participate in the design of a module in Professional Practice for our first year students, I was moved out of the comfort zone of the arts, and had to grapple with the principles of the new curriculum in other areas of education. Based on the premise of ‘learning to be’, by exploring their human identities, we aimed to connect our other three pillars, ‘learning to know, learning to do, and learning to live together’, in a module that would extend and deepen the students’ thinking as they explored
their new environments and the beginnings of their chosen careers. Understanding, or perhaps even reflecting on their human identities for the first time, becoming aware of their values and their beliefs, and giving value to their agency and individuality would possibly encourage them to be innovative, creative teachers in a world that is globalising, and changing beyond what we, as teacher educators, can imagine.

We chose a dialogical approach, with each lecture based on a series of probing, thought-provoking questions. Key content was provided as the students became receptive. Their own voices formed much of the discussion, and their opinions were given value and credence. They were encouraged to argue, using strong communication skills, and in an atmosphere of trust and shared purpose, they were free to challenge their own, each other’s, and the presenter’s assumptions. Practical tasks, like presenting an argument wearing de Bono’s different coloured hats, or giving value to their own life journeys by drawing their symbolic pathways, were added, and groupwork was an important part of the process.

In preparing for these workshops, it was necessary for me to do much extra reading, and I discovered, to my great delight, a description of the concept of ‘less is more’ to which I could subscribe, and which I embraced with joy: “Every discipline has an inner logic so profound that every critical piece of it contains the information necessary to reconstruct the whole – if it is illuminated by a laser, a highly organised beam of light. That laser is the act of teaching” (Palmer, 1998:125). My challenge is to find the critical pieces.”

**Dilemmas and challenges**

Having outlined the vision and design of the revised curriculum, we move to a discussion of some of the dilemmas and challenges of enactment. Where possible, we highlight ways in which we tried to address these tensions.

**The dilemmas of context**

The shifting policy environment of both the school curriculum and the qualifications framework for teacher education was seen as a concern as lecturers were initially reluctant to spend time on curriculum re-design in a context of impending policy change. The extent to which policy parameters should shape the design was a point of debate, with some arguing for stronger levels of policy compliance than others. In the end, there was agreement that one could not hold back on the required curriculum renewal and that policy movement should not stifle professional initiative. Policy thus formed the backdrop rather than the foreground of the exercise, with the emphasis being placed on scholarly inquiry. Some lingering questions remained, however, for example, whether more time for Mathematics teaching at school level implied that student teachers should spend more time on explicit instruction in Mathematics.

Interestingly, the contextual conditions of the institution did not impact as significantly on the process as one might have expected. Despite limited resources for curriculum development, the pressures of having to work across different campuses, and a university incentive scheme that rewarded individual research rather than participatory curriculum development, lecturers spoke with enthusiasm about the collective professional practice that was established during the process. Time was the main constraint, with high teaching and assessment loads and the distance between the two campuses impinging on lecturers’ opportunities for collaborative reflection and planning.
The dilemmas of design

A central dilemma derived from the shared assumption that quality education is dependent on teachers’ competence in their respective disciplines. For this reason lecturers were asked to work in subject groups as they planned their curricula. Many lecturers expressed concern about ‘how much’ knowledge they could expose students to in the year. The tension of time for content knowledge was particularly a matter of concern where students came to the B Ed with levels of under-preparedness in certain subjects. In general, challenges were noted with respect to working with large classes characterised by students of different ability with different home languages and varied experiences of learning.

These dilemmas were addressed in part through establishing links between subjects, and working conceptually rather than allowing the school curriculum to dictate the content. Through more demanding assignments, students were exposed to the core competences of learning to analyse, reflect and apply knowledge, rather than only content coverage. Attempts were increasingly made to create learning opportunities around the various graduate attributes, thereby paying attention to motivation and disposition on the part of student teachers, as well as to their cognitive development.

Reflections from the side of lecturers revealed the extent to which the re-design process had thrown up a range of questions related to their own pedagogy of teacher education. In the words of one lecturer, “What is the link between the way we teach and what we expect students to become?” Questions raised included how ‘good teaching’ could be modelled for student teachers, both by lecturing staff and at schools, how student teachers might (or might not) ‘transfer’ the knowledge gained as novice teachers to school settings, and the relationship between cognitive and affective learning.

The dilemmas of change

A significant challenge was balancing the requirement to prepare teachers both for the ‘here and now’ and for the future. The teacher education curriculum needed to be rooted in the local context of the country and prepare teachers for the national school curriculum, but be flexible enough to consider global trends in education, thinking, and the world of work. Emphasising an applied science model of teacher education, some staff members argued that student teachers needed to be trained in ways that they could directly apply their knowledge in the school. Others were more inclined to a view of teacher education as educating student teachers to become change agents in society.

Whatever their orientation, all lecturers agreed that in a country with such poor results in literacy and numeracy, and with such disparities in the quality of education across social groupings, it would be important in the future to track the potential of this revised teacher education curriculum to improving teaching and learning in schools.

Another dilemma of change related to advancing the scholarship of practice. For a significant number of the lecturers engaged in this process research was seen as unfamiliar or even threatening (Robinson & McMillan, 2006; Chetty & Lubben, 2010). Yet the combination of research and teaching in this process inspired a number of colleagues to embrace the role of research. In the words of one of the lecturers involved, “The interest comes from the fact that research is not for its own sake. We can see how research can make a difference. We have an opportunity to intervene in how we prepare our teachers and to make a contribution to quality teacher education.”
Conclusion

The journey of a group of teacher educators embarking on a far-reaching curriculum reform process has been outlined. What, from this experience, can we conclude about the spaces between vision, context and curriculum design in supporting new forms of teacher learning?

In answering this question, we distinguish between those spaces that are overt and those that are implicit. At an overt level, there is no doubt that contextual factors impacted on the curriculum reform. Potentially constraining factors included student teachers’ own school experiences, limited resources for curriculum development, staff members working conditions, research capacity, institutional amalgamations, the distance between teaching sites, as well as the fluidity in teacher education and school curriculum policies at the time.

This experience has revealed, however, that these potentially constraining factors need not be as significant as one might expect and that professional identities and commitments are able to rise above such overt constraints. Thus, despite the ambitious nature of the process described here, the small steps made by individuals, groups of staff, whole staff and increasingly, student teachers, showed evidence of a developing sense of common purpose, the emergence of professional learning communities and a sense of excitement about contributing to the discourse on teacher education in South Africa and internationally. In the words of one of the drivers of the curriculum process: “A certain vitality has crept into the academic discussions of staff around ‘what could be’ rather than ‘what is’ and day to day operational challenges are slowly but surely being balanced by a scholarly approach of inquiry, in order to give shape to re-imagined teacher learning”.

At an implicit level, it also became evident that individual staff members’ own personal and professional conceptions of teacher education play as powerful role in curriculum design as a vision of teacher education articulated through a process of scholarly inquiry. Although the principles of ‘connectedness’ and ‘less is more’ were initially motivated by a shared need to counter a fragmented knowledge world and an over-full timetable, as the process unfolded, these design principles became linked in different degrees to the concern for educational reform and the deeper transformation of both students and staff. Individual staff members, in their own practice, drew more or less consciously on a vision of teacher education that emphasised teaching for a changing world and particular graduate attributes. Similarly, there appeared to be an uneven engagement with the design principles as well as differing interpretations of the implications of these principles for the pedagogy of teacher education. Thus the coherence between the overall vision, the principles of design and teaching practices became as much a process of capacity building at staff level, both individually and collectively, as a process of curriculum design. The path of action research and scholarly engagement facilitated this engagement, as it provided a discursive space within which to discuss and debate outside of the immediate challenges of the here-and-now.

One can conclude by comparing the nature of this curriculum journey to that of a chess game: with every move, new possibilities opened up although it remained an intentional design guided by a specific conceptual framework. We sum up both the passion and the learning experience of the curriculum re-design by once again quoting one of the drivers of the process: “By adopting a generative agenda, we had embarked on a journey without a fixed end and no guarantees of success. What we envisage, is a curriculum responsive to the needs of a body of students characterized by their diversity. In addition to that, we want to address the needs of primary education in a developing country, reeling under the demands of both local and global challenges at many levels. Against such a complex background, we realized from the outset that successful implementation will depend on a collective energy of staff and students converging into a cohesive vision of a community of teaching and learning”.

13
Acknowledgement

We gratefully acknowledge the many lecturers in the Faculty of Education at the Cape Peninsula University of Technology who participated with enthusiasm, professionalism, creativity and integrity in the drive to improve the B Ed curriculum. Thanks also to those who contributed directly and indirectly to this paper.

References


Using focussed free-writing as a pedagogical ‘multi-tool’ to overcome barriers, empower student writers and access the student voice

Bernie Millar

“I think free-writing is very important because I come from a school where I did not have the chance of writing English every week.” (Student, 2010 ECP class).

Introduction

Free-writing is “stream-of-consciousness” writing that has a long history, but was popularised in the 1970s by Peter Elbow for students in higher education as an effective way of improving writing (Elbow, 1973). In essence, free-writing means writing without stopping to think, self-censor or edit. Li (2007) describes free-writing as “an empowering learning tool”. Somerville and Crème (2005) report from their research that free-writing gives “students a space to articulate and explore their tentative first thoughts in an unthreatening and supportive way in work they could use as a basis for their course essays”. Hinkle and Hinkle (1990) have shown that an advantage of focussed free-writing is enhancing students’ comprehension of course content.

This paper reports on a year-long classroom-research project on the use of focussed free-writing as a unique pedagogical ‘multi-tool’ in a first-year Information Literacy course in an Extended Curriculum Programme at a University of Technology. In particular, it looks at using free-writing as a means for a higher education teacher to access the students' voice, thinking, prior knowledge and strengths. The paper will explore how focussed free-writing is not only an access point to academic writing, but is also a means of learning how to become a reflective learner and critical thinker. During the academic year the class of students kept a private free-writing journal that was only shared with the Information Literacy teacher and only used in the classroom for free-writing on specific topics set by the teacher. This paper will explore some anonymous examples of the student free-writing taken from these journals to illustrate the effectiveness of focussed free-writing as a pedagogical tool. The theoretical framework within which this paper is situated is that of the New Literacies Studies.

Free-writing

Advocating the use of free-writing to improve both writing and thinking can be traced back to an early source. In 1934 Dorothea Brande published a slim volume on “Becoming a Writer” in which she first advocated the use of free-writing although she does not call it such. She advises aspiring writers to practise ‘unconscious writing’ every day where they have to suspend critical thought and write, “However halting or perfunctory the writing is, write. If you must, you can write: “I am finding this exercise remarkably difficult” and say what you think are the reasons for the difficulty” (Brande, 1934:28). She explains ‘unconscious writing’ as suspending one’s critical faculties while writing: “At the time of writing, nothing is more
confusing that to have the alert, critical over-scrupulous rational faculty at the forefront of your mind. The tormenting doubts of one’s own ability, the self-conscious muteness that drops like a pall over the best story ideas, come from consulting the judge in oneself…” (Brande, 1934:19).

This approach to writing was taken up and re-invigorated in the 60s. The term ‘free-writing’ was first used by Ken Macrorie in the ‘60s, and popularised by Peter Elbow in his 1973 book “Writing without teachers” (Elbow, 1998), his subsequent books and his corpus of published articles. As “stream-of-consciousness” was a popular term in the ’70s, it was used for free-writing rather than “unconscious” writing. Kinney (1979:355) acknowledges the importance of the stream-of-consciousness element of free-writing when he describes free-writing as a simple and most effective ‘intuitive heuristic’ because it alternates between right-brain and left-brain approaches. This ‘intuitive’ heuristic is in contrast to the ‘rationalist’ heuristic which sees writing as a logical, linear left-brain only process.

Belanoff, Elbow and Fontaine (cited in Fulkerson, 1993:38) define free-writing as a practice of writing which is continuous over a set period of time, e.g. ten minutes. If the writers are given a topic on which to focus their writing, it is called ‘focussed free-writing’, while open free-writing without a topic is called ‘unfocussed free-writing’. Free-writing can also be private in that the writing is not shared with anyone, or it can be shown to peers and/or the teacher. Free-writing is not a product; it is the practice of writing which is ‘free’ in the sense that (i) no grammar or spelling rules apply; (ii) considerations of voice, register and audience do not apply and (iii) it flows as stream-of-consciousness without stopping to think how to express oneself or having to choose precise words, and with no self-censoring.

Elbow (cited in Moxley, 1996) names four benefits of free-writing: (i) gets you writing and develops a “free-writing muscle” which is the capacity to let words come to mind and write them down immediately; (ii) because it is non-stop free-writing improves thinking because a writer then “drifts into metadiscourse” giving one the opportunity to talk to oneself in writing. Elbow (1983:37) describes two levels of thinking: “first order thinking which is intuitive, creative and does not strive for conscious control or direction”; and “second order thinking that is conscious, directed, controlled thinking”. Second order thinking checks and controls first order thinking; (iii) free-writing puts life into our writing: “voice, energy and presence” because one is speaking on paper; (iv) free-writing helps students to think of themselves as writers. Elbow (1983:37) sees free-writing as developmental and generative: “Free-writing is a place where there is maximum safety and maximum invitation for the buried places of the mind and the emotions to have a little space.”

Theoretical background: an Academic Literacies approach

This paper positions itself within the theoretical approach of the New Literacies Studies (NLS) and Academic Literacies, because in Higher Education writing and particularly the teaching of writing is viewed as socially, contextually and ideologically loaded.

The New Literacies Studies (Street, 2003:77) considers literacy as a social practice rather than a set of acquired skills. In essence, NLS recognises that there are multiple literacies that vary in terms of time and space and are contested in power-relations. Street (1985) distinguishes between ‘autonomous’ and ‘ideological’ models of literacy. The autonomous model sees literacy as a technical skill allowing people to develop cognitive skills that will improve their life, but actually imposes western notions of literacy on others (Street 2003:77). In contrast the ideological model is more culturally sensitive and nuanced, recognising that literacies may change over time and context. Street’s definition of literary practices is particularly useful to this paper: “Literacy practices, then, refer to the broader cultural conception of particular ways of thinking about and doing reading and writing in cultural
contexts (Street, 2003:79), because the cultural context of a classroom is not only an ideological space but is also influenced by the collective agency of the teacher and students within the particular structure of a department within a specific type of university.

Academic literacies fall within the ambit of NLS. Lillis (2003) following Lea and Street (1998) defines an academic literacies stance as “a socially situated discourse practice which is ideologically inscribed”. In the free-writing project within the Information Literacy course, the ‘ideological’ inscription could be described in the following ways: (i) as one of actively rejecting a deficit approach to first-year students, particularly those in the Extended Curriculum Programme and replacing it with a strengths-based approach that recognises that the students bring various individual strengths into the classroom, hence students have ontological access; (ii) as using a social justice approach which seeks to give a voice to students and to empower them on different levels; and (iii) by enabling them to recognise, access and participate in academic and disciplinary discourses, students have epistemological access.

Free-writing is seen as dialogic where the dialogue happens in different ways at different times, for example, reflexively as a conversation with oneself as one writes; as a metadiscourse where one discourses with oneself about the discourse; or in open free-writing, which is given to another to read, as a dialogue with the reader. As I was the only reader, I entered into this writer-reader dialogue by commenting at appropriate points in the writing or at the end of the piece mainly to let the writer know that she/he had been heard. This notion of ‘being heard’ is important in terms of the ideological stance mentioned above, because having a voice is only significant and empowering when the voice is heard and acknowledged. Interestingly, I observed that when their journals were returned, the students immediately flipped to my comments to read them. Often, students would respond to my comment and we would set up a brief writer-reader conversation. One student wrote: “When the diary comes back I like the comments made by Mrs Millar, I like that and it shows she read what we write and she cares about us…”

The case study

The focussed free-writing classroom-based research project was run in an Extended Curriculum Programme in a small department at a South African University of Technology, over 24 weeks of an academic year from January to October, within an Academic Literacy class. During the study, focussed free-writing was used in the classroom on 28 foci. The students wrote in a free-writing journal which only I read. I had been using free-writing informally in the classroom for several years, but decided to incorporate it as part of my teaching strategy and explore what value it added to the course and to the students’ learning experience. This then became the research question: “How can free-writing be used as a pedagogical tool in my Information Literacy Class?” with the objective of exploring how I could use free-writing as a pedagogical tool to add value to the teaching and learning experience.

The students

In order to create a student profile of the class which would enable me, as teacher, to approach my students as individuals with diverse personal stories (Adachie, 2009), the students were invited to complete a biographical questionnaire at the beginning of the first term. One question asked students to rate themselves in terms of their speaking, reading and writing abilities in English as a first or additional language. The majority indicated that they felt that their spoken command of English was good, but they did not rate themselves highly on reading and writing English. Students are also asked how often they speak, read and write English outside of the classroom – the majority response was that they never used
English outside the classroom unless absolutely necessary. In the diverse class of 31 students, there were the following home languages: one Zulu student, one Afrikaans student, three English first language speakers, and 26 isiXhosa students. The age of the students varied from 18 to 37. Three of the students were single parents while the mature student was married with three children. The students came from diverse schooling backgrounds, i.e. from schools in the rural areas, the urban townships, and former Model C schools.

The method

Each student had a free-writing journal which I read, but did not correct or grade, although I did sometimes comment, as explained above. Free-writing and the rationale behind it were explained to the students before their first freewrite. Students were asked to write without stopping – “Just write and write; don’t stop to think or check your writing”. Focussed free-writing uses prompts or supplies a topic as a focus. I used the focus for different purposes:

a. To break the barriers of resistance to writing in English  
b. To practise writing in English by writing on a topic of relevance to the students  
c. To explore what prior knowledge the student had of a particular topic  
d. To explore what learning had taken place  
e. To explore any difficulties in learning  
f. To brainstorm in preparation for an assignment or project  
g. As an aide-memoire for the students to use later in an assignment  
h. To access the student voice on a particular matter or issue  
i. To access students’ evaluation of a particular topic or issue  
j. To reflect or comment on social and personal issues

These foci can be classed into four broad areas: overcoming resistance to writing (a-b), learning (c-g), accessing the student voice (h-i), and reflecting (j). I recognise that in choosing the focus and asking students to freewrite on it, I was adding a particular dimension to the free-writing that might have been different, if the students had selected their own topics/foci or had freewritten without a prescribed focus/topic.

The four areas of focus

Anonymous excerpts from the students’ free-writing journals will be included to illustrate the four areas of focus. Due to space constraints it is not possible to include all the full freewrites.

Area One: Overcoming resistance to writing in English

Although there were three EL1 students, the other 28 were not. However, none of the students were used to writing in class for a sustained period of ten to twenty minutes regularly. Therefore, this exercise was new to everyone in the class.

Area Two: Learning

The focus question that accessed students’ prior knowledge was given at the start of the lesson asking students to write down all they knew about the topic. In preparation for an integrated content and language (ICL) project with the Finance lecturer, I intended to use my language class to explore different concepts related to finance. Therefore, the free-writing focus was: “What I know about financial statements...”.


“I have heard about financial statement before but I do not know what it is. I have never did accounting as a subject. But in my understanding financial statements is similar to a balance sheet but financial statements ate the information that you put in a Ledger book.” (Student A).

“To be honest, I never done finance in my life. This year is the first year I have experienced financial work. At first it was hard because I know nothing about it, but as a year goes on I started to understand it a little bit. I can not say what I know about financial statements, maybe when I have learned about it I can tell you what I know…” (Student B).

“I think financial statement is about calculation is money that business uses and profit that business makes. The total amount of fixed and current assets should be calculated to find balance between assets and capital.” (Student C).

“The financial statements are the business or the companies financial records, where auditors record the inflow and the outflow of money to determine if the business has made a surplus or a deficit. Usually the financial statements are made at the end of the accounting period which is 12 months. The financial statement is important for the business because it shows each and every transaction that has been made during the year. It also determines the future of the company whether it can be able to be successful or not.” (Student D).

The free-writing of the four students above shows that the degree of prior knowledge about financial statements varies from none to having a general idea. After this initial free-writing, I showed the class a YouTube video about financial statements, which we discussed. Then we looked at examples of financial statements and discussed their core concepts. I gave the students a short, scaffolded reading about financial statements which they read and discussed in pairs. At the end of the class I asked them to freewrite for fifteen minutes about exactly the same focus: “What I know about financial statements…”

Student A wrote one and a half pages: “I now know that financial statements come in three forms which are the income statement, balance sheet and cash flow statement. Financial statements are used by owners of the business, creditors, potential buyers that needs to know the growth of a business, banks, SARS etc. … I have learnt that it is possible to compare the financial statements of different businesses, and it should be possible to compare one year to another. I have learnt that there are fixed assets which are things that cannot be moved in a business e.g. furniture and the building. I learnt words that are used when doing a financial statement e.g. purchasing policy, stock control policy and sales policy. If a person wants to buy a business (SPUR [the example used in class]) from an owner the person who will buy the business should always ask to see the business’s financial statements in order to see if the business is or is not making any profit…”.

Student B wrote: “I have learned more things I did not know at first when I was not lectured about financial statements. I learned that financial statements has the desirable characteristics which includes comparability, reliability, fairness and timeliness. I also learned about the users of financial statements which are the owners, potential buyers, banks, SARS and employees and trade unions. There is also a lot of preparation of and information in financial statement for example a pre-adjustment trial balance…there are also financial statements such as income statements, balance sheet statement and cash flow statements. … every financial transaction goes through steps by steps. I can also define accounting, it is the system for keeping the records of all the money you collect and all the money that you spend”.
Student C wrote: “Financial statement comes in different several forms such as Income statement, Balance Sheet statement and Cash flow statement…” [then goes on to explain the three].

Student D wrote: “What I know now is that there are 3 main kinds of financial statement which are: The Balance Sheet, cash flow statement and the income statement. The financial statement is having characteristics which are – comparability (able to compare), understandability (able to understand), reliability (able to relied on) fairness (to treat people equal) and timeliness (to be on right time). The one thing I have learnt is that there are people who uses financial statements, such as the owner of the business, the manager or other personel, SARS, employees and trade unions…” [then goes on to describe the three statements].

When comparing the initial freewrite with the final one at the end of class, it is clear that learning has happened to the extent that the students can freely write in their own words about their increased understanding of financial statements. If more time were given for the freewrite, the students may have written more and added in more detail. After the final freewrite, I asked the students to look at their initial freewrite on financial statements and compare it to their final ones to see how much their understanding had grown and their learning increased. I could do this because I observed how much the students were writing in contrast to their initial freewrite. In a quick, brief discussion students expressed their delight at being able to see how much they had learned. Observing the students closely, I could see that for some it was an “AHA!” moment. Doing the final freewrite at the end of the class served another purpose, namely that of consolidating the knowledge that the students had gained during the class. The use of this particular exercise was extended into using the information that they had written in their own words and refining it to integrate it into the report they had to write about the processes in the factory.

At the end of a lesson I used free-writing to see how much the students had learned and understood of the lesson by asking them to write very quickly for three or four minutes on “What I have learned in this lesson…”. Reading through the students free-writing, enabled me to see what was understood and what areas needed revisiting and further work. Another way of accessing the learning that has or has not happened is to ask the students to freewrite about any areas of the lesson that they felt they did not understand clearly as illustrated by the following quote from one student’s free-writing journal: “Free-writing helped me a lot because when writing about something you have learned in the class is like emphasising and summarising what you have learned”.

When preparing students for an oral presentation and PowerPoint slideshow, I first ask them to freewrite on the topic as a means of brainstorming what they intend to talk about in their oral. They then use their piece of free-writing to plan the storyboard for the PowerPoint production.

In some of their other subjects the students are taken on factory visits as an experiential learning exercise. When they return, I ask them immediately to freewrite about the factory visit and to write everything they can remember seeing. The point of this freewrite is as an aide-memoire which the students can use when they have to do a project on the factory visit – either a report or a photo-essay. This aide-memoire is intended to be used to link what they have seen and experienced with the research that they have to do for their assignment on the factory visit.

**Area Three: The student voice**

I used free-writing to create a space for the students’ voice in the class, especially for those voices that are usually silent or withdrawn. The students indicated that they enjoyed having
the freedom to express their own opinions and especially that they would be heard, as I commented and acted on what they had written.

I used free-writing to access the student voice on a particular matter or issue. Here the foci asked students to write their opinion on particular issues such as evaluating the course. For example, the focus given was “In my opinion, students plagiarise because...” The response: Student A: “First of all students today are so lazy they don’t want to think or to work hard, they want simple fast things”; Student B: “Students plagiarise because they see it as the easy way out for them”; Student C: “Students plagiarise because of the difficulty of the article or information, it becomes difficult to summarize something you don’t have an inkling [sic] about”; and Student D: “Lack of time management. It plays a big role”. These four responses show that students have differing opinions about reasons for plagiarism. This led to an interesting class discussion about plagiarism.

What became clear from both the free-writing and the class discussion is that the students had actually engaged with the concept of plagiarism but more importantly that students had gained epistemological access to the concept of plagiarism whereby they gained a knowing (subjective knowledge) of the concept.

I also used free-writing to ask the students to evaluate the course: “What improvements can I suggest for the Information Literacy Course?” Because a level of trust had been established in free-writing, the students felt free to express their opinions honestly. The students knew that their responses were meaningful because I took what they said seriously as I had shown during the course of the year-long case study.

Area Four: Reflection

The intention behind the free-writing in this area was to get the students to reflect and to see that writing can be used to make sense of life. The foci used in this area covered self-reflection and became a journey of discovery for the students. One free-writing exercise was a response to the question: “Who am I?” A longer time of 15 minutes was given for this freewrite so that the students would have enough time to express themselves. The students wrote energetically to get as much down about themselves as possible within the time limit. The value of this exercise lies primarily in the insight it gave me into my students and the difficulties they face and obstacles they have to overcome in order to study. The majority of students are from homes where there is great financial hardship with only a single parent working. Reading the freewrites I began to understand how difficult both ontological and epistemological access is for many students. This made me reflect on ways in which this ontological and epistemological access could become easier for my students.

At the end of the project, I asked the students to reflect on “The value of free-writing is...” Every student saw free-writing as valuable and gave various reasons: “The more you write, the more you start improving your writing skills”; “…to tell the lecturer who I am inside and my background and things that I want to achieve...” and “Freewriting is good because a lecturer gets to know more about the students she teaches”. The most remarkable comment made by a student during this final session of free-writing was: “Freewriting has made me to think in English. Always I thought in isiXhosa only. When I am freewriting I think in English...” – metacognition in action!

Conclusions

In response to my research question: “How can free-writing be used as a pedagogical tool in my Information Literacy Class?” I would answer the following based on the findings of the case study:
Free-writing overcomes barriers to writing and learning. Allowing the students to freewrite without any restrictions or any rules within the constraints of a time limit which forced them to focus has proved to empower students as writers by developing their writing “muscle” and allowing them to find their own voice and express that voice in their own words. Students begin to see themselves as writers.

Free-writing is a development tool for learning about learning. This applies both to the teacher as well as the student. By using foci that ask students to freewrite about their learning experience, the students are engaging in a metacognitive process which allows them to express their level of understanding of a subject. The students’ free-writing allows the teacher immediate access to any problems the students may be encountering, as well as seeing what works well in the classroom.

Free-writing opens the student voice. The students are free to express their thoughts and opinions. The teacher who reads the free-writing has access to that student voice and by choosing to hear it can engage in further conversation with the students and can use what the students are saying to improve the teaching and learning situation.

Free-writing improves thinking and reflecting. The more students freewrite, the more focused their responses to the foci became during the course of the case study.

Free-writing is a valuable and powerful pedagogical multi-tool for both students and teacher. Free-writing operates on both the epistemological and ontological levels of access to higher education. Let me end with the words of a student:

“Free-writing works for me because it helps an individual to reflect and interact with herself without being aware of that because you don’t think but you just write things that you don’t consider therefor you write what you feel at the moment and it helps people to know their selves better than before”.

References


Developing locally attuned and responsive curricula

Rael Futerman, Andrea Grant-Broom and Bruce Snaddon

Abstract

Developing curricula responsive to the complexity of the current time is the challenge for design educators. This paper explores the development of an innovative module driven by the need for sustainability through consideration of a more productive relationship between design, technology and science. The authors believe it is imperative for design students to be taught to investigate design solutions from a more sustainable and holistic perspective, acknowledging that habitual approaches to design are proving to be destructive to our environment.

We discuss the merits of a trans-disciplinary, holistic approach to project development in design education and practice, and provide a rationale for Biomimicry as an imperative consideration in design education curricula. A pilot project is proposed which will involve Graphic, Industrial and Surface Design students at the Cape Peninsula University of Technology (CPUT) focusing on Biomimicry both as the topic for study, but also as the lens through which the design process is applied.

Introduction

Biomimicry is about learning how to innovate by mimicking the design systems, strategies and processes evident in nature. The biomimetic process gives us a highly structured methodology that enables us to investigate carefully what organisms are doing to survive. From this we can move to and fro between biology and human needs to develop strategies that can be beneficial to us without impacting negatively on our context/environment.

“Design is no longer just about form anymore but is a method of thinking that can let you see around corners. And the high tech breakthroughs that do count today are not about speed and performance but about collaboration, conversation and co-creation.” (Nussbaum, n.d.).

From a business perspective, Bruce Nussbaum, editor of BusinessWeek, describes design thinking as no longer about form but about an anticipatory, collaborative way of thinking which leads to responsible innovation. Clarke and Smith (2008:8) maintain that people educated in design should be able to offer organisations valuable insights in addressing problems as complex as systemic re-evaluation of corporate companies' responses to sustainability in product development and communication.

As educators, our responsibility lies in designing appropriate learning contexts which develop students’ capacity to act (Quinn, Spreitzer & Brown, 2000; Welsh & Dehler, 2001 cited in Welsh and Murray, 2003:221). This paper describes a planned collaborative, transdisciplinary module designed to empower students through a deep and critical understanding of Biomimicry’s life principles and design methodology. It is projected that this will then enable them to innovate products and communications in a genuinely sustainable
manner.
Our job is made easier by acknowledging the unique context we find ourselves in – a Faculty of Informatics and Design (FID) housing fourteen design disciplines within the context of a University of Technology. This unique configuration affords us the opportunity to engage relatively easily with many other design disciplines as well as with Informatics, Commerce, the Sciences and Education.

Our local context is constantly influenced by rapidly changing social patterns and new technology and as such, we have begun to increase students’ exposure to, and capacities for innovative design by taking advantage of local opportunities for solving immediate and accessible problems in and around the city.

In our broader context, we find ourselves situated in a developing country with a new democracy. This presents many challenges for education – many of which have to do with infrastructure and improvement of quality of life for all citizens. An example of this is the proposed Design and Informatics Hub planned for the area in Cape Town East City, now known as the Fringe initiative. In concept phase since 2007, the project is under way with the FID at CPUT playing a role as a key partner. The project focuses on the need for an environment to support innovation and development in the design, media and ICT sectors (The Fringe: Cape Town Partnership Proposal, 2010).

Building capacity for conversation and response

Over the last three years we have begun responding promptly to new transdisciplinary opportunities posed, and have increased our collaborative capacity as a faculty. As individuals sharing this ‘space’, or place of education, conversation has deepened as a result of pilot collaborations, consistently growing our collective awareness of all aspects of environmental and sustainability issues. We found by maintaining an openness toward overcoming routinely accepted restrictions inherent in subject-specific timetables, we were able to almost immediately accept opportunities for civil involvement offered by government and corporate business. Creative solutions to problems posed by logistical and assessment challenges were overcome through commitment and collaboration, and as a result, some highly successful interdisciplinary projects were run.

The first of these involved the development of proposals for graphic concepts for the new MyCiti Bus Rapid transport system developed for the 2010 Soccer World Cup in Cape Town, with social, economic and environmental concerns underpinning the brief. For a week students worked in groups of four to present concepts and artwork for the glass panels of the terminals which are situated in and around Cape Town. The process was documented and presented to representatives from the city. We found that the interaction enabled the sharing of skills and approaches between the two disciplines, such as knowledge of materials and presentation of three-dimensional models of the industrial designers, together with the visual and conceptual communication skills of the graphic designers.

Although only Graphic Design was involved, another successful introduction to the curriculum included the re-design of the Steenbras Gorge information system and signage. The students’ task was to propose solutions to the lack of information about safety in a potentially dangerous and environmentally sensitive reserve. A day was spent experiencing the location physically, thus coming into contact with all situations visitors encounter. We found that being involved with a local and critical need, produced highly motivated students – and exciting innovation resulted. Similarly, the shark threat at a local beach was tackled. The students designed some very workable solutions to the historically bad communication on the beach. Again, playing a role in saving lives - and the shark habitat - became a stimulating challenge for them, and there was new- found understanding of the kinds of
situations where design can change perception and action.

On reflection, Stehr’s claim of the emancipatory nature of knowledge which leads to capacity to act and exercise influence (1994:259, in Welsh & Murray, 2003:220), is a powerful reminder to educators of the need to involve our students in projects that generate meaning and purpose.

**Nature as inspiration**

In late 2010, our earlier experiences of interdisciplinary collaboration and ever-expanding consciousness of environmental issues resulted in four design educators from the FID (three being the authors) attending an Educator’s workshop run by the Biomimicry Institute at a Game Reserve in the North West Province. The week-long workshop had attracted fourteen people from disparate sectors such as Engineering, Game Ranging, Geo-informatics, secondary school Education, Architecture and Zoology. An intensive week spent learning and analysing nature’s strategies, and then implementing these to solve design challenges resulted in innovative and pragmatic design solutions to a number of situations posed locally. This bore testament not only to the methodology introduced and the range of skills present, but notably, to the importance of inter-disciplinary collaboration. The setting and context of a game reserve allowed powerful learning to take place as ‘live’ situations presented themselves for examination and analysis. The sharing of vastly diverse knowledge became the most valued commodity, and a keen awareness of the limitations of discipline-specific solutions was evident.

The experience has catalysed a number of educational initiatives through the Biomimicry network. Relationships with resource-producers, civil bodies and corporate business have been identified and established as willing partners for the Faculty. The potential learning for students is that through exposure to local initiatives they will gain a better understanding of the complexity involved in reconciling social, economic and environmental concerns as well as how their employers may respond. According to Welsh & Murray (2003:222), it is not the collaborators themselves that are important in an educational setting, but the purpose and process of collaboration itself. They maintain that for corporate, governmental and private enterprise, collaboration of this kind is necessary to improve and deepen understanding of environmental concerns thereby improving the quality of corporate decision-making.

We are confident that we have a pedagogical model that works, and convinced of the efficacy of the rigorous design process as displayed by natural systems. In the next section we provide a rationale for Biomimicry within curriculum design, and go on to describe and outline the proposed module structure.

**Biomimicry explained**

Biomimicry literally means, ‘to imitate life’, and is derived from the Greek words *bios* meaning life and *mimesis* meaning to imitate. It is a design discipline that studies nature’s best ideas and then imitates them in artifact, process or system design. The term ‘biomimicry’ was coined by Janine Benyus, author of *Biomimicry: Innovation Inspired by Nature*, and refers to the “conscious emulation of nature’s genius” (Benyus, 1997:1). The concept as a whole is not new. An example of early adopters of this concept can be seen in a letter by Wilber Wright in which he mentions his investigation into buzzards’ wings for design of a more stable aeroplane wing (Wright quoted in Culick, 2010).

What is new though is the development of the idea of mimicking nature’s solutions to solve human needs, into a specific field of study. Life on earth has been around for approximately 3.85 billion years, that means 3.85 billion years of trial and error, selection and rigorous
testing that resulted in a 99.9% failure rate of species. What this means is that the 0.1% of species alive today must have developed or evolved some pretty remarkable strategies for sustaining life (Biomimicry Guild, 2009). Biomimics aim to identify these strategies and understand the underlying principles, then apply them to designing sustainable solutions to human needs.

Biomimicry is about seeing nature as a model, measure and mentor (Biomimicry Institute, 2009). This is done by imitating or taking inspiration from natural designs and processes, by using ecological standards to judge the efficacy of our innovations, and by viewing not what we can extract from the natural world but what we can learn from it. Biomimicry is thus a tool for attaining sustainable products, processes and systems.

There are different levels of inquiry within Biomimicry. The first level is the mimicking of natural forms. Interrogating natural processes involves a deeper form of Biomimicry, which looks into how nature moves, maintains communities and processes information, to name a few. The third level is investigating natural systems/ ecosystems. This is probably the most important area of curriculum development as one looks at how nature’s systems work together. The focus here is on the bigger picture. To mimic a natural system one must ask how each aspect relates to the other components to form the greater whole. Possible questions for such inquiry could include: is it necessary?; is it contextually relevant?; and, what is its role in the system? Through this investigation into the bigger picture one can visualize the system as a sort of interconnected web where each meeting point is a dialogue or interaction between two or more components of the system.

At the heart of Biomimicry are what is described as ‘Life’s Principles’. These are intended to represent nature’s overarching patterns and strategies for sustainability, and are how we use nature as a measure in evaluating the sustainability of our designs.

The first principle, ‘Life Adapts and Evolves’, presents a systemic approach or design that alters in response to changing conditions in order to stay relevant. This is done in various ways, some of which are: optimizing rather than maximizing; and leveraging interdependence. One asks questions such as: does the design enhance the systems capacity to support life over the long haul?, and, does it foster symbiotic, co-operative, community-savvy relationships?

The second principle, ‘Life creates conditions conducive to Life’, is a systemic approach that enhances the environment and fosters survival. Here one would investigate if the design, process or system is locally attuned and responsive, whether it integrates cyclic processes, and if it is resilient. These traits are achieved through the following actions, to name a few: being resourceful and aware of opportunities and limitations; responding quickly and appropriately to feedback; creating opportunities for cross pollination; and using mistakes to encourage continual idea generation.

There are two approaches one can take in putting this methodology into practice. The first is ‘challenge to biology’. Initially the design brief is defined and the real challenge identified, through reinterpreting the brief as not “what do you want to design?” but rather, “what do you want your design to do?” This approach broadens one’s potential solution space significantly and is good practice, independent of turning to nature. The next steps are to contextualise the brief and biologize the question, in other words, interpret the design brief from nature’s perspective by investigating how nature does or doesn’t perform a function. The process is to identify champions in nature, whether forms or strategies, which answer or resolve aspects of the brief. One then develops ideas and solutions based on these natural models through mimicking form, function and context (Biomimicry Guild, 2009).
An example of this methodology having been successfully put into practice is the Eastgate Centre in Harare, designed by architect Mike Pearce. Instead of designing a building that uses standard air-conditioning, natural methods for keeping a structure cool were interrogated. Here the challenge was to create a self-regulating ventilation system that would keep the building at temperatures that are comfortable for workers and residents. He drew inspiration from the thermal control found in termite mounds, which use airflow to maintain ideal temperatures (Onwumere, 2008). The building is designed so that cool air is drawn in from the open lower sections, while warm air is blown out from chimney-like structures in the roof, creating a cooling effect. As a result the construction company saved 10% on costs up front, and the building uses 10% less energy than similar-sized buildings.

The second approach is “Biology to Design”. Here one identifies organisms or ecosystems that are achieving what humans want to do. This is done initially through observation and by asking “who, in the natural kingdom, has innovative strategies one could use to solve design challenges?” These strategies are then used to abstract relevant principles and emulated (Biomimicry Institute, 2009). An example would be to investigate how animals that swarm but rarely, if ever, collide with one another. This observation has led to the development of collision detection and avoidance systems for motor vehicles.

**Biomimicry as an educational lens**

Design education needs to stay current, with the flexibility to respond to multiple external and internal requirements. These could range from the size of student cohort, industry’s needs and new technologies to place of delivery (in studio or off-campus). The curriculum needs to evolve and adapt in order to stay relevant.

Possibilities for curricula developers and how they can draw from life’s principles are presented in Table 1.

**Table 1: potential curriculum development guidelines**

<table>
<thead>
<tr>
<th>Curricula should adapt and evolve by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Being designed with context in mind</td>
</tr>
<tr>
<td>- Being designed to be responsive, and</td>
</tr>
<tr>
<td>- Improve resilience through taking into account:</td>
</tr>
<tr>
<td>diversity</td>
</tr>
<tr>
<td>building in feedback loops</td>
</tr>
<tr>
<td>cross-pollination</td>
</tr>
<tr>
<td>resourcefulness &amp;</td>
</tr>
<tr>
<td>using simple common building blocks</td>
</tr>
</tbody>
</table>

*Curricula can be designed to create conditions conducive to life by:*

- Identifying neighbours and creating productive, mutually beneficial relationships
The pilot module

The aim is to pilot the integration of this approach by running an interdisciplinary module in the second term of 2011 involving students in Graphic, Product and Surface design.

As all design disciplines depend on creativity and problem solving, this pedagogic model is consistent with current and historic modes of learning in design disciplines. The module uses reflective practice as a basis for learning, which is consistent with the iterative process of design and rolls out in three distinct phases, namely:

**Phase 1:** A week is set aside for students to absorb and practice the Biomimicry design methodology. After a two-day workshop run by the South African representative of the Biomimicry Institute we then move on to the methodology and available tools while working on short exercises to put into practice what is being learned. Students will be shown how to use AskNature, an online resource where biology and design cross-pollinate providing a rich source of information where they can find biological blueprints and strategies, bio-inspired solutions and design sketches, talk to and collaborate with other biomimics as well as contribute case studies and pictures (AskNature, 2008). Time for reflection and presentation of research and findings is an important part of the process of immersion into the field. Field trips will take participants into various local biomes in order to engender appropriate listening and noticing behaviours. In working within these areas alongside relevant experts, we would be identifying the needs or problems that require designed solutions.

**Phase 2:** A potential project partner has been identified to develop a brief that is locally attuned and responsive to the needs of the Cape Town community. As the module coincides with Cape Town’s Water Week, the theme of water as a natural resource has been decided on. This intention blends well with the ‘Reclaim Camissa’ project. The project is located in Cape Town at the foot of Table Mountain and is described by von Zeil (2010) as a “stewardship for the waters that flow from Table Mountain to the sea”. The aim of this project is to reclaim the common heritage of Camissa, “the very waters that defined the location of the City of Cape Town, reflecting the public past and embracing a new civic infrastructure - this time inspired by a deliberate recognition and respect for the social / cultural and ecological significance of this water” (von Zeil, 2010). This initiative has the potential to yield some very interesting design problems and issues due to its ecological, economic, historical and socio-political layers. For the project challenge students will work in groups of five, using the lens of Biomimicry to develop innovative solutions to the problems identified within the localized context of Cape Town’s CBD.

Other project partners are Biomimicry SA, Creative Cape Town, and For Love Of Water or FLOW. The Creative Cape Town website (accessed 2011) states that it “communicates, supports and facilitates the development of the creative and knowledge economy in the Central City of Cape Town”, its key aim being “to facilitate dynamic partnerships in the central city to position it as a leading centre for knowledge, innovation, creativity and culture in South Africa”. FLOW is a solution and innovation-based national campaign aiming to instill awareness and create practical solutions regarding our water supply.

The module will conclude with presentations for assessment. This is designed to support learning formatively at this stage, and is part of the continuous assessment policy at this level. Students will, in their groups, deliver their design solutions as presentations to the appropriate stakeholder groups and partners. Opportunity exists for the presentation of the more successful ideas at the Young Water Professionals conference in July 2011.

**Phase 3:** Having completed the first two phases of the module, a further week is devoted to retrospective reflection. This will involve students making further improvements to their
designs according to recommendations made by stakeholders at the assessment stage, and reporting back on insights gained during the process. This will engender the notion that design does not stop at an evaluation point, but that learning is a continuum through which we can arrive at fully resolved and workable solutions. Continuous and rigorous testing needs to be understood as part of the design process, sidestepping students’ common misunderstanding of assessment as judgmental and final.

Roles of faculty staff

After an initial phase of guidance and facilitation, staff will follow a learner-centered approach, collaborating with and working alongside students as they use the methodology to explore solutions. In this way roles become decentralised and distributed and knowledge is co-created and shared, using a bottom-up approach.

The interdisciplinary approach

The interdisciplinary approach is itself biomimetic in the way that it helps students develop a sense of mutual appreciation and interdependence - these are key aspects governing the ‘success story’ of any living organism. Students recognize how “similar their underlying crafts are and then also see how incomplete either craft is when enacted in isolation” (Welsh & Murray, 2003:223). In this way we endorse the idea that life works around simple common building blocks and how they connect to create the whole. It is our belief that, working in this way, students tap into a wider knowledge and personality base (Haynes cited in Jones, 2010), where they can learn to be the problem solvers and change agents we need in society today (Staples, 2005:18).

In addition, the aspect of mentorship and leadership is added to the dynamic as groups are made up of a combination of third and fourth year students. Those in their fourth year will be expected to play a project management role. It is our belief that Biomimicry provides us as educators with a very positive and proactive approach to teaching sustainability. There is overwhelming evidence of the lack of respect shown to the environment by human beings and this creates a negative, rather hopeless perception. Biomimicry begins rather by ‘inspiring admiration for the remarkable adaptations that organisms historically deemed ‘lower’ or ‘primitive’ employ’, and therefore encourages us to take a more humble view of our relationship to life on earth (Staples, 2005:5).

Why Biomimicry in Design Education?

We believe that we can energize our curriculum by including Biomimicry for the following reasons:
• to encourage students to “develop a better understanding of how naturally occurring processes and patterns may be used as design inspiration for the development of forms, structures, systems and interactions.” (Ontario College of Art and Design, n.d.)
• by being cognizant of natural patterns and the way we intuitively ‘read’ archetypal patterns, we stand a better chance of designing better communication, products and systems.
• recognising pattern is one of humanity’s greatest abilities - it is what helps us to make sense of a chaotic world, allowing us to see contrast as well as similarity (Macnab, 2008:9). Pattern awareness runs deep, and as designers we are able to touch on universal concepts to communicate.

To cite a graphic example, in this logo design by Herb Lubalin reproduced below (cited in McAlhone & Stuart 1998:86), the shape of the letterform ‘O’ becomes the womb for an embryonic ampersand. There is an economic use of elements, optimizing rather than
maximising, multifunctional in the way information is layered and how the letter-forms are exploited to reveal function.

Fig. 1: Herb Lubalin’s mother and child logo (McAlhone & Stuart 1998:86).

Conclusion

An aim for this module is to draw attention toward the source, and in doing so to create conscious design that is ‘naturally aesthetic, efficient and enduring by its very nature of being nature’ (Macnab, 2008:10). In effect, these approaches open a path for a perspective shift by transferring energies to creativity and ingenuity, revealing solutions and sustainability (Staples 2005:5). We will attempt to mimic the basic principles of ecology in the way that the module is structured and run, so that we encourage “interdependence, recycling, partnership, flexibility, diversity, and as a consequence of all those, sustainability” (Capra, 1996:304). It is our hope that introducing students to Biomimicry will help to develop them as mature designers, with a sense of responsibility toward their environment and their fellow human beings.

References


Thinking About Thinking in Industrial Design

Veronica Barnes and Vikki du Preez

Abstract

The Think Tank project is a four year project which began in 2010, in order to assess the Industrial design learning environment in relation to the development of critical thinking skills. Understanding and evaluating information is considered the key feature of critical thinking (Schafersman, 1991:3). Staff had noticed a distinctive change in students coming from school in terms of critical thinking and ability to make considered decisions. Because critical thinking is viewed as a pivotal skill for the field of Industrial Design, it is imperative that the learning environment encourages and facilitates the development of these skills. Design education has moved towards student-driven research and mixed learning methodologies which require thinking skills. But is this enough to stimulate and develop the critical thinking skills needed by graduates of the industrial design programme?

In order to assess the critical thinking skills of the students, many factors needed to be considered. One of the many challenges faced by Higher Education institutions, is the different attitudes and learning behaviours presented by Generation Y students, including difficulty in making informed decisions. The nature of the critical thinking test also needed to be considered in the South African educational environment – which has many levels of literacy and multilingualism. For many students, English may be a second or third language. Although we are aware that the nature of the test is not ideal for the environment, varied literacy levels and multilingual students, the results of the test were an indicator, as opposed to a final evaluation of the project. Issues related to the nature of the test, culture, language and literacy will be addressed in later stages of the project.

Context and background literature for this project was discussed at RITAL 2010, in a paper presentation, “Think Tank - Assessing the Industrial Design Learning Environment”. Part of the context was a preliminary study to identify the relevance of the project, by testing a small group of students. This initial critical thinking test showed poor results, highlighting the need for further investigation. The 2010 paper also outlined the structure of the proposed pilot project (involving testing many more students) for 2011. This year, we ran the pilot project with second year Industrial Design students. The students completed the Ennis-Weir critical thinking test at the start of the pilot project.

This paper describes the learning activities of the pilot project, activities with embedded critical thinking components, and the methods used to try and facilitate as much freedom to think as possible. This included the students’ views of their own abilities. The findings will be discussed, as well as recommendations for curriculum development and areas for future study.

Introduction

Design, as a professional discipline, is characterised by the creative and innovative solution or improvement of artefacts, communication, environments, systems and processes. Traditionally, Industrial Design referred to the creation, adaption or improvement of
industrially produced artefacts. Modern design practice, including Industrial Design, has become less defined through interdisciplinary projects, social concerns, environmental factors and the influence of technology. The design process however, is still characterised by established and continuous cycles of innovation, production and reflection. During the design cycle various modes of thought are required including analytical thinking, creative thinking and critical thinking. Critical thinking in Industrial Design refers to the solving of complex design problems through the use of appropriate visual imagery. One of the most important characteristics of critical thinking is the ability to evaluate information and make informed decisions based on this evaluation, which is fundamental to the design process. To establish the level of critical thinking skills exhibited by Industrial Design students, an ongoing research project titled Think Tank was launched in 2010.

Projects completed as part of the Think Tank project during 2010 focused on the relevance of critical thought in the design process and tested the level of critical thinking expressed by a small focus group. The findings from the preliminary studies in 2010 indicated the need for a more defined and larger test group and as a result the 2011 Public Transport Project: Critical Inquiry (PTP:CI) was run with all second year Industrial Design students at the Cape Peninsula University of Technology. The completion of the internationally benchmarked Cornell Critical Thinking Test (Level Z) formed part of the project. The findings from this qualitative action-research study are explored in this article.

Description of the study

Participatory Action Research was used as the methodology for the PTP:CI research project. The main reason for selecting this methodology is that both the researchers and researched parties play an active role in the generation and interpretation of findings. The methodology encourages participation and stakeholder involvement. A fundamental component of the participatory action research model is the practical use of findings to improve the researched situation, as stated by Bradbury and Reason (2001:2): “…action research is about working toward practical outcomes, and also about creating new forms of understanding, since action without reflection and understanding is blind, just as theory without action is meaningless". This aspect of the methodology is important as the Think Tank project aims to practically implement research findings to improve the critical thinking environment within the Industrial Design programme. This concept is described by Gaveta (1988:19) as: “In the process, research is seen not only as a process of creating knowledge, but simultaneously, as education and development of consciousness, and of mobilization for action.” The development of key areas and future curricular practice was a major consideration during the PTP:CI project.

The PTP:CI project was run between 18 and 29 July 2011, with thirty-eight second year Industrial Design students. The project was introduced on Day 1, following which from Days 2 to 5, students completed the Cornell Critical Thinking Test (level Z). This took place in a training laboratory equipped with desktop computers, prior to the formal start of the project on 25 July 2011. The aim of the PTP:CI was for the students to understand the relevant factors that influence the user's selection of public transport methods, including the impact of social, environmental, developmental, economic, health and safety issues.

The students received a project brief and a timeline (see Table 1 below). The project began with the students travelling on public transport to get to campus, and then reflecting on and discussing their experiences, as well as identifying issues related to the brief. The students were required to keep a personal journal for the duration of the project and were able to use any visual material, as well as written observations. Students were divided into groups of four or five. Each group was given one of a range of 'What if' scenarios (which were developed in order to provide a variety of specific situations to investigate, all related to
This allowed students to imagine themselves in a character/persona’s situation, and to solve their particular transport problems. Once issues had been identified, the students needed to evaluate their information and then present proposals to the class, in the form of a “low-tech” presentation (- using posters, drawings, maps on the whiteboard, handouts, etc. No PowerPoint shows/ digital displays were used. This was mainly to facilitate freedom in exploring the situation using visual means, as well as working within the time constraints of the project). Following the presentations, they needed to re-evaluate their assumptions and proposals. The student groups were then given a final ‘What if’ scenario, which, although different to the first one, had enough similarities for the group to reflect upon their previous methodology and work, re-evaluate their proposals and develop new and appropriate solutions for their new persona. Their new scenario was analysed and described in a PowerPoint presentation, and visually detailed in a research poster. The activities are outlined in the table below.

### Table 1: An abbreviated list of activities of the PTP:CI research project

<table>
<thead>
<tr>
<th>Day</th>
<th>Activity</th>
<th>Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>• Introduction to project</td>
<td>Input from students regarding brief and project.</td>
</tr>
<tr>
<td></td>
<td>• Students are informed that they need to use, or incorporate some form of,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>public transport in their commute to CPUT on Day 6. Discuss safety issues.</td>
<td></td>
</tr>
<tr>
<td>Days 2 - 5</td>
<td>• Student testing. There will be a schedule to indicate when each student</td>
<td>Critical Thinking Test results.</td>
</tr>
<tr>
<td></td>
<td>must complete the preliminary Critical Thinking Test. Digital testing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stations will be set up in the training lab.</td>
<td></td>
</tr>
<tr>
<td>Day 6</td>
<td>• 7:00 – 10:00 Students are required to commute to CPUT using only, or</td>
<td>Journal activity: trace route on map in journal. Interview questions and</td>
</tr>
<tr>
<td></td>
<td>mostly, public transport. Students must paste a Google street map in</td>
<td>answers in journal. Obstacles, hindrances and opportunities noted and</td>
</tr>
<tr>
<td></td>
<td>their journal and trace their journey. Obstacles, hindrances and</td>
<td>described. Personal reflection on trip and 3-minute exercise.</td>
</tr>
<tr>
<td></td>
<td>opportunities must be noted. Interviews with other passengers must be</td>
<td>Informal peer presentation mark sheets.</td>
</tr>
<tr>
<td></td>
<td>conducted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students complete 3-minute listening activity in pairs: describe their</td>
<td></td>
</tr>
<tr>
<td></td>
<td>journey followed by personal reflection in journal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students present their journey and findings in small groups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Critical thinking activity.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students divided into groups and briefed on a ‘what if’ scenario mini-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>presentation. Preparatory work completed in journals.</td>
<td></td>
</tr>
<tr>
<td>Day 7</td>
<td>• Group time to work on mini-presentation (low-tech i.e. draw on whiteboard,</td>
<td>Mini-presentation (peers and lecturers) mark sheets.</td>
</tr>
<tr>
<td></td>
<td>paper, handouts etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Presentations in 2 sessions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Critical thinking activity.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Presentation and poster project brief: ‘What If?’ scenario Needs to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>include: review of original assumptions, interviews, international</td>
<td></td>
</tr>
<tr>
<td></td>
<td>benchmarking, national legislation &amp; protocols (needs to be researched),</td>
<td></td>
</tr>
<tr>
<td></td>
<td>all prep work completed in journals.</td>
<td></td>
</tr>
<tr>
<td>Day 8</td>
<td>Students complete project in assigned groups</td>
<td></td>
</tr>
<tr>
<td>Day 9</td>
<td>• Students prepare for presentation.</td>
<td>PowerPoint Presentations. Video footage of presenting groups. Peer and</td>
</tr>
<tr>
<td></td>
<td>• ‘What If?’ PowerPoint presentations and feedback on content.</td>
<td>lecturer mark sheets.</td>
</tr>
<tr>
<td></td>
<td>• Ad-hoc feedback on poster designs.</td>
<td></td>
</tr>
<tr>
<td>Day 10</td>
<td>• All posters up on the wall and journals handed in.</td>
<td>Group Research Posters (related to presentation).</td>
</tr>
<tr>
<td></td>
<td>• Students complete reflective exercise.</td>
<td></td>
</tr>
</tbody>
</table>

(Du Preez & Barnes, 2011)
The activities of the PTP:CI were designed for maximum student participation and engagement with the subject matter, and real-world problems. The activities (see Table 2 below) were also designed to get students to think critically – to evaluate and use their evidence/research skillfully. Use of journals and posters gave them the chance to organise their thoughts coherently, and presentations gave the opportunity to articulate this reasoning. By using scenarios and personas, the students were attempting to anticipate consequences of different actions, and to transfer skills from one context to another. These are all skills cited by Nickerson (1987 cited in Schafersman, 1991:4), as key to critical thinking.

Table 2: List of activities and their purposes in the PTP:CI research project

<table>
<thead>
<tr>
<th>Activity</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Experiential learning, real life experience of public transport, associated issues, real world context</td>
</tr>
<tr>
<td>Journals</td>
<td>Reflective journals, visual brainstorming, non-restrictive communication, use of imagery to aid thinking, mind mapping</td>
</tr>
<tr>
<td>Attentive listening exercise</td>
<td>Attentive listening to facilitate thinking, no interrupting. Reflecting on the journey, transport issues</td>
</tr>
<tr>
<td>Working in groups</td>
<td>Collaborative learning, evaluating problems from diverse points of view/ experience</td>
</tr>
<tr>
<td>Short presentation (lo-fi)</td>
<td>Introductory research &amp; situational analysis Followed by peer feedback, reflection and re-evaluation of situation and solutions</td>
</tr>
<tr>
<td>Large presentation (PowerPoint)</td>
<td>In-depth research, situational analysis, developing a persona, developing solutions, international benchmarking, evaluating different solutions</td>
</tr>
<tr>
<td>Academic posters</td>
<td>Hierarchical organising of information, evaluating and editing relevant information</td>
</tr>
</tbody>
</table>

(Barnes & Du Preez, 2011)

The role of visual imagery in relation to thinking skills

Design problems tend to be vague in nature, not having “precise starting and finishing points”, and as a result, a combination of resources, strategies and creativity are required to solve them (Middleton, 2005:63). The combination of strategies needed to solve any kind of complex problems need to be developed and nurtured in the design education environment. The process of design can be applied in many problem-solving contexts. With regard to the educational environment, Middleton (2005:66) describes design and technology learning as “complex activities requiring higher-order thinking; where that higher-order thinking is facilitated not primarily by abstract thought but by visual, mental imagery and the manipulation of concrete materials”.

Thus design problem-solving falls within the area of high order thinking: designing, using visual imagery and managing materials. What is so important is that the visual representation of knowledge is the key to the generation of ideas. Middleton cites Kaufmann (1990) who asserts that we now know that people use mental imagery to solve complex problems, and also that using these images is the most efficient way to represent complex problems. Plainly, words could describe many elements individually, but in a sketch/image all relevant parts that interact with each other are located next to each other (Middleton, 2005:65).

It was therefore important to provide the opportunity for students to use as many visual methods as possible to explore the problems and visualise their scenarios, thereby
facilitating critical thinking. The use of journals, presentations and posters provided the opportunity for students to visualize their problems, and start to solve them.

While the academic research posters adhere to a more formal layout, the journal provided the students with the freedom to express themselves in any way they liked – using maps, images, drawings, mind maps, etc. This was to encourage as much creative analysis and critical thinking as possible.

**Facilitating the process of thinking in the studio**

A presentation on the features of critical thinking, as well as a class discussion on the subject, meant that the students were aware of the focus on critical thinking while they were busy with the PTP: CI. Consequently, for the duration of the pilot project in particular, it was important to create an environment that would allow the students to think critically. In Nancy Kline’s book, *Time to Think*, she asserts that the mind that has identified a problem, has the capacity to solve that problem (Kline, 1999:35). What is needed is to create the best conditions for people to think for themselves, in order to solve problems creatively. Conditions that foster a “Thinking environment” include (Kline 1999:35):

- Working with a ratio of 5:1 of appreciation/positives: criticism (- this is been used in schools with excellent results)
- Asking incisive questions, as these cut through mental blocks
- Attentive listening

Methods used to create a thinking environment also embrace diversity in the learning environment – as value is given to each person's thinking/ proposals. The technique of attentive listening was explained to the students in the pilot project. They did two exercises in the class context, as a form of reflection (see Table 3 below).

<table>
<thead>
<tr>
<th>RULES OF ENGAGEMENT: LISTENING EXERCISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>You will <strong>each</strong> have 3 minutes to speak to the other person/ people.</td>
</tr>
<tr>
<td>If the speaker stops talking, you may say, “is there anything else you would like to <em>think</em> about?” They can choose to keep speaking, or they can wait until 3 minutes have passed.</td>
</tr>
<tr>
<td>1. You must listen attentively.</td>
</tr>
<tr>
<td>2. You must look the speaker in the eye.</td>
</tr>
<tr>
<td>3. You may not interrupt at all during the 3 minutes.</td>
</tr>
<tr>
<td><strong>Exercise 1:</strong> In your group of 2, reflect on your trip to CPUT this morning. At the end of the exercise, spend some time writing an accurate report of your own reflection.</td>
</tr>
<tr>
<td><strong>Exercise 2:</strong> In your group of 3 or 4, reflect on the issues/ problems of your trip to CPUT this morning. After all have finished, you may discuss any common issues with your group. Be sure to record the details of the discussion in your journal.</td>
</tr>
</tbody>
</table>

In a reflective exercise at the end of the project, the students were asked to identify which of the 3 “rules” of the exercise was the most challenging. It is clear that ‘not interrupting’ was the major hurdle (see Figure 1 below).
Figure 1: Graph showing behaviours students found most challenging for effective listening in the PTP:CI project.

(Barnes & Du Preez, 2011)

Kline (1999) describes effective listening as a means to effective thinking – one thinks to the captive audience – almost ‘thinking aloud’. One may also be surprised by what actually came out of one’s mouth, an unplanned insight or statement. In the reflective questionnaire, which students completed at the end of the project, a quarter (25%) of the pilot student group recorded saying something unplanned (or that they personally found surprising or unexpected) in the three minutes. One student described the experience as “just speaking my mind. This was refreshing” (student db30). Another wrote: “It was challenging to ‘finish’ my conversation - I was constantly being interrupted”, as the most challenging part of working in a group (student db13).

The reflective and listening exercises helped students to formulate their understanding of their experience and that of their classmates. The exercises also encouraged students to be more engaged in the activities they were completing. The heightened level of engagement experienced by students can be linked to the two main theories that underpinned the project, namely Problem Based Learning and Engagement Theory.

The role of Problem Based Learning (PBL) and Engagement Theory

Problem Based Learning (PBL), which originated in the medical discipline, is an approach to teaching and learning which closely resembled studio based education. Boud (1985:13) describes problem-based learning: “The principle idea behind problem-based learning is.... that the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve.” In the design studio a design ‘problem’ is documented in a project brief and students undertake to complete the task described in the brief while taking into consideration any restrictions, theories or additional considerations specified. Thus design education, within a studio environment, always begins with a ‘problem, query or puzzle’. The main features of problem based learning are that the approach encourages deep learning (because learners are actively involved in the learning process and the context in which the knowledge is used), and that it enables learners to learn “quickly, effectively and independently when they need it” (Boud & Felett, 1997:4). The ability to learn independently is important when the ever-changing nature of professional disciplines like design and the influence of technology are considered. Another factor to consider is that tertiary programmes simply cannot include all of the skills and knowledge the learner will need as a professional. The need for a problem-orientated, real-world learning approach was also explored in the Boyer Commission report (1998) to produce individuals equipped with: “… a spirit of inquiry and a zest for problem solving; one possessed of the skill in communication that is the hallmark of clear thinking as well as mastery of language; one informed by a rich and diverse experience.”
The PTP:CI research project was heavily influenced by the theoretical underpinning of problem based learning. Design, as a studio taught discipline, is closely aligned to problem based learning. A real-world design problem is described in a brief which is communicated to the student, after which students work individually or in groups to resolve the set problem or scenario. Table 4 shows the connection between the features of problem-based learning as explored by Boud and Felett (1997) and the PTP:CI research project.

**Table 4: A comparison between the features of problem based learning and the PTP:CI research project.**

<table>
<thead>
<tr>
<th>Problem Based Learning</th>
<th>PTP:CI Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students must learn in the context in which the knowledge will be used (real world context).</td>
<td>• Students were given a real-world project brief.</td>
</tr>
<tr>
<td></td>
<td>• Timeframes were realistic and comparable to professional design practice.</td>
</tr>
<tr>
<td>Encourage and develop independent learning skills.</td>
<td>• Students worked in teams.</td>
</tr>
<tr>
<td>Adapts to changes and challenges experienced in professional practice to remain relevant.</td>
<td>• Students were given challenging scenarios to work through; however, the learning focus was on the development of information processing and critical thinking skills (transferable skills).</td>
</tr>
<tr>
<td>Fits into the traditional learning methods at traditional universities.</td>
<td>• Student had to engage with real-world individuals and investigate existing situations which kept the research and knowledge focus relevant and current.</td>
</tr>
<tr>
<td></td>
<td>• The design activities and workshops were run using the facilities and materials normally available in the department / (institution).</td>
</tr>
</tbody>
</table>

(Du Preez & Barnes, 2011)

The focus of both problem-based learning and design education on simulating real-world situations and projects leads to a heightened sense of student engagement. Kearsley and Shneiderman (1999), who were influential in developing the original theory of engagement in relation to digital and long-distance education, describe engaged learning activities as collaborative, project based and having a real-world context. These three aspects of learning correlate to the concept of Relate-Create-Donate (Kearsley & Shneiderman, 1999). The first principle, ‘Relate’, links to collaborative learning and the social skills development which relate to successful group work processes. Interaction with clients and fellow professionals is a key component to design and, as such, the development of collaborative and communication skills is of utmost importance to design education. The second principle, ‘Create’, links to problem based learning. By contributing to the focus and content of their projects, students are more involved which leads to greater engagement. The final principle, ‘Donate’, relates to the idea of maintaining a real-world context in projects. Through this approach students engage with real problems experienced by users. The learning activity is thus more authentic, and students develop an understanding of the importance of community contribution. Engaged students are described as learners who can learn “… at high level and have a profound grasp of what they learn, retain what they learn and can transfer what they learn to new contexts.” (The Schlechty Centre, 2009). To ensure that learners remained engaged throughout the PTP:CI research project and to encourage the transfer of knowledge after the project, the project was designed with a focus on engagement theory (Table 5).
Table 5: Engagement theory and the PTP:CI research project.

<table>
<thead>
<tr>
<th>Engagement Theory</th>
<th>PTP:CI Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relate</strong></td>
<td>Learning activities should be collaborative, co-operative and group orientated.</td>
</tr>
<tr>
<td><strong>Create</strong></td>
<td>Activities should be project based and student should have input on the generation of projects.</td>
</tr>
<tr>
<td><strong>Donate</strong></td>
<td>Real-world contexts. Benefit to users within the community.</td>
</tr>
</tbody>
</table>

(Du Preez & Barnes, 2011)

Findings from the study

There were two main research components to the PTP:CI research project: the first relates to the findings of the Cornell Critical Thinking test completed by the smaller test group and the second to data generated by the PTP:CI project in the form of observations, generated imagery, photography and the feedback from focus groups.

The initial research component was the establishment of students’ critical thinking abilities through the internationally benchmarked Cornell Critical Thinking test, which was completed digitally by a group of twenty-eight students. The Level Z Cornell Test is a 52-item, multiple-choice test which focuses on testing of critical thought as well as the conceptualising of critical thinking skills. The focus is on five main areas of critical thinking including induction, deduction, observation, assumption and meaning. Test results were analysed using the total right (TR) formula, in which all the correct answers are added or rights minus one-half the number wrong (R-W/2). The focus group scored a right answer score of 24.9 which translates to an average score of 47%-TR. In comparison to this, student groups from an American university scored 48.2%-TR (Krank, 2003) and those from a Canadian institution scored 42.1%-TR (Money, 2007). A Gauteng undergraduate test group scored 34.7%-TR (Lombard & Grosser, 2004). Although the scores from the PTP:CI study are comparable to other undergraduate studies completed nationally and internationally, they do indicate a need for extensive development of critical thinking skills within the programme – especially with regard to the concepts of credibility and meaning (Table 6).

Of the five main areas tested, the group scored best in the induction (average 55.5%) and deduction (average 48.5%) categories, as noted in Table 6.
Table 6: Focus areas of Cornell Critical Thinking Test and test group scores.

<table>
<thead>
<tr>
<th>Induction</th>
<th>Deduction</th>
<th>Credibility</th>
<th>Assumptions</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaching a conclusion regarding a class of facts through the process of estimating the validity of observations of part of a class of facts.</td>
<td>Reasoning process in which the conclusion, following the presented premise, cannot be false if the premises are true.</td>
<td>A statement which is worthy of belief.</td>
<td>The act of taking something for granted; a supposition.</td>
<td>What is intended to be, or actually is, expressed or indicated; the purpose of something.</td>
</tr>
<tr>
<td>Test group score = 55.5%</td>
<td>Test group score = 48.5%</td>
<td>Test group score = 34.8%</td>
<td>Test group score = 41.4%</td>
<td>Test group score = 38.5%</td>
</tr>
</tbody>
</table>

(Du Preez & Barnes, 2011)

The suitability of the Cornell Critical Thinking test to a South African context has, however, not been established. The implications of multiculturalism and multilingualism within South African tertiary programmes on critical thinking tests have also not been established. One student described the critical thinking test as difficult because they “had to really concentrate and read several questions over and over. Because I’m Afrikaans it was also quite difficult to properly understand everything” (author’s emphasis) (student db16).

There may be further alterations when the visual nature of design students is considered in relation to the text-based style of the critical thinking test. This also points to the fact that assessing this type of thinking, frequently including visual imagery – required for solving complex problems – is unlikely to be successfully measured using purely academic/writing tests. This is further compounded by the nature of the ‘Generation Y’ students currently in tertiary institutions. Generation Y students (described by Black (2010:92) as being born between 1981 and 2001), have been surrounded by visual electronic media their whole lives and thus have a far greater focus on visuals, as opposed to written text (Black, 2010: 95). They would therefore find the written nature of the Cornell Critical thinking test more challenging. Unfortunately, up to now, there has been no critical thinking test focused on visuals rather than on written questions, and this does put the current generation of students at a disadvantage. To address this concern, the PTP:CI research project was designed to acknowledge various modes of learning, visual interpretations and individual meaning-making throughout the project.

Despite these limitations, students showed growth in the development of critical thinking skills. Several observations were revealed in an in-depth post-project questionnaire completed by the students. The first was that they acknowledged altering their perceptions of and assumptions related to public transport, indicating the ability to critically evaluate evidence and use it impartially.

Student db11 described the challenge of travelling to class using public transport as ‘cool’ because “it opened up my perspective with regards to the fact that South Africans have strong opinions and find millions of things to change without even having experienced it. Unenlightened opinions, telling me that I can't do the train ride for fear of danger, etc., and it wasn’t bad at all”.

The critical thinking attribute of using evidence skillfully and impartially was also highlighted by student db9: “We design for different situations, scenarios, nationalities, etc. We need to see past the design article and consider all aspects".
The use of scenarios forced the students to anticipate consequences of possible solutions, which is a key critical thinking skill. Many perceived this as challenging, including student db24 who wrote: “Putting yourself in someone else’s shoes and really think about all the problems and solutions that this person deals with just to get to work every day”.

Student db8 identified the task as *deceptively* simple, stating: “The task was somewhat simple only with an extensive amount of thinking where one idea leads to various solutions”.

Notably, all students identified the importance of the role of critical thinking skills in the world of design. Students db17 and db32 wrote: “If no one uses critical thinking in design then there would be a lot of unfinished design as without critical thinking a vital step in the design process is lost”, and “It is important, for *everyone*, not just designers to make use of these skills, because the only way we can develop effective solutions to problems that face us in the world today is to apply these very skills to arrive at the innovative solutions of the future”.

**Conclusion**

Critical thinking is an important skill for both design students and professionals. The current critical thinking testing methods are not always appropriate in a design context, in terms of being text-based and in English. The textual nature of the test (whether on paper or digital) provides challenges for visually orientated design and Generation Y students, as well as challenges in the South African context of multilingualism, where English may be the second or third language. Consequently, the test data may not yield the results that reflect the actual level of critical engagement. Because solving problems using visual imagery is also considered higher order thinking, using a variety of learning activities and media to record research and analysis is recommended. The role of reflective activities is important because, while not a measure of critical thinking, they can be used by students to describe their own levels of critical thinking development and observations during a project. The possibility of a test that is not linked to text-based testing remains an area for future study, as does the impact of explicit critical thinking tuition (as opposed to current embedded critical thinking requirements in problem based learning activities).

**References:**


Think tank: Assessing the Industrial Design learning environment

Vikki du Preez and Veronica Barnes

Abstract

In higher education, it is imperative to equip students with both simple and complex skills required for their future professions. Skill required of a professional Industrial Designer includes the ability to find creative and suitable solution to what are often complex problems, as well as more general problem solving and decision making. In essence, that is the true core of design as a discourse as stated by Heskett (2002:4): “While the influence of context and circumstances may be considerable, the human factor is present in decisions taken at all levels in design practice.” As decision-making and problem-solving are key elements of a professional industrial designer’s practice, these elements should be developed and encouraged as part of the tertiary programme. The trend towards ‘learner-driver investigation’ and research as well as interactive mixed methodologies, have facilitated many projects requiring thinking skills. But does the learning environment support and develop these skills?

The Ennis-Weir Critical Thinking test was used to evaluate current Industrial Design students’ critical thinking ability and results highlight the need for further critical thinking trainings. This paper, delivered at the first annual Research & Innovation in teaching and Learning (RITAL) conference, takes into account current research pertaining to critical thought and investigates the relationship between critical thought and Industrial Design. The paper was presented in the conference’s Developing Responsive Curricula stream as the ultimate goal of the Think Tank project, of which this paper forms a part, is to initiate curricular changes.

Introduction

The International Council of Societies of Industrial Design describes design as follows: “…a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life cycles. Therefore, design is the central factor of innovative humanisation of technologies and the crucial factor of cultural and economic exchange” (ICSID, 2008). The Industrial Design course at the Cape Peninsula University of Technology, aims to equip students with the knowledge and skills to apply the design process to problems related to mass-produced products, to produce conceptual sketches, technical specifications, rendered images and physical or virtual 3D-models to communicate proposed solutions in a professional way. The graduate should be able to participate in debate around current design thinking and movements, based on historical reference and position the results of their work in the business framework that generated the need for the design input (CPUT, 2008). In short, an Industrial Design graduate must be able to make appropriate and informed decisions, whether they are practical design decisions or decisions based on abstract discussion. But does the Industrial Design learning environment support and develop these skills? The Ennis-Weir Critical Thinking test was completed by a focus group of students to evaluate their ability to think critically. These findings and a review of
other sources, including a continuous digital discussion between international educators, are presented in this paper and clearly indicate the need for curricular changes which encourage a stronger focus on the development of students’ critical thinking skills (Robyn, 2010).

**What is critical thinking?**

The key feature of critical thinking is the ability to understand and evaluate information. Critical thinking is described as higher order thinking, and also as “…reasonable, responsible, and skilful thinking that is focused on deciding what to believe or do. A person who thinks critically can ask appropriate questions, gather relevant information, efficiently and creatively sort through this information, reason logically about this information, and come to reliable and trustworthy conclusions about the world” (Schafersman, 1991:3). Nickerson (1987, cited in Schafersman, 1991:4) suggests that individuals who use critical thinking would have, among others, the following characteristics:

- Uses evidence skilfully and impartially
- organizes thoughts and articulates them concisely and coherently
- distinguishes between logically valid and invalid references
- attempts to anticipate probable consequences of alternative actions
- applies problem solving techniques in domains other than those in which learned
- can learn independently and has an abiding interest in doing so (adapted from Nickerson, 1987).

The ability to anticipate consequences of actions is a key skill, in evaluating proposed solutions to design problems, as is the need to act upon one’s evaluation. The need to decide what to do, think, or act upon is what is most challenging, as one needs to have come to a conclusion. Critical thinking thus relates to solving complex design problems using mental and actual visual imagery to solve problems. Critical thinking tests such as the Ennis-Weir Critical Thinking test are often in written format which can be problematic for practically-orientated design disciplines. So, while we recognise the importance of critical thinking skills and wish to cultivate these skills, we are limited by issues of language (particularly in the context of a country with eleven official languages, and students frequently studying in a second or third language), and an appropriate and relevant means of measuring or testing such skills.

**Why is critical thinking important to the design process?**

The ability to analyse a situation and make appropriate decisions, within predetermined boundaries, describes the underlying foundation of all design activities. Unlike many other disciplines that are taught in a traditional large group lecturing style, design is taught in a design studio. The studio is a space of sharing, exploring, stumbling, reflecting and learning. It is the learning environment that best reflects the way in which design professionals work, and can thus offer particular kinds of learning experiences that are essential for developing a professional approach: “Like other types of pedagogies, design studio pedagogy conveys, conserves, and transmits the values of design professions and society at large” (Salama & Wilkinson, 2007:3).

Design education is characterised by not only a unique teaching method, studio-based education, but also a unique teaching process: using the design process itself as the teaching process. The entire design process reflects cycles of critical analysis and responsive adjustments. To understand the relevance of critical thinking to design it is important to understand the design process. There are many different interpretations and models relating to the design process. The design process, as explored in the Industrial Design department at CPUT, can broadly be divided into three main sections: 1) Context,
Calculation & Creative Exploration, 2) Selection & Production and 3) Reflection, Adaptation and Reflection.

The first section (Context, Calculation & Creative Exploration) relates to the identification of a design problem or need, and is followed by a thorough investigation of the topic. Following this investigation a design brief is created. The design brief is a detailed document between the designer and the client outlining all the information relating to a design project. It outlines what is required of the design and the timeframe in which the project should be completed, and may also include additional information such as material restriction, technology specification, intermediary deadlines, budgetary information, etc. After both parties have agreed to the details outlined in the brief, the designer will find as many feasible solutions to the design problem, drawing on past experiences and knowledge. The design solutions should always adhere to the specifications detailed in the project brief and the designer must thus have a critical understanding of the project parameters whilst exploring possible design solutions.

The second section of the design process, Selection and Production, relates to the selection of an appropriate design solution and the production of the design. In terms of constructivist learning theory, this section corresponds to the learner deciding which information and past experiences are relevant to understanding new knowledge. In his book *In Search of Mind*, Jerome Bruner, states (Bruner cited in Clabaugh, 2009):

“Learning is most often, figuring out how to use what you already know in order to go beyond what you currently think. There are many ways of doing that. Some are more intuitive; others are formally derivational. But they all depend on knowing something “structural” about what you are contemplating – how to put it together. Knowing how something is put together is worth a thousand facts about it. It permits you to go beyond it.”

A learner may decide that their original selection of experience and viewpoints do not fully explain the new knowledge, and they may review additional opinions or experiences. The process of evaluating what is known, and extracting appropriate information which informs further action, clearly indicates the need for critical analysis and thinking skills throughout this section of the design process. Donald Schön (1987) refers to this process as reflection-in-action because learners are reflecting on what they are doing as part of the learning process and making adjustments based on this reflection.

Reflection is an important part of the design, during the design process and at the end of the project. The final review of the project refers to the third stage of the design process: Reflection, Adapation and Reflection. Reflection as part of the design process (reflection-in-action) is a natural process during which designers continuously review what they are doing and how it could be improved. Once a design is finalised, Schön (1987) encourages reflection-on-action, during which the process is evaluated as a whole and information on how to improve future projects is collected. The design learner must be able to gauge the success of the final design and critically review the process as a whole to identify positive aspects which can be built upon and negative aspects that should resolved or avoided. In each of the design process stages the learner must evaluate, critically, new knowledge and design choices – making critical thought a key skill for successful design.

<table>
<thead>
<tr>
<th>Table 1.1 Comparison of the Design and Critical Thinking Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Process</strong></td>
</tr>
<tr>
<td>Context, calculation and creative exploration:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Design Process | Critical Thinking Process
---|---
• identify the problem | Analyse and creatively sort through information
• investigate the topic |  
• generate possible solutions to problem |  
Selection and Production:  
• evaluating and selecting of a particular solution | Offer conclusions and solutions:  
• seeing other possibilities  
• evaluating the other possibilities |  
Reflection  
• continuous review of the chosen solution |  
Adaption |  
Reflection |  

Barnes, 2011.

Comparison of the Design and Critical Thinking Process

What is design thinking and how does it relate to critical thinking?

Design thinking has become a buzz-word in many fields outside design, representing a combination of intense situation analysis with creative solution exploration. Design thinking is a method of approaching problematic situations, then analysing that situation and establishing or suggesting actions to create a more beneficial scenario. It differs from other ways of thinking in that it represents a wide range of creative components which are often overlooked in scientific ways of thinking and other methods of thought and inquiry (Owen, 2007:16).

As an approach, design thinking taps into capacities we all have but that are overlooked by more conventional problem-solving practices. Not only does it focus on creating products and services that are human-centred, but the process itself is also deeply human. Design thinking relies on our ability to be intuitive, to recognize patterns, to construct ideas that have emotional meaning as well as being functional, and to express ourselves in media other than words or symbols (Brown and Wyatt, 2010). The link to expression without text and words, with critical thinking, is design thinking. Design thinking allows for a critical evaluation of situations and possible solutions with an outcome which is not based in a written format.

Testing the waters

Industrial Design students at CPUT are required to make informed decisions throughout the design process. Although the process is supported by lecturer consultation and group feedback sessions, students are expected to develop an understanding of the design process and required decision making. Over the last few years the authors have noticed a decline in the student’s ability to assess design situations and make appropriate decisions. Students also struggle to identify which information is relevant to a specific problem or project. The effect of this situation is that students seem unable to make a decision without affirmation from a lecturer at every stage of the project.

This characteristic seems to agree with findings of research on Generation Y students, also known as "the Millennial Generation" and "Generation D, the Net Generation, Digital Natives, Echo Boomers, and Nexters" (Bracey, Bevill & Roach, 2010:21). Generation Y students are those born from 1980 onwards, acceptable dates seem to be 1977 – 1982 (Bracey et al, 2010:21). In addition, in South Africa, these students are also among the first to have had an entirely outcomes-based school education. These are confident student, street smart students. They are techno-savvy, and have excellent multi tasking capabilities, and they “bore easily”(Bracey et al., 2010:22). In fact, Bracey et al. (2010: 22) also state that one of the “most significant characteristics of Generation Y... is their attachment to, understanding
of, and comfort with technology”. This is echoed by Weiler (2005: 46) in his article, Information-Seeking Behaviour in Generation Y Students: Motivation, Critical Thinking, and Learning Theory:

“The students currently on college campuses, as well as those due to arrive in the next few years, have grown up in front of electronic screens: televisions, movies, video games, computer monitors. It has been said that student critical thinking and other cognitive skills (as well as their physical well-being) are suffering because of the large proportion of time spent in sedentary pastimes, passively absorbing words and images, rather than in reading.”

Industrial design students were observed in the classroom and notes were also made regarding informal interaction with students (impromptu discussions as well as question & answer sessions). The main aim of this project was to establish the level of critical thinking exhibited by design students in their everyday classroom activities. To this end an ethnographic approach was used to document student activities through observation. Research methods were mostly ‘emic’ in nature as the lecturer concerned formed part of the classroom situation being observed.

From the field notes and observations, one could note that students required a substantial amount of attention and often look to the lecturer for guidance without any initial personal exploration of the situation or problem. This is significant in the educational context. They need additional support to enable them to make their own decisions, as they struggle to do this confidently. The changes in the students have been observed in the last few years. Examples of changes noticed in Generation Y students, are detailed in these three examples, from the History of Art and Design Department at CPUT (Barnes & Du Preez, 2010):

**Example 1:**
The project brief is a thorough document outlining all the project requirements and deadlines. This document is introduced and explained in class and students have the opportunity to read through the brief more than once, and ask questions regarding the project. During 2009 and 2010, the researchers observed a noticeable change in how students ‘use’ or ‘read’ their project briefs. Student would approach the lecturer, with the brief in their hands, and ask questions regarding the project that are addressed in the brief. These instances, noted in field and discussion notes, became more frequent. When students are asked why they are asking questions, when they are holding the document which has the answer, their response usually is that they simply thought they would “make sure”.

**Example 2:**
From class observation and field notes it has also been noted that many first year students, who form part of Generation Y, lack the ability to identify information relative to a project. Students would, for example, review a section from a website or book and not be able to see how the information relates to their project. The information is mostly in clear, accessible language, and often has headings which indicate the relevance of the information, but many students seem to struggle making the connection.

**Example 3:**
When given a reading, (Gen Y) students struggle to identify the main themes or the point of the reading. Often students simply rephrase the main points from every single paragraph and offer these as the main point without considering repetition, elaboration or hierarchy of ideas. This scenario is noticeable in, for example, the answers students supply in comprehension exercises.
As the gathering and selection of appropriate information is key in critical thinking, and with the above mentioned examples in mind, Weiler (2005) sounds a warning about the “information seeking behaviours in Generation Y students” that are, or soon will be, part of our educational institutions:

“Critical thinking is a process that is widely acknowledged in the literature to be crucial to the learning process, to cognitive development, and to effective information seeking. Most college faculty and librarians are painfully aware of how often students seem to be incapable of thinking critically about course work in general, and about information needs or information resources in particular. Evaluation and effective use of information in any form is impossible without the use of critical thinking, and so the level and quality of critical thinking are of primary concern when speaking of information seeking behaviours in Generation Y students.” (Weiler, 2005:46).

There appeared to be similarities between literature concerning Generation Y students and classroom observations made by Industrial Design lecturers regarding the inability of students to make decisions or identify appropriate information. In order to establish whether Industrial design students were in fact struggling with critical thinking, as one of the modes of thinking required by the design process, a group of first year students completed the Ennis-Weir Critical Thinking Test (1985). This test, designed by Robert H. Ennis and Eric Weir, is aimed at learners from secondary school level through to tertiary level but can also be used as a teaching resource. The test is formulated within an essay structure and requires the respondent to write an appropriate response based on a mock letter. The essay response is evaluated against a framework designed as part of the test. The test has a number of focus areas (Ennis, 1999):

- “getting the point”,
- seeing the reasons and assumptions,
- stating one’s point,
- offering good reasons,
- seeing other possibilities (including other possible explanations),
- and responding to and avoiding equivocation, irrelevance, circularity, reversal of an if-then (or other conditional) relationship, overgeneralization, credibility problems, and the use of emotive language to persuade.

The Ennis-Weir test's focus areas (indicated above), correspond to specific criteria of the design process (Table 1.3). Although the design process is not based in a written format,

**Table 1.3: Focal Criteria of the Ennis-Weir Critical Thinking test at the Design Process**

<table>
<thead>
<tr>
<th>Ennis-Weir Testing Focus Area</th>
<th>Design Activities and Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Getting the point”.</td>
<td>Understanding the design ‘problem’ and what is being asked of the designer.</td>
</tr>
<tr>
<td>“Seeing the reasons and assumptions”.</td>
<td>Analysing the reason for the design activity and identifying project constraints and details. Developing the design brief.</td>
</tr>
<tr>
<td>“Stating one's point”.</td>
<td>Analysing the design brief and formulating appropriate proposed solutions. Evaluating all proposed solutions to identify the most suitable design solution for the context and other criteria. Being able to visually and verbally communicate these proposals, and the reasoning for the final selection, to clients and fellow designers.</td>
</tr>
<tr>
<td>“Offering good reasons”.</td>
<td></td>
</tr>
<tr>
<td>“Seeing other possibilities (including other possible explanations)”.</td>
<td></td>
</tr>
</tbody>
</table>

Barnes & Du Preez, 2011.

*Focal Criteria of the Ennis-Weir Critical Thinking test at the Design Process*
which is used as the medium in the majority of critical thinking tests, the link between cognitive skills tested are similar.

To evaluate the basic skill of thinking critically, nine diverse (in terms of gender, culture and home language) Industrial Design students were requested to take the Ennis-Weir test (the Cornell Critical Thinking Test (Level Z), which is completed electronically, comprises multiple choice sections aimed at testing various aspects of critical thought). The results are indicated in the graph below (Figure 1.1):

![Figure 1.1: Industrial Design Student's Ennis-Weir Test Scores](image)

The average score of the first year test group of Industrial Design student at CPUT was 9.6, out of a possible top score of 29. The variability of the result, measured as a standard deviation, is 4.9. The relatively low standard deviation means that the score of each individual respondent was not far from the average of the group (the mean) and supports the validity of the findings.

The average of the 2010 CPUT findings, when compared to those of a Midwestern University (USA) study documented in 1993, is quite low. The Midwestern University’s Ennis-Weir study resulted in an average score of 14.6 (Ennis, 2005). Although the average score is significantly higher than that of the Industrial Design students at CPUT, the standard deviation is also higher, at 6.1 (Ennis, 2005). The higher standard deviation implies that the individual scores, achieved at the Midwestern University, were more varied. Results of a 2000/2001 study completed at a community college in Florida (USA) also reported a higher group average than CPUT’s students – a mean of 11.91 was recorded in the undergraduate test group with a standard deviation of 8.61 (Reed & Kromley, 2001).

The link to critical thinking and design, as documented in this article, highlights critical thinking as one of the modes of thinking required of a successful designer. The relatively low score of first year Industrial Design students highlights a need for curriculum development which supports a focus on critical thinking skills, as well as further research to investigate the impact of generational attributes.
Reflecting on the muddied waters

In the course of the research, studio-based learning, problem-based learning, design process and critiques technique were all reflected upon as influencing factors. The role that the Generation Y students played in the Industrial Design environment had also been considered. The results of the pilot Ennis Weir test were, however, unexpected. The result of this was a serious consideration of the direction of the project, which had begun as the pursuit of critical thinking skills. While critical thinking is described as a higher-order thinking skill, solving complex design problems using mental and actual visual imagery is also described as higher order thinking. The conclusion was, therefore, that it was not possible to isolate just one form of thinking in the design process. All modes of thinking, aligned to the design process, require investigation.

Optimum thinking conditions in the mud

In her 1999 book, *Time to Think*, Nancy Kline’s premise is this: the mind has grappled with or identified the problem, that same mind has the capacity to solve the problem. She firmly believes that solutions to problems identified can be found by the same person, by creating an optimum environment for thinking. One needs to create the best conditions for people to think for themselves, in order to solve problems creatively. According to Kline (1999:35), conditions that foster a “Thinking environment” include:

- Attentive listening – listening with interest and respect
- Asking incisive questions – this cuts through mental blocks that limit ideas
- Treating each other as thinking peers
- A working ratio of 5:1 of appreciation/ positives: criticism (this has been used in schools with excellent results)
- Encouragement - as opposed to competition
- Diversity – differences create quality

South African society, and particularly the education landscape, has changed radically over the last 10 years in terms of access to education. Many previously homogeneous universities have a far more diverse student body. However, owing to the complex, discriminatory past of our country, increasing diversity presents its own challenges. Some courses have a more diverse student population than others, creating adjustment issues for the minorities. Kline (1999:91) refers to the issue of sexism, and suggests that the characteristics of a Thinking Environment are in direct opposition to male conditioning:

<table>
<thead>
<tr>
<th>Table 1.5: Thinking Environment Compared to Male Conditioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thinking Environment</strong></td>
</tr>
<tr>
<td>Listen</td>
</tr>
<tr>
<td>Ask incisive questions</td>
</tr>
<tr>
<td>Establish equality</td>
</tr>
<tr>
<td>Appreciate</td>
</tr>
<tr>
<td>Be at ease</td>
</tr>
<tr>
<td>Encourage</td>
</tr>
<tr>
<td>Feel</td>
</tr>
<tr>
<td>Supply accurate information</td>
</tr>
<tr>
<td>Humanize the place</td>
</tr>
<tr>
<td>Create diversity</td>
</tr>
</tbody>
</table>

Kline, 1999.

The ideal situation would be for both male and female conditioning to be disregarded, while retaining the best features of each culture. Methods to create a thinking environment
embrace diversity in the learning environment – as value is given to each person’s thinking/proposals.

The 2005 study by Laird at the University at Michigan, described in “College Students’ Experiences with diversity and their effects on Academic Self Confidence, social agency and disposition towards Critical thinking”, shows that all students with more experiences of diversity in the learning environment, have improved disposition to critical thinking and academic self confidence (Laird, 2005: 365). While the Industrial Design Department is not the most racially diverse environment on the CPUT campus, there are many different types of diversity – such as gender, levels of education, economic empowerment, age, as well as language, among others. Creating a thinking environment which embraces diversity should therefore be a goal, and will benefit the critical thinking disposition and academic development of all students.

Conclusion

The aim of this research project is to investigate whether the Industrial Design learning environment at CPUT supports and develops the skills that the students need for their profession. In this article, the skills required for the industrial design profession have been explained. The importance of critical thinking in the profession has been made clear, and this was further explored in relation to the design process. The explanation of the design process led to a discussion on the importance of design thinking methods, the use of which is becoming more widespread in a variety of industries. Given the importance of critical thinking, the pilot testing of the sample Industrial Design students was described, including the benefits and limitations of the Ennis-Weir testing method. The use of the test was further scrutinised in the light of the extensive use of visual imagery to solve problems, the characteristics of the Generation Y students, as well as the language limitations of the students in the South African context. While the results were surprising, the conclusion drawn was that all modes of thinking need to be considered in the design process. The optimum conditions to create a “Thinking Environment” were also described, with an explanation of the limitations of conventional thinking methods and gender conditioning. The three phase approach to the research was outlined, with a brief description of the pilot project planned for 2011.

The results of the planned pilot project could well be appropriate for many other areas of design, to enhance thinking in learning. There is no doubt it will benefit the indecisive Generation Y students, by equipping them with the thinking skills to properly evaluate information in order to make considered decisions. Therefore, the chosen methodology of relevant studio based research (the pilot project, the thinking in action, and appropriate cognitive research), in combination with the process of seeking out different thinking styles, theories and testing methods for high order thinking, should result in a responsive design learning environment – thus creating an optimum thinking environment, to best equip students to make decisions in the real world.

References


Postgraduate Learning: pushing the boundaries through Academic Development (AD)

Thami Tisani

Introduction

The argument presented in this paper on postgraduate learning takes off from the premise that learning is transformative and a lifelong activity. It is in the context of learning that is not static or finite, that the discussion is to be had about postgraduate learning development. Despite a view among some researchers that use of the term “student” at postgraduate level diminishes the research and scholarly work expected at postgraduate level (Van Braeckel, 2010), in this paper the researcher focuses on postgraduate student learning and development. Furthermore, in the argument pursued, learning is framed around Habermasian typology and thus postgraduate learning will be broadly looked at from the empirical, practical and emancipatory domains of knowledge.

The line of reasoning pursued in this paper is that Academic Development (AD) in South Africa, traceable from the late nineteen-eighties, has attained a degree of maturity. As a concept in higher education studies it is relatively well grounded in scientific research, has a sizeable number of scholars, and is increasingly being recognised as a field of study in institutions of higher learning. It is within this context that the concept of AD in postgraduate learning is being explored.

Despite notable developments, AD still has traces of the deficit theory in its practice. Over the years, the themes covered at Higher Education in Learning and Teaching Association of South Africa (HELTASA) conferences, and even at the Research and Innovation in Teaching and Learning (RITAL) gathering, are on research done mainly on student learning at undergraduate level. Only 10 out of about 160 papers at the HELTASA conference 2010 touch on aspects of postgraduate studies. An important exception is the focus on research papers emanating from the professional development programmes and qualifications for lecturers.

Camouflaged deficit theory in postgraduate learning

Boughey (2007) traces the history of AD in South Africa, outlining the shift in understanding of the concept AD from ‘academic support’ to ‘academic development’. The former approach had focused on students and their perceived shortcomings. The shift came about as early critics of this view have called for a broader and deeper analysis of the challenge of student learning and competence which would then go beyond “craft knowledge” (Scott et al., 60 ) to the building of scholarship including the broader context of human capital and institutional development. The deficit model which was premised on the notion of ‘disadvantaged students’, ‘underprepared students’, ‘non-speakers of English’, etc., sought to work on re-fixing these students. Popular approach followed in most of the universities was through
separate summer schools or bridging courses and even language classes in which the approach was to manipulate the environment following technical (grammar) rules. The practitioners were operating within Habermas’s ‘first domain knowledge’ (MacIsaac, 1996).

Over the past fifteen years or so, there has been a groundswell of change and development in the way practitioners and institutions have theorised and practised academic development. In-depth research on higher education studies, particularly on student learning, has thrived. This can be seen from the number of doctoral theses that have been produced in the field as well as publications in scientific journals both nationally and internationally. At institutional levels the Higher Education Institutions (HEIs) have one and all established centres for higher education development which, with different degrees of emphasis, work on student development, staff development as well as institutional development through policy formulation and promotion of scientific pedagogy in faculties and departments. Under this tripartite alliance academic development is an all-encompassing experience that does not just find fault with students. This is what Scott et al. (2007:59) call a “comprehensive approach to improvement”.

But deficit theory is resilient and is alive especially in postgraduate learning. Commentators on poor retention and limited completion rates of postgraduate students tend to dwell on the well-trodden path of identifying student lack of preparedness to cope with the rigorous demands of postgraduate work. Indeed, thinking in line with the deficit theory creeps in in least expected corners. A close study of the Report of the Ministerial Committee (DoE, 2008), a notable document in the history of higher education, especially in the new era in South Africa, provides an interesting example of the point under discussion. The section of the report that deals with ‘Students and Learning Experience’ (DoE, 2008:63-73) is framed around student equity in relation to race and gender. The statistical analysis presented in this section is informative insofar as it reveals that “the progress made in equity of access has not translated into progress in equity of outcomes” (DoE, 2008:64).

Unfortunately the main thrust of the recommendations proffered in the Report (DoE, 2008) on student equity, especially on learning, tilts towards interventions that address learning needs of students at undergraduate level through academic development programmes that are “add-ons”. Implied in this approach is the notion that AD is a corrective exercise for undergraduate studies. To be comprehensive and to adequately address issues of transformation, social cohesion and elimination of discrimination the Report should have addressed itself to the disjuncture in terms of demographics on postgraduate enrolments as well. In other words the Ministerial Committee did not address the under-performance of black students at postgraduate level nor did it make recommendations to address that. On the part of institutional interventions, the approach recommended in the Report is the one on staff development programmes that familiarise staff on student needs.

The argument that the researcher is making here is that this salient report on transformation, social cohesion and the elimination of discrimination dwells largely on identifying student needs and shortcomings with recommendations on fixing them. However, the dimension of power dynamics between students and staff does not get adequate coverage. The transformation agenda is mainly through meeting the students’ perceived needs and hardly at all on interrogating dominant ideologies in the institutions of higher education.

**The Transformation agenda in higher education**

In South Africa the broad transformation agenda was initially contained and directed through the Reconstruction and Development Programme (RDP) which aimed at eradicating all vestiges of inequality and injustice in the socio-economic systems of South African society. The transformation agenda of higher education embraced the core tenets of the post 1994
order in South Africa. Issues of equity and redress, access with success, diversity and reconstruction were enunciated in a number of key documents that were promulgated in the first ten years after the official end of apartheid: these include the Education White Paper 3 (1997), The National Plan for Higher Education (NPHE, 2001), as well as a number of acts like the Higher Education Act (1997) and the South African Qualifications Authority (SAQA) Act (1995).

On postgraduate learning, the pressing concerns covered in these documents were in relation to the low enrolments in master’s and doctoral programmes by black students. The low figures actually showed a decline between 1995 and 1999 (NPHE, 2001:70). There was thus a call for the development of a national research plan that would include the co-ordination of the key stakeholders like the universities, science councils and the National Research Foundation (NPHE, 2001:70). Under the NPHE in particular the call was for access with success to higher education; equity and redress, as well as production of graduates equipped to service the needs of South Africa.

These ambitious plans placed heavy responsibilities on the higher education system, especially the institutions of higher learning. Universities and Technikons (later Universities of Technology) became the sites expected to provide space for the formal intellectual development needs of individuals. At the same time the same institutions were to supply the much-needed skilled workforce and competent professionals for the growing South African economy.

After almost two decades of development initiatives to transform higher education through access and success for historically marginalised groups, challenges still remain. The optimism of the mid-nineties was brought to a rude awakening when it became clear that the expected huge numbers of enrolments were not being attained (Bunting cited in Cloete et al., 2006:100-101). Postgraduate learning was still in dire need of well developed learning practices and theories that would bring about comprehensive learning development.

Postgraduate studies in crisis in South Africa

Postgraduate studies the world over experience a number of complex challenges which cannot be adequately addressed in the confines of this paper. These include, amongst others, what Koen (2007:14) sums up as: Rational-economics, resource scarcity, ineffective admissions policies, schooling deficits, inadequate adaptations and inappropriate vocation choice.

In the South African context, ten years after the NPHE and related documents, some of the key pillars of transformation outlined in the Plan continue to be the very challenges that still need to be overcome in the higher education system. These failings manifest themselves in a crippled postgraduate system.

Obstructions in the flow of postgraduates

The flow or academic progress of postgraduate students is hampered by numerous ebbs and eddies. It has almost become the norm that the majority of postgraduate students in South Africa do not complete the qualifications they are registered for, in the minimum time.

In looking at the pass rates of postgraduate students, a misconception is sometimes created through the manner in which researchers evaluating and monitoring progress have, in the past, tended to churn out quantitative data that focused on performance comparisons by race and gender. Through such raw data, often the focus has been on increase in numbers as shown in Table 1 below.
Table 1: Headcount enrolments by Race and Gender: Undergraduate and Postgraduate

<table>
<thead>
<tr>
<th>Race &amp; Gender</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>African</td>
<td>317998</td>
<td>353327</td>
<td>377072</td>
<td>403235</td>
<td>453621</td>
<td>446945</td>
<td>451106</td>
<td>476770</td>
<td>6.00%</td>
</tr>
<tr>
<td>Coloured</td>
<td>30106</td>
<td>32900</td>
<td>37906</td>
<td>42390</td>
<td>46091</td>
<td>46302</td>
<td>48538</td>
<td>49066</td>
<td>7.20%</td>
</tr>
<tr>
<td>Indian</td>
<td>39558</td>
<td>43436</td>
<td>47567</td>
<td>51611</td>
<td>54326</td>
<td>54611</td>
<td>54859</td>
<td>52596</td>
<td>4.20%</td>
</tr>
<tr>
<td>White</td>
<td>163004</td>
<td>173397</td>
<td>178871</td>
<td>184964</td>
<td>188714</td>
<td>185847</td>
<td>184667</td>
<td>180461</td>
<td>1.50%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>555080</td>
<td>604667</td>
<td>643236</td>
<td>684409</td>
<td>744489</td>
<td>734925</td>
<td>741380</td>
<td>761087</td>
<td>4.60%</td>
</tr>
<tr>
<td>Female</td>
<td>289555</td>
<td>321653</td>
<td>344979</td>
<td>366465</td>
<td>403832</td>
<td>401019</td>
<td>408718</td>
<td>422533</td>
<td>5.50%</td>
</tr>
<tr>
<td>Male</td>
<td>265525</td>
<td>283014</td>
<td>298257</td>
<td>317944</td>
<td>340657</td>
<td>333906</td>
<td>332662</td>
<td>338548</td>
<td>3.50%</td>
</tr>
</tbody>
</table>

Note: Percentages may total less than 100, due to rounding off, and/or race/gender unknown.

However, a deeper analysis of the figures has shown that despite the bulge of graduate enrolments in South African universities between 1990 to 2005, there was in fact a relative decline in enrolments. The figures which on the surface appear to show a constant increase, are due to the overall increase in population and hence students eligible to enrol in higher education (CHE Monitor 8, 2009:44). Indeed, according to the Crest Report (2009:3) the country was actually producing proportionally fewer postgraduates in 2005 than in 1990.

Such a decline can be discerned in other areas which reflect on South Africa’s position when compared with other developing countries. For example, the ‘knowledge-based economy index’ which is framed around four pillars – namely, economic incentive and institutional regime; education and training; adoption of innovation; technology, information and communication technologies infrastructures – shows that South Africa’s position has dropped from 49 in 1999 to 55 in 2008 (Development Indicators, 2009:17). At a global level, South Africa’s share of global research has also been decreasing over more or less the same period (Habib and Morrow, 2006).

The many obstructions to postgraduate outputs are a debilitating feature to the individuals and their families affected. They are a serious drain to the resources of the country that has to continue to fund a clogged up postgraduate system. Further, they rob the country of much-needed knowledge workers in the various facets of South African society.

Decreasing number of South African nationals in postgraduate cohorts

Another development in postgraduate graduate output during the past ten years has been the growing numbers of foreign nationals obtaining master’s and doctoral degrees in comparison to South African citizens. Initially, in accordance with the Southern African Development Community (SADC) protocol each member state would avail a maximum 10% of total number of postgraduate places or those from the SADC (NPHE, 2001: 22). However, in his study Mthembu (2010) has shown a huge increase of SADC nationals obtaining master’s and doctoral degrees. Philp, quoted in Mthembu (2010) observes that: “Although 400 of the roughly 1300 PhDs awarded in 2007 are described as black African, more than half of those were from other African countries revealing the illusion of Transformation.” In the meantime in a 2007 report, Higher Education South Africa (HESA) congratulated itself...
for “the resounding success story of HE’s ability to offer quality study opportunities to the region” (HESA, 2007:3).

This phenomenon is a double-edged sword for South Africa as well as for the rest of the continent. Firstly, South Africa has in the past decade or so become a new destination for African intellectuals, arguably contributing to a brain-drain on their African countries of origin. Secondly, an overproduction of foreign nationals to supply the much needed experts in the South African economy creates serious socio-economic challenges for the country in the long term.

**Inequity in the distribution in fields of study between gender and race**

Evidence shows that disparities in the fields of study between racial and gender groups in postgraduate studies are sharper than in the undergraduate sector. Another difference concerns the tendency for black students to dominate social sciences as against science, engineering and technology, which tend to be the arenas of white students. To complicate matters further, SADC students again swell the numbers of African graduates, inadvertently neutralising the gravity of the situation.

**Resource scarcity**

The inequalities that characterised the apartheid system are deeply embedded in South African society and they still are a part of the South African reality. Funding for postgraduate studies remains a serious hurdle to those students who come from economically deprived backgrounds. Offers of scholarships sometimes do not address the needs of these students, as in most cases as young adults they have a responsibility to look after parents, siblings and extended family.

An issue of scarce resources expressed itself in a covert manner in the historically black institutions. This occurred when historically black institutions experienced a dramatic loss of student intake as students voted with their feet searching for the better resourced and therefore more prestigious institutions (NPHE, 2001:5). The poorly developed postgraduate agenda (Bunting cited in Cloete et al., 2000:45) at these institutions actually became worse soon after 1994. Paradoxically, the migration by black postgraduate students resulted in a further stunting of the development of postgraduate studies in South Africa as the Historically White Institutions (HWIs) were not necessarily capable of providing conducive environments for learning for these students.

The shortage of qualified staff to nurture and supervise young researchers in postgraduate programmes in a majority of universities in South Africa, is another instance of resource scarcity and has a deleterious effect on postgraduate learning.

**AD as a broad concept on learning development**

A paradox in the scientific work done in AD, is its narrow stance through the continued focus on undergraduate learning. There is little reference to research undertaken by practitioners on postgraduate learning and its development. The silence by AD practitioners on this issue is baffling. This is particularly the case as these practitioners have for a long time, in the South African context, been the vanguard of transformation of higher education. Could it be yet another re-surfacing of the notion of learning development as only a corrective exercise and therefore to be confined to undergraduates or to ‘underprepared’ students coming from schools? Under such thinking, postgraduate students would thus not fit in.

However, if learning is a much more complex activity than just “fixing” shortcomings, then AD practitioners are to address the crisis facing postgraduate learning. They have to work
towards staunching the haemorrhaging system that is characterised by high drop-out rates, pile-ups of students that clog the system, and general disillusionment of thousands of young South Africans who are described as having failed to make it.

An AD approach that is not tethered to the idea of “support”, which rather concentrates on students, will adopt a broader and more open approach to work on the development of postgraduate learning. Research on learning that puts emphasis on the social context, like Wenger’s Communities of Practice, epistemic communities and attendant principles (Bailey, 2010:14), would in this instance draw attention to departments and faculties where postgraduates find themselves. Indeed, with the period of fifteen years of liberation, the shift should go even beyond emancipatory pedagogy to what Jansen (2009:260) refers to as ‘Post-conflict Pedagogy’.

In Koen (2007:22-28) there is a discussion on the theoretical approaches to the study of postgraduate retention and success. Two aspects in this discussion which include “environmental influences” and “interconnections within an environment” (Koen, 2007:22), share an affinity with the social theories on learning. Such thinking further connects with Habermas’s ‘Practical Knowledge’ which identifies human social interaction as a key mode of discovering knowledge (MacIsaac, 1996).

The practical implications of these theoretical approaches to the study of quality postgraduate learning, is the examination of the social settings of faculties and departments where postgraduate students are registered. Secondly, the human dimension of “interconnections” between the departmental staff as mentors and academic leaders and the postgraduate students as initiates and young researchers who eventually grow into autonomous and independent critical thinkers. The pervading culture in these environments, the epistemic environments, is crucial for a successful and transformed self-awareness of the postgraduate student.

Detail on the analysis of postgraduate learning and improvement of success and retention through an examination of social settings and human interconnectedness in departments and faculties, can best be undertaken through workshops and seminars (Tight, 2003:97). AD practitioners have, in the past decade, through academic staff development, built a scholarship of teaching with theoretical underpinnings. An extension of this developmental approach to the postgraduate level has to accommodate the transition from the curriculum to research. The former refers to the process of cultivating ‘smart skills’ and knowledgeable graduates, and the latter to production of new knowledge (Cloete et al., 2000:175). In these overlapping levels or phases in the knowledge production process the possibilities are endless. Universities, while they may be generally seen as conservative spaces, have the ability to be agents of change as they can facilitate the “equalisation of chances and democratisation of society... [making] contribution to social equality” (Castells, 2009). This is a call that is made to South African universities and to AD practitioners to act as agents for educational development especially at postgraduate learning.

**Conclusion**

Academic Development in South African higher education has been a driving force in the transformation process of that sector. While its practitioners have not worked directly at the macro level of policy making, they have nonetheless played a vital role in the re-conceptualisation of quality teaching and learning in higher education. Informed by research, AD thinking has permeated most of the universities as can be testified by the existence of Centres for Higher Education Development and related units. The thesis proffered in this paper, however, is that AD seems to have stalled at undergraduate work. Postgraduate learning in South Africa, despite the many challenges it faces, has hardly been touched by
new approaches embedded within theories of learning aligned to AD. The conventional approach or "craft knowledge" has to be overhauled in light of new and diverse students, new and diverse academics, as well as demanding national and global environments.

References

Bailey, T., 2010. The research-policy nexus: mapping the terrain of the literature. Wynberg: HERANA, CHET.


Castells, M. 2009. Transcript of a lecture on Higher Education, University of the Western Cape.


Student experiences of the communication demands of the workplace

Shairn Hollis-Turner

Abstract

The impact of globalisation on the workplace demands that individuals must be prepared to respond to rapid technological and knowledge changes. While the courses offered by the various Universities of Technology take into account the role of the workplace, very little research exists on the impact of career-focussed programmes and how these meet or do not meet workplace demands. This paper discusses a research project conducted with third year students undertaking the co-operative component of their Higher Education programme. The aim of this study is to determine whether students are adequately prepared to meet the demands of the workplace. The experiences of the students as novice employees and feedback from the employers provide critical perspectives of the demand and supply in Higher Education.

This study used both quantitative and qualitative methods and collected and produced documentary data, questionnaires, observations and interviews at both higher education and workplace sites. The findings show that workplace communication is complex and that while Higher Education programmes attempt to simulate workplace practices, many students struggle to meet the demands of the workplace. While preparing students to acquire knowledge and skills, the learning of communication skills in higher education can become pedagogized and unrelated to the realities of the workplace.

Introduction

The focus of this paper is to report on research undertaken on student experiences of the communication demands of the workplace. The aim of this study is to investigate whether students are adequately prepared to meet the communication demands of the workplace, to determine the communication practices learned in higher education Office Management and Technology (OMT) programmes and those of office managers in the workplace, and the alignment between the supply and demand of communication practices, i.e. between the classroom and the workplace.

Literature review

Miller (1994) views language practices as situated activities. This theory is expanded upon by versions of Activity Theory (AT) that views language as a tool within an activity system (Russell, 1997). AT relies on an interdisciplinary perspective that views performance as formed by, and responsive to, social, historical, cultural and linguistic resources, conditions and processes. Bernstein (1996:99) talks of ‘boundary objects’ which are those tasks and activities that have meaning for different communities of practice, such as higher education and the workplace. Some of the boundary objects used in the higher education context include portfolios, in-service training and integrated work assignments, to name a few.
In the academic setting, research findings show communication practices are often ‘pedagogized’ for learning purposes (Winberg, Lehman, Van der Geest & Nduna, 2005:1). The purpose of students’ communication is not to explain something to an audience and assessor who do not understand the information, but to ‘perform knowledge’ (Paretti, 2006:189). Learning is often provided in a bound set of notes or in a textbook and tends to be decontextualised, as courses are often constructed as separate from the body of knowledge and practices on which they focus (Boud & Falchikov, 2006). Knowledge transfer can be defined as “how knowledge acquired in one situation applies or fails to apply at another situation” (Singley & Anderson, 1989:42). The higher education institution re-contextualises workplace communication practices combining the constraints of educational policy, teaching methods and curricula. Finally, the graduate takes this knowledge to the workplace. The question posed is whether the knowledge which graduates bring with them to the world of work is effective in the workplace, taking into account the various transformations of knowledge, particularly between the world of work and that of higher education.

Research methodology

The research on which this article is based was conducted at both higher education and workplace sites. A survey was conducted with 371 first and second year business communication students of a higher education institution. A total of 265 students responded to the survey questionnaire. Three academic staff members were interviewed and observational data were obtained by video-recording written communication practices at the higher education sites. Documentary data at the higher education sites, such as curricula documents, teaching and learning materials, assessment material, results of learned communication skills and examples of students’ writing were examined and studied. Observational data were obtained by video-recording written communication practices during four double periods at the higher education sites.

Students’ training comprises a co-operative education training component which requires that third year students undertake six months of co-operative training or work-integrated learning in the workplace. Students, as novice employees, were employed in a wide variety of fields and their employers were required to complete Personal Skills Assessment forms for the purpose of providing feedback on the performance of novice employees at the end of the period. Data were obtained from 68 employers of students who had completed their training period during 2007.

In addition, purposive sampling of the employers was undertaken and the sites selected were limited to those companies that granted permission for the research and those that employ the third year OMT students for the six months of co-operative training. Six employers with track records of dedication to employee development and support for novice employees were selected for observations and interviews and six novice employees were interviewed and their practices observed in the workplace.

In the research on which this article is based, higher education and the workplace are contexts in which the communication process takes place. A theoretical model of communication (refer to Figure below) comprising the elements of the communication writing process served as categories of investigation. While the model focussed on written communication, the findings of the research provided data on both verbal and non-verbal communication.
Communication practices in higher education

The higher education context has the supply and acquisition of knowledge as its central focus. It is a context of knowledge production and information exchange and a discourse community of academics and learners. Students are able to withdraw from the busy classroom environment to produce work in quiet and studious environments, such as the library or study rooms. The higher education staff attempted to prepare students for the workplace environment by imposing workplace values of adherence to punctuality, responsibility, meeting deadlines, ensuring the accuracy of written work and incorporating feedback. The academic staff attempted to maintain contact with the needs of the workplace by remaining current on the latest business communication practices. Academics attempted to simulate the communication requirements of the workplace by using examples from textbooks, notes, articles from newspapers and handouts from current business-related articles.

In this context the medium of learning is English. Students speak a variety of different languages, with only 11.5% speaking English as their home language. In order to simulate workplace practices, students are often provided with opportunities for communication practise individually and in collaboration with their peers in the classrooms. However, classroom exercises were often pedagogized for learning purposes as students were usually required to produce business writing without supporting texts. For example, the writing of a notice and agenda, without access to the lesser genres, such as e-mail messages for agenda items. Students practised the writing of messages in a simulated workplace context and did not, for example, take messages from a client over the telephone (Winberg, 2007).

The communication genres include verbal, non-verbal, academic, business and electronic genres. Academics employed a variety of methods to teach students generic formats of business writing and to keep up-to-date with workplace practices. Students were required to use computers to produce both academic and business texts for the communication
courses, with the exception of class exercises and tests. The electronic communication genres which first and second year students were required to learn, included the Microsoft suite comprising Microsoft Office: Word, PowerPoint, Excel and Desktop Publishing. Students were also required to use Outlook and the Internet and to learn a financial program, namely, Pastel.

The primary purpose for students’ communication practices is to demonstrate their knowledge of the subject for the communication academics who are the audience and who know more about the subject than the students do. The secondary purpose of students’ communication in the simulated workplace situations is to communicate with simulated workplace audiences. Students are required to demonstrate that they can communicate with the simulated clients, customers and staff of the kinds of companies where they might eventually be employed. The academics reported that they required that students met the specific course requirements, but students are able to pass an assignment, project or test with 50%. Communication students often have more than one opportunity to meet the course outcomes, dependent on the institution’s assessment policy.

Student experiences of communication demands of the workplace

Students undertaking the six month co-operative training component of the National Diploma: Office Management and Technology, entered a complex workplace environment with flexible, multi-skilled individuals. Information sharing is the central focus of the modern workplace and novice employees were required to communicate with multiple audiences in the workplace. The workplace community consists of the employers and staff who aim to satisfy the customers and clients and to provide a professional service on behalf of the companies by whom they are employed.

The workplace is a busy context and the novice employees were required to communicate verbally and non-verbally, and to not be distracted by the activity of the workplace. There are very specific communication requirements in the workplace context. The findings show that the workplace context demands awareness of multiple audiences with specific needs, specific knowledge requirements, concise and accurate writing skills, higher-level and analytical skills. The novice employees were required to speak and write in English as the language of business and mainly used Afrikaans and Xhosa for oral communication purposes in response to customer queries or telephone calls. Novice employees were required to produce a variety of business documents and to continue with a variety of other duties at the same time.

The electronic communication genres utilised at the companies were: Microsoft software, in-house software, online databases, PowerPoint, SAP, in-house home shopping, MWEB, internet/electronic banking, Outlook, intelligence database for the generation of documents, and internet research. Novice employees were required to be competent in generating business writing and to communicate and share information with multiple audiences, to acquire and maintain contracts and to generate income for the organisation. The exchange of correct and accurate information was the main focus of workplace communication practices. Novice employees’ work was checked and novice employees were required to evaluate their work and have it held up for scrutiny.

Difficulties experienced by students in the workplace

Problems with soft skills such as time keeping, meeting due dates and taking initiative were some of the difficulties experienced by the novice employees. For example it was reported by an employer that novice employees do not “know what to order when the stationery runs out or the costs involved”, and a novice employee reported: “I found it difficult to talk to
directors of other companies”. In addition, novice employees found it difficult to take accurate instructions and messages, produce minutes of meetings, labels, Systems Application Programming (SAP) documentation and corporate letters to directors. Regular practice and exposure to these communication experiences in the workplace saw improvements in novice employees’ work. These views reveal that novice employees had difficulties making the transition from the higher education context to the workplace context and did not know how to put their academic knowledge into practice.

Some of the novice employees reported having difficulties with the knowledge-based technologies of some of the organisations at which they were employed. Those documents generated by software packages and SAP would not comprise the course content of communication or information administration subjects of the OMT programme, as they are specific to the companies at which they are utilised.

**Gaps in supply and demand**

The gaps in supply and demand of communication skills (refer to Table below) as experienced by students’ undergoing co-operative training, lie with the contrasting requirements of the higher education context and the workplace context. The higher education context is influenced by the educational policy, teaching methods, curricula, and assessment criteria, that require students to communicate to meet the needs of the academics and assessors. The higher education context focusses on preparing students for acquisition of learning rather than participation in learning and tends to be decontextualised.

**Table: Gaps in supply and demand**

<table>
<thead>
<tr>
<th>SUPPLY: HIGHER EDUCATION</th>
<th>DEMAND: WORKPLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning context:</strong> classrooms, library and study rooms</td>
<td><strong>Busy context:</strong> writer needs to produce writing in noisy, active context</td>
</tr>
<tr>
<td><strong>Primary focus:</strong> Acquisition of knowledge and knowledge production, students perform knowledge</td>
<td><strong>Primary focus:</strong> Business of organisation and ‘information’ sharing</td>
</tr>
<tr>
<td><strong>Discourse community:</strong> academics and students</td>
<td><strong>Discourse community:</strong> employers, staff, customers and clients</td>
</tr>
<tr>
<td>Learn generic communication skills</td>
<td>For transfer of learnt skills to the workplace</td>
</tr>
<tr>
<td>Electronic communication genres: Microsoft suite, Outlook, internet, Pastel.</td>
<td>Electronic communication genres: Microsoft suite, in-house software, online databases, SAP, MWEB, internet/electronic banking, Outlook, internet research, web page designing.</td>
</tr>
<tr>
<td><strong>Business writing:</strong> students required to produce all writing genres using computers, except for tests and class exercises</td>
<td><strong>Problems:</strong> Need more advanced Excel and basic computer knowledge</td>
</tr>
<tr>
<td><strong>Emphasis on proficiency in computer skills and electronic communication genres</strong></td>
<td><strong>Emphasis on proficiency in computer skills and electronic communication genres</strong></td>
</tr>
<tr>
<td><strong>Audience:</strong> students writing to perform knowledge for academics and not to exchange information</td>
<td><strong>Audiences evaluate writing</strong> by what is derived and understood</td>
</tr>
<tr>
<td></td>
<td><strong>Novice employees tailor writing</strong> genres to meet needs of audiences</td>
</tr>
</tbody>
</table>
Novice employees struggled to shift from using communication practices to perform knowledge for an assessor, to using communication practices as a means to exchange information with clients and colleagues. Novice employees entered the workplace with communication knowledge but lacked rhetorical, discourse and conceptual knowledge of the workplace.

OMT students learn generic communication practices but graduate students are employed in a wide variety of fields (including advertising, tourism, medical, insurance, legal, and in the general business areas). The curriculum cannot meet the specific requirements of all these fields. It would appear that while the performance of students in higher education may be good enough to meet the course requirements, these performances may not be of the standard required to meet the demands of the workplace.

The electronic communication demands of the workplace were reported by most employers to be excellent but one employer reported that “the [novice employee] was not competent in advanced Excel skills”, and another reported that “[novice employees] did not know how to solve basic computer problems, such as setting up the computer or connecting a printer”. The demand for advanced IT skills such as advanced Excel and SAP are gaps which require attention.

Conclusion

Knowledge and skills are socially constructed (Yates & Orlikowski, 2002) and the challenge confronting higher education is to maintain a balance between academic supply and the demands of the workplace. The learning of communication skills in higher education can become pedagogized and unrelated to the realities of the workplace. It is evident from the findings that a longer duration of time is required in the workplace in order for novice employees to become proficient in verbal and written communication skills.

Recommendations

The role of higher education is to train students for current and future workplace demands (Boud & Solomon, 2001; Boud & Falchikov, 2005). The future demands for life-long learning is that students be provided with exercises and opportunities for reflective thinking, critical thinking and problem-solving. Academics need to ensure that the course content is relevant to the world of work, for example the introduction of integrated work assignments, job shadowing and in-service assignments. Academics need to teach problem-solving beyond subject knowledge and to ensure that students are actively involved in assessment, including peer and self-evaluation exercises, which should be aligned with classroom practice.

Two suggestions received from novice employees related to the need for “more written work, presentations and group work” to be included in the course, and provision for additional training on telephone skills. The need for deliberate practice is central to the development of communication skills and expert performance in the workplace (Kellogg, 2008).

References


Evaluation of RPL applicants’ knowledge claims into BTech: project management

Frederika de Graaff

Introduction

Individuals with extensive experience find themselves sometimes appointed in managerial positions in the workplace, without having formal qualifications. They find themselves having acquired occupational knowledge and competence over a period of time that enables them to be successful managers within the organization or industry. Recognition of this knowledge is a necessary option for these individuals. The Recognition of Prior Learning (RPL) policy of Cape Peninsula University of Technology (CPUT) allows for admission to a BTech programme – which is at fourth year level.

This paper explores the RPL process used for access into the BTech Project Management, which is a course offered by the Department of Management at CPUT. This qualification presents the RPL assessment process with a challenge because there is no National Diploma (ND) underpinning it. It is a generic programme aimed at people from any profession who are involved in projects. This paper looks into how the academics involved in the RPL assessment, determine if the RPL applicant’s knowledge is at the level of an ND. In addition the paper analyses the performance of the RPL students in the BTech programme once the individuals have been admitted to the University. Participants in the study were six RPL applicants who successfully completed their studies during the course of the research. Three academics who lecture on the BTech also participated in the research.

This paper is part of a Master of Education (MEd) thesis looking into knowledge claims in RPL. The approach used is based on two sets of knowledge claims, namely claims made prior to the RPL applicant’s entry to Higher Education programmes and claims made after the person has become a student, as noted in Figure 1 below.
The focus of this paper is the academic interpretation of the knowledge claim. Firstly, the interpretation of the knowledge claim by the academic staff involved in the RPL assessment is addressed. Secondly, the paper deals with the knowledge claim once the RPL applicant is a student and the academic's interpretation thereof.

The methodology used is a case study. The aim of the study is to develop a deeper understanding, not to draw generalizations; therefore the focus is on the issue of knowledge claims made by the various participants in the study. The BTech in Project Management at CPUT is the frame for the “unit of analysis” (Creswell, 2007:40 and Yin, 2009:28-30) in this case study.

The findings of this paper deal with these two aspects of the knowledge claim. The paper analyses the RPL assessment for access into the BTech programme. In addition the paper draws conclusions about the interaction of the RPL students in the class and their performance on the course.

**Theoretical framework**

Various theories were used as part of the study including two RPL theories which are relevant to the analysis. Theories such as Eraunt (2004) about the learning in the workplace are used to interpret the knowledge claims made before entry into Higher Education. The concept of situational knowledge is used to discuss the knowledge in the classroom and the interaction with the RPL students.

RPL models relevant to this paper are the “Credit Exchange model” and the “Learning and Development model”. The Credit Exchange model generally requires the RPL applicant to link their knowledge to the learning outcomes and assessment criteria relevant to the level of the qualification or subjects for which recognition is sought. The credit exchange model does not attempt to develop new knowledge or convert knowledge from one form to another (Trowler, 1996:20), but if an RPL applicant claims to have certain knowledge and he/she can demonstrate this or provide evidence of this knowledge, recognition is given. A problem with this approach is that knowledge becomes invisible if it falls outside what is deemed to be pertinent to the Higher Education Institution (HEI) curriculum, especially when compared to specific subjects within a qualification. As Harris (1999:3) states, “The site of knowledge production has changed, but not what counts as knowledge.”

Recognizing knowledge in the learning and development approach requires prior knowledge to be linked to the academy in a creative and reflective manner, and provides developmental opportunities to the candidate to make the necessary links. Paul Trowler (1996:20-21) interprets the “credit exchange” and “learning and development” models as being “twin poles on a continuum”, because the latter merely provides support for the candidate endeavouring to meet the requirements for credit exchange. In this model, the RPL applicant is assisted to meet the relevant learning outcomes by a process of learning and reflection. It is often characterized by the development of a portfolio, where the RPL applicant is required to re-work and interpret his/her own knowledge about specific topics and aspects of his/her experience and to compare it with the curriculum of a level, qualification or programme against which recognition is sought (Butterworth, 1992:40, Breier, 2005:58 and Harris, 1999:4).

Project Management is part of management theory – its focus is on the completion of a specific task, for example the construction of a building, with a specific beginning and end. The major tasks of a project are planning, sequencing, co-ordinating and control (Hannagan, 1998:438). Project Management is associated with very specific phases, namely “Initiating”, “Planning”, “Executing”, “Controlling” including financial and human resources and “Closing”, respectively.
according to the Project Management Body of Knowledge (PMBOK) guide by Adams and Caldentry (2004:78). These phases are accepted worldwide by most project managers as the standard phases used in the management of any project, regardless of its size. Sometimes these phases are named differently, but the approach is the same. Software packages also use similar phases. The theoretical departure point needs to be kept in mind when analyzing the knowledge claim made, because it provides a paradigm that is common to the practice of project management.

This notion is in line with that of Bernstein: that a language has to be acquired, leading to a “gaze” within a Horizontal knowledge structure, within a particular field (Bernstein, 1999:165). Using Bernstein’s “gaze”, the importance of theory is discussed in an attempt to understand the academics’ interpretation of the RPL applicant’s Knowledge Claim.

**Before entry into Higher Education**

Before one can understand the knowledge claims of the RPL applicant, a short analysis needs to be made about the nature of learning in the workplace.

What is being learned in the workplace is broader than what obtained in higher education. It is individually focused, workplace or community based and socially orientated. Eraut (2004: 19) and Evans (2002: 88-90) list a variety of competencies that are required in the workplace, such as problem solving, task performance, use of academic knowledge in the workplace, decision making, interpersonal skills including communication and awareness of diversity, and organisational ability.

The context of learning influences what the person knows. This issue is addressed by Eraut (2004:19) who deals with the concept of “codified knowledge”, which, in the workplace, deals with an organisation’s specific information records, correspondence manuals, policy and procedures.

Eraut (2004) mentions academic knowledge as one of many competencies used in the workplace. He uses the concept of “propositional knowledge” (Eraut cited in Breier, 2008:102) which consists of discipline-based knowledge and concepts derived from bodies of coherent systematic knowledge, applied in a field of professional action and including specific propositions about particular cases, decisions and actions. A similar process is discussed by Michael Barnett (2006:144) in an interesting theory on how academic knowledge is incorporated and recontextualised into the workplace and vocational pedagogy.

Barnett (2006), looking into vocational training and vocational qualifications in the UK and drawing on the work of Basil Bernstein, has drawn interesting conclusions about different types of knowledge. Analysing vocational education, he found that it is influenced by “workplace activities” on the one hand, and by “discipline knowledge” on the other. Using the concept of “recontextualisation” from Bernstein (1999:159), which Barnett (2006:144) defines as “the appropriation and transformation of knowledge for various purposes”, he applies the concept to both academia and the workplace. I find his work applicable to RPL, because in a knowledge claim an RPL applicant’s knowledge is “recontextualised” for the purposes of the RPL assessment which is done within Higher Education.

Barnett (2006:144-146) explains that disciplinary knowledge is transformed from the primary sources to academic subjects that are studied at university. Textbooks, especially in the humanities, are constructed from multiple sources to suit the needs of a particular syllabus. This is what Barnett calls “pedagogic recontextualisation” – making disciplinary knowledge
more teachable and learnable in a particular educational context. According to Barnett, a similar process takes place in vocational education and training. Vocational education relates to “practicalities of occupations or groups of occupations which relate to bodies of knowledge that may not be occupational specific” (Barnett, 2006:145). Vocational pedagogy occupies a space between subjects and jobs, because it is influenced by workplace activities, as well as disciplinary knowledge. Using the concept of Pedagogic Recontextualisation, Barnett explains that there is a link between “vocational pedagogy” and “discipline knowledge reorganised for vocational purposes”.

Development of workplace knowledge occurs when an individual manages his or her work, makes decisions and solves problems. Barnett says that the “reclassification recontextualisation” creates a “toolbox of applicable knowledge” (Barnett, 2006:147). During the process of analyzing the knowledge claims, recontextualisation of knowledge takes place as part of the RPL assessment process. This paper analyses how “the toolbox of applicable knowledge” is interpreted by the academics when assessing the RPL application.

This concept of recontextualisation might work the other way around from what is described by Barnett (2006), who describes the process starting at the point of discipline knowledge being recontextualised. However, the RPL applicant might not have been exposed to disciplinary knowledge when the person started to work, but learnt in the workplace how to perform the jobs they are doing. This is important for the knowledge claims that I am exploring because I want to know what knowledge the RPL applicants are using to succeed in the workplace.

After entry into Higher Education

The second part of this paper focuses on the interpretation by academics of the RPL Student’s performance in class. According to Barnett (2006:145) situational knowledge associated with particular job tasks, is mainly tacit. Michelson’s (1996:147) interpretation is broader, looking at RPL as a method whereby knowledge can be acknowledged regardless of where it originates from. Both interpretations are used in this paper, because Michelson (1996) wants to use RPL to accommodate contested knowledge. Dealing with academics who are sceptical about RPL and the value of the knowledge claims of RPL applicants, one also deals with contested knowledge.

Studying the interaction between formal qualifications and informal learning in the workplace, Eraut (2004:63) found that the processes seem to be complementary to each other. Eraut (2004), with his concept of “mutual enhancement”, says that the interaction depended on the purpose and nature of the qualification, types of work and nature of the working context, where work-based learning and learning for a qualification integrate at the point of use. The use of formal knowledge based on a qualification enhances the quality of informal learning in the workplace, but at the same time, experience can be used to modify formal knowledge. He found that mature students with relevant prior knowledge and following a formal course, started thinking critically and systematically about their workplace practices with the “guidance of concepts encountered in the formal educational contexts” (Eraut 2004:63).

RPL approach at CPUT

The RPL approach used by the academics who run the BTech in Project Management programme, is portfolio, test and panel interview to determine whether an individual can be given access to the programme or not. The entry requirements state that a person applying to the programme should have a National Diploma or any three year degree or “equivalent”, as well as three years relevant work experience. The RPL assessment is based on the “equivalent” and the relevance of the work experience.
The RPL approach used by the academics in project management has been changed over the past few years. Initially only a test and a panel interview were used. The first test consisted of six questions based on a case study. The test required the candidates to indicate how they would plan and implement a project for the building of a community centre. They were asked to do the following exercises: compile a project brief, discuss the role of stakeholders, discuss the four stages of the project’s life cycle and the importance of team composition, elaborate on the important characteristics of a project manager and how to manage risk. In 2008 a numeracy section was added to the test because the academics involved were of the opinion that the RPL candidates should demonstrate an ability in numeracy.

In 2009, with the appointment of a new Head of Programme the test was changed to a computerized version that tested the candidate’s computer skills. The new Head was of the opinion that the former test was incorrect, as he felt that it had tested “theoretical knowledge and applied knowledge”. He pointed out that some of the students who apply for entry into the BTech by the normal procedure (rather than RPL), might not even know what a ‘project’ is (as defined in the RPL test). He felt it was therefore unreasonable to expect RPL candidates to know what a project is, and was of the opinion that it was more important – as he described – “to test the ability to think and rationalize, ability to write and put an argument across”.

The test was changed to include three questions. The first question has three options: expansion of a business, implementation of a software application and road expansion of a busy road. These are all project-orientated questions, but do not ask the student to apply principles of project management as was asked in the first test. The first question focuses on problem solving and logical thinking. The second question is the numeracy question used in the former test, but expanded to include a cash flow statement. The third question is about the career plans of the individual and how gaining access to the BTech Project Management would support the person’s career.

The test is followed up by a panel interview, which is very informal. The interview is used to get to know the RPL candidate. If the candidate made mistakes in the test the interview is used as an opportunity to discuss these. It has happened that candidates have corrected an answer during the interview and if they can explain why the correction has been made, it is accepted by the academics.

Over time it became apparent that this process was inadequate. It was found that some applicants did not have the academic ability to pass the test. In 2010 a portfolio of evidence was introduced, which supports the screening process. The Head of Programme developed six questions to be answered as part of a small portfolio of evidence that had to be submitted electronically before the applicant is invited to the test. The first question asks the applicant to describe his/her academic background and why it would be equal to the three year degree. The second question is about the person’s working career and the third question deals with the person’s management style. The fourth and fifth questions are linked: first the applicant is asked to explain why a BTech is a career requirement, followed by an explanation of why he/she was unable to study towards a degree or National Diploma. In conclusion the person is asked to submit evidence of the project he/she is involved in: this question gives the opportunity to determine the type/s of projects, as well as being an indication of the applicant’s position or managerial level at work.

Collection of information

Due to the nature of this researcher’s work, she is exposed to the interpretation and application of the RPL process within CPUT on a daily basis. This has facilitated the
inclusion of both direct and indirect evidence in the study. Direct evidence is in the form of
the RPL applications and the documentation generated as a result. Indirect evidence is
sourced from comments made in meetings, e-mails or by telephone. Even informal
comments made in the passage or over a cup of tea had an impact on the findings.

The documentation of the RPL assessment process is one of the main sources of
information for this study. For the knowledge claim before entering HE, the documentation
that is part of the RPL application (including CV and background information of the
applicants) was used, in addition to the test written by the applicants.

One-on-one interviews were held with three academics who lecture on the programme and
are involved in the RPL Assessment. Two sets of questions where asked: the first set of
questions deals with the RPL application itself and the motivation for the assessment
method being used. The aim of these questions was to determine what the knowledge is,
that the academics look for during the RPL assessment. In addition, the importance of
Project Management theory was discussed and the impact of workplace experience was
analyzed.

The second set of questions concerns the RPL students and their performance in the
course. Their contribution to the classroom interactions was discussed, as well as how they
were coping with academic work. The aim was to understand the academics’ interpretation
of workplace knowledge in the classroom and in the formal course. It was important to
determine if there was opportunity for the recontextualisation that Bernstein (1999) and
Barnett (2006) discuss, and if so, the extent to which that opportunity or ‘space’
accommodates both the academic and the RPL student.

Findings

The motivation for the RPL assessment is highlighted here before discussing the findings. In
the one-on-one interviews with the academics, the rationale for using a test and interview
was discussed. The Department felt that this was a fair and valid way of evaluating
applicants. According to one academic: “The test is a baseline assessment of the
candidate’s knowledge and interaction with project management in practice and in industry.”
The academic further stated that “the focus of the panel interview was to [evaluate] the
interaction of the candidate with project management on a daily basis”.

The answers by the academics did not indicate an awareness of any RPL approaches such
as the credit exchange model or the learning and development model (Harris, 1999:4). As a
department, they decided on their own approach to assessing RPL applications using a test,
because this is an assessment method with which they are familiar.

Before entry into Higher Education

The ‘importance’ of theory

The second point of discussion was the knowledge that the academics are looking for when
marking the RPL tests. Theory plays a bigger part in the assessment of the first test than the
second one.

The academic involved, explained that he was “looking for skills, i.e. budgets, knowing when
a project starts and stop[s].” When asked about the importance of theory in the first test, the
academic explained that he is not interested in theory or “in jargon like ‘Gantt Chart’”. The
answer is interesting because if one looks at the questions in the test, they do require some
background knowledge of theory. For example, the question about phases does require the applicants to indicate that they are aware of the project life cycle.

The second test was used by a different academic who is aware of this contradiction and who therefore developed the test differently. He demonstrated a deeper understanding of the importance of prior learning, for example in his statement, “In the test we are looking for numerical skills, numeric acumen, and the ability to write and put an argument across.” It is not clear from the academics what they regarded as sufficient knowledge about the project management phases included in the test. There seems to be a contradiction here: on the one hand, some background theoretical knowledge is required, but on the other hand, this is not seen as important.

The confusion deepened when the academics were asked about the importance of short courses. The short courses are being used as a screening mechanism, as pointed out by one of the academics that a student having completed short courses “indicates if the person will be able to make the transition from the workplace to the academic environment”.

Analysis of the RPL test results was confusing because no answers were being marked as incorrect, yet the test elicited quite different answers to the questions. The academics seemed to mark everything correct, although the method of results was different. The assessment criteria for the test were not clearly spelled out. Sometimes marks were allocated to the test, while other results was just given as “competent”. This situation is problematic, because there seems to be neither consistency regarding the marking of the tests, nor is moderation applied to the test results.

The question is, how is this test regarded as meeting the entry requirements of the BTech? Based on the analysis so far, there is no clear answer to the question, due to vagueness of the answers given by the academics interviewed and the contradictions found within the test. This makes interpretation of the knowledge claim difficult.

**Ability to cope in Higher Education**

The interpretation by the academics of workplace-based experience is of interest to this study. All three academics interviewed, said that they look for two things: scope and ability. One of them explained as follows: “Scope is the applicant’s ability to grasp the scope so that they can deliver a project, I am more interested in ability than theory knowledge; the applicant must be analytical in [their] thinking – that is why the numeracy skills are important.”

The workplace experience is discussed in the panel interview. It is an opportunity to find out how many projects the RPL candidate is involved in, the size of the projects, and how many people they coordinate. Sometimes lecturers will know people with whom the RPL candidates work, and the interview is used to check truthfulness in this regard. The interview is also used to discuss the interpretations of Project Management, and what is seen as a project, within the context of the candidate’s workplace. From the various panel interviews held by the department (– panels on which the academics sit), it has become clear that the broader the managerial experience, the better. One of the academics reflecting on one RPL candidate, commented: “Being more mature, having five to ten years of what they have been up to, they usually come in and fly!”

The emphasis that these academics placed on the ability to cope with studies at the level of NQF 7, is most interesting. The impression was created that they regarded the completion of short courses as very important. But during the interviews, emphasis was placed on academic acumen and the ability to study. I recognised that this approach is in line with that of Shalem and Steinberg (2006:101), who indicate that RPL assessment includes “a
prospective and a retrospective action”. The academics need to be “retrospective” and look at knowledge that they can recognise. At the same time, the academics are being “prospective”, because they want to be able to explain why the person will cope with studies at the level of NQF 7.

If theory is not that important, which seems to be the approach of the academics, it is in line with the SAQA definition of RPL. The SAQA Act 58 of 1995 (SAQA, 2002:7) describes RPL as: “Recognition of prior learning means the comparison of the previous learning and experience of a learner howsoever obtained against the learning outcomes required for a specified qualification, and the acceptance for purposes of qualification of that which meets the requirements”. The academics give the applicants opportunity to demonstrate their knowledge “howsoever obtained”.

The RPL test and interview as the RPL assessment, provides a space for the applicants to substantiate their knowledge claim. What knowledge do they present? The RPL applicants have learnt how to run and manage a project of reasonable size in the workplace through adhering to organisation systems and procedure, learning from others and attending short courses. The fusion of all this knowledge is now presented as part of the knowledge claim for entry in the BTech in Project Management. Do the knowledge claims of the applicants’ measure up against the academics’ assessment? This question is difficult to answer because the assessment criteria are not clear. The concept of “equivalence” as it is part of the entry requirements has not been elucidated due to the RPL process. What has become clear, is that the academics seem to be more concerned about the RPL applicant’s ability to cope with studies at fourth year level than about the knowledge they already have.

**After entry into Higher Education**

The academics involved in the RPL assessment also lecture on the BTech programme. The question of knowledge claim after entry into higher education is how they interpreted the RPL students’ performance on the course and their interaction in the class.

*Interaction in the class*

The six students who participated in the study attended the part-time classes for Project Management which has a total of 70 students, which is a relatively big class. The students have all graduated since the start of the study.

Due to the size of the class, keeping track of the RPL students was not done formally. Informally, the academics commented that “the RPL students were not dropping out, but the others are!” and, “the RPL students are better than the others!” - indicating that they do monitor the RPL students informally.

The academics were asked if the RPL students were experiencing problems (as students), and indicated that the problems experienced were the same for other students – and thus did not apply to the RPL students only. The academics pointed out that the majority of students in the part-time class had not studied for some time and all struggled to get into “the academic swing of things”. What is interesting is that the students seemed to cope after a while, although no formal support is provided by CPUT to part-time students.

Talking about the participation of the RPL students in the class, academics commented that the RPL students “are impressive guys – a pleasure to have them in the class”. Having RPL students and students with work experience in the class was beneficial for everyone – to them as the academics and to the other students in the class. One of the academics mentioned that they have debates “between industry and Government [employees]”. In this way the class becomes a learning space for everyone.
Interpretation of workplace knowledge in academia

Talking about the assignments that the students are required to do, one academic commented that “their work experience gives them an edge”, because they use their work experience in group assignments. He said that “one can say they have ‘cloned’ their work for the group assignments to a certain extent” because the figures they present are realistic, legal requirements are correct and the project is developed realistically – the requirements for the workforce have thus been met. Another academic pointed out that the type of projects in which they are involved, influences the assignment they submit, with “a better expanded view of a project”.

The academics were asked if they thought that the RPL students had any views about Project Management that were either affirmed or challenged during the course. The academics did not think so, and added that the opinions of the RPL students were no different to those of a student with a National Diploma or a BTech: “What they have done in industry has pointed them in the same direction”. This comment contributed to the findings that the RPL process is valid and that therefore knowledge claims made by the RPL applicants should be acknowledged by CPUT.

It is interesting to see how the academics embraced the students’ experience and knowledge from the workplace. Focusing on realistic projects and referring to some of the assignments, they supported the use of workplace-based knowledge in the assignments, and provided space to use workplace knowledge. The RPL students supported this approach (unknowingly) through their experience and practical knowledge.

This appreciation of workplace knowledge is in line with the concept of situational knowledge. The academics’ interpretation is in line with Michelson’s (1996) approach that knowledge can originate from anywhere, as well as Barnett’s (2006) approach that knowledge can be associated with particular tasks.

What counts as knowledge? In their interviews, the academics placed emphasis on cognitive skills, theory, experience, workplace-based learning and maturity. The question now arises, what knowledge is this? Or is it only about an ability to cope with studies in Higher Education? What role does recontextualisation play in this process? Recontextualisation does take place for the RPL students, to their own benefit as well as that of the learning process in the classroom.

The “toolbox of applicable knowledge” (Barnett, 2006) seems to be appreciated in the classroom and in the assignments given by the academics. This is not the case in the curriculum, which is a set framework with little flexibility to include workplace knowledge. In some of the assignments analysed in this study, space is not always provided for Project Management knowledge to be applied. The Strategic Management 4 assignment is such an example, being about corporate companies. In this assignment the students were required to apply specific templates to corporate companies. The assignment did not deal with projects at all. This situation does not provide the opportunity for the RPL student (or any mature students with work experience), to apply workplace knowledge in the academic environment.

Academic results

All six students who participated in the study graduated during the course of the research. Their course results were analysed and show that two students got distinctions. Compared to the class averages, the results varied for study participants: two students were above the class average, while one was below class average. The remaining three students were on par with the class average.

The nature of their work and the students’ results were other aspects to be considered. Four of them, including the top two students, worked for Government and were not involved in the
execution of projects. The results of those who were involved in executing projects, were within the class average. The nature of these students' work, therefore, did not seem to influence their course results.

**Knowledge claims: a conclusion**

Having analysed the findings, the conclusion can be drawn that the knowledge claims before entry into Higher Education, are interpreted differently to the knowledge claims made after entry into Higher Education.

**Before entry into Higher Education**

CPUT has an RPL policy which is being implemented. The Management Department has developed its own method of assessment which is not explicitly linked to any specific RPL model. Emphasis is placed on the ability to cope in Higher Education rather than to use a learning and developmental approach (Harris, 1999:4). If the department did use a learning and developmental approach, an opportunity would be created to prepare the RPL candidate for both the RPL assessment and the studies within Higher Education.

The knowledge claims made during RPL application is valid, based on the fact that the RPL students are passing the course - they are doing well academically. One can conclude that the assessment process enables the department to select RPL applicants who will pass the course, and in some cases achieve high marks.

**After entry into Higher Education**

Once the RPL students were on the programme they used their work experience extensively in the classroom, and to a lesser degree in assignments and exams. The assignments were described as “realistic” by the academics.

In Higher Education, the RPL students struggle with academic language, writing skills and research, but these problems are not unique to RPL students. These problems seem to be overcome after the first semester of study. The knowledge of the RPL applicants prior to entering higher education and the knowledge that develops once they participate in the BTech in Project Management interact and resonate with each other. It is a matter of ‘cross-pollination’ – they both support and enrich each other. This reflects what Eraut (2002:63) called “mutual enhancement”.

Listening to the academics, I have developed a sense that the University is being enriched too, although to a limited extent, by practical experience and knowledge from the workplace. The influence of the RPL students’ knowledge within Higher Education is limited to the classroom and the academic who is willing to give it space. Workplace knowledge may not influence all the subjects, as was discussed in the analysis on the assignment for Strategic Management 4.

RPL is seen as something outside of academia. Knowledge seems to be acknowledged from various sites and origins as part of the RPL application in line with Michelson’s (1996) concept of Situational Knowledge. Once the knowledge holder is within Higher Education, the knowledge is expected to fit into the academic framework. There is little space to use and apply the knowledge outside of academia.

There is no opportunity for the knowledge to influence the curriculum. “Gaze” described by Bernstein (1999) does seem to be present, especially during the RPL application itself, and also in the classroom. It is not clear to what extent the “gaze” influences the development of
assignments or even the curriculum. One of the academics pointed out that the BTech Project Management is a course “based on the application of theory in the workplace”. The RPL process should influence the process the other way around, using workplace knowledge to influence theory.

The development of the Higher Education Qualification Framework (HEQF) is an opportunity for both RPL and the inclusion of “contested knowledge” (Michelson, 1996). The recurriculation process that is being undertaken especially with the Universities of Technology, provides academic staff with an opportunity to reflect on how RPL will be implemented within their respective fields. In addition, the development of the HEQF can provide an opportunity for knowledge from the workplace to be included in the curriculum. If this opportunity is used, situational knowledge can be used to broaden the basis from which the knowledge originates.

References


Learning at “frikking four in the morning”: Using Facebook and Blogs to enhance student engagement

Eunice Ivala, Daniela Gachago

Introduction

Universities in South Africa continue to experience low levels of student success and poor throughput rates (Scott, Yeld & Hendry, 2007; Strydom, Mentz & Kuh, 2010). To address these issues, university teachers need to explore innovative ways of teaching and learning, particularly ways that promote student engagement. International research shows that student engagement can help to enhance student learning and other desired outcomes as well as the efficiency and effectiveness of higher education systems (Strydom et al., 2010; Kuh, 2009; McGarity & Butts, 1984; Sandholtz, Ringstaff & Dwyer, 1994). Student engagement in this article is defined as the amount of physical and psychological energy that a student devotes to the academic experience (Astin, 1984). Indicators of student engagement include taking initiative, self-motivation, independent experimentation, spontaneous collaboration and peer coaching, and enthusiasm or frustration (Sandholtz et al., 1994). The study investigated the potential of Facebook and blogs as an innovative way of promoting student levels of engagement in learning.

Literature review

Research on student engagement

A large number of international research studies on college student development shows that the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development (Astin, 1993; Kuh, 2009; McGarity & Butts, 1984; Pascarella & Terenzini, 1991; Pace, 1980; Sandholtz et al., 1994). In South Africa, there is a growing body of research on student engagement (Strydom et al., Mentz & Kuh, 2010; Ivala & Kioko, 2009) encouraged by the South African Survey of Students Engagement (SASSE) commissioned by the Council for Higher Education and carried out nationally in 2009 (Strydom et al., 2010). Results of these studies are being used to develop context-specific interventions that can help improve student engagement and further improve the conditions required for student success. The investigation of the potential of Facebook and blogs to enhance student engagement is one such intervention. An overview of what these technologies can offer for teaching and learning is provided in the subsequent section.

Facebook and blogs for enhancing student engagement

Facebook attracts and supports networks of people and facilitates connections between them (McLoughlin & Lee, 2007). Facebook is a representative of what Gee (2004) calls affinity spaces, where people acquire social and communicative skills, and at the same time become engaged in the participatory culture of Web 2.0. In these spaces, youth engage in
informal learning, and creative, expressive forms of behaviour. Facebook has also been used for formal learning with academics setting up open or private groups for classroom practices (Minocha, 2009). In this regard, Facebook can be used to improve communication between students and lecturers and provide a forum where the lecturer can answer any academic questions, offering an open-ended way of consulting which may produce interesting or unanticipated points of view that other approaches may not pick up; and consultation which reaches students who may not normally have got involved in giving feedback (Minocha, 2009).

Functioning as an online journal, blogs can be written by one person or a group of contributors (Minocha, 2009). They are noted for being the unedited, published voice of the people (Ferding & Trammell, 2004). Through the use of blogs, academics have the opportunity to make material accessible for subsequent reflection and analysis, allowing students to revisit and revise their artefacts, thus enriching the learning experience. Publishing students’ creative work and the fact that blogs can be commented on, offers the opportunity for feedback, which in turn, scaffolds a learner in his/her quest for knowledge construction (Ferding & Trammell, 2004).

Although there is evidence of the potential of Facebook and blogs in teaching and learning, there is currently little published empirical research on use of these tools for enhancing student engagement internationally, including within Africa. Studies that exist stem largely from fields outside education such as sociology, anthropology and communication studies (Greenhow, Robella & Hughes, 2009; Bosch, 2009). However, research that exists in the field of education shows that students use social media such as Facebook and blogs in their everyday lives and believe that more use of such technologies in academic contexts would lead to increased preparation and engagement (DeGennaro, 2008; Lenhart et al., 2008; Rambe, 2009; Solomon & Schrum, 2007; Spire, Lee, Turner & Johnson, 2008). Yet, most evidence indicates that university teachers have not utilized these technologies to the same extent as students have. This implies that students live in separate realities from those of their teachers, who are typically not motivated or rewarded by institutional incentives to change their practice (McGee & Diaz, 2007). Some university teachers assume that students’ online social activities are devoid of substantive intellectual activity and distract students from academic activity. As result, many universities block the use of social networking sites (Bosch, 2009), especially Facebook, in their institutions. Contrary to this assumption, the researchers in this study confirm the National School Boards Association’s (2007) findings that student activities on some social networks sites do involve education and learning, although we acknowledge that further research on the potential of Facebook and blogs in enhancing student engagement is required.

Theoretical Framework

This study was informed by a learning ecology perspective (Barron, 2006; Bronfenbrenner, Kessel, Kessen & White, 1986) which is based on socio-cultural, activity and situated learning theories (Cole, 1996; Engeström, 1987; Greeno, 1989; Vygotsky, 1978). The notion of a learning ecology suggests that:

- Individuals are simultaneously involved in many settings (in this case, they can be simultaneously involved in academic and social activities);
- Individuals create learning contexts for themselves within and across settings (e.g. students engage in academic activities on-campus and off-campus);
- The boundaries among settings can be permeable (e.g. academic activities started on- campus permeate the students’ contexts off-campus and vice versa); and
- Interest-driven activities can span contextual boundaries and be self-sustaining given adequate time, freedom, and resources (Barron 2006) (- in this case, an activity
students are interested in, such as Facebook, can transfer from a social context to an academic context and vice versa).

The learning ecology framework aids in better understanding how learning outside university relates to learning within universities or other formal organizations, and how learning in university can lead to learning activities outside of university. This is vital because a better understanding of how learning takes place across settings, and of the possible synergies and barriers between them, may help educators find ways to supplement university-based opportunities. The framework helped the researchers in this study in investigating whether the use of Facebook and blogs in teaching and learning promoted student engagement with academic materials from the initiatives of the learner and his or her companions across time and settings. According to the ecology framework, the self-initiated processes of learning that take place across contexts are new opportunities for activity and knowledge-building relationships, and for the pursuit of learning resources that are found outside the primary learning settings (such as the university). The framework suggests that interest in learning may originate within and outside the university and that students have a significant role to play in sustaining their own development and learning (Barron, 2006). This notion played a vital role in the researchers’ attempt to understand the potential of Facebook and blogs in enhancing student engagement with their studies on- and off-campus.

Research methods

To gather data for this study, the researchers investigated the use of Facebook and blogs in three courses at a South African university of technology: i) first year students in an engineering discipline taking a course in communication, ii) third year Design students, and iii) fourth year Design students and their respective lecturers. In-depth interviews were conducted with the three lecturers whose teaching included using Facebook and blogs; and two focus group interviews per course were carried out with students, comprising an average of six students per focus group. Document review was done on literature in the subject under investigation to ascertain the kind of research that exists and the gaps that would inform the direction of the current study. Facebook walls and blog postings were analyzed to investigate the learning activities students engaged with and the context (within university or outside of the university), in which the students used the technology. All interviews were recorded on tape and transcribed verbatim for analysis. Data analysis focused on the identification of conceptual themes and issues emerging from the data, using techniques such as clustering, and making contrasts and comparisons (Miles & Huberman, 1994).

In the next section, we present the findings and discussion on how the lecturers and students participating in this study used Facebook and blogs for teaching and learning, the contexts of usage, challenges encountered in usage, and whether these technologies enhanced student engagement with their learning. For clarity, lecturers and students will be referred to as Engineering lecturer and students, Design 3 (third year) lecturer and students and Design 4 (fourth year) lecturer and students.

Results and discussion

Usage of Facebook and blogs for teaching and learning

Findings showed that all the lecturers utilized Facebook groups and class blogs as a supplementary, teaching and learning resource to face-to-face teaching. The purpose of utilizing Facebook groups and blogs for teaching and learning varied from lecturer to lecturer. For instance, the Engineering lecturer used a blog to motivate students to read, to initiate dialogue and to develop students’ writing skills by posting a story written collaboratively by staff and students, in monthly instalments. The story focused on an
interracial relationship set within Cape Town, South Africa, a topic discussed in one of the face-to-face conversation classes. Students were supposed to comment and to voluntarily write individual chapters of the story. In this course, a Facebook group was employed as a forum for students to continue discussions on the issues discussed in the face-to-face conversation class and for the lecturer to send information to students in the form of updates on the blog.

The Design 3 lecturer used a blog as a course management tool. In the process of using the blog, the students asked the lecturer to duplicate all the resources in the blog into a Facebook group. Results showed that unlike the blog which promoted one way communication from the lecturer to the students, the Facebook group promoted interactive student discussion.

The Design 4 lecturer designed a class blog for information sharing, encouraging a sense of belonging and peer learning. In addition, students set up their own blogs which acted as an online portfolio for reflecting on their learning over the four weeks of industry internship. These blogs fed information to the lecturer on the students’ experiences during the internship which the lecturer in turn fed back to respective employers to improve the internship. Students also shared their experiences with each other through the blogs and marketed themselves to prospective employers.

The above results indicate that Facebook and blogs can offer an alternative way of organizing learning opportunities in order to encourage students to participate and benefit from such activities (Kuh et al., 2005). Additionally, the findings also support Minocha’s (2009) argument that Facebook and blogs can be used for formal learning.

With regard to sites of use, all the lecturers and most of the students accessed Facebook groups and blogs both on-campus during available time and off-campus. The students accessed the applications on-campus in their dedicated computer laboratory and in their residences, while most of the student access off-campus was at home, through their cell phones.

These results concur with the learning ecology perspective notion that individuals create learning contexts for themselves within and across settings (Barron, 2006). Learning on campus can lead to learning activities outside of the university, and the boundaries between settings can be permeable. Additionally, the results confirm Pearce’s (2010) argument that in many developing countries, the main form of internet access is from cell phones; this can explain the increased use of mobile technology to promote student interaction and greater engagement with the learning materials.

Lecturers’ and students’ perceptions on the usage of blogs for teaching and learning

Since blogs were used for different reasons in the various courses, feedback from lecturers on the usefulness of blogs for teaching and learning differed from course to course. The Engineering lecturer reported that the blog enabled her to model good writing style and empowered students to be comfortable with English. The students pointed out that the blog helped them improve their reading pace and communication, and brought understanding, cohesion and appreciation of different races and cultures. One of the Engineering students stated:

A: “I just think it basically help us understand one another better and teaches us, slightly teaches us on how certain people are doing certain things ja...it just teaches us socially. It teaches how to appreciate one another, just put it like that.”
The Design 4 lecturer revealed that the lecturer blog was useful in that it served as a platform for pointing students towards innovation and good practice in the particular field of practice, and served as a link to the sites where students had been placed. The student blogs gave students an opportunity to reflect on and track the process and progress of their internships. The students further indicated that they used their blogs for marketing themselves.

Despite the expressed usefulness of the blog for enhancing teaching and learning, both students and lecturers asserted that the class blogs served more as a one-way communication channel from the lecturer to the students as very few students commented on the postings. The few students who commented on the class blogs and the Design 4 students who had to create their own blogs, indicated that it gave them the opportunity to create content and express their ideas. Two students commented:

Engineering student E: “… you get to commenting and say now you comment on that thing and someone’s comments assist with yours and they agree on something and you are actually communicating with each other. …it is my first time to go through this stuff and I start enjoying commenting and writing stories…”

Design 4 student A: “The idea of one’s blog was quite exciting… I mean essentially it’s promoting your thoughts, your opinions, your works…”

The above results show that students were engaged in content creation through self-initiated learning processes and that students played a significant role in sustaining their own learning (Barron, 2006).

Both lecturers and students participating in the study indicated that the use of the blogs in teaching and learning enhanced student interactions with one another. The following quote from an Engineering student could be taken to speak for them all:

A: “…there are some guys who are so enthusiastic about the story…they come to the cafeteria, they want to talk about the story…some guys, it’s all what they want to talk about..what will happen next …”

The lecturers opined that shy student participation in course activities were enhanced through the use of the blog:

Design 4 lecturer: “[There is] this quite shy girl, a returning student…she never really participated in class, never said a lot…and yet she created this blog and named it after her childhood imaginary friend called Lisa…which is quite revealing, I thought, and quite a brave thing to do…”

Students made the point that the use of blogs did not change the participation of shy students in course activities substantially even on the course where students were expected to create their own blogs. One Design 4 students explained:

A: “…those who are more vocal in class were more active on the blog, I think about this one guy that we are friends with... he wasn’t more active... he’s quite an introvert, he doesn’t speak much and it’s always the same with his blog... so …his posts were very limited, blunt, short…”

From the above responses on the usefulness of blogs for enhancing teaching and learning, the researchers suggest that blogs enhance student engagement in learning by promoting
interactivity (such as the sharing of ideas and information); providing opportunities for active
learning and creation of content; and to a certain extent, peer-to-peer learning.

**Lecturer and student perceptions on the usage of Facebook for teaching and learning**

Of the two Facebook groups that were part of this study, only the Design 3 group integrated
their Facebook group into their formal learning activities. Their lecturer indicated that
Facebook groups enhanced teaching and learning by acting as an information repository for
the students and improving communication between the lecturer and students. The students
felt that Facebook groups helped them access academic and moral support from their
lecturers and peers and improved the quality of their projects through feedback from
students and lecturers, as evidenced in the following selected quotes from Design 3
students:

A: “I will say it created that relationship with the lecturers so I believe after this whole
Facebook thing I understand like my lecturers better than I thought, you know... I am
free like to chat to them….it created that.”

B: “The thing is, just coming back to the whole communication that you actually
...know your fellow students….actually you can go to for advice…not just highlighting
the top students in the class...gaining confidence in your fellow students not just
asking [the lecturer] all the time.”

Both the Design 3 lecturer and her students indicated that Facebook groups enabled
students to create content through their discussions with the lecturer and fellow students and
this resulted in students creating their own groups for other projects.

Students reported that Facebook was an integral part of their everyday life, appreciated
Facebook’s ease of access and the more mature Design 3 students saw no separation
between their private and academic lives, as shown in the following quotes:

H:“…we just use Facebook most of the time because most of us are on it anyway for
social, so it will just, when there is a notification or a brief it will pop up in your
newsfeed while you are busy socializing, you’re always up to date…”

F: “... sometimes lecturers forget often and its human nature to forget about giving us
work or something which is needed probably for the next day or for the weekend and
maybe she will remember only to give to us maybe the night...then she will post it,
post it like on Facebook for us, 10:00 at night and most of us are awake till frikking
4:00 the morning...its perfect.”

However, the Facebook group set up by the Engineering lecturer was not successfully used
for academic activities as students resented the invasion of their private lives by the lecturer.

A: “I think students feel that’s their personal space away from class, that’s how I
feel...I don't want it to be forced on me, that I have to go read there, I have to join this
group….this is my personal space, I don’t want to be forced to do something
personal.”

Based on the above findings on the use of Facebook groups, the researchers conclude that
Facebook groups have the potential of enhancing student levels of engagement in learning
through its promotion of improved interaction and communication between lecturers and
students and vice versa, providing a space where members of a group can discuss and
share their success and challenges, offering opportunities for active learning and an open-ended forum for student consultation.

In summary, the researchers concluded that the use of Facebook groups and blogs in teaching and learning enables students to spend more time on their study subjects which may lead to deeper understanding of what they are learning (Kuh, 2009) and may promote student retention (Doneen, 2010). Furthermore the use of Facebook, especially by the mature students who saw no separation of academic and their social lives, supports the four notions of the learning ecology perspective (Barron, 2006).

Challenges encountered in the use of Facebook and blogs for teaching and learning

While the usefulness of Facebook groups and blogs for enhancing student engagement with their studies is demonstrated in this study, their use was met with several challenges:

- Students are disadvantaged by the paucity of computer facilities compounded with the blocking of Facebook in some computer laboratories and the library, as well as insufficient internet quotas, especially for first year students who are given 50 megabytes per month.
- Lecturers had time constraints in regard to updating and visiting the class blogs as regularly as they would have wished and had the challenge of encouraging all students to participate in the blog as participation was not compulsory. Students' workload influenced the voluntary participation on the blogs,
- Distraction of students from academic activities by use of Facebook was reported amongst the first year Engineering students.
- Blurring of social and academic life: the first year Engineering students in particular, resented the lecturer's intrusion online into what they perceived as their private social space (Facebook). However, more mature students such as the third year Architectural Design, saw no need to separate their social and academic lives.

Strategies for using social media in teaching and learning

Based on the researchers’ experience with teaching and research on the use of technology in teaching and learning, and insights from the lecturers who participated in this study, certain strategies are suggested for implementing Facebook and blogs in teaching and learning in order to have a positive impact on student levels of engagement in learning.

The integration of Facebook and blogs in teaching and learning should be implemented as supplementary material or for creative use. Supplementary materials in the form of additional materials may broaden or deepen students' understanding by providing alternative perspectives, or enable further deeper exploration of topics. Adoption for creative use enables students to become more engaged in learning through constructing knowledge rather than receiving it. Lecturers should embed the use of Facebook and blogs in their teaching into the larger curricular framework and not see the use of technology as another tool to fit into an already full curriculum.

Academics wishing to explore new technologies should clearly define objectives for using Facebook and blogs and involve students from the onset in choosing the appropriate technology. Student involvement and feedback will ensure students' uptake of and engagement with the technology. Lecturers should not dominate the discussion, but let students own the Facebook or blog platform as this may enhance student participation.

Academics who wish to integrate Facebook and blogs in their teaching should also engage in collaboration with the students to outline Facebook and blog etiquette (such as privacy issues and the question of befriending lecturers on Facebook, or the academic authority of
blog postings). The involvement of students on drawing up the etiquette ensures that the students have ownership of the learning space and respect the rules of engagement.

For a wider adoption of Facebook and blogs in teaching and learning, academics who are champions should share their experiences and insights with colleagues, create training materials and provide training, which should encourage his/her colleagues to adopt these technologies.

**Conclusion**

The findings of this study highlight the potential of Facebook and blogs in enhancing student engagement in learning both on- and off-campus. The paper suggests that technologies in the students' everyday life, such as Facebook enhanced by cell phones, should be utilized in higher education to promote student interaction and greater engagement with learning materials. This increased engagement could lead to improved performance and student retention.

**References**


Greenhow, C., Robelia, B. and Hughes, J.E., 2009. Learning, Teaching, and Technology in a digital age: Web 2.0 and classroom research: what path should we take now? [online] Available at: http://edr.sagepub.com/cgi/content/abstract/38/4/246.


Ivala, E. and Kioko, J., 2009. Student levels of engagement in learning: a case study of Cape Peninsula University of Technology. Paper delivered at the HELTASA Conference, University of Johannesburg, November 2009, RSA.


Transforming assessments: an investigation into the assessment strategy for Commercial Law for Accountants I

Noleen Leach

Introduction

Over the past decade a transformation has occurred in higher education and alternative methods of assessment have evolved. Many institutions of higher learning are no longer only engaged in assessment of learning but also assessment for learning. Coll, Rochera, Mayordomo and Naranjo (2007) acknowledge “the need for the use of evaluation for pedagogical ends, without necessarily overlooking or undervaluing the importance of final credentials.”

Therefore, adding a developmental component to assessments meant that students are now encouraged to be “active agents in their own learning” (Boud and Falchikov, 2005). No longer can students be regarded as passive recipients of knowledge to be imparted by a teacher. This was the rationale behind the design of the 2007 assessment schedule for Commercial Law for Accountants 1, which was a “multiple point summative assessment model” consisting of formative as well as summative assessments.

However, during the harmonisation process in 2008, the subject reverted to an assessment schedule consisting of summative assessments (tests) only. A comparison of the overall results of 2007 and 2008 showed a decrease of 11,4% in the pass rate for Commercial Law 1. The average final mark has dropped from 51,9% in 2007 to 48,74% in 2008. The significance of this drop in the average final mark is not so much reflected in the 3,16% by which it has dropped but by the fact that the final mark for the average student in Commercial law 1 now constituted a fail.

A range of factors could have been responsible for the drop in the pass rate as well as the average final mark. However, “assessment is considered to be a fundamental by which the teacher can regulate his or her teaching activity along the way and by which the student can regulate his or her own learning process.” (Coll et al., 2007). Therefore, if you want to “change learning, you have to “change assessments” (Brown, 2001). This investigation therefore focused on the assessment strategy.

The 2007 assessment strategy was designed to be student centred in that the progress of the student, through continuous assessment, constantly informed the lecturer as to the need for and the nature of the interventions. More emphasis was placed on the developmental part of assessments and this required a high level of student involvement in their own learning. An integrated approach was followed whereby assessment and learning activities were in dynamic interaction with each other. The diagram below illustrates that process:
The ultimate goal of the formative assessments (open book WebCT tests and tutorials), was to 'level the playing field' for the diverse population making up the student body before the first summative assessment. This meant that, ideally, the opportunity had to be provided for each student to acquire the necessary skills to meet the standard of the summative assessments.

The weekly WebCT tests are computer based and consist of multiple choice questions. This form of formative assessment has been chosen for its “usefulness for self-assessment and screening, its high reliability, validity and manageability and its potential to assess a wide range of knowledge quickly” (Brown, 2001). These tests have two main objectives. They had to create the opportunity for students to acquire the factual knowledge of the subject by compelling students to read up on this content before lectures, and, in so doing, prepare for lectures. Secondly, these tests had to determine the focus of lectures to enable lecturers to prepare their classroom activities from an informed position.

Tutorials, on the other hand, were selected for their potential to measure application of knowledge, analysis, problem-solving and evaluation skills. They also had two main objectives, namely to serve as a formative as well as a summative assessment for these skills. It was therefore intended to be a diagnostic tool to determine the need for and the nature of intervention.
Summative assessments (tests) were designed to determine whether the student has mastered the range of skills required at NQF level 5 and were set in strict compliance with the institutional guidelines.

The 2007 assessment schedule was therefore repeated in 2009 to determine whether it was fit for purpose. This meant that firstly, the assessments had to meet the essential criteria of fairness, reliability and validity; and secondly, the results from these assessments had to inform the teaching and learning strategy.

The fairness of assessments is determined by whether the student has been sufficiently prepared, whether the assessment has been set at the appropriate level and whether it is unbiased. The reliability of the assessment is determined by strict adherence to the same criteria when marking students’ efforts and an assessment is regarded as valid when one or more of the intended outcomes are assessed (Fundani, 2009). The validity and reliability of the assessments are mainly ensured by the institutional quality assurance process, to which there was strict adherence.

Although this project aimed to evaluate the assessment strategy to determine whether it was fit for purpose using the above terms of reference, this paper will only report on two aspects: i) whether the assessments met the key element of fairness, and ii) whether they informed the teaching and learning strategy.

Methodology

This is an exploratory study using a cross-sectional research design surveying students registered for the subject as well as subject lecturers.

Two sets of questionnaires were designed, one for the students and another for the subject lecturers. The purpose of the questionnaires was to determine whether, in the opinion of these stakeholders, the assessments met the key elements of fairness, validity and reliability and whether the assessments informed the teaching and learning strategy in the subject. It therefore contained both structured as well as open-ended questions which allowed for the collection of quantitative as well as qualitative data.

Both questionnaires contain the same themes which are as follows:
Preparation on the part of the lecturer and the students, the degree of complexity of the assessments, the assessment criteria, management of the assessments, appropriateness of the design/form of the assessment, feedback and recommendations.
A theme added to the lecturer’s questionnaire, was alignment to specific outcomes and CCFOs. The questionnaires examined each assessment type along the above themes.

The target population spanned three campuses and consisted of all students who were registered for the subject, as well as all subject lecturers. Participation in the survey was voluntary and the questionnaires were self-administered. The target population and final sample are reflected in Table 1 below.

Table 1: Target population and final sample

<table>
<thead>
<tr>
<th>CATEGORY OF PERSONS</th>
<th>TARGET POPULATION</th>
<th>FINAL SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>711</td>
<td>360</td>
</tr>
<tr>
<td>Lecturers</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Although the purpose of the project was to implement the assessment strategy and have it evaluated by stakeholders, it was subsequently discovered that the assessment schedule...
was not harmonised as all subject lecturers did not comply with it. This provided the opportunity for a comparison between the results of the groups where the lecturers were compliant with the assessment schedule (compliant groups) and those where the lecturer was not (non-compliant groups). All lecturers who participated in the survey were compliant with the assessment schedule.

**Results and discussion**

The results are presented along three broad themes: i) preparation of the student for the assessment, ii) appropriateness of the level of the assessment, and iii) appropriateness of the form of assessment. Bias, or the lack of it, was not specifically addressed, but is inferred from the management of the tutorials. The discussion on whether the assessment informed the teaching and learning strategy and lecturer’s responses are integrated under the various types of assessment. Each type of assessment is addressed in turn.

**Preparation**

**Formative assessments (open-book)**

Formative assessments consisted of weekly WebCT tests and tutorials. These tests are part of the student’s independent learning and the lecturer simply had to inform students of the schedule of tests, explain what preparation for these tests entails and stress its importance within the broader assessment strategy.

Preparation of the students for formal tutorials entails managing your classroom activities in such a way that tutorials could serve as preparation for the summative assessments as well as a diagnostic tool to determine the student’s readiness for the summative assessments. Preparation for tutorials was not specifically addressed in the questionnaire. This was inferred from the enquiry into preparation for the summative assessments (Figures 5 and 6). It is therefore inferred from those results that the majority of students felt that the lecturers prepared them adequately for tutorials.

Moreover, formal tutorials have a weight bearing status of 15%, and, like in the case of the weekly WebCT tests, students have to be informed of the schedule of tutorials, its importance within the broader assessment strategy and what their preparation for these tutorials entails. Students were therefore asked whether they have been informed by their lecturer of the weekly WebCT tests and the tutorials.

The overwhelming majority of students in the full sample claimed that they were informed by their lecturer of the weekly WebCT tests and tutorials that they had to complete (Figures 2 and 3). However, a comparison between compliant and non-compliant groups shows a distinct difference in the responses for the weekly WebCT test (Figure 2). The results of the compliant groups correlate well with the full sample. The results of the non-compliant group, however, show that a slight majority (55%) claimed to have been informed and a substantial percentage of students (42%) claimed not to have been informed.
All participating lecturers indicated that they had informed students of the weekly WebCT tests. The record of results on blackboard supports this claim as the overwhelming majority of students in these groups completed the tests as scheduled. The same record shows sporadic attempts at these tests from the second term onwards by individual students in the non-compliant groups.

Where students had been informed of weekly WebCT test, the opportunity was created for them to acquire the factual knowledge of the subject independently, to prepare for lectures and, bearing in mind the 5% weight bearing status of these tests, score marks. Moreover, where students made use of this opportunity, the results had the potential to inform lecturers as to classroom activities that would be suitable for their students. Failure on the part of the lecturer to inform students of these tests denied them that opportunity and failure on the part of the student to complete these tests denied lecturers the opportunity to plan their classroom activities from an informed position.

The results for the response to the tutorials seem to correlate well in both the compliant as
well as the non-compliant groups (Figure 3).

Tutorials also have a weight bearing status of 15% and its purpose makes it a pivotal feature in the teaching and learning process. Failure on the part of the lecturer to inform students of tutorials and failure on the part of the student to complete them may prove to be fatal to the student's progress in the subject.

**Summative assessments (WebCT test and written test)**

The focus of the project was mainly on the developmental aspects of assessment, in other words, the formative assessments. These assessments formed part of the preparation of the students for the summative assessments. The group presentations as a summative assessment would thus be excluded from the discussion.

The WebCT test was decided upon as a compromise during the harmonisation process, as summative assessments on one campus consisted of written tests and presentations, and on the other campuses of WebCT tests only. This test was nevertheless set at NQF level 5.

The written test was the final summative assessment. It assessed the content of a series of integrated units and addressed specific outcomes as well as critical cross field outcomes identified in the subject guide. It further assessed the whole range of skills across Bloom's taxonomy and was designed to determine whether students are competent to move on to the next level, that is, Commercial Law 2A.

Preparing the students for the tests entailed, amongst others, having the lecturer explaining the work to students, dealing with various case studies in the class, focusing on specific outcomes in the subject guide, giving timeous feedback on formative assessments and having lectures regularly.

Lecturers further had to tailor these activities to the needs of the students. The results of the full sample seem to suggest that the overwhelming majority of students consider themselves to have been adequately prepared (Figures 4, 5 and 6).

![Fig. 4: Timeous feedback on tutorials?](image)
However, a comparison between the compliant and non-compliant groups seems to suggest differently. Fewer students in the non-compliant group (51%) claimed that feedback on tutorials was given timeously (Figure 4). The co-ordinator’s record contradicts this claim by these students in the non-compliant groups as tutorials were not completed as scheduled in these groups, therefore feedback on their performance could not have been given timeously. Compliant lecturers also confirmed that they managed to give timeous feedback to students. Non-compliant lecturers elected not to take part in the study.

Moreover, although the difference in the results of the two groups is less pronounced when the question of adequate preparation for the tests is addressed, the results for the enquiry into the preparation for the WebCT test (Figure 5) show that fewer students in the non-compliant groups considered the preparation by the lecturer to have been adequate. For the written test, however, there appears to be a greater correlation in the responses to the question (Figure 6).
Participating lecturers also ranked the level of preparation provided for the students at medium to high. They claimed that time constraints impacted on the level of preparation but nevertheless indicated that the integration of learning activities with the assessment activities assisted in overcoming these constraints.

**Appropriateness of the level of assessment**

The level of assessment is often determined by the purpose of the assessment. Formative assessments were developmental and summative assessments were intended to determine whether students were ready to proceed to the next stage. Students were therefore asked to rank the degree of difficulty of each type of assessment on a scale of 1 to 5, 1 being the easiest of all their assessments, 5 being the most difficult. The results show that more students found the assessments to increase in its degree of difficulty from the initial formative assessment to the final summative assessment.

**Formative assessments**

Bearing in mind the main objectives of these tests they had to be set at an appropriate level so that the degree of difficulty did not deter students from completing them. On the other hand, the level had to be appropriate so that the results could inform the lecturer as to the nature and extent of his or her preparation for class. In essence these tests only required of the student to be able to read with comprehension.

Tutorials served as an early indicator of the capacity of the students to manage the higher order skills. It therefore determined the need for, and nature of, the intervention. Although the results of the full sample seem to follow similar patterns for both formative assessments, categorising the results into level 3 and below, and 3 and above, reveals a slight difference. More students found the tutorials to be more difficult than the weekly WebCT tests (Figure 7).

A comparison between the compliant and non-compliant groups did not seem to assist in the evaluation. However, a substantial percentage of students in the non-compliant groups (42%) did not respond to this question for both formative assessments.
Most students in this group did not do these tests which may account for this phenomenon in the response to the WebCT tests. The researcher had no insight into the classroom management of tutorials in the non-compliant groups and can therefore not offer an explanation for the lack of response.

Participating lecturers ranked the tests at 3 and considered the tutorials to have increased in its degree of difficulty as the semester progressed. This is an indication of “scaffolding” which is appropriate in the preparation for summative assessments. The results therefore seem to suggest that the formative assessments were set at the appropriate level for the majority of students.

**Summative assessments**

Summative assessments (tests) were designed to determine whether the student has mastered the range of skills required at NQF level 5 and were set in strict compliance with the institutional guidelines. The examiner found the capacity of WebCT tests to assess higher order skills in Commercial Law 1 rather limited. The written test, on the other hand, lends itself to the assessment of a wide range of skills across Bloom’s taxonomy. Most students ranked the summative assessments at 3 and above (Figures 9 and 10).
However, the comparison between compliant and non-compliant groups (Figure 9) shows more students from the compliant groups (62%) ranking the WebCT test at 3 and below, compared to the non-compliant group (45%). It would therefore appear that more students from the compliant group found the test to be somewhat more manageable than the non-compliant group.

The results for the written tests show a similar pattern as 62% of students in the compliant group ranked this test at 3 and below, compared to 41% in the non-compliant groups.

Two lecturers ranked the WebCT test at level 3 and 4 respectively, while another did not respond to the question. They all ranked the written test at level 5.

The results seem to suggest that these assessments were set at the right level.

**Fig. 10: Degree of difficulty of Written test?**

![Fig. 10: Degree of difficulty of Written test?](image)

**Appropriateness of the design or form of assessment**

The purpose of the assessment also influences the appropriateness of the design or form of the assessment. The purpose of each form of assessment has been spelled out in the introduction. Students were therefore asked whether the formative assessment served its purpose and whether they would recommend the assessment type. They also had to motivate their choice of answer.

The results seem to suggest that where there was compliance with the assessment strategy, most students and all lecturers not only considered the design and form of assessments to be appropriate, but it also informed the teaching and learning process. Each type of assessment will be considered in turn.

**Formative assessments**

When asked whether weekly WebCT tests helped to prepare for lectures, most students (75%) agreed (Figure 11).
However, the comparison between the compliant and non-compliant groups shows most students in the latter group (61%) either disagreeing or failing to respond to the question. This response must be viewed against the claim by a considerable percentage of students from these groups, that they had not been informed of the tests. The record on blackboard showed only sporadic attempts at informing students of the tests.

This also explains why the majority of students in the non-compliant groups either did not recommend these tests or failed to respond to the question (Figure 12).

Participating lecturers observed that these tests assisted students in preparing for lectures. They found that students “gained knowledge of the relevant units prior to the formal lecture”, it “compelled students to learn independently” and to “pose questions during the ensuing
lectures”. These tests also informed their classroom activities as it “enhanced interactive learning” and is conducive to “Socratic methods of teaching”.

Students who recommended the tests seemed to confirm their value as they claimed that it “improved (their) understanding in the subject”, that “it helped (them) through the chapters step by step”. For others, the element of compulsion brought about by the weight bearing status of the tests resulted in these tests becoming an integral part of the preparation and they therefore claimed that it “forced them to prepare for class”. Other students found the test to be “easy” and therefore claimed that it “boosted their marks”.

Most students who did not recommend the tests opted not to provide a reason. Only two responses were recorded. One student claimed that “the tests are not challenging enough” and another felt that “law is not for Accounting students”.

The participating lecturers were also unanimous in their recommendation of these tests. They observed that “less time is spent on explaining rudimentary concepts”, “higher levels of Bloom’s taxonomy are reached”, “critical questions become the norm”, “relevant questions are posed in class” and “tests foster class participation”.

It would therefore appear that these tests encouraged students to become “active agents in their own learning”. Moreover, the results seem to suggest that, where there was compliance with the assessment strategy, these tests ultimately served their purpose. The appropriateness of the form or design can therefore be inferred.

Students were also asked whether tutorials prepared them for the summative assessments (tests). Most students (68%) claimed that they did (Figure 14). The responses from the compliant groups seem to mirror that of the full sample whereas the non-compliant group appears to be equally split between a positive and a negative response. This phenomenon will be addressed when the management of tutorials is discussed.

Participating lecturers indicated that the tutorials indeed enhanced student performance in the summative assessment as they had the opportunity to apply their conceptual knowledge to practical situations. It also prepared them for the type of questions they could expect in the examination. It would therefore appear that it not only served as a diagnostic tool, but also informed the teaching and learning process.
Moreover, in spite of the claim by a substantial percentage of students in the non-compliant groups that tutorials did not prepare them for the summative assessments, the overwhelming majority of students nevertheless recommended the tutorials (Figure 14).

This support for tutorials among both compliant and non-compliant groups seems to suggest that students recognized the value of tutorials in the teaching and learning process and therefore saw it as an integral part of their learning. Students who recommended the tutorials claimed that tutorials helped them to “understand the work”, it helped them “prepare for the examinations”, it provided a “good foundation”, it helped them “practice” and helped them “identify and rectify their mistakes”. They also considered the tutorials to be “difficult but useful”.

These responses clearly show that the tutorials served as a developmental tool to enhance deeper learning, rather than simply encouraging surface learning.

Those who did not recommend the tutorials, advanced reasons seemingly related to the ineffective management thereof (“students fail because they did not do all the tutorials”; “no feedback is given and no explanations are given”) or insufficient preparation (“tutorials are difficult”). These responses were concentrated in the non-compliant group.

Participating lecturers also unanimously recommended the tutorials and advanced the following reasons for this recommendation: it “adds to the variety of assessments which serves the principle of continuous assessment”. It also provides students with “fair opportunity to pass the subject”. Tutorials require a “good understanding of the work” and are “an effective tool to determine whether students engage in deep learning”. It also “gives lecturer forewarning of problem areas prior to examinations”.

Lecturers further commented that they found the tutorials to be “highly effective as it requires more than just surface learning”. It also shows a “progression in the degree of difficulty of assessments which is an effective way to ensure that the student gradually develops the skills that can be applied to the course content”.

It therefore appears that tutorials served their purpose, namely, as a formative assessment for advanced skills and a diagnostic tool for the capacity of students to meet the summative
assessments. Furthermore, tutorials appear to have informed the teaching and learning process.

**Summative assessments**

The purpose of these summative assessments is mainly to determine whether the student qualifies to move to the next stage. Each summative assessment dealt with a different set of units. When asked whether they would recommend the WebCT summative assessment, the majority of students (67%) recommended the test (Figure 15).

These students perceived this test to be easier as they claimed that “answers are given” and they merely need to “guess”. They further “don’t have to explain their answer”, they therefore “perform better”. Students further preferred the test because the “feedback is quicker”.

Those who did not recommend the test gave reasons that relate to problems with the server, (“server is forever down”), or a preference for written tests (“you can’t express yourself”; “writing the answer is better”). Others advanced reasons relating to form and degree of difficulty of the assessment (“WebCT test confusing and not easy”). Some would advance reasons relating to a more holistic approach to assessments and a preference for deeper learning (“It is no true reflection of your capacity”; “it makes the students lazier than before”).

Two participating lecturers recommended the test. They claimed that “questions focused on the lower level of Bloom’s taxonomy which is valid when dealing with new students writing their first test”. The third lecturer did not recommend this test as a summative assessment, as the high pass rate provides a skewed impression of the student’s capacity to perform the higher order skills and to express themselves through the means of written communication.
When asked whether they would recommend the written test, most students (61%) agreed; however, responses of the compliant and the non-compliant groups show a marked difference (Figure 16). Despite the students’ claim of preparation on their part and on the part of their lecturer, as well as claims of the appropriate level of the assessment, only 42% of the non-compliant groups recommended this as a summative assessment as compared to 63% of the compliant group. Another 43% of the non-compliant group did not recommend the test.

Upon considering their reasons for recommending the test, the students seem to recognise the integrity and comprehensiveness of the test as they mentioned that they get “tested thoroughly”, “the result is a true reflection of their capacity”, “test is challenging”, “it forces you to study”, “one needs to know how to handle all types of assessments”, “you are allowed to express your understanding of the work”, “answers are not given” and “it requires of you to formulate your answers logically”. Their reasons for recommending the test also related to the fairness of the assessment as they claimed that “it was set at the right level” and “the test is easy when attending class and working”.

Those who did not recommend the test appear to advance reasons relating to inadequate preparation as they found the test “difficult”, “stressful” and “time consuming”, they felt “under pressure”, they “fail the test” and they “have to study all their work”. Other reasons relate to a reluctance to express themselves in writing as they claimed that this test requires “too much writing” and that their “handwriting is ugly”.

Participating lecturers also unanimously recommended this form of assessment as “following the specific outcomes in the subject guide enables students to handle even the most difficult of their assessments”. Another indicated that it contains a “good mix of questions across Bloom’s taxonomy.”

**Management of formative assessments**

How students and lecturers manage the assessments could also be considered to be a reflection of the fairness thereof, hence the investigation into the management of assessments. The focus of this part of the investigation was on formative assessments only and was conducted on an “arms length” basis.
The weekly WebCT tests required of students to manage themselves and their activities responsibly. The number of tests completed by the student is therefore a reflection thereof. Students were asked how many of these tests they have completed. Most students (57%) claimed that they managed to complete between 6 and 8 tests (Figure 17).

However, comparison between the compliant and the non-compliant groups shows that the majority of students in the compliant group (73%) claimed to have completed between 6 and 8 WebCT tests, compared to 4% of the non-compliant group.

Participating lecturers confirmed that the overwhelming majority of students in the compliant groups managed to complete 7 to 8 tests. The record of results on blackboard supports these claims. Doing these tests appear not to be unnecessarily burdensome and these students seemed to have managed to fit them into their regular learning activities and their performance in the tests was above average.

The majority of students have therefore managed this activity independently and responsibly. However, the same record shows a maximum of 3 tests having been completed by individual students in the non-compliant groups.

Considering the purpose of the tutorials, effective management thereof by the lecturer as well as the students would have a significant impact on the teaching and learning process as well as the success rate in the subject. The scheduling of tutorials, the number of tutorials scheduled by the lecturer and completed by the students and timeous feedback, amongst others, is a reflection of the effective management thereof. Students were therefore asked whether tutorials were completed as scheduled and the overwhelming majority of students (81%) agreed (Figure 18).
The responses of the compliant and non-compliant groups were similar. However, the record kept centrally by the coordinator contradicts the claims by the students in the non-compliant groups that tutorials were completed as scheduled. Tutorials 1 and 2 were submitted for marking after the first summative assessment, and tutorial 3 one week before the final summative assessment. This difference takes on greater significance when the final results of the two groups are considered.

Effective management of the tutorials is also reflected in the number of tutorials scheduled by the lecturer as well as the number of tutorials completed by the student. The majority of students (72%) claimed they managed to complete 3 to 4 tutorials (Figure 19).
The comparison between the compliant and the non-compliant groups (Figure 5) shows that 57% of the compliant group claimed that they completed 4 tutorials, compared to 29% from the non-compliant group. The participating lecturers confirmed that the majority of their students completed 3 to 4 tutorials.

The record of marks kept centrally by the co-ordinator supports this claim by the compliant groups. However, the same record does not support the claim by 29% of the students in the non-compliant groups that they had completed 4 tutorials. The record reflects only 3 tutorials were submitted for this group. These results, combined with the observation relating to the submission of tutorials, seem to suggest that tutorials were more effectively managed in the compliant groups by both lecturer and students than in the non-compliant groups.

**Student performance for 2009**

When the overall student performance for 2009 is considered, it would appear to correlate well with that of 2007. However, comparing the results of the compliant group with that of the non-compliant group shows the latter group performing more poorly than the former. It must be emphasized that there are too many factors impacting on student performance to draw a correlation between the performance of the students and the assessment strategy.
Conclusion

The results of this study lead to the conclusion that the majority of stakeholders who participated in the study considered the assessment strategy to be fit for purpose. Not only did they consider the assessments to be fair, but the results of the assessments also informed the teaching and learning process in the subject. The majority of students also considered themselves to have been adequately prepared, assessments to have been set at the appropriate level and the form of the assessments to have been appropriate. The assessment strategy further seemed to have informed the teaching and learning process as weekly WebCT tests encouraged students to prepare for lectures and lecturers were informed as to the nature and extent of their preparation for class. Where tutorials were effectively managed, it seemed to serve as a diagnostic tool for the student’s readiness for the test and whether there was a need for further intervention. The students’ performance in the summative assessments further informed the teaching and learning strategy for future students.

Nevertheless, creating the most favourable conditions to encourage student involvement is not enough. The lecturer also has to tutor, support and follow up to make continuous assessment successful.

Recommendations

It is recommended that the assessment schedule be uniformly implemented in Commercial Law for Accountants 1. Furthermore, the use of a WebCT test as a summative assessment in the subject should be reconsidered and classroom management should be evaluated, to ensure the quality of delivery.

References


The implementation of a continuous assessment strategy for determining learners’ terminal attainment in higher education

Eugene Fester

Introduction

This paper investigates various applications of continuous assessment in higher education in South Africa. It forms part of a research project at present underway in the faculty of Business, Cape Peninsula University of Technology (CPUT), which will present findings on the efficacy of current assessment practices in determining a learner’s terminal attainment. While the research project covers a broad spectrum of assessment practices, this paper focuses on a specific aspect, namely the use of continuous assessment in determining learners’ terminal attainment in higher education. The central concern is perhaps best articulated by Brown et al. (1995):

“With an increase in modular courses and continuous assessment schemes, problems can occur in relation to overall course marks, when like is not being added to like. Marks originating from different elements or aspects of an assignment are frequently just added together, and averaged with, other marks derived from entirely different contexts, and this can skew the final total in a disproportionate way.” (Brown, Race & Rust, 1995).

Concerns relating to the validity of a learner’s “final total”, within the context of “continuous assessment”, are therefore addressed in this research project. Are assessment schemes appropriately weighted to ensure that the intended learning outcomes, both content and ability, are covered and satisfactorily achieved by the learners? Are sufficient checks and balances provided to ensure that assessment instruments measure learners’ individual acquired competences in the course? Is the computation of the final mark a fair indication that the learner qualifies to be promoted or licensed with a qualification?

A common understanding of the terms “continuous assessment”, “formative assessment” and “summative assessment” is therefore necessary to ensure that assessment strategies fulfill the requirements of validity, reliability and fairness. These assessment terminologies are often used loosely, probably due to the varying degrees of overlap embedded in them. For example, while the distinction between formative and summative assessment is generally thought to be a clear-cut one, it becomes less clear when formative assessments are converted for summative purposes, as when assessors decide to include them in determining the final mark.

For the purposes of this paper, such concerns, as articulated by Brown et al. (1995), are addressed through an investigation into present interpretations and applications of continuous assessment practices within higher education in South Africa in general, and the faculty of Business at CPUT in particular.
Continuous assessment and formative assessment

There is general consensus among commentators and researchers that the main purpose for introducing continuous assessment is to provide academic support through remedial and diagnostic interventions in learning. The National University of Singapore (2008), in its teaching handbook *Learning to Teach, and Teaching to Learn*, defines continuous assessment as follows:

“Continuous assessment is more likely to be formative, process-oriented, informal, internal, learner-involved, and/or self-referenced in nature. It can take the form of daily work (e.g. essays, quizzes, presentation and participation in class), projects/term papers and practical work (e.g. laboratory work, fieldwork, clinical procedures, drawing practice)”. (National University of Singapore, 2008).

All the literature on this matter that has been reviewed, both locally and internationally, concur. One can therefore safely infer that the main purpose for deciding on a continuous assessment strategy is to create opportunities to include formative assessments in the assessment regime. Thus continuous assessment accommodates formative assessment, in order to enhance and support the learning process.

The problem with such a definition, however, is that it implies that continuous assessment and formative assessment are closely, even inextricably, linked. This interchangeability between continuous assessment and formative assessment is more common than is generally evident. Anne Ward (1980) notes characteristics of “continuous assessment” that provide a further example of this prevailing ambiguity (Ward, 1980:49):

- the assessment, related to each syllabus section, takes place immediately after it has been taught, and it may indeed be difficult to separate the assessment from the learning process;
- …the majority of the assessment is based upon class work, homework…not done under examination conditions;
- There is usually free access to reference material, so the application of information may be assessed, but recall is not easily assessed;
- It may be difficult to be certain that the work is the student’s own.
- The emphasis tends to be on the work done during the course rather than the standard achieved by the end of it.

These characteristics of “continuous assessment” resonate with characteristics one would normally associate with formative assessment. The effect of conflating these highly disparate elements of assessment has resulted in a distorted interpretation of their unique purposes, and probably explains the general scepticism of assessors in higher education towards the use of continuous assessment in determining learners’ terminal attainment (Roodt, 2009; Williams, 2009).

The dilemma created when collapsing these concepts into a vague, homogenous entity is that the notably distinctive roles of teaching and learning on the one hand, and assessment on the other, are blurred. In order to provide clarity, one must separate these concepts into their distinctive purposes.

The purpose of adopting continuous assessment strategy should be to provide opportunities for learners to be assessed progressively, rather than by a once-off event, as in the case of an end-of-course assessment. This means that continuous assessment refers to the regularity of the assessment events – not the type of events. On the other hand, formative assessment refers to the type of assessment event – not the regularity of the events. Furthermore, formative assessment belongs to the teaching and learning component of
programme delivery – not the assessment component. As such, formative assessment is a teaching methodology employed to enhance learning. Its didactic function is to diagnose the effectiveness of the teaching and learning process. Formative assessment, like all forms of assessment, is also an instrument of measurement. However, unlike summative assessment, it is specifically designed to measure learners' progress – not their terminal attainment.

It is the contention of the researcher that continuous assessment should be seen as an assessment strategy, rather than an assessment instrument or activity. As such, it incorporates all types of assessments – both formative and summative. It is a strategy adopted to regulate the assessment events. As the name implies, continuous assessment allows for more assessment opportunities than, for example, do end-of-course examinations. This is the chief advantage of adopting a continuous assessment strategy. It provides opportunities for formative as well as summative assessing, in a progressive way which accommodates the learner, and is therefore much more learner-centred than the punitive nature of an end-of-term examination.

It is therefore quite apparent that the formative assessments administered within a continuous assessment strategy cannot fulfill the role of the summative assessments administered in the same strategy. Their purposes are very different. Thus, while the traditional form of end-of-course examinations consist largely (if not only) of summative assessments, the introduction of continuous assessment allows for more opportunities for diagnostic assessments within the assessment regime. These additional assessments are of the formative kind. They do not replace summative assessments – rather, they contribute to the preparation of learners for summative assessment. An important point to note is that while both form part of a continuous assessment strategy, they are not all appropriate for measuring terminal attainment. Only summative assessment can fulfill this role.

In summary, “continuous assessment” should be seen as an assessment strategy, while formative and summative assessments should be categorized as types of assessment (National University of Singapore, 2008). A critical point is that, within a continuous assessment strategy, assessment instruments measure both diagnostic and achievement ratings; however, only the achievement ratings can be used for the determination of terminal attainment.

Miller et al. (1998) suggest that appropriate weighting of formative and summative assessments will address this problem:

“...the teacher’s dilemma is to decide what should be regarded as summative and what as formative, and the extent to which each earlier or interim measure is allowed to influence the final grade. In most degree programs leading to a professional qualification, the profession itself will determine...the levels of attainment expected. Thus the task of allocating suitable weights to each item of assessment must be faced...” (Miller, Imrie & Cox, 1998:38)

Firstly, the authors reveal a crucial fact – that in order to determine a student’s “level of attainment”, the formative and summative assessments need to be weighted appropriately over time and with due regard for the purpose of the assessment (diagnostic or evaluative). The significance of ensuring that a student’s final result is achieved through an evaluative (summative) assessment rather than a diagnostic (formative) one is emphasized by these authors: “It is therefore preferable that any marks given for formative tasks should have only marginal, if any, influence on a student’s final result.” (Miller, Imrie & Cox, 1998:32). Discussions with academics within higher education institutions in South Africa with regard to the
interpretation and implementation of continuous assessment. At Nelson Mandela Metropolitan University, for example, there is a perception that “academic rigour is compromised” due to the different forms of implementing continuous assessment (Roodt, 2009). The inclusion of a high weighting for formative assessments in the computation of a learner’s terminal attainment, under the guise that the final mark is derived from continuous assessments, should not be condoned. Assessors should ensure that the final mark is a product of assessment activities that have been crafted to measure individual achievement – not learner progress, otherwise a skewed, invalid measurement of terminal attainment will result.

Continuous assessment and summative assessment

The South African Qualifications Authority (SAQA) provides the following distinction between formative and summative assessment, reproduced in Table 1 (SAQA, 2001:26):

Table 1: Differences between Formative and Summative Assessment

<table>
<thead>
<tr>
<th>FORMATIVE ASSESSMENT</th>
<th>SUMMATIVE ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed to support the teaching and learning process</td>
<td>At the end of a learning programme (qualification, unit standard, or part qualification)</td>
</tr>
<tr>
<td>Assists in the planning of future learning</td>
<td>To determine whether the learner is competent or not yet competent</td>
</tr>
<tr>
<td>Diagnoses the learner’s strength and weaknesses</td>
<td>In knowledge and inputs-based systems, this usually occurs after a specified period of study, e.g. one year</td>
</tr>
<tr>
<td>Provides feedback to the learner on his/her progress</td>
<td>In OBET, learner-readiness determines when assessments will take place</td>
</tr>
<tr>
<td>Helps to make decisions on the readiness of learners to do a summative assessment</td>
<td>Is carried out when the assessor and the learner agree that the learner is ready for assessment</td>
</tr>
<tr>
<td>Is developmental in nature</td>
<td></td>
</tr>
<tr>
<td>Credits/certificates are not awarded</td>
<td></td>
</tr>
</tbody>
</table>

These guidelines support the distinction between formative assessment as a learning tool, and summative assessment as a measurement of learner achievement. It is especially noteworthy to observe that SAQA (2001) states categorically that, in formative assessment, “credits/certificates are not awarded.” However, under certain circumstances, to be discussed later, SAQA approves of the use of formative assessments for summative purposes.

The South African Qualifications Authority defines summative assessment as “assessment for making a judgement about achievement. This is carried out when a learner is ready to be assessed at the end of a programme of learning.” (SAQA, 2001:26). Furthermore, in compliance with the programmes-based approach to learning that SAQA espouses, it recommends that summative assessments can be done “on a continuous basis throughout the learning experience. It can be carried out at any of the given points of the total learning experience” (SAQA, 2001:27). This is a clear indication that summative assessment forms an integral part of continuous assessment.
This confirmation that continuous assessment incorporates summative assessment (as well as formative assessment), confirms its designation as an assessment strategy rather than an assessment instrument. While the inclusion of formative assessment greatly enhances the teaching and learning experience, summative assessment remains the only means whereby a learner’s readiness for promotion or grading, i.e. terminal attainment, can be measured. Put another way, while formative assessment has a critical purpose in a learner-centred environment it was not introduced to measure terminal attainment. That is the purpose of summative assessment. The difference between these two forms of assessment is apparent in their peculiar designs: formative assessments provide opportunities to discover learning needs, or teaching gaps, or both, while summative assessment measures the attained competences of students, in relation to the intended learning outcomes (ILOs) of the course. In order to achieve an accurate measurement of learner success, therefore, an assessment strategy should clearly be dominated by summative assessment instruments. In the words of Brown et al. (1995), “problems can occur in relation to overall course marks, when like is not being added to like.” (Brown, Race & Rust, 1995). This comment includes the danger of combining the results of formative and summative assessments, in order to decide whether a student has attained the desired competence to be graded or promoted.

The role of formal written examinations within a continuous assessment strategy

In the teachers’ handbook, Learning to Teach, and Teaching to Learn, the following definition of summative assessment is proffered: “Its chief aim is to grade and license. A prime example would be the final examination.” (National University of Singapore, 2008). The “final examination” is given as a “prime example” of summative assessment. In South Africa, the unpopularity of this form of assessment is largely due to its former perceived gatekeeping function in the previous political dispensation, when faculty staff were perceived to use assessment as a means of denying certain students progress. Fortunately this is no longer possible due to the “constructive alignment” required in the design of learning programmes today (Biggs, 2002). All elements of programmes, from outcomes through delivery methodologies to assessment plans, should be clearly spelled out to prospective learners. The inter-relatedness of the building blocks of courses (outcomes, assessment criteria, level descriptors etc.), ensures accountability and transparency in the assessment process. Additional requirements that impact on the rights of the students, like progressive feedback and the need to ensure validity, reliability and fairness, further ensure that students are clear about the requirements for successful completion of academic programmes (SAQA, 2001:18).

The main reason for confusion around the choice of assessment strategies has been the idea that continuous assessment is a contrary choice to examinations. This distinction is made in the faculty of Business, CPUT. At present, the faculty office in the faculty of Business, CPUT distinguishes between two types of assessments: continuous assessment and examinations. This is a curiously widespread interpretation. It implies that continuous assessment and examinations are mutually exclusive strategies of assessment. The faculty of Business has opted for the continuous assessment strategy as opposed to the adoption of an examination strategy. All subjects are flagged in the faculty office as being continuously assessed. This distinction begs the following questions:

- Is continuous assessment an alternative to examinations, or can the two coexist in the same assessment strategy?
- What are the implications of the above for the accurate measurement of a learner’s terminal attainment?
In order to address these questions, a brief background to the adoption of continuous assessment at the Cape Peninsula University of Technology could serve as a typical explanation of the origin of this conundrum in higher education in South Africa. At the turn of the 21st century, continuous assessment was introduced as an integral element of outcomes-based education and training (OBET) in South Africa. It became associated with all the inventive and creative assessment practices that accompanied the new OBET paradigm. The call for providers of education at all levels to ensure that exit competences of programmes are characterized by “applied competences” placed an obligation on universities to design assessment instruments that measure affective and motor skills as well as cognitive competences. Thus continuous assessment came to replace, rather than augment, the traditional examinations. It was accepted as an alternative to the examination. While many of these non-traditional assessment instruments prove to be valid and reliable measurements of motor and affective abilities, they are often not sufficiently rigorous to satisfactorily assess cognitive astuteness, especially at higher education level.

Perhaps the time has come to revisit the efficacy of the end of course assessment (final examination). Its usefulness as an accurate measurement of learner attainment is well known, but it needs, firstly, to be divorced from its former notoriety – that is, its perceived role as gatekeeper to learner progress. This can be achieved by including it as one of many assessment instruments within the continuous assessment repertoire. Such end-of-course assessments will then be able to fulfill the role of determining whether learners have acquired the necessary cognitive competences to allow them to be promoted.

Secondly, faculty staff need to accept formal written examinations as an integral component of a continuous assessment strategy. It is not a substitute for continuous assessment, but an integral component of it. As a summative type of assessment, it is a useful measurement of terminal attainment. Its inclusion in the continuous assessment strategy will therefore greatly enhance the validity of learners’ terminal attainment. In this regard, Heywood (2000) citing Sharp and Culver, provides some interesting insights:

“Sharp and Culver (1996) describe one of these programmes. They had the same problems that their predecessors had of integrating the vocational into the academic. The requirements for the technician course in the feeder colleges were for a curriculum based on continuous assessment. This was in contrast to the university where the main method of assessment was formal written examinations set at the end of the academic year. They reported that the students found it difficult to perform at higher levels of intellectual functioning (i.e. analysis and synthesis).” (Heywood, 2000:144).

The above scenario presents two critical assumptions that are central to this discussion. Firstly, it implies that continuous assessment is not as effective in assessing the higher order cognitive skills of students as is a final examination. If this is the case, then by implication the adoption of a continuous assessment strategy in higher education will have to be seriously reconsidered. Secondly, an important additional observation made by Heywood (2000) is that this summative form of assessment, namely “formal written examinations”, remains a crucial assessment instrument to measure the higher order abilities of learners.

The first assumption, namely that continuous assessment is not effective in assessing the higher order abilities of learners, is only valid insofar as, once again, it assumes the popular interpretation which conflates continuous assessment and formative assessment - and polarizes continuous assessment and formal written examinations. In other words, with reference to Heywood (2000), the apparent ineffectiveness of continuous assessment to measure “higher levels of intellectual functioning” can be directly ascribed to the fact that, in this interpretation, excludes “formal written examinations”. Within such an interpretation and
practice, continuous assessment proves to be an invalid measurement of terminal attainment, as the final mark computed for these learners is too heavily weighted with formative assessment activities. Put another way, the terminal attainment of learners is erroneously measured with instruments that measure learner progress (formative assessments) instead of learner achievement (summative assessments). This skews the final mark, and renders it invalid.

The second observation offered by Heywood (2000), namely that “formal written examinations” remain an effective instrument for measuring higher order abilities of learners, is supported by many higher education institutions and professional bodies (Williams, 2009).

The dilemma presented above is easily reconciled through an interpretation of continuous assessment, as proffered by the researcher. As an assessment strategy, it comfortably incorporates both types of assessment, namely formative and summative assessments. A full array of formative assessment instruments can be employed in order to enhance the teaching and learning process. Similarly, a full array of summative assessment instruments can be employed, including formal written examinations, for the purpose of determining terminal attainment. Thus the adoption of a continuous assessment strategy allows for optimum utilization of assessment for enhancing teaching and learning, and for measuring learner achievement (terminal attainment).

Perhaps the time has come to recognize formal written examinations, in the form of end-of-course assessments, as an integral component of the continuous assessment strategy, as motivated above. It is, in effect, one of many assessment instruments within the continuous assessment repertoire that qualifies to measure learners’ terminal attainment. It is “a prime example” of summative assessment (National University of Singapore, 2008).

The preference for adopting a continuous assessment strategy should not be construed with a relaxation of the measurement of individual competences. Continuous assessment allows for more assessment opportunities, which makes it possible for lecturers to incorporate formative activities in the assessment strategy. However, and this is critical: only the summative assessments within the repertoire of the continuous assessment strategy should be used to determine terminal attainment. This complies with SAQA, which clearly states that “credits/certificates are not awarded” for formative assessments (SAQA, 2001).

Findings

Based on findings in the literature review, learner success in study courses should be measured by a scheme of summative assessments that reflect the academic achievement of students, in relation to the expected competency outcomes of a course. This does not preclude the important role of formative assessment in the learning process. However, formative assessments, by all accounts, are teaching and learning mechanisms – not measurements of required competence. They are precursors to summative assessment. Their purpose is to prepare students for summative assessment. Thus the didactic motivations for designing assessment schemes intended to justify terminal attainment of learners (not progressive learner performance), should be based on the principles of summative assessment.

A spot survey of assessment instruments used by professional bodies reveal their preference for heavily-weighted formal written examinations to augment the practical and other assessment activities. This trend is true of the department of Accounting at Rhodes University. Here continuous assessment comprises structured tutorials, while the main exit assessments for students in the Chartered Accounting programme are two 5-hour formal written examinations, as prescribed by their professional body, SAICA (Williams, 2009).
In a survey conducted in the faculty of Business at CPUT in Nov/Dec 2009, 88% of respondents answered “Yes” to the question: “Do you include formative assessments in the assessment weightings on the Marks Administration System (MAS)?” The MAS refers to the final assessment scheme that computes a learner's terminal attainment. This finding needs to be further interrogated, in light of the literature survey, which suggests that these types of assessments should have “only marginal, if any, influence on a student’s final result” (Miller, Imrie & Cox, 1998:32). Investigations are underway to determine whether the weightings of these assessments are of such a nature that they compromise the measurement of terminal attainment of learners in any way.

### Conclusion

Through this study, I propose the following interpretation of continuous assessment in an attempt to formulate a common understanding amongst higher education institutions in South Africa, thereby ensuring that the computation of learners' terminal attainment is valid, reliable and fair:

- Continuous assessment should not be conflated with formative assessment.
  - Continuous assessment is an assessment strategy based on the regularity of assessment events. It is an alternative to end-of-course assessments.
  - Formative assessment is a type of assessment employed as a diagnostic, remedial tool to enhance teaching and learning. It is an alternative to summative assessment, which measures terminal attainment.

- A continuous assessment strategy includes both formative and summative assessments:
  - Formative assessments are used to enhance teaching and learning;
  - Summative assessments are used to determine terminal attainment.

### ALTERNATIVES

<table>
<thead>
<tr>
<th>ALTERNATIVES</th>
<th>PERCENT</th>
<th>VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 YES</td>
<td>87.8%</td>
<td>43</td>
</tr>
<tr>
<td>2 NO</td>
<td>12.2%</td>
<td>6</td>
</tr>
</tbody>
</table>

TOTAL 49
• Formal written examinations are prime examples of summative assessments:
  o A formal written examination is not an alternative to continuous assessment, but an integral component of it;
  o The effectiveness of formal written examinations in determining learners’ terminal attainment should justify their inclusion in any continuous assessment strategy.
• Within the continuous assessment strategy, predominantly summative assessments should be used to measure learners’ terminal attainment.

Bibliography


Analysis of students’ perspectives on the language of teaching and learning

Somikazi Deyi and Wouter Wium

Abstract

This paper focuses on a multilingual intervention in mathematics undertaken in mathematics related to Chemistry. The multilingual intervention, which involved the subject and communications lecturer in a team-teaching process, created an opportunity for students to use their first language (L1) for conceptual development. The findings indicate that when students learned concepts in the L1, their general understanding was enhanced. The findings also show that students’ acquisition of academic and technical English (an additional language for most students in the study), improved when they used the L1 to think through calculations, problems, diagrams and the other mathematical applications which form the basis of Chemistry I. The study highlights the relationship between the students’ conceptual development and their access to an appropriate language for conceptualisation. It shows that students were unable to respond to required tasks at an adequate level when they had limited linguistic resources for the processes demanded in advanced learning. When students were able to draw on the resources of a familiar language, they were better able to develop higher order concepts.

Introduction

The purpose of this paper is to give an account of the possibilities provided by use of multilingualism in conceptualizing mathematics in the Extended Curriculum Programme of Chemistry at CPUT. Furthermore, it tends to display how language and concepts are deeply interrelated in that once learners are taught concepts in mother tongue, their conceptual understanding is fully developed for knowledge processing. This guarantees cognitive advantages for learners (Cummins, 1978). Researchers like Vygotsky (1962) and many others, show that once a person’s primary language is fully developed, s/he is able to learn successfully in an additional language. This view contests the thought that African languages do not have enough capacity to be used as languages of teaching and learning in HE. Stroud (2002:46) on the relatedness of language and conceptualization, contends that when students cannot respond in cognitively adequate ways on classroom tasks, much communication is lost if students have limited linguistic resources to account for processes involved in their learning.

Concurring with Stroud (2002) on the relatedness of language and conceptualization, Mlama and Materu (1978) regard language as a means to articulate a relevant account of learning processes that the student is exposed to. This displays the dependency of conceptualization of information on usable language. When students learn in a language in which they are familiar, they are able to develop higher order concepts and are better able to achieve academic success.
This paper’s aim is to show the difficulty of measuring the effectiveness of using multilingualism as a teaching tool and concludes by showing whether or not using multilingualism fosters deeper learning and understanding.

**Understanding use of multilingualism in higher education**

It is almost a decade after the adoption of policies promoting use of mother tongue and multilingualism in higher education. Policies, e.g. the National Language Policy for Higher Education (DoE, 2002) and promotion of multilingualism (DoE Ministerial Report, 2002) are in place, but implementation of multilingualism in the classroom is still a challenge. The result is that the students are seen as inadequately prepared and lacking the language skills required for successful learning at higher education levels.

South Africa is a country in which eleven languages are officially recognized, yet many students do not have access to academic text in their home languages. This gives rise to a need for the integration of languaging tools into subject matter to improve conceptualization skills amongst students. The common concern leading to an awareness by educational staff and others, is the mathematics performance of learners in multilingual classrooms in South Africa. Investigating and measuring the impact of multilingualism on the performance of students is complex, since learner performance is not determined by language proficiency alone. Other related factors play a part, ranging from mathematical pedagogy issues, the nature of social issues, schooling background and lack of exposure to enabling factors (Setati, 2009).

**Brief discussion of the literature**

Literature on use of multilingualism displays an ongoing debate amongst scholars. Some see successful learning as dependent on language. Their argument is that language is central to learning in that thought is dependent on language (e.g., Worf, 1956; Vygotsky, 1962; Gxilishe, 2003). Using a multilingual approach affords students an opportunity to gain deeper understanding of subject-specific jargon. This provides the platform for a full grasp of concepts and terminology which enables students to ‘crack the code’ of their fields of study (Cummins, 1981; Deyi, 2010). Another scholarly approach to multilingualism in relation to learning, sees thought as a separate entity from language. However, in this approach it is not clear how language forms that are discipline-specific, relate to concept learning (Carrunthers, Laurence & Stitch, 2007).

The difficulties associated with the abstract nature of scientific and academic language, can potentially be addressed through the use of multilingualism as an approach to teaching and learning in higher education (Deyi, 2007). In scientific contexts, using multilingualism through content language integration appears to promote subject matter knowledge in the L1 without any negative effects on second language developments (Cummins, 2000; Winberg, 2006). An example of this approach is the case of a lecturer in Chemistry at CPUT who, assisted by the researcher, integrated the students’ first languages into the language of the subject content. This helped to address the language and learning needs of second language students and students whose first language/s were different to the language in which the subject was presented. Multilingualism appears to be of great value when it is embedded in scientific texts. Setati, Chiterra and Essien (2009) call for more research in this area of study, as they regard it as critical for greater access to mathematics as well as to enhance understanding amongst students whose L1 is other than English.

**The intervention**

The intervention began with four ninety-minute sessions. The purpose of these were to observe the students and identify which of the mathematics course contents the students
found difficult to conceptualize. The intention of the sessions was to acquire an understanding of the problems experienced by the students. This was followed by a questionnaire which aimed to ascertain students’ language preferences in teaching and learning, writing assignments and portfolios, assessment, questions and classroom discussions.

The intervention occurred in three stages. The first stage included a needs analysis questionnaire to ascertain factors leading to students’ difficulties in mastering the mathematics involved in learning Chemistry. Fifty students participated by responding to the questionnaire.

It is significant to note that during the intervention the institution, CPUT, was undergoing a language audit. The group of students was therefore familiar with the documents indicated in the questionnaire, since they had had exposure to it through the intervention. They were aware that the language policy puts emphasis on use of multilingualism as a tool to enhance conceptualization amongst students (CPUT Language Policy, 2007).

Data were collected using questionnaires to ascertain preferred language for written work, assessment and teaching. Figures 1 – 3 illustrate student responses from the first questionnaire:

**Fig. 1: Would you prefer to learn mathematics in your home language?**

Response example from a student: “We are at university to learn, we should do more English”.

**Fig. 2: Do you understand English which is used to teach mathematics well?**
Response examples from students:
“All my textbooks were in English when I was at school so I understand well”.
“I cannot understand everything taught in English”.

Fig. 3: Would using English and your home language help you understand mathematics fully?

Response examples from students:
“That process won’t be necessary because we do everything in English, we need to learn more English”.
“It will help to have many languages on the exam paper to [sic] so that I can be sure about my answer”.

The first stage of intervention

At this stage of the study it was found that students’ social use of English was of adequate quality for communication amongst themselves and lecturers. However, English for academic purposes was evidently a challenge. This difficulty was clearly seen in four areas, namely reading, writing, mis/conceptions and understanding questions posed. Problems posed by reading skill requirements became evident when students indicated that they struggled to make sense of the language used in the textbook. The students described how they would re-read paragraphs, reading through each sentence and trying to make sense of it. Through this repetition the students then learnt the content, but without clear understanding of the meaning. Reading with comprehension was often a challenge, due to the level of language used as well as the jargon of the field with which students were not familiar, both of which posed barriers for deeper learning.

This stage of the intervention involved asking students questions on language preferences with regards to:
- the extent to which the language used by lecturers enabled them to participate fully in class;
- the language used in study materials, for writing tasks;
- whether classroom discussions enabled them to participate fully in class; and
- whether they would prefer to learn using English or their home languages.

Findings of the first stage of the intervention

The students indicated that they preferred to be taught in English because it gives them access to better economic opportunities. They indicated that it is the language used across the globe, it is the language of status and power, and it is the language of assessment at the university. They also indicated that it is the language most widely used for communication, it
prepares them for industry and there is therefore no point in using any other language at the university.

Global benefits

At this stage of the intervention, students attributed their choice of learning in English to future prospects, which included being prepared to become part of a ‘globalized nation’. The students indicated that if they speak English well, they can work anywhere in the world and furthermore, that if they learn in their home language/s, it would definitely reduce their chances of working abroad.

Workplace Preparation

Students who were interviewed indicated the following views when asked about their expectations of language use in the workplace: They will be employed in industry and will need to be able to speak English well, since it is used across workplaces; and will also be required to write reports and present those ideas to management.

The students also felt that if they were taught in their home language/s at CPUT, the likelihood of understanding and improving their English skills would be small. This would cause problems for them as they would not be able to communicate well in the workplace.

The second stage of the intervention

The second stage of the intervention focused on teaching mathematics used in learning Chemistry. This was done using a multilingual approach to give the students access to key concepts of the subject. The expected outcome of the course was that the students would produce a written report, after conducting an experiment based on a brief given to them on how to conduct an experiment in the laboratory.

During the intervention a set of problems became evident, one being that as a result of the students’ struggle with comprehension of the readings, their writing was affected. This resulted in an absence of structure in their reporting and consequently the reports made no sense. Another problem that was noted, was a tendency to write reports in a manner inconsistent with the requirements of Chemistry reports. The students wrote each point in bullet form, with sentences explaining the whole process undertaken during the experiment as well as the results. Instead, the convention is to write a clear account of each step, explaining and distinguishing the procedure and processes involved in the laboratory experiment.

To summarise, in the initial stage of the intervention it was thought that the key problem concerned the structure of the report. This problem was sufficiently dealt with in class. However, the outcome of the intervention was not what was expected, since the students then still wrote one sentence under each sub-heading in their reports.

A further attempt was made to get the students to write more about their laboratory results by asking them probing questions that would lead them to talk freely, using language of their preference. When this opportunity was afforded, they communicated their lab observations well. When asked for reasons why they could not articulate this in writing, language was pointed out as the challenge, since they found it hard to articulate their laboratory results in a manner consistent with the academic style.

Students managed to convey their laboratory results when offered an opportunity to write in their home language. When their reports were written in mother tongue, they were able to
then present them in English without difficulty. This attempt seemed to change their attitudes and perceptions regarding use of multilingualism in teaching. As students gained access to more meaningful understanding of the subject, their expression using second language skills seemed to improve.

The third stage of the intervention

The third intervention comprised a set of focused interviews with the students. The objective of this was to ascertain whether the students maintained their language preferences previously stated, even after the learning they had experienced through use of multilingualism to grasp concepts involved in Chemistry.

Findings of the third stage

Students expressed the following views when asked to assess the value of multilingualism in education:

- They would like to see multilingualism used in a wider range of teaching, since it enables them to understand more clearly what was required of them.
- They also indicated that the use of multilingualism improves their grasp of the questions, enabling them to respond with confidence rather than guessing.

Even if their English skills were not good enough, the students were able to gain a better understanding about the tasks given, which made it easier for them to make a transition between their mother tongue and the language used to explain the task. According to the students, this transition affords them an opportunity to develop their second language skills. In the interview, students asked for a process whereby assessment (examination papers and essay questions) could appear in more than one language, to ensure that they could clearly understand the questions.

The students were asked to critically assess the value and usefulness of multilingualism. The following results from the interviews reflect the students’ impressions of multilingualism:

- 80% of those interviewed felt that the use of multilingualism is beneficial and that it should be used across all fields of study.
- 20% felt it was a good approach but that it should also be used at high school, so that when students start at university they would be familiar with the process. Some students thought that multilingualism is a good teaching method, but that the development it requires can take time especially if one’s home language experience within the learning context is not strong.
- 80% of the students indicated that through use of multilingualism, they were able to directly use and understand the language in which the text was written. Only 20% felt they needed more time to think their ideas through.
- 60% felt that they were able to tackle difficult text as they used the approach both as a learning style and a study method.
- 40% felt that guidance was needed to translate the conversation they had in groups, into “proper” English.

The overall findings

It was observed that in group discussion, students used a lot of what Canagarajah (1999) refers to as ‘translanguaging’, or language users using two languages at the same time. It
appeared less problematic to use isiXhosa and English interchangeably without negotiation among interactants. The languaging in groups indicated that students had found their own strategy to overcome linguistic barriers to understanding mathematics. The strategy is unconsciously used but there is an indication that it can be formally used as a teaching strategy without being a distraction to students. It afforded both students and teachers opportunities to interact without being concerned about the correctness of their (students’) grammar, but concerned more about understanding the mathematics concepts they were dealing with. This multilingual approach to learning appeared appealing to the students using it, who seemed to cope with the mathematics tasks given. It seemed to enable conceptual interactions amongst students themselves and the lecturers involved.

**Enhanced understanding**

The multilingual approach used in this form of learning enhanced understanding and can provide a basis for educational scaffolding. The process can also encourage students to interrogate concepts within the context of the field and find meaning in the particular context. The process allows them to internalize the concepts and language used to explain the processes to resolve each task.

**Improvement of second language skills**

As concepts were explained in L1, students also improved their L2 skills. Discussing the meaning of concepts amongst themselves in the L1 provided them with an opportunity to use the L2 to either explain to other members of the group, or to the entire class.

**Students’ preferences regarding use of multilingualism**

The role of multilingualism should not be limited to oral discourse alone but should also have a place in assessment practices. All study materials should have multilingual dictionaries or glossaries that explain each concept in more detail than simply showing the equivalent statement in another language. This clarifies the questions, enabling students to answer them with greater certainty. Examination papers should be constituted in the three languages of the Western Cape so that students can be confident about the meaning of the questions asked. Using the three languages in an examination would certainly eliminate misconception regarding the questions.

**Concluding remarks**

Previous research on the relationship between cognition and language has often focused on positive effects of multilingualism, rather than on the connectedness of concepts and language which is apparent during the course of translanguaging among students to enhance their conceptual understanding of the subject or field. Through this study we tried to show that concepts and language are not separate entities.

The study does not claim that there is a drastic turnaround in using students’ home languages for teaching and learning, neither does it advocate that we negate the use of English. Rather, we make a statement that use of multilingualism enhances learning. Our findings suggest that through use of multilingualism, concepts are more fully understood.

Through this study, we have attempted to display that during the multilingual intervention, students were enabled to construct a complex and dynamic representation of thought about the mathematical processes and applications. This shows the benefits of using multilingualism in mathematics in this context.
References


