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Michael Johann van Heerden studied Social Sciences, Philosophy and Theology, graduating in 1984 with a Bachelor of Arts and in 1985 with a Bachelor of Theology (Honours). In 1991 he was appointed as a lecturer in Philosophy and Social Sciences and Vice Rector of St Peter's National Seminary in Garsfontein, Pretoria. He continued his studies in Theology and, in 1994, graduated with a Master's degree in Systematic Theology from the University of South Africa. The following year he was awarded a scholarship to the Katholieke Universiteit Leuven, Belgium where he completed a Master of Philosophy in 1995 and a Doctorate in Philosophy in 1998. Between 1999 and 2005, he was Rector of the Cape Town Diocesan Major Seminary and Episcopal Vicar for Catholic Schools and Education of the Archdiocese of Cape Town. During this period he published many articles and edited two books. In 2008, he was appointed President of St Augustine College of South Africa, Victory Park, Johannesburg and Senior Lecturer in Philosophy and Theology.

Editorial

Dolina Dowling

South Africa finds itself confronted by two interrelated socio-economic imperatives. The first is the challenge of responding to the demands of the emerging knowledge economy. The skills and competencies required are radically different from those of agricultural and industrial economies. Unlike the latter, whose primary resources are land and raw materials, the knowledge economy increasingly relies on the sharing, dissemination and exploitation of knowledge, as well as its creation. Success in this economy is dependent on, *inter alia,* high level human resources and communication technologies. However a majority of South Africans are still only equipped for employment in the agriculture and extractive economy.

The second imperative is that of increasing access to higher education. Unfortunately higher education has not yet come to terms with the challenges and demands of the knowledge economy. This is underscored by the high rate of unemployment in South Africa. Each year a large number of graduates join the ranks of the unemployed since they lack the knowledge and skills needed by a knowledge economy. Indeed statistics issued by different organisations show alarming trends in unemployment. For example, one agency found that South Africa has an unemployment rate of 25.2% - i.e. 4.3 million people - and of this number 75% are the youth. Hence there needs to be renewed and vigorous efforts by the education sector and tertiary education in particular, to ensure that this generation of young people does not become another 'lost generation'.

Without a successful education experience the majority of the youth in South Africa have little prospect for employment at all; never mind meaningful and satisfying employment. From a utilitarian perspective this is not a tenable prospect. A country depends on its young people to acquire skills and knowledge and to be able to use their talents to contribute to its continuing economic growth and prosperity. Hence there is the need for access with success. In this sixth edition of *The Journal of Independent Teaching and Learning* most of the papers are concerned with meeting this desideratum.

Education also functions in another way. It provides a learning environment in which young people can expand their knowledge base outside their chosen field of study to develop into well-rounded people and so lead more fulfilled lives. This can give them the confidence to participate in civil society in a way that contributes to the social flourishing of the country. It helps to create a society that is at ease with itself and in which there is a shared mores.

Perhaps even more important is the idea that human beings are free, autonomous, self-determining agents who aspire to gain transcendence, to fulfil their potential, become the person they want to be, and so want

to define for themselves their purpose in life and to make a positive contribution to the common good. Education is the vehicle through which they have the best chance to succeed. This point lies at the core of the first article. The author uses the philosophies and teachings of the ancient Greeks to show why the teachings of the Sophists led to philosophical confusion and why their theories could not provide the basis for defining the meaning of one's life. There are no external reference points. Using the works of three ancient philosophers as a counterpoint, and drawing on Plato, he builds a persuasive case about knowledge, justice, the good life and the role of education. Through highlighting what education is not, he shows what it needs to be. In his discussion of the ancient Greeks he draws parallels with education in South Africa today and the dilemma facing the youth.

The other articles in this edition explore different aspects of teaching and learning. The second contributor is concerned with assessment practices. Her thesis is that if student learning is cumulative they will be more able on completion of their studies to apply their knowledge and skills in industry. As indicated above, this is one of the desiderata that is required of tertiary education.

In the following four papers the authors deal with issues of success. Given the large numbers of students that enter higher education from disadvantaged backgrounds and are underprepared for higher education, interventions are needed to support them so that they can succeed in their studies. In the third article the authors show the importance of cultivating resilience in students so that they can achieve their goals. The argument is that it is the responsibility of higher education institutions to put in place appropriate support mechanisms and ensure that students make use of these. This will improve throughput and retention.

The author in the fourth article is concerned with the alienation that disadvantaged students in particular experience when they enrol in a higher education institution. His case study shows that by using email messages as one form of support for newly enrolled students this creates a pedagogy of caring which assists students to overcome the difficulties and challenges they face both in their studies and in adapting to a new culture. The fifth author demonstrates that an extended learning curriculum elicits good results in achieving access with success as well as creates a social support network for newly enrolled students. The benefits of the extended learning curriculum as opposed to a foundation course are highlighted.

Lastly in *Practitioners' Corner*, the authors examine a case study on collaborative learning in mathematics. The study shows that students learn more easily in groups and an added benefit is that the network created through these learning groups provides social forms of support, which helps them as they adapt to the university environment.

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Three Sophists - what education must not be!

Michael Johann van Heerden - St Augustine College of South Africa

ABSTRACT

The aim of this essay is to approach the question of the task of tertiary education from a new angle. It seeks to examine some of the issues of the malaise among contemporary students ***via negativa****, i.e. by examining three thinkers from antiquity (Sophists) it is argued we have a window on what tertiary education should not be doing in our own time to address this malaise. This is because not only was the Greece of their time beset with similar problems, but also because the Sophists,who had a view on education that was primarily pragmatic and reductionist, fuelled this sense of being in an ethical limbo. Their view on education, it is argued, does not help the malaise among our youth, but only entrenches rampant professional greed, a sense of historical disconnectedness and a lack of overall vision. This in turn cripples the imagination, which should be the locus in which life's meaning is situated and in which a student is invigorated to take on the challenges of the 21st century.*

INTRODUCTION

Much has been written recently as to what the shape of academia should be in the 21st century. One might even be tempted to tire of the plethora of articles written around the functions of teaching and learning, research and social outreach. However, because of the inherent contradictions between many of these models, it might help if we understood a bit better what it **should not be**. To guide this discernment I have chosen three of the prominent Athenian Sophists of the fourth century B.C.[1] I have made this choice for two reasons. The first is **ideological**: I believe that, since their teachings instigated a counter-reaction that was arguably the birth of the ideal of higher learning, to understand where they went wrong might help set the direction of our discourse. Originating in the genius of Socrates, the Academy and the Lyceum, established respectively by Plato (B.C. 428-348) and Aristotle (B.C. 384-323), were colleges founded to counter the teachings of the Sophists. A second reason for choosing the Sophists is **historical**: an analysis of the circumstances they found themselves in shows uncanny similarities to our own in Africa today: the struggle to establish young democracies, the collapse of the old orders, the fluctuation between periods of economic prosperity and recession, a widening gap between rich and poor, rapid urbanisation and abusive leadership - with the resultant conflicts (including xenophobic attacks) between the peoples and

1 The Sophists were an itinerant group of lecturers who gave courses: 'mainly on rhetoric and the art of getting along, in return for fees from their audiences' (Urmson, 1985: 270-271). Their encyclopedic knowledge of the different cultures of the time made them sceptical about the possibility of attaining any objective truth or universal set of moral norms. 'It was their skepticism and relativism that made them suspect … they developed the reputation of gathering young men from good families only to lead them in a critical and destructive analysis of their traditional religious and ethical views' (Stumpf, 1988: 31).

regions affected, to name just a few. These uncertainties were ultimately aggravated by the teaching of the Sophists for if, as the Sophists claimed, humans are the measure of all things and success is the sole criterion of truth, it is difficult to see how a united effort for the common good could be born to face these challenges.

Admittedly, the Sophists have received somewhat of a bad press, and their educative efforts have been revisited by many scholars, such as Werner Jaeger (1939) in his *Paideia*. One author has likened them to 'Encyclopaedists of culture', or 'Polymaths', who 'accumulated facts from which they proceeded to draw conclusions' (Copleston, 1985: 82). Their breadth of view generally made them advocates of Panhellenism, a doctrine sorely needed to unify the Greek city states and end the internecine conflicts between them. But, the undisputed error of their ways was that, while some of their levelling-out techniques were undoubtedly needed, their sceptical tendencies did not 'put anything really new and stable in place of old convictions which they tended to unsettle' (Copleston, 1985: 84). Further, because their ideologies differed widely, the Sophists were really an aggregate of specialists, with no united vision. This tended to deepen the malaise among the youth that they taught - a malaise that is alluded to in many of Plato's dialogues as being characterised by three pertinent factors: a lack of human purpose, a broken sense of belonging, and a crippled imagination - a combination that can become corrosive to the tasks faced by society at large. This corrosion

> …becomes most obvious in questions of ethics. If man is really the measure and if success is the criterion, it is difficult to see why a particular man should not commit any number of crimes as long as he can get away with them … people were bound, while accepting the fact, to wonder what had happened to the old ideas of "justice," "truth" etc. (Warner, 1958: 51).

THREE SOPHISTS

Thrasymachus of Chalcedon

In Plato's *Republic* (Plato, 1987: 17-42; Book 1, Part 3: 337-354) our first Sophist, Thrasymachus, is portrayed as holding to the idea that 'might is right'.[2] Justice is defined by the laws enacted by the ruling party, whether it be a monarchy, an oligarchy or a democracy, and these laws will always serve the interests of those in power. Not only is power that which defines what is right, but Thrasymachus further contends that the unjust person is positively superior in character and intelligence. The use of the word 'unjust' is merely one that portrays the balance of power.

> If you are caught committing such crimes in detail you are punished and disgraced … But when a man succeeds in robbing the whole body of citizens and reducing them to slavery, they forget these ugly names and call him happy and fortunate … So we see that injustice, given scope, has greater strength and freedom and power than justice (Plato, 1987: 27; Book 1, Part 3: 344, b-c).

Plato's response to the idea that people should aggressively pursue their own interests 'in a virtually unlimited form of self assertion' (Stumpf, 1988: 33) is twofold: first, he mentions that if anyone be a true professional, the very nature of one's effort is directed towards the realisation of one's craft - which, in turn, serves the common good in a particular way. One's own interests are secondary and flow from the realisation of the first end. Second, Plato also mentions that, if one is not guided by justice, then, not only does one become ineffectual in the end (because of the dissension that ensues); but, one's own nature is compromised and this 'division of purpose' sets one at variance with oneself.

2 In *The Republic* (Plato, 1987: 44-55; Book 2, Part 4: 358-367) two other, lesser known Sophists - Adeimantus and Glaucon - are presented as holding the same view.

> Injustice, then, seems to have the following results, whether it occurs in a state or family or army or anything else: it renders it incapable of any common action because of factions and quarrels, and sets it at variance with itself … And it will produce its natural effects also in the individual. It renders him incapable of action because of internal conflicts and division of purpose, and sets him at variance with himself and with all who are just (Plato, 1987: 38; Book 1, Part 3: 352).

Plato, however, in no way succeeded in putting Thrasymachus to rest. His thought has resurfaced periodically through the ages. One has only to think of *The Prince* by Niccolò Machiavelli (A.D. 1469-1527), *Leviathan* by Thomas Hobbes (A.D. 1588-1679) and *Beyond Good and Evil* by Friedrich Nietzsche (A.D. 1844-1900). Machiavelli advocates the view that people will aggressively pursue their own interests and that a good statesperson will be able to manipulate this fact to his/her own benefit; a view reinforced by Nietzsche who sees a natural leader as being above the petty claims of morality and justice. Hobbes, while endorsing the idea that leadership originated in a social contract, proposed the thought that only after this transfer of power had been made from people to leader, could one speak about justice - in fact, the decisions of the leader, being the source of justice, meant that no decision could be unjust.

But, how does all of this affect our discussion?

I think in a number of ways. The most obvious is that it raises the awkward, but ever self-regenerating, question as to what is the **purpose of life**. The first Greek academies were formed to reinstate the knowing subject as an ethical being - charged with the improvement of his/her own life and the betterment of the lot of his/her community. For the great Greek thinkers the purpose of life was justice: the right ordering of one's life and that of society. Power and privilege, if sought as ends in themselves, led to the disintegration of justice. I have also noted that the first element of the malaise that infected the Greek youth was precisely a lack of human purpose or an overall vision to guide life. This we see in our own time as well. Bombarded with a barrage of notions of what the 'good life' is, it is hardly surprising that confusion has set in.

In *The Idea of a University*, one of John Newman's (A.D. 1801-1890) central theses is that the university should be producing people with an appreciation of the inter-connectedness of reality, which is what he depicts as the 'teaching of universal knowledge' (Newman, 1902: 20). For Newman, it is this vision that forms the basis of a sense of human purpose:

> That only is the true enlargement of mind which is the power of viewing many things at once as one whole, or referring them severally to their true place in the universal system, of understanding their respective values, and determining their respective dependence (1902: 137).

Universal knowledge can only be secured in an institution of higher learning where each science is awarded its place and autonomy. But, no one science must be given an importance at the expense of another. Core integrative disciplines, such as philosophy and ethics, can help to ensure this balance. We must ask ourselves continually as to how far tertiary education has aligned itself with the powers that be: producing specialists in their fields with the sole ambition of succeeding at any cost. Not that I think excellence should not be rewarded; but, should we not be preparing people who are content to make their contribution to the common good by pursuing that excellence in their respective crafts and not just monetary reward? Most tertiary institutions, by the nature of their task instil in students a sense of excellence and the purpose of their crafts, but, what has changed is how these are evaluated. In the past they had intrinsic value as contributing to the common good. Today, however, the benchmark of excellence has shifted progressively to material success. If excellence is grafted only onto the purpose of success, how will people contend with the inevitable disappointment of being second best or having to live a life that is less than perfect? How will they succeed in resisting the temptations of the shortcuts to be on top of the

pile? Are these not the 'internal conflicts and division of purpose' that Plato spoke about that set a person 'at variance' with him/herself?

Another more insidious way in which this brand of Sophism has crept into our institutions is, I believe, in the almost uncritical acceptance of the most radical form of ultra-Darwinism.[3] Here the survival of the fittest, the most powerful, has become the motif of life at every level, and chance its only restraint. Recently we celebrated the 150th anniversary of the publication of Charles Darwin's (A.D. 1809-1882) *Origin of Species*; a book which contains insights that should rightly affect how we think about almost every topic. However, ultra-Darwinism was quick to become the dominant interpretation of Darwin's insights and was popularisedin the nineteenth century by Nietzsche (A.D. 1844-1900).

> 'Exploitation' does not pertain to a corrupt or imperfect or primitive society: it pertains to the *essence* of the living thing as a fundamental organic function, it is the consequence of the intrinsic will to power which is precisely the will of life (Nietzsche, 1978: 175).

If genes - rather than organisms or personalities - become the fundamental units of selection, then persons are reduced merely to the sum of their genes and the world is just an arena for a fight to the death. This strange inversion of the purpose of human life has affected sciences as widely ranging as sociobiology and jurisprudence. People see themselves as victims of their biology and this undermines the critical role that the conscience should have in the formation of their character. However, with the collaboration between sciences and the humanities, wider visions of evolution have begun to surface in a broad corpus of thinking termed 'meta-Darwinism'. I mention, to illustrate my point, just two such theories: the holon theory and endosymbiosis. The holon theory was introduced by Arthur Koestler (1978) more than a quarter of a century ago and postulates that whatever exists - in whatever field of enquiry - exists as both a whole and a part. Every whole forms a part of something larger, without ceasing to be a whole of its own parts. This paradox of autonomy and interdependence is an apt delineation for what any tertiary institution is, as well as for what its role in society should be. It also gives a more universal view of the purpose of life: at each level of supervenient synthesis a broader and more comprehensive purpose emerges that cannot be reduced to the mere sum of its parts.[4]

In the theory of endosymbiosis, biologists such as Lynn Margolis (Fowler & Kuebler, 2007: 320-321) focus the theory of evolution not just on competition and conflict, but also associations and cooperations between organisms. These symbiotic relationships, they contend, are of escalating value as the structures involved become all the more complex. In other words, as structures of higher complexity emerge at each new level so do the structures of their relationships and the importance these have for their evolution. Human purpose, therefore, as reflective of the most complex of known structures, i.e. the human psyche, would be based more in cooperation than competition. Education has the awesome task of deciphering the precise nature and implications of this relationship between justice to the self and justice to all, without capitulating to the fundamentalism of ultra-Darwinism.

> How to interpret the Epic of Evolution is neither obvious nor simple. It requires romantic vision and philosophic rigor … an interpretive community that seeks to integrate knowledge and wisdom from

3 Fowler and Kuebler contend that there are four main positions in the evolution controversy (2007: 30-34). These are: the Neo-Darwinians (amongst who are the ultra-Darwinians); the Creationists; the Intelligent Design advocates; and the Meta-Darwinians. I count myself amongst the last group that are united in their conviction that there are more mechanisms at play in evolution than mere survival of the fittest and chance mutations.

4 Supervenience is the relation that exists between different levels of discourse or between different levels of reality. While a supervening level cannot exist without the subvening levels that comprise it, nonetheless, the novel properties and purposes that emerge at the supervening level cannot be reduced merely to a sum of the subvening levels (Kim, 1995: 582).

> across the disciplinary boundaries of our compartmentalized modern university and our fragmented postmodern society (Grassie, quoted in Dowd 2009:139).

Protagoras of Abdera

Among all the Sophists that came to Athens, Protagoras of Abdera was the most influential and enjoyed the personal favour of Pericles. We are told, for example, that he was entrusted by Pericles with the task of drawing up a constitution for the Panhellenic colony of Thurii - founded in 444 B.C. (Copleston: 1985: 87). Protagoras is credited by Plato (in the dialogue *Theaitetos*) with the saying that 'man is the measure of all things' (Plato,1961: 79; Par.: 152ff). While there is some opinion today that with the term 'man', Protagoras did not mean the individual person, but the community or the whole human species, this does not seem to be borne out in any of the dialogues of Plato. Since, then, for Protagoras knowledge is limited to our perceptions - which differ with each person - there can be no objective standard by which to judge the veracity of knowledge. This position, when embraced, inevitably lands one in varying shades of cultural relativism and post-modern solipsism.[5] Plato's immediate response is to say that, if this be the case, then all academies should close shop, for this position undermines the very project of education itself.

> … every man is to have his own beliefs for himself alone and they are all right and true: on these assumptions, I ask you my friend, how comes it that Protagoras is so wise as to justify setting up to teach others in return for large fees…when each of us is the measure of his own wisdom? (Plato, 1961: 91; Par.: 161, c).

Plato contends that this position reflects a gross misunderstanding of the very act of knowing. We have already noted that the project of the earliest academies was to reinstate the centrality of the knowing subject and the objectivity of knowledge. Plato acknowledges that the cosmos can best be described as a unity of developmental systems (Plato, 1961: 84-5; Par.: 156, b), which means that all experiential knowledge must grow and change in accord with that development. All knowledge is unfinished; but, the fact that it is in process does not mean that there has not been the refinement of understanding and insights, nor does it mean that all knowledge gleaned so far is relative. At every advance, the knowledge judged to be a true belief should be relatively more adequate than that which preceded it. On the other hand, the very act of knowing demonstrates that each person (arguably because our intellect has been forged by the very processes of that we study) has within him/herself the innate 'standard by which to judge' their experiences and beliefs (Plato, 1961: 111; Par.: 178, c). This standard Plato explains with an analogy: imagine a person in an aviary; the pigeons flying around being our thoughts and the person being the mind. The act of knowing means that we are able both to hold in our hands the right pigeon (i.e. we are able to extract from our experience that which is relevant to knowledge) and get the right pigeon to fly to our hands when we need it (i.e. to extract from memory that which forms the basis of comparison for any judgement) (Plato, 1961: 138-9; Par.: 198).

Education is the very process by which people are, firstly, trained to be both more discerning in what they extract from experience and, secondly, are equipped in memory with the right thoughts that enable broader and more comprehensive judgements. Again we have to admit that Plato was unable to put the thinking of Protagoras to rest. From the thinking of David Hume (A.D. 1711-1776) and post-modern,

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5 Solipsism is an extreme position that derives its name from the Latin: *solus ipse* (I alone). Solipsism contends that, since all I know comes from my perceptions, which are unique to myself, I have no guarantee that anything apart from myself actually exists. Interestingly enough, the most extreme statement of this position ever given was by the Sophist, Gorgias. He contended that we can never know whether anything really exists and even if we did know (for example, if we knew ourselves to exist), we could not understand that existence, as we have no fixed point of reference, which also makes communication of that knowledge to others impossible (Stumpf, 1988: 33).

conceptual constructivism, this relativism continues to bedevil the academic enterprise. Côté & Allahar show how it has even crept into standards of marking.

> At the same time, the 'post modern view' gained ascendance among many faculty members: standards are relative and students' knowledge needs to be accepted as comparable to that of professors'. When professors believe in relativism … they become less confident in their judgements of student's work, and more likely to reward student performances based solely on students' pre-formed opinions … (Côté & Allahar, 2007: 163).

More importantly, this form of relativism has the direct effect of destroying the **sense of belonging** of our generation, a result anticipated by both Plato and Protagoras himself (Plato, 1961: 104-5; Par.: 172, a). If everything in our culture is relative, then each individual is the final arbitrator of the truth and there can be no sense in adhering to social codes and customs that do not suit his/her subjective definitions. This cultural relativism gives a directionless freedom that does not enhance a person's well-being; but, ultimately, deepens their sense of *anomie*[6] and lack of belonging. One of the primary tasks of educational institutions should be to advance the cultural appreciation of their students and their sense of being rooted.

In any culture there are enabling elements and disenabling elements. Starting with the valuable or the enabling elements within the student's own cultural perspective, educators should weave this with their knowledge and experience by careful steps of explanation and discussion. Cultural relativism thrives on the notion that, because cultures are human constructs, they are all equally arbitrary and dispensable. Aristotle, in both his *Ethics* and *Politics*, acknowledged the fact that all cultures have elements that are relative to the history and geography of a particular people. This is why one cannot legislate as to which of the three forms of legitimate government would suit a particular culture: monarchy, aristocracy or polity (what we call democracy today). However, whatever form is in place, it should govern for the common good of all the people. The most insidious presumption of a corrupt democracy, Aristotle holds, is to assume that because people and cultures are similar in some respects, they are necessarily similar and equally arbitrary in all respects (Stumpf, 1988: 105). As the equalising tendencies of globalisation continue unabated in our time, it is imperative that universities and higher institutions of learning be the think-tanks where new cultural forms are born - preserving the best of the past syntheses. These must be able to give a sense of belonging to a technological generation. This will take discernment to judge what the enabling elements within each culture are and how these can best be developed in personal and ecologically friendly ways.

> What is wrong with our culture is that it offers us an inaccurate conception of the self. It depicts the personal self as existing in competition with and in opposition to nature … We fail to realize that if we destroy the environment, we are destroying what is in fact our larger self (Mathews, quoted in Dowd 2009: 290).

Prodicus of Ceos

This brings our discussion to the last of the three Sophists: Prodicus, who came from the island of Ceos in the Aegean. Prodicus, was undoubtedly an expert in linguistics;[7] but, he is arguably best known for his theories on religion. For him, God is really a human construct: religion begins with animism,in which the natural elements are worshipped; then, as people become more civilised, religion becomes a reflection of their arts and technological endeavours; finally, however, religion will become redundant and will be

6 *Anomie* was a term coined by Emile Durkheim to describe the sense of being without roots and connections among youth in urban areas that lack social stability (Reid, 1979: 204).

7 In Plato's *Cratylus*, he is described as giving a 'complete education in grammar and language' (Plato, 1952: 85; * 384b).

replaced by scientific paradigms (Copleston, 1985: 92). His position seems to be an early anticipation of the thinking of Auguste Comte (A.D. 1798-1857). Comte's positivistic philosophy postulated what he called the law of three stages (Magill, 1968: 588-593). In the theological stage of society, people invent gods and are held bound by superstition; in the metaphysical stage, the intellect deifies itself and religion becomes a sectarian phenomenon; finally, in the positive stage, the sciences provide certainties that make a new social order possible and inspire a moral regeneration. In our post-modern world, the sciences are a lot more humble about what they can achieve and the limits of their discourses. For example, it is generally clear to most post-modern thinkers that the physical sciences cannot, on their own, provide the sorely needed moral regeneration; nor can they provide any meta-narrative beyond the strictures of their empirical methodologies. The resurgence of religious fundamentalism and the stand-off between many religious thinkers and scientists indicates, however, that the quest for a meta-narrative is part and parcel of the human condition. Hans-Georg Gadamer (A.D. 1900-2002) sees this quest as arising in the imagination and holds it to be an essential part of each person's self-transcendence (Gadamer, 2003: 80-81). Commenting on Plato's notion of a wise person, Gadamer contends that

> … Plato is interpreting the being of the human being in the great scope of cosmic events in that he unifies the two aspects of self-movement and 'logos' in mythical metaphors … is Heidegger not also justified when he discovers a Heraclitus who is enquiring back behind metaphysics, yet one in whom all things play into one another? Could he not also have discovered Plato's dialectic, in which the play of these ideas is played out further? (Gadamer, 2003: 81).

I have mentioned as the third element of the malaise of the Greek youth (and the youth of our time) - **a crippled imagination**. I agree with Gadamer that this can only be restored to health through a living dialectic - akin to the method prescribed by Plato. In the context of higher education this means that there should be a living discourse between the various sciences, one in which none is marginalised. This dialogue will probably entail the reformulation of many theological doctrines to bring them into existential fitness with scientific truths; but, it will also entail the physical sciences seeking an inclusive metaphysics in which all the diverse human experiences (including the religious) can be interpreted. While, strictly speaking, the province of the philosopher, this arena - in which the imagination thrives - is the result of a common reflection of all involved in the quest for truth. Many authors contend that higher education is determined to marginalise the humanities or reduce them merely to hermeneutics. If this be the case, it is another example of the exclusion of a vital corrective and contribution in the dialectic of knowledge. The stifling of the dialogue of knowledge is one of the most insidious forms of fundamentalism which kills the imagination. Fundamentalism reduces the complexity of life to some comfortable truths that are then given a prominence that distorts other truths, crippling the sense of wonder and the power of the imagination to find more inclusive narratives. What is particularly alarming is that, while religious fundamentalism might be frowned upon by most academic institutions, what seems to be encouraged under the banner of academic freedom is the equally corrosive and fundamentalist influence of what has been coined the 'new atheism'. Roy Varghese describes the chief target of the new atheists as:

> …organized religion of any kind, time, or place. Paradoxically the books themselves read like fundamentalist sermons … they refuse to engage the real issues involved in the question of God's existence … they show no awareness of the fallacies and muddles that led to the rise and fall of logical positivism (Varghese, 2008: xvi-ii).

CONCLUSION

I heard it once said that Mark Twain, when asked to comment on the state of universities, wryly responded that universities are full of knowledge: the freshmen bring a little in, the seniors take none away, so the knowledge accumulates. At the outset, I mentioned that the Sophists were an aggregate of specialists,

without a united vision. I believe that if institutions of higher learning today are no more than that aggregate, then there is a danger that Twain will be proved right. If they are to provide the critical role envisaged by the great Greek philosophers then they must reinstate the thinking subject as the source of objective truth and as an ethical being capable of realising the ideals of justice. To do this will help to counter the malaise of our time. People are essentially self-transcending in their quest for purpose and belonging; equally the whole project of knowledge could not have started or sustained itself without the imagination. Perhaps at the kernel, the role of a higher education institution today is merely to restore people to their real selves. Newman seems to sum this up when he says that the university is really there to refine that method which is anyway so 'natural to ourselves' (1902: 75).

> The intellect of man … perceives in sights and sounds something beyond them. It seizes and unites what the senses present to it. … In a word, it philosophizes; for I suppose Science and Philosophy, in their elementary idea, are nothing else but this habit of *viewing*, as it may be called, the objects which sense conveys to the mind, of throwing them into system, and uniting and stamping them with one form (*ibid*).

REFERENCES

Copleston, F. (1985) *A History of Philosophy. Volume 1. Greece and Rome*. New York: Doubleday.

Côté, J.E. & Allahar, A.L. (2007) *Ivory Tower Blues. A University System in Crises*. Toronto: University of Toronto Press.

Darwin, C. (1952) *The Origin of Species by Means of Natural Selection*. Chicago: William Benton.

Dowd, M. (2009) *Thank God for Evolution*. New York: Penguin.

Fowler, T.B. & Kuebler, D. (2007) *The Evolution Controversy. A Survey of Competing Theories*. Grand Rapids, Michigan: Baker.

Gadamer, H. (2003) *The Beginning of Knowledge*. New York: Continuum.

Hobbes, T. (1952) *Leviathan*. Chicago: William Benton.

Jaeger, W. (1939) *Paideia*. (Trans. G. Highet) Oxford: Basil Blackwell.

Kim, J. (1995) 'Supervenience' In S. Guttenplan (Ed.) *A Companion to the Philosophy of Mind*. Oxford: Blackwell. pp. 581-583.

Koestler, A. (1978) *Janus*. London: Hutchinson.

Machiavelli, N. (1997) *The Prince*. (Trans. C.E. Detmold) Hertfordshire, UK: Wordsworth.

Magill, F.N. (Ed.) (1968) *Masterpieces of World Philosophy in Summary Form*. London: George Allen & Unwin.

Newman, J.H. (1902) *The Idea of a University*. London: Longmans, Green and Company.

Nietzsche, F. (1978) *Beyond Good and Evil*. (Trans. R. Hollingdale) New York: Penguin.

Plato. (1952) Cratylus. (Trans. B. Jowett) Chicago: William Benton.

Plato. (1961) *Parmenides, Theaitetos, Sophist, Statesman*. (Trans. J. Warrington) London: J.M. Dent and Sons.

Plato. (1987) *The Republic*. (Trans. D. Lee) London: Penguin Books.

Reid, S.T. (Ed.) (1979) *Crime and Criminology*. New York: Holt, Rinehart and Winston.

Stumpf, S.E. (1988) *Socrates to Sartre: A History of Philosophy*. New York: McGraw Hill.

Urmson, J.O. (1985) 'Sophists' *The Concise Encyclopedia of Western Philosophy and Philosophers*. J.O. Urmson (Ed.) Bergvlei, South Africa: Century Hutchinson, pp.270-271.

Varghese, R.A. (2008) 'Preface' In A. Flew *There is a God. How the World's Most Notorious Theist Changed His Mind*. New York: Harper Collins.

Warner, R. (1958) *The Greek Philosophers*. New York: The New American Library.

Lighting fires from fires: A description of the research entitled 'Kindling Fires'

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ABSTRACT

This study examined students' responses to assessment for evidence of cumulative learning. The hypothesis was that if students' learning is cumulative, then they will be able to apply their knowledge and skills productively in industry. The research used Maton's (2009) concept of 'semantic gravity' as a tool to determine the relative context-dependency of the students' knowledge. A higher education institution provided the Journalism curriculum for this research. Assessments were coded according to 'knowledge principles' described by the research tool. The coding allowed these responses to be given a 'weight' of semantic gravity, i.e. a level of context-dependency. The codes were then examined for patterns that would reveal evidence of cumulative learning. The study found evidence of cumulative learning, but because of certain limitations, this learning was not fully developed. The findings of this research have implications for an enriched understanding of the potential for students to be productive after they graduate.

The mind is not a vessel to be filled but a fire to be kindled.
Plutarch (c.46–119 AD)

INTRODUCTION

The research entitled 'Kindling fires' was inspired by Maton's (2009a) theoretical concepts of 'cumulative' and 'segmented' learning. Cumulative learning means that students are able to use new learning to build on their previously acquired knowledge or skills. It means that graduates will be able to apply what they have learnt during their studies to unfamiliar situations in industry. Segmented learning means that students cannot make significant links between the knowledge and skills they have acquired, and new learning does not develop from these. They will not be able to take what they have learnt beyond the culmination of their studies. Maton (2009a) theorises that cumulative learning is based on the relative context-dependence of knowledge. If students can abstract knowledge from the context in which it is learnt, then they should be able to use it in an unfamiliar context. Conversely, students mired in the learning context may not be able to use their learning in any context other than that in which it was learnt.

The research examined students' responses to the assessments for Newswriting 2, a module in the second year of a private, higher education Journalism qualification, for evidence of cumulative learning. The focus was on whether the curriculum constrained or enabled cumulative learning. The conceptual tool developed for this research was used to code the students' responses by the inherent knowledge principles, and nominally ascribe a 'weight' of semantic gravity.

This paper will provide a synopsis of this research, outlining what prompted the study and the context, the theoretical grounding of the research, the method used, and the main points from the analysis of the results.

RELEVANCE TO SOUTH AFRICA'S EDUCATIONAL CONTEXT AND INTERNATIONAL INTEREST

The South African government has been attempting to develop and democratise education simultaneously. The Education White Paper 3 of 1997 summarises these competing priorities. On the one hand, higher education must

> address the development needs of society and provide the labour market, in a knowledge-driven and knowledge-dependent society, with the ever-changing high-level competencies and expertise necessary for the growth and prosperity of a modern economy …

on the other, higher education must help transform South African society, as

> … part of the broader process of South Africa's political, social and economic transition, which includes political democratisation, economic reconstruction and development, and redistributive social policies aimed at equity (Department of Education, 1997: 1,3).

Among the mechanisms the government has used to facilitate these changes is a programmes-based and outcomes-based definition of higher education, which includes the modularisation of qualifications and the explication of learning outcomes. Many of these changes indicate that the government encourages curricula to be 'supportive of what they see as the needs of the economy' (Moore & Young, 2001: 447). The focus of this approach is the trainability, employability and assumed productivity of those receiving an education. There is an emphasis on preparing students for lifelong learning and on education that will lead them into useful vocations.

The Journalism programme and its assessments, on which this research focuses, is an example of a vocation-driven curriculum. This two-year diploma is offered through a private provider that operates in South Africa. My study considered whether this Journalism curriculum might be helping or hindering the kind of learning that graduates need in order to be productive after completing their studies. The intention was to see whether this curriculum has the potential to produce graduates who are lifelong learners. The selected window for this examination was the students' responses to the assessments in one of the second-year modules of this Journalism curriculum - Newswriting 2.

Writing in Australia, Maton (2009a) frames the issue of lifelong learning from the point of view of what he calls 'cumulative' and 'segmented' forms of learning. Maton says policy dictates that curriculum design must encourage cumulative learning to create graduates who are able to adapt to the requirements of the rapidly-changing working world. In 2009, he examined a study conducted by Bennett in 2002 in Australia, for evidence that the selected curricula, and their assessments, actually did what they claimed, that is, enable cumulative learning. This research emulated Maton's investigations (2009a) and reflected on his findings from a South African perspective.

KEY CONCEPTS

The key concepts relevant to this research are: cumulative and segmented learning, context-independent or context-dependent knowledge, and semantic gravity. Students who experience cumulative learning should be able to take the higher-level knowledge principles (which consist of accumulated information and skills) they have acquired and use them wherever they find employment. This research examines the

students' responses to assessments to see whether they are using these context-independent, higher-order knowledge principles.

The student who experiences cumulative learning will be able to use the information and skills beyond the context in which they were learnt. This creates context-independent knowledge. If the student experiences segmented learning, then the information and the skills will require the same context to be useful or meaningful. This creates context-dependent knowledge. But what is context? I separated context into three types: Context 1 is the students' Newswriting 2 manual, which contains the selected facts and skills upon which students will be assessed; Context 2 is the created intermediate context - the abstracted version of these facts and skills, modelled on how they would be used in the media industry; and Context 3 is the real-life practice of journalism. If the responses are less context-dependent (freed from Context 1 and situated within Context 2), then the curriculum enables cumulative learning, and we can assume that the students will have gained knowledge and skills that can be applied beyond their qualification (Context 3). If the responses show that learning is stuck in the context from which it came (Context 1), then the students will have experienced segmented learning, and thus will be unable to make immediate and effective use of what they have learnt on graduating.

MATON'S THEORIES AND RESEARCH

Maton (2009a) extends Bernstein's concept of the pedagogic device (2000). While accepting that Bernstein's model addresses the production of new knowledge in intellectual fields, he suggests that Bernstein's ideas can be developed further if we distinguish between hierarchical and horizontal curriculum structures. A hierarchical curriculum structure is one in which the information builds on the previous year's or module's learning 'through integration and subsumption' of knowledge (2009a: 45), whereas a horizontal curriculum structure increases knowledge through 'segmental aggregation' (*ibid*).

Maton's theory provides a lens for examining the way students learn. If they develop their understanding by using their previous learning as a foundation, expanding what they know, and by exercising this knowledge in new and unfamiliar contexts, this is 'cumulative learning' (*ibid*). If, on the other hand, they develop their understanding by acquiring knowledge in discrete chunks and are unable to transfer this learning because it is context-specific, then this is 'segmented learning' (*ibid*). Maton relates these two ways of learning to the aforementioned hierarchical and horizontal curriculum structures, and concludes that the former might assist a student's cumulative learning, since it is designed to build on accumulated knowledge, but that the latter might hinder it.

Maton emphasises the relevance of the context-dependence or context-independence of educational knowledge for these forms of learning, which he refers to as 'semantic gravity', the concept he uses to measure 'the degree to which meaning is dependent on its context' (*ibid*: 46). He explains that if a notion is strongly context-bound, meaning that you require an understanding of its context in order to get to make sense of it, then this notion has a strong semantic gravity. Conversely, the weaker the attachment to context is, the weaker the semantic gravity.

This means that cumulative learning, with its emphasis on context-liberated information and understanding, has a weaker semantic gravity than segmented learning, which is rooted in context. Maton asserts that 'cumulative learning depends on weaker semantic gravity and segmented learning is characterised by stronger semantic gravity, constraining the transfer of meaning between contexts' (2009a: 46). This statement leads to his hypothesis that 'one condition for building knowledge or understanding over time may be weaker semantic gravity' (*ibid*).

Maton's examination of Bennett's 2002 study revealed that the students' responses to their assessments reflect their difficulty in separating from the context of their studies and reveal their experience of segmented

learning (*ibid*). He suggests that this is because of 'a mismatch between [the] aim of enabling students to acquire higher-order principles of knowledge and their means, which focus on knowers' dispositions rather than explicitly articulating these principles of knowledge' (*ibid*: 44).

To understand what Maton means by 'knowers' dispositions', we need to review his Legitimation Code Theory. This theory provides a framework for examining what form of knowledge is considered valid in different disciplines and a means of describing the basis for legitimate claims to truth in a field. There are four languages of legitimation or legitimation codes (Maton, 2000, 2006, 2009a,b): a knowledge code, a knower code, an elite code, and a relativist code. Maton hypothesises that a hierarchical knowledge structure (and by extension a hierarchical curriculum structure) is characterised by a knowledge code (what you know) and a horizontal knowledge structure (and by extension a horizontal curriculum structure) by a knower code (who you are) (*ibid*: 46). He uses his Legitimation Code Theory to explain why the students' responses to assessments in Bennett's research did not reflect cumulative learning. He proposes that the emphasis on a knower code in the assessments meant that students responded from a knower code, while what was intended and valued in the curriculum was a knowledge code, as could be seen in the course designers' attempts to encourage cumulative learning. My research suggested that the practice and discipline of Journalism is driven by an elite code and my analysis recommended how the curriculum should respond to this fact.

In this research I examined Maton's suggestion that cumulative learning is dependent on a weak semantic gravity, firstly by loosely ascribing a particular semantic gravity to the Journalism curriculum, and secondly by trying to gauge the potential 'weight' or semantic gravity of students' responses to the assessments in the Journalism curriculum; that is, I investigated how context-bound the students' responses are. The context in this case is the content of the students' Newswriting 2 manual and not the teaching in the classroom. It is important to note that semantic gravity is considered to be an attribute of both the individual assessment questions and the students' responses, and it is these responses that are analysed as samples of the curriculum.

JOURNALISM AS PROFESSIONAL DISCIPLINE AND REGION OF KNOWLEDGE

Certain features of the field of practice for Journalism can make it problematic to translate practice into theoretical knowledge, and thus describe the discipline of Journalism. It is obvious that a good journalist needs to have a background in many subjects, even though, as Vorster admits, 'Journalism as a field does not have a generally agreed-upon coherent body of knowledge which makes up the curriculum' (2009: 140). Barnett would agree with this - when describing vocational pedagogy, he explains that it fills a space between subjects and jobs and that 'academic subjects do not map onto jobs in any very straightforward manner' (2006: 145). When examining knowledge fields, Muller noticed that 'independent disciplines may converge to form a new field, or "region", of knowledge, comprised of clusters of disciplines now come together to focus on a supervening purpose' (2008: 15; italics in original). Academic Journalism can be described as a region of knowledge (instead of a body of knowledge) that provides the collection of meta-theory for a particular professional practice (*ibid*). In fact, Journalism can be described as a region of knowledge that is 'at the interface between disciplinary knowledge and the field of practice' (Bernstein, 2000: 52; Barnett, 2006; Wheelahan, 2007).

Gamble (2009) would refine this by suggesting that Journalism belongs to the empirical domain, the everyday world of practice, and that it specifically takes the form of principled knowledge (based on what Gamble calls the 'discursive principle type'). Journalists often claim to work by instinct, which may just be another way of saying that the principles they apply are very deeply entrenched in the procedures they use. Extracting these principles to create a set of rules to use in developing a curriculum is part of the difficulty. Muller would say that creating a Journalism curriculum is trying 'to "pedagogise" what is essentially contextually tacit procedural knowledge' (2008: 26).

The qualification must make room for the situated knowledge that is related to practical work tasks (Barnett, 2006). Barnett distinguishes between disciplinary knowledge and situated knowledge by explaining that situated knowledge (by its very nature) is 'often trapped within its context of application, while disciplinary knowledge generally aspires to some degree of context-independence' (*ibid*: 146). Hence curriculum developers are faced with dual difficulties: extricating slippery tacit and implicit procedural knowledge from the field of practice, while linking it to meta-principles that exist in a variety of disciplinary knowledge. This is an attempt to design this vocation-related curriculum to 'face both ways', as Barnett (*ibid*) puts it: towards both the practical aspects of the occupation it derives from and the theoretical concepts that explain the underlying processes that influence the occupation.

In this curriculum, we can see an attempt to design 'authentic activities' - 'experiences that reflect real-world ways of knowing and doing … [that] allow learners to transfer knowledge from formal education to practice' (Bennett *et al*, 2001: 73). The intention in getting students to write articles in various news writing styles is to give them some experience of being 'real' journalists.

We know that knowledge from a number of disciplines, as well as procedures from the field of practice, are brought together to create the Journalism curriculum. These different sets of knowledge do not necessarily sit comfortably together. To make sense of the segmented knowledge in this curriculum, the student may need to refer back to the structure and context in which he or she acquired the knowledge, which means that the curriculum could be strongly context-bound. This suggests the curriculum has a strong semantic gravity. However, some parts of the assessments are intended to be 'authentic' and others are intended to encourage students to use higher levels of cognition. This points to an attempt to weaken the semantic gravity, which leads us to wonder exactly which way this curriculum is facing. These few factors might create a 'contextual' tension that pulls in opposite directions and students could be caught in the middle of it.

METHODOLOGY

This research aimed to reveal the form of learning (cumulative or segmented) the Journalism curriculum encourages by focusing on the assessments in one module of the second year of the programme - a sample component of the entire curriculum. I examined whether there is evidence of cumulative learning in the students' responses to assessments, that is, whether the responses are context-dependent (having strong semantic gravity) or context-independent (having weak semantic gravity). If there was this evidence, then it is possible that these graduates will be able to apply their learning to unfamiliar situations after graduation, and therefore be productive in their chosen industry.

The question I asked was:

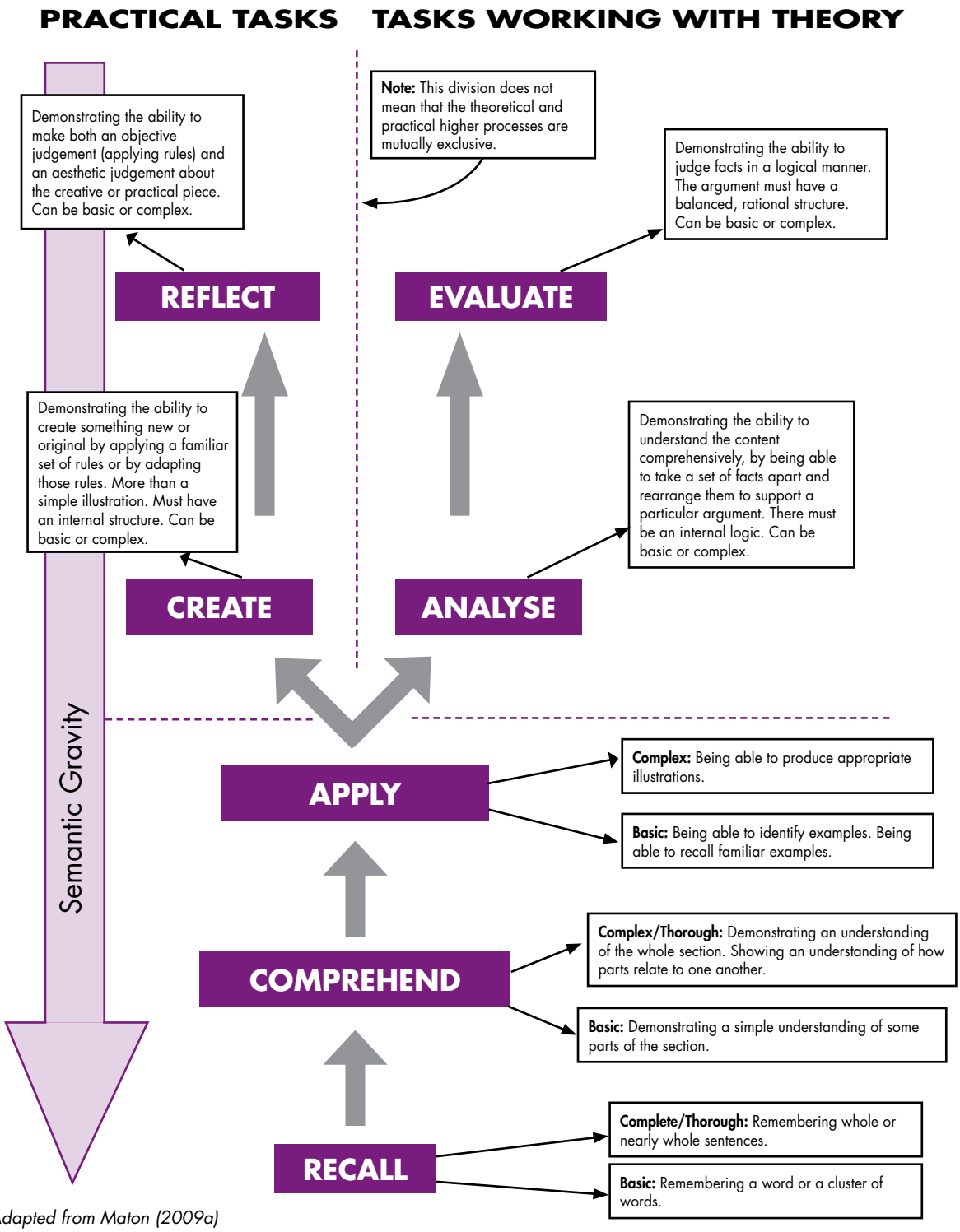
- What evidence of cumulative learning is there in students' performance on assessment tasks in a private higher education Journalism curriculum?

Before analysing the students' responses to their assessments, I reviewed the assessments - both tests, both assignments and the final examination. I studied each question in these assessments and, on the basis of what the question asked for and what the memorandum suggested, I deliberated as to which knowledge principle would be expected in the students' responses and what reference to context (what level of semantic gravity) each question seemed to require. By 'knowledge principle' I mean the categories of knowledge developed for this research project's research tool (see Figure 1).

The students' responses to questions in the assessments were broken up into individual 'units of meaning', which Maton describes as 'passages conveying a single coherent meaning' (2009a: 48). For this data,

this meant reviewing the student's answer as a whole. In some cases, the student's answer was simply one word, or a bulleted list of words or phrases; in other cases, the student's whole article was taken into consideration. Each of the 961 'units of meaning' was coded by one knowledge principle or a sequence of knowledge principles, according to the research tool I developed from Maton's language of description for semantic gravity (2009a). Figure 1 illustrates this research tool.

Figure 1
Diagram of the research tool to measure semantic gravity



Adapted from Maton (2009a)

The concept of 'knowledge principle' can be defined as the cognitive activity the student seems to have used to answer the question: remembering what was learnt, understanding what was learnt, applying what was learnt, and so on. This cognitive activity reflects the 'what' and 'how' of the student's learning with regards to that question, and how context-dependent the answers are. An initial review of the assessment questions, and a few of the students' responses, revealed that the six categories that Maton drew from Bennett's research would be inadequate for describing the forms of learning and thinking in the Journalism students' responses. I needed to re-create categories that would reflect the knowledge principles that the Journalism students were using and at the same time maintain the continuum for measuring semantic gravity.

I decided to use Bloom's Taxonomy of Educational Objectives, despite the debate surrounding this popular tool (1956, revised by Krathwohl, 2002). This taxonomy provided me with a new set of categories: Remember, Understand, Apply, Analyse, Evaluate and Create. Through the iterative process of using this tool, I discovered that Bloom's categories did not do justice to the practical tasks that students were required to perform. For the purposes of this research, I found it inappropriate to rank 'Create' as the highest form, while relegating analysis and evaluation to lower levels. It was at this point that I chose to split the taxonomy after 'Apply' to create two divisions - one for coding practical tasks, and one for coding tasks that involved examining theory. This gave me seven categories, ranked from stronger to weaker semantic gravity.

Like Bloom (1956), (Krathwohl, 2002), I could see that the categories of knowledge principles were not tightly bound. I could see how each category might overlap with the category above it. Students might also 'jump around' between the various levels and not follow a simple trajectory that included all the categories. I also noticed that there were levels within the categories. To illustrate these phenomena I included levels of 'Basic' and 'Complex' for each category of knowledge principle, and used grey arrows to indicate the 'flow' through the categories. I attempted to take into account these 'fuzzy' boundaries and the internal levels while keeping the tool as user-friendly as possible.

This coding was intuitive, based on personal judgement. I was looking to see how closely the student's response matched what the assessment question seemed to expect. For example, if the question asked the student to list five factors, and the student responded by doing exactly that, then I coded the answer as R (for Recall), as the student was merely remembering what was in the manual. However, if the student answered not just by naming each of these factors, but rather by describing them, then the answer would be coded C (for Comprehend). If a student remembered, for example, three of the five factors, but was unsure of the other two and tried to complete the answer by offering an understanding of what they could be, then the response would be coded R (C) (for Recall, with some Comprehend). If a student used Comprehend to answer a simple Recall question, then this was evidence of the use of a higher form of knowledge principle, and thus a weaker form of semantic gravity than was required.

Once I had finished coding the individual student responses, across all of the assessments, I examined the coding for patterns. This was not as straightforward as grouping the units of meaning according to the seven categories of knowledge principles and counting the number of instances: it was more intuitive and imprecise. I examined the trends in the coding to see if one type of knowledge principle was more evident than others. I also looked for anomalies in the students' responses; not necessarily incorrect answers, but whether students were using higher or lower levels of knowledge principles than the question seemed to expect. These observations provided the basis for my analysis.

ANALYSIS OF RESULTS

There did appear to be some evidence of cumulative learning in the students' responses, but the research question asked for 'what evidence'. Four salient observations were drawn from the analysis of the data. Firstly, there appeared to be a gap in this curriculum between practising lower-level knowledge principles, with strong semantic gravity, and practising higher-level knowledge principles, with weaker semantic gravity. Students would try to release themselves from Context 1 when limited by questions that required lower-level knowledge principles, but struggled to be truly successful in using higher-level knowledge principles (with weaker semantic gravity). These two kinds of behaviour could be described as 'overreaching the target' and 'falling short of the target'. I suggested the following reasons for these behaviours.

In terms of 'overreaching the target', students repeatedly 'over-answered' the questions and this indicated that they were unclear as to what was expected of them in assessments. They were using whichever knowledge principles were available in their toolbox of abilities. By pushing beyond the level that is expected of them, these higher education students seem to be straining against the boundaries that hold them. However, in many cases, students were awarded marks primarily for lower-level knowledge principles (like Recall), including reproducing the descriptions of each point of advice, rather than higher-level knowledge principles (like Comprehend). Those who combined these knowledge principles (as many did), did so either to add to their answers to ensure they received as many marks as possible ('over-answering'), or because they could not remember the exact wording of the points of advice but wanted to explain that they understood them. This observation highlights the use of a knowledge code - what is being expected and rewarded is the facts or abstraction directly from the facts, and not the students' personal opinions regarding these facts (Maton, 2009a,b).

'Falling short of the target' is evident when students were asked to produce creative pieces of writing in the form of media articles. Most students were able to use the higher knowledge principles in a basic sense, by building up from lower knowledge principles layered beneath them, but some struggled to produce truly complex creations - ones that had a logical structure and were also original and appealing.

I concluded that students needed to assimilate all levels of knowledge principles properly in order to experience complete cumulative learning. The curriculum may require further scaffolding in between the lower and the higher knowledge principles. I recommended that this Journalism curriculum incorporate further opportunities to practise mid-range knowledge principles to help solidify the students' abilities before moving onto higher-level, more context-independent tasks. This might help alleviate the contextual tension present in the curriculum and aid further cumulative learning.

Secondly, I noticed that some students' responses 'skipped' a knowledge principle and simply used a higher-order one. These responses were rewarded when the student's explanation approximated the correct answer. If the student was guessing, he or she was unlikely to receive marks for that question, despite using a higher-level knowledge principle. The research tool used for measuring semantic gravity represents both a continuum and a hierarchy of knowledge principles, a layering of different types of learning. Students cannot choose to use a single knowledge principle in isolation from the knowledge principles that surround it. To be effective and significant, the skills and learning reflected by knowledge principles cannot be used in a segmented fashion, but must be used cumulatively. What we can see here is that higher-order knowledge principles (with weaker semantic gravity and a looser relation to context) are not sufficient in themselves; to be both correct and meaningful they must contain a foundation of lower-order knowledge principles.

This observation also showed that cumulative learning can never be entirely devoid of context. Weakened semantic gravity, and the consequent cumulative learning, does not imply leaving the base of strong

semantic gravity behind. Weakened semantic gravity means that the load becomes lighter so that the students can take their learning with them. They should still remember the fundamental, abstracted rules that they originally learnt; they have simply acquired context-loosening techniques for using them anywhere. This observation also showed that no matter how adept at writing or persuasive at arguing a student is, part of the answer has to be 'right'. A student's response and supposed learning will be meaningless without some reference to the consensus of information as defined by that region of knowledge.

My findings and observations indicate that to be able to perform effectively in the higher-level practical tasks, students must have thoroughly assimilated the underlying theoretical knowledge base (Wheelahan, 2007; Gamble, 2009). I concluded that no matter how well students are able to abstract what they have learnt, they will always carry the foundation of context-bound knowledge with them. For cumulative learning to be comprehensive and complete, the underpinning knowledge base has to be wholly integrated and absorbed.

Thirdly, I discovered that although the assessments appeared to be offering the students opportunities to practise higher-level knowledge principles, the memoranda were constraining the marker by encouraging her to reward lower-level knowledge principles over the higher-level ones. A curriculum and its assessments may be well designed to enable cumulative learning, but unless this form of learning is seen to be valued through results and feedback, students will hesitate to use the higher-level knowledge principles that provide evidence of cumulative learning. I concluded that cumulative learning would be further enabled in this curriculum if lecturers who mark these students' assessments were given more freedom to reward thinking and skills that are beyond the context of the students' studies. The procedures set up to standardise this curriculum, and ensure that it complies with strict education policies, appeared to be limiting the institution's ability to reward higher-level knowledge principles in students' work. A compromise needs to be reached, between the benefits of standards and the pitfalls of standardisation.

Lastly, this research aimed to emulate Maton's similar research and test his proposition that a mismatch of codes between curriculum intentions and curriculum means, constrains cumulative learning. On the premise that Journalism is an elite code and that there is emphasis on both knowledge at lower levels and the knower at higher levels (for creative practical tasks), then it would appear that to enable cumulative learning in an elite code, the curriculum must be designed to facilitate an elite code. When Maton (2009a) examined Bennett's research, he came to the conclusion that there was a mismatch of codes for the curriculum he was investigating. He explains that this mismatch is the reason why cumulative learning might not be occurring. He goes on to state that students who are likely to succeed with this type of curriculum are the ones who already possess the knowledge principles for which they are being rewarded (*ibid*). But it may not only be the legitimation code that is relevant for enabling cumulative learning. The professional education curriculum that Maton examined may have a different organising logic and may be based in a different form of knowledge. Cumulative learning in vocation-based curricula may differ according to the structure of knowledge in the originating vocation. This extends Maton's premise by stating that cumulative learning may be enabled not only by a knowledge code, but also by correctly matching the legitimation code of the discipline to the legitimation code of the curriculum.

CONCLUSION

This research investigated what evidence of cumulative learning there was in students' responses to a set of assessments. This was achieved by examining the level of context-dependency of the responses. Context-dependency was measured by ascribing a code that indicated a particular 'weight' of semantic gravity: strong semantic gravity revealed a strong dependency and weak semantic gravity a weaker one. This research accepted Maton's premise that the ability to abstract information from the original context

is a sign that students will be able to apply what they have learnt in unfamiliar situations after they have graduated. This ability would mean that they had experienced cumulative learning.

I established that cumulative learning is present, but that this learning is restricted and so cannot develop to its full potential during the students' studies. This limitation is the result of a gap between the assessment questions that require context-dependent responses and those that require students to reach beyond Context 1. Students' cumulative learning is also constrained by their attempts to use higher-level knowledge principles (with weaker semantic gravity) before having mastered the lower-level ones. They are also limited by not being rewarded for using context-independent learning. Finally, cumulative learning is inhibited by too much emphasis on a knowledge code, with too little inclusion of a knower code. The balanced combination of both of these codes could help the student develop the elite code that is necessary for becoming a productive journalist after graduation.

This study gave rise to many ensuing lines of inquiry. It would be interesting to examine the role of student effort in enabling cumulative learning. It would be valuable to investigate what 'talent' is and how it is related to cumulative learning. When it comes to practical tasks, it would be relevant to study the role that aesthetic judgement plays and how it affects student learning. These issues, and many others, were beyond the scope of this research but offer promising avenues for further research into cumulative learning and its relationship to professional disciplines in general.

REFERENCES

Barnett, M. (2006) 'Vocational knowledge and vocational pedagogy' In M. Young & J. Gamble (Eds.) *Knowledge, Curriculum and Qualifications for South African Further Education*. Cape Town: HSRC Press.

Bennett, S. (2002) *Learning about design in context: An investigation of learners' interpretations and use of real life cases within a constructivist learning environment created to support authentic design activities*. Unpublished PhD Thesis, University of Wollongong, Australia.

Bennett, S., Harper, B. & Hedberg, J. (2001) 'Designing real-life cases to support authentic design activities' *Australian Journal of Educational Technology* 18(1) pp.1-12.

Bernstein, B. (1996) *Pedagogy, Symbolic Control and Identity: Theory, Research, Critique*. London & New York: Taylor & Francis.

Bernstein, B. (2000) *Pedagogy, Symbolic Control and Identity: Theory, Research, Critique*. (Revised edition) New York & London: Rowman & Littlefield.

Bloom, B.S. (Ed.) (1956) *Taxonomy of Educational Objectives: Cognitive Domain*. New York: David McKay.

Department of Education. (1997) Education White Paper 3: A Programme for the Transformation of Higher Education. Government Gazette No.18207 August. Pretoria: Government Printers.

Gamble, J. (2009) 'The relation between knowledge and practice in curriculum and assessment' Concept paper commissioned by UMALUSI (Council for Quality Assurance in General and Further Education and Training) Pretoria.

Krathwohl, D. (2002) 'A Revision of Bloom's Taxonomy: An Overview' *Theory into Practice* 41(4) pp.212-219.

Maton, K. (2000) 'Languages of legitimation: The structuring significance for intellectual fields of strategic knowledge claims' *British Journal of Sociology of Education* 21(2) pp.147-167.

Maton, K. (2006) 'On knowledge structures and knower structures' In R. Moore, M. Arnot, J. Beck, & H. Daniels (Eds.) *Knowledge, Power and Educational Reform: Applying the Sociology of Basil Bernstein.* London: Routledge.

Maton, K. (2009a) 'Cumulative and segmented learning: Exploring the role of curriculum structures in knowledge-building' *British Journal of Sociology of Education* 30(1) pp.43-57.

Maton, K. (2009b) 'Analyzing knowledge claims: Languages of legitimation' In K. Maton & R. Moore (Eds.) *Social Realism, Knowledge and the Sociology of Education: Coalitions of the Mind.* London: Continuum.

Moore, R. & Young, M. (2001) 'Knowledge and the curriculum in the sociology of education: Towards a reconceptualisation' *British Journal of Sociology of Education* 22(4) pp.44-61.

Muller, J. (2008) 'Forms of knowledge and curriculum coherence' Paper presented to the ESRC Seminar Series, *Epistemology and the Curriculum*, University of Bath, UK. 26-27 June.

Vorster, J. (2009) *A social realist analysis of collaborative curriculum development processes in an academic department at a South African university*. Unpublished PhD Thesis, Rhodes University, South Africa.

Wheelahan, L. (2007) 'How competency-based training locks the working class out of powerful knowledge: A modified Bernsteinian analysis' *British Journal of Sociology of Education* 28(5) pp.637-651.

Risk, resilience and retention - a multi-pronged student development model

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ABSTRACT

The notion of resilience amongst first year students in higher education is of increasing interest as the number of at-risk students is growing and educators are seeking ways of strengthening the whole teaching and learning package. This study investigated a group of 51 first year Public Relations and Communication students at the University of Johannesburg who were identified by the faculty as at-risk students and who had been given provisional passes into the second semester of study. The study was conducted through the use of a questionnaire which related to several internal risk factors but more specifically to the students' use of the support services offered by the university. These support services are considered by the university to be strategic interventions which, if utilised by the students, may assist in realising their academic success. The study concluded that it is the responsibility of those who structure the learning environment to nurture students specifically through ensuring that the services offered by the university are well utilised by them and thus promote the vision of the university to widen access and improve retention and throughput.

It is an urban legend that there are lecturers who, on their first day of class with first year students, say 'Look at the person on your left. Now look at the person on your right. Do not expect to see them next year'. It is difficult to believe that this had the desired effect of making students work harder. It is certainly no longer appropriate, if indeed it ever was. Many of our first year students did not grow up expecting to attend university and cannot have known what to expect when they walked into these corridors of learning. For some, the open doors to higher education become revolving doors, and they leave almost as quickly as they came. This is unacceptable and we urgently need to establish:

- the extent to which it is the student's responsibility to overcome the difficulties they face in their first year of study
- the extent to which it is the lecturer's and university's responsibility to assist students overcome their difficulties and develop the resilience and ability to cope with challenges hitherto unknown to them.

We know very well that to be at university is to be in an unfamiliar culture for an increasing number of students - especially given the increased diversity of those who now access higher education. For many, the university experience is completely unknown. They are usually first-generation students. Their parents are unfamiliar with the experience and while they might well admire their children for being at university, they are able to offer little support in terms of financial, practical and emotional needs. Furthermore, they

still expect the young person to play an active role in the duties assigned to him/her as a family member and there is little understanding of the work involved in attaining a qualification.

From an institutional perspective, research in the higher education sector (Krause, Hartley, James & McInnis, 2005; Krause, McInnis & Welle, 2002; Lawrence, 2000a) points to the fact that early student engagement with the culture of the university has a positive impact on shaping the academic and social development of new students. Furthermore, a positive first-year experience that supports students as they attempt to deal with academic, administrative and social processes is more likely to encourage academic application and success at the individual level and to reduce attrition rates at the institutional level. Thus, social transition is acknowledged as being a vital contributor to successful academic transition (Kantanis, 2002).

Under such circumstances there is clearly a responsibility amongst lecturers and staff to ask what they have to do:

- to assist students in familiarising themselves with this new culture
- to make smoother the transition from a troubled school system and a disadvantaged background
- to help students engage with, and master, the new culture's multiple discourses
- to motivate them to succeed.

The questions that have been posed and deliberation of the responsibilities as mentioned above may best be addressed within the framework of sociocultural theory. Sociocultural theory (Wertsch, 1991: 90) explains how individual mental functioning is related to cultural, institutional, and historical contexts. Hence, the focus of the sociocultural perspective is on the roles that participation in social interactions and culturally organised activities play in influencing development. From a Vygotskian perspective (cited in Cole, John-Steiner, Scribner & Souberman, 1978) effective learning is more likely to take place when individuals are afforded opportunities to grow into the culture that surrounds them.

In contrast to prevailing views of his time, namely those of Piaget, in which learning was regarded as an external process and development an internal process, Vygotsky (1978) was concerned with the unity and interdependence of learning and development.

From a sociocultural perspective (Lave and Wenger, 1991: 101), and within the context of higher education, students learn about the culture of the particular community through the interactions they have with those around them. Typically, these interactions involve dialogues between the individual and more conversant members of the community, i.e. academic and administrative staff, and more experienced students as new students learn about university life. As an example, the institutional structure includes support systems in the form of tutoring and peer buddies. However, the complexity of the environment and the speed with which learning must occur means that other tools must also be available to support effective learning. Learning itself is viewed as an activity that is situated in the social practice of the 'real world' context in which the individual operates. This argument supports the development of a range of experiences that will encourage access and participation by those to whom the university environment is foreign.

In Wilmer's view (2008: 15), a student success course for underprepared students offers a natural place to support students in understanding academic policies, communication skills, campus resources, goal-setting skills, to mention a few. This supports Tinto's (1999) interactionalist theory, which states that 'students who achieve greater social and academic integration are more likely to reach their goal of graduation'.

Thus we need to understand that first year students are grappling with a multiplicity of issues. Gee (2000) maintains that even the ways of communicating within an academic context are difficult to grasp amongst students whose backgrounds and ways of thinking are different from, or even in conflict with, the university context. Added to this are the adjustments students have to make to the new environment: the teaching styles, learning styles, policies, practices, discipline, assessment, presentation skills, interpersonal skills, communication skills, technical skills, university life, and other people, to name but a few challenges that come with this new higher education experience (Mak and Barker, cited in Lawrence, 2000b: 239). Altogether they constitute what amounts to 'resilience', a characteristic that indicates whether a student will have the ability to stay the course. Luthar, Cicchetti & Becker (2000: 543) give us a useful definition of 'resilience' for these purposes. It is 'a dynamic process of individuals exhibiting positive behavioral adaptation when they encounter significant adversity or trauma'.

This paper focuses, firstly, on the strategies that have been put into place at the University of Johannesburg (UJ) to assist its students registered for the National Diploma: Public Relations and Communication to improve their resilience and help them succeed in their first year of study. Secondly, whether, and if so, to what extent students have made use of these strategies.

The paper describes how the investigation was conducted and attempts to explain the failure rate recorded in the first semester. The students (51 in total of a first year group of 170) located on Bunting Road Campus were categorised as PP (F5) students. These are students who, after the first semester of 2009, were given permission to continue with their studies despite not passing all their subjects. This permission was granted with specific conditions. The group of students who fell into this category was identified through the records kept at the Faculty Office and in accordance with the university policy that 60% of all registered semester modules must be passed.

The Public Relations programme is offered in the Faculty of Humanities which has, over a number of years, devised and implemented policies for teaching and learning taking into account the structures of the UJ Teaching and Learning Policy Document which recommends as follows:

> Academic development implies interventions and strategies geared towards the development and enrichment of un¬prepared and underprepared students at undergraduate level as a response to the need for widening access and improving retention and throughput. Consequently, academic development strategies and interventions should form an integral part of all accredited programmes and modules.

Given the issue of throughput within the faculty, the Executive Dean has set out three principles to keep in mind when considering throughput:

1. the creation and retention of high academic standards
2. the analysis of each throughput, whether high or low, in the search for explanations
3. if throughput is indeed low, the search for ways of strengthening the whole teaching and learning 'package' of the course.

> If the throughput in any particular course improves without our having improved the 'package' of that course, that too should raise questions as to how this improvement occurred, and whether or not this was the result of lowered standards, which would, if true, be a contravention of our first principle (Memo from the Dean, 16-10-06).

It is the third principle that is of interest in this paper: 'If throughput is indeed low, we find ways of strengthening the whole teaching and learning package of the course', and we offer the concept of 'resilience' as useful in this context.

Resilience has already been described as a 'construct concerning the exposure to adversity and the positive adjustment outcomes of that adversity' (Luthar & Cicchetti, 2000: 857). Adversity refers to any risks associated with negative life conditions that can be statistically related to adjustment difficulties. Positive adaptation is considered as a demonstration of manifested behaviour with regards to social competence or 'success at meeting any particular tasks at a specific life stage' (Luthar & Cicchetti, 2000: 875). The manifestation of resilience can be described as seeing good outcomes regardless of high-risk status, and a constant competence under stress.

Taking into consideration the fact that students who come to study at the university have many challenges besides the academic challenge, a questionnaire was designed specifically to gain information about the support students receive from the department and from the people at their place of residence. We asked questions relating to expectations of the students and their performance; their involvement in social and other activities, and their understanding and utilisation of the support services offered by the university. Thus, the questionnaire was designed with a number of factors in mind:

- to establish the extent of support the students believe they receive
- to establish the amount of involvement the students have within the university and in outside activities
- to establish the level of expectations the students perceive others have of them.

Questions were also designed to measure the existing resilience of students in the areas of:

- seeking help
- holding the belief that there is something one can do to manage one's feelings and cope with challenges
- having social support
- being connected with others, such as family or friends, and being involved with others through group activities.

Thus, for the purposes of this study, support services at university for first year students were considered to be: the language centre; the learning support centre; tutor facilities; psychological services; the academic support centre; orientation assistance; and trauma counselling services. Our questionnaire focused specifically on these, attempting to find out whether students knew of these services and which of the services they had in fact used. We further asked for their comments on how helpful these services had been to them in the event they had been used.

Strategies that are in place in the Public Relations and Communication Department to assist students' success in their first year of study are reliant on the strategies put into place by the University. There is also a Safenet programme being implemented, which is designed to track students who fail their first term test and inform them of their situation and advise them to consult their tutors.

Currently the Public Relations and Communication department appoints tutors annually to assist with the academic needs of students. During 2009 four senior students were trained and allocated weekly periods to consult with students on an individual basis. Although this support service was implemented in line with faculty and university policies the Public Relations Department is in the process of restructuring their approach to tutoring to ensure that at-risk students make better use of this service.

There were 31 students' responses to the questionnaire. And the findings were singular in their similarity. The main points were as follows:

- 27 students agreed that there was someone in the department who cared about them, listened to what they had to say, told them that they had done a good job, wanted them to do their best and see them

succeed. The students went so far as to name the lecturers that gave them this support. However, they noted that rarely did a lecturer notice when they were not in class.

- 11 students in residence and 20 students who live at home noted that there was someone who was interested in them, listened to them, noticed when they were upset and wanted them to do their best. All the students indicated that they have a friend who offers them similar support.
- In terms of participation in departmental activities, sport activities, church activities or belonging to some type of club, 25 students indicated that they do not participate in any kind of activity.
- More striking were the responses to the questions regarding the university's facilities and support services. 24 students did not know about the learning centre, and of those who did, only one had made use of its facilities. Five students said that they had heard of the career services and one student had made use of it. Two students knew of, and had used, the Psychological Support Services Centre (Psycad), while the academic services offered to people with disabilities and work integrated learning was known by three students. This is despite the fact that a message is included in the results posted to students informing them of, and urging them to, visit the learning centre.
- 30 students were aware of the tutoring services offered by the Department of Public Relations and Communication, with 15 students having made use of this service as a once off visit. No students made use of the service on a regular basis.
- When it came to orientation, 27 students were aware of and had attended the orientation programme, but had indicated that they could not remember much of what had occurred. 27 students also indicated that their transition to university life has not been successful.

The findings lead to several conclusions:

- There seems to be a lack of motivation on the part of the student to act with initiative and to think independently about success, engagement, and what constitutes authentic learning. There seems to be a lack of motivation on the part of the student to find ways to make educational activities a true priority. It is interesting to note Wilmer's (2008: 11) view that what is required is a more intrusive approach to providing the services necessary for their success.
- In view of the point made above, there seems to be a need for academic staff to start driving the process with more energy and determination, and rather than rely on the students to find out about the services and support available, to monitor more rigorously the students' use of the services that this department and the university have put in place. For real effectiveness, there needs to be structured, rigorous and controlled implementation.

Various aspects of the teaching and learning strategies need individual consideration, namely:

1. Effective, structured tutoring must be a priority, bearing in mind Smith & Beggs's Triple C Model of care, control and consistency (2002), and giving consideration to Dzubak's invaluable insight into the value of tutoring. She (2008) notes the value, importance and significance of tutoring and pays particular attention to the notion of scaffolding that best manifests itself in the tutoring process.

Vygotsky (cited in Dzubak, 2008: 1) first used the term 'zone of actual development' to describe 'the skills and tasks that a student is able to perform independently'. He further described the area which is 'beyond what a student can perform alone as the zone of proximal development', which includes the skills and tasks that the student has to learn which, once learned, fall into the zone of actual development. It is the aim of any educator to assist the student to acquire the skills to move from the zone of proximal development to the zone of actual development. However, with the ever-growing demand of universities on lecturers to have larger classes, resulting in the lecturers not personally interacting with the majority

of their students, not getting to know the students and hence tracking students based only on their results, the need grows for departments to use tutors to assist in achieving this acquiring of skills to help students progress to the zone of actual development.

According to Vygotsky (cited in Dzubak, 2008: 2), scaffolding is the process that provides assistance to students to help them move to the point 'where they are able to perform a skill independently'. In this regard, the onus would fall on the lecturer to identify students with problems, and send these students to the tutor to give assistance so that the student can reach the point where s/he becomes independent. Scaffolding, as described by Vygotsky, is this process of giving assistance and, by using effective tutoring, is provided through one-to-one interaction which encourages student engagement and immediate feedback based on questions asked, cues given, and organised tasks that will help the student progress from what s/he actually knows and what s/he needs to know.

2. Tutoring is a service that a department is obliged to offer. Tutoring can benefit any student at some point in his/her academic career. Because of its social nature and the advantage of students' voices being heard, tutoring does not necessarily need to be confined to students with poor academic skills or who need remedial help. It has value to all students in that other skills can be developed: interpersonal skills, personalised interest, face-to-face interaction and thus social interaction (Dzubak, 2008: 1). However, as the focus of this paper is the retention of first year students, and strategies that can be put in place to assist them in increasing their levels of resilience, the important point to be noted here is that tutoring needs to be approached in a more authentic way.

To use the tutoring service effectively, the academic staff in the department need to participate more rigorously in equipping the tutor to ensure that the students get the best opportunity to develop the skills and tasks to perform independently. Besides the training given to the tutors by the Tutor Training Centre, academic staff will have to become more involved in the training and development of tutors in the subjects offered to the students. There must be consistency in the times that lecturers meet with tutors; regular discussion about the course material; exercises provided to benefit students in developing their skills to enable them to transfer their knowledge; and feedback between lecturer and tutor about progress made. Lecturers need to keep track of students who use the tutoring service and record whether there is evidence of the transfer of skills to other contexts, which demonstrates that learning has taken place.

This puts more pressure on the lecturers who already have the burden of larger classes, increased administrative duties, lack of departmental support due to budgetary constraints, and the ever-looming worry of not doing enough research to satisfy the demands made on the institution.

3. Cooperation and willingness to track the students relies heavily on the disposition, attitudes and interest of the lecturing staff and other support services. Wilmer (2008: 11) notes that 'underprepared students are the least likely student population to seek or participate in support services'. Lecturing staff should thus ensure that they have policies and practices in place to ensure that underprepared students are 'forced' to seek assistance. For this to occur, faculty, administrators, and others must challenge students and each other to view learning as continuous.

Assistance and support to lecturing staff and students are offered by the Psychological Support Services Centre. Structures, such as peer buddies, career counselling, emotional support, studying methods and a 24-hour crisis line, are available to all students and should be actively promoted during orientation.

4. Another opportunity to assist students with especially the resilience component is to involve them in a variety of academic activities that will not only enhance their independent learning but will also result in

actual learning. Participation in community projects, designing public relations and communication plans and implementing them for a variety of community organisations can have a reciprocal result for student and lecturer. Proper learning outcomes and assessments of these activities will ensure that they do not become just an add-on but that they form an integral part of the learning process. Research done by Astin (1993); Chickering & Reisser (1993) and Pascarella & Terenzini (1991) points out that any institution can enhance student learning by using its existing resources more effectively. They maintain that the key tasks of the institution are to minimise the boundaries between the in-class and out-of-class experiences, to create more integrated approaches among and between, for example, the academic departments, administrative services and student affairs, which will in turn create opportunities for students to develop an understanding of the connections between their studies and their lives outside the classroom and perhaps in this way develop ways in which to apply their learning (Pascarella & Terenzini, 1991). Key steps are for institutions to address the importance of out-of-class experiences explicitly in the institution's mission, develop a common understanding of the desired outcomes of undergraduate education and the combination of institutional conditions and student experiences most likely to produce these outcomes, assess regularly the impact of out-of-class environments on students, and shape student cultures in ways that foster responsible behaviour. The conditions that foster student learning outside the classroom cannot be created by any one individual.

5. Orientation needs to be planned and implemented in a more considered way. From the readings that informed the writing of this paper, the department is approaching orientation more from the point of view of what the new students can assimilate during the limited time available, rather than from the amount of information that is considered necessary to be provided. Thus, for future orientation, the department has decided to compile a booklet of information to which students can refer during the first weeks of the academic year. The orientation time will be used more effectively by devising activities that will practically exemplify the material in the booklet. While these activities will be good ice-breakers, they will also serve the purpose of sensitising the students to the need for academic engagement and act as a stepping stone to authentic learning. Furthermore, a decision has been taken at an institutional level to extend the orientation period by having shorter orientation sessions spread over four weeks of the first term with specific focus on the personal and academic topics necessary to succeed in the university environment. This planned programme is in line with the proposed extended orientation suggested by Wilmer (2008: 15).

6. Attendance and the monitoring of attendance fall into two parts of Smith & Beggs' Triple C model - care and control (2002). Smith & Beggs maintain that the manner in which first year students are managed needs to be changed if there is to be a change in retention rates. Relying on attendance registers taken in class by the lecturers, they worked out an absence data system, for which data on absence of students from class was collated on a regular basis. Students were then categorised according to their levels of absenteeism and given letters on different coloured paper, the colour of the paper depicting the extent of the absenteeism. Thus, if a students' attendance was below 85% (which was considered an unacceptable level) the student was given a letter on red paper. Red = STOP WHAT YOU ARE DOING! COME TO CLASS. If a student's attendance was between 75% and 85%, s/he was given a letter on yellow paper. Yellow = PROCEED WITH CAUTION ON THE PRESENT ROUTE. A green piece of paper reflected over 85% attendance meaning 'continue and keep going'.

This may not be a sufficient incentive for students to come to class. Further monitoring would help the lecturer assess whether the student may need other assistance, such as counselling or career guidance.

This system of monitoring indicates to the students that the department knows who they are, cares whether they are in class or not, and also shows that effective recording systems are in place which gives credence

to the idea of control; control being exercised in the right place and for the right reasons. This strengthens the notion that where there is control, there is care. This system may also help to identify students who may be on the brink of dropping out but could be helped if the early monitoring strategy is implemented.

The objectives of this exploratory study were to ask what the responsibility of the at-risk (underprepared) student is to ensure that he/she copes with the changing environment and its demands and what the responsibilities of the lecturers and the institution are to assist students during this transition stage. To achieve these objectives we looked at some of the most prominent influences and found that these at-risk or underprepared students believe that they do have the support they need but that they do not necessarily belong to any organised group on or off campus and neither do they make use of the existing support services offered by the institution. As mentioned earlier, underprepared students need to be 'forced' to become part of a group and interact with their fellow students. Interaction in and out of the classroom may contribute to the ability of students to cope with the demands of the changing environment and assist them in understanding the new language and practices of this new culture.

It was also established that the lecturers and the institution play a significant role in ensuring that the students interact, know where to ask for assistance and make use of support services. These students may not have the social skills or the confidence to initiate interaction with fellow students or ask for assistance from institutional support services.

Being an exploratory study there are a number of other areas of further interest which are:

- What constitutes an at-risk student? Only marks?
- How does one find out other aspects of the students' lives that may contribute to lack of resilience? An example of this would be their sociocultural background which they bring with them into this new and unfamiliar environment.
- How does one integrate this information to offer the student a higher education experience that makes them more rounded, educated people and not just a graduate of a programme?

We look forward to continuing tracking these students through to their graduation and strongly believe that the more interaction the students have, 'forced' initially but later more naturally, the more they will learn to support one another, share information and develop more authentic learning communities.

REFERENCES

Astin, A.W. (1993) *What Matters in College: Four Critical Years Revisited.* San Francisco: Jossey-Bass.

Chickering, A.W. & Reisser, L. (1993) *Education and Identity.* (2nd ed.) San Francisco: Jossey-Bass.

Cole, M., John-Steiner, V., Scribner, S. & Souberman, E. (Eds. and Trans.) (1978) *Mind in Society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Dzubak, C. (2008) 'Why Tutoring Matters: The interaction of a peer tutor and a tutee during scaffolding' The Association for the Tutoring Profession. http://www.myatp.org/Synergy_1/Syn_a10.htm (Accessed 15 January 2010).

Gee, J.P. (2000) *Social linguistics and literacies: ideology in discourses.* New York: Routledge.

Kantanis, T. (2002) 'Same or different: Issues that affect mature age undergraduate students' *transition to university'* The Sixth Pacific Rim - First Year in Higher Education Conference 'Changing Agendas "*TeAoHurihuri*"' The University of Canterbury, Christchurch, New Zealand in conjunction with Queensland University of Technology, Brisbane, Australia.

Krause, K., Hartley, R., James, R. & McInnis, C. (2005) *The first year experience in Australian universities: Findings from a decade of national studies*. Canberra: Australian Department of Education, Science and Training.

Krause, K., McInnis, C. & Welle, C. (2002) 'Student engagement: The role of peers in undergraduate student experience' Conference of the Society for Research into Higher Education 'Students and Learning - What is Changing?' 10-12 December. Glasgow, UK.

Lave, J. & Wenger, E. (1991) *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lawrence, J. (2000a) 'Rethinking diversity: Re-theorising transition as a process of engaging, negotiating and mastering the discourses and multiliteracies of an unfamiliar culture rather than as a problem of deficit' The 4th Pacific Rim - First Year in Higher Education Conference 2000 'Creating Futures for a New Millennium' Queensland University of Technology, Brisbane, Australia.

Lawrence, J. (2000b) 'Re-theorising the university as an unfamiliar culture: Consequences and responses for the increasing diversity of the student body' In M. Sheehan, S. Ramsay & J. Patrick (Eds.) *Transcending Boundaries: Integrating People, Processes and Systems*. Brisbane: Griffith University.

Luthar, S.S. & Cicchetti, D. (2000) 'The construct of resilience: Implications for interventions and social policies' *Development and Psychopathology* 12 pp.857-885.

Luthar, S.S., Cicchetti, D. & Becker, B. (2000) 'The construct of resilience: A critical evaluation and guidelines for future work' *Child Development* 71(3) pp.543-562.

McInnis, C., James, R. & Hartley, R. (2000) *Trends in the first year experience in Australian universities*. Canberra: AGPS Press.

Pascarella, E. & P. Terenzini. (1991) *How College Affects Students: Findings and Insights From Twenty Years of Research*. San Francisco: Jossey-Bass.

UJ Teaching and Learning Policy Document. (2006) University of Johanesburg, South Africa.

Smith, E.M. & Beggs, B.J. (2002) 'Optimally maximising student retention in higher education' Society for Research into Higher Education Annual Conference, December. Glasgow, UK.

Tinto, V. (1999) 'Taking retention seriously: Rethinking the first year of college' *The Journal of the National Academic Advisory Association (NACADA)* 19(2) pp.5-9.

Wertsch J. (1991) *Voices of the mind: A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.

Wilmer, E. (2008) 'Student Support Services for the Underprepared Student' *Inquiry* 13(1) pp.5-19.

Email messages: Towards a pedagogy of caring

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ABSTRACT

A lecturer in mathematics undertook a study of his students' perceptions of the various new technologies he was embedding in their extended curriculum programme. This paper is not about that study; this paper is about something seemingly simple and yet profound that happened along the way. The lecturer, aware of the alienation students may feel in their new university environment, used emails to encourage his students to invest time in their university studies. Unexpectedly, the impact of this personal correspondence, which was initially just seen to be a means to an end, turned out to be something worthy of consideration in its own right. This paper examines what that was and how emails can be one way of demonstrating care for our students within the South African higher education context.

INTRODUCTION

Issues of exclusion and injustice in higher education are often considered at a level of policy and institutional structures. This article reports at a micro-level of an intervention aimed at fostering social inclusion through making students feel valued and part of the institution. The email correspondence reported on here had, at a surface level, the motivation of students to invest time in their studies as its agenda. At a deeper level it had an agenda of connecting with individual students, recognising the multiple identities students have and facilitating access to the institutional culture.

If '…academic language… is no one's mother tongue…' (Bourdieu & Passeron 1994: 8) then academia is no one's birthplace. Scholars within higher education have recognised this and are calling for higher education practitioners to provide students with epistemological access to disciplines being studied (Morrow, 2007). When one considers the dismal throughput rates of the higher education sector (Scott, Yeld & Hendry, 2007) and the call for equity of outcomes within higher education, one senses that there is a gap between the culture of teaching and learning at schools and at universities. In other words, schools and universities may not necessarily value the same academic ways of being (Badat, 2007). It is this difference in ways of being that constitutes a cultural gap between school and university; a cultural gap that students need to negotiate (Huysamen, 2000); it is this cultural gap that higher education practitioners need to help students negotiate.

The call for epistemological access within higher education suggests that higher education practitioners need to develop more effective, supportive and transparent ways of teaching concepts to students. If we are to provide students with effective support then we need to understand the schooling culture from which our students come.

In the Science Foundation Programme on the Pietermaritzburg campus of the University of KwaZulu-Natal (UKZN), where this study took place, the majority of Foundation Programme students are from the province of KwaZulu-Natal, which is one of the poorest provinces in South Africa (Taylor, Jinabhai, Naidoo, Kleinschmidt & Dlamini, 2003). Besides the issue of poverty, the province is grappling with high HIV/Aids infection rates (Moletsane, Morrell, Unterhalter & Epstein, 2002) and the many children in HIV/Aids households are forced to take on more family responsibilities, negatively impacting their schooling (Griessel-Roux, Ebersohn, Smit & Eloff, 2005; Hepburn, 2002).

Further, the Foundation Programme is specifically directed at providing access to students from historically disadvantaged schools.[1] Foundation students are mainly from township and rural schools. These schools are often, though certainly not always, sites of substance abuse (Taylor *et al*, 2003); violence (de Wet, 2003; Maree & Cherian, 2004); and high teenage pregnancy rates (Department of Education, 2007). Lack of resources (Ngidi & Sibaya, 2002), teacher apathy and learner misconduct (Joubert, de Waal & Rossouw, 2004) contrive to diminish the culture of teaching and learning within these schools, effectively rendering the majority of township and rural schools dysfunctional (Department of Education, 2009; Morrow, 2007).

Students, who survive such a culture of schooling, arrive at university hoping to negotiate the academic terrain in pursuit of a brighter future. This article will show that personal communication, in this case in the form of motivational email messages, can be used towards a pedagogy of caring thereby contributing to diminishing the cultural gap between school and university, and student and lecturer. A pedagogy of caring may help higher education practitioners provide epistemological access to students. For students, a pedagogy of caring may help them to feel valued and so more readily able to embrace the academic ways of being that are valued by higher education.

Within the South African higher education context of transformation and social equity, through a pedagogy of caring, students may feel part of higher education institutions and so invest themselves in their studies. In so doing, personal communication as an aspect of a pedagogy of caring can contribute to creating a learning environment in which academics can '...become aware of, and learn to understand the students they teach, by being much more sensitive towards these [all] students' (Department of Education, 2008).

I next briefly review the literature on this subject before describing the conceptual framework of the study. Thereafter I discuss the methodology, findings and then make some concluding remarks.

LITERATURE REVIEW

There are several ways in which email has been used within educational contexts. The uses include sending and receiving of course material such as assignments (Smith, Whiteley & Smith, 1999): to facilitate communication between students and teacher (Bloch, 2002; Hassini, 2006); to facilitate communication between teachers and colleagues (Hu, Wong, Cheah & Wong, 2009); to foster collaborative learning (Hwang, 2008; Kim & Keller, 2008); and to address students' conceptual understanding with regard to course content (Murphy & Manzanares, 2008; Valadez & Duran, 2007). However, there is little research surrounding the use of email for the improvement of students' motivation to study (Kim, 2008; Kim & Keller, 2008). This paper seeks to address the gap in the literature by reporting on the changes in students' academic identities brought about by their exposure to motivational email messages; highlighting the potential of email to motivate students to invest in their studies.

1 A classification list provided by the Department of Education used to identify a school's level of disadvantage.

CONCEPTUAL FRAMEWORK

The adoption of new academic practices entails a particular cultural understanding of what learning constitutes (McKenna, 2004). Practices such as checking your work, reflecting on material covered in lectures, preparing for tutorials by attempting tutorial problems in advance of the tutorial, practising concepts covered in class and consulting with lecturers and peers in order to sort out difficulties with course content, all assume a particular understanding of learning. Such an understanding may either be foreign to students or may be at odds with their previous learning experiences (de Kadt & Mathonsi, 2003); in effect preventing students from adopting the academic practices expected of them (McKenna, 2004). Since learning is an experience in identity (Lave & Wenger, 1991), a conceptualisation of identity was needed for this study.

Sfard & Prusak (2005) used a narrative approach to conceptualise identity in terms of actual and designated identity. The narrative approach frames identity as an individual's collection of stories about their life (Wojecki, 2007). It is this collection of stories that influences how individuals act in various situations; when applied to this context, either facilitating or blocking students from using new academic practices. For example, if a student used to do poorly in mathematics tests then that experience would be storied as a negative within their actual identity. The negative story could make a student envision future failures in mathematics thereby forcing a student to construct an associated negative designated identity. Consequently, the student will embark on a negative learning trajectory, taking on practices associated with poor academic behaviour. In other words, the construction of a negative actual identity can result in a student performing in a way that realises an associated negative designated identity (Sfard & Prusak, 2005).

How are actual and designated identities operationalised? Actual identities are characterised by present tense statements (Sfard & Prusak, 2005), such as: 'I am bad at algebra'; 'I like studying'; and 'that lecturer does not like me'. These present tense statements give rise to an associated designated identity characterised by future tense statements (Sfard & Prusak, 2005), such as 'I am going to fail the next algebra test'; 'I will be able to apply for a bursary'; and 'there is no point in me trying to ask that lecturer for help'. Thus, in order for students to assume academic practices that are valued by academia, students' learning experiences which are storied as a negative in their actual identity need to be re-scripted. Through exposure to positive learning experiences the negative stories can be replaced with positive ones and new designated identities can be envisioned in order to allow students to follow positive learning trajectories (Wojecki, 2007). Thus, when new, positive actual and designated identities are scripted, learning is taking place (Sfard & Prusak, 2005).

METHODOLOGY

The following research question is answered in this paper:

- To what extent can motivational email messages be used to develop the academic identities of Science Foundation Programme students in mathematics?

This paper is exploratory in nature, based on participants' perceived influence of the motivational email messages on their academic identities. Larger questions, such as the design and implementation of motivational email messages, are not the focus of this paper; these are potential areas of further research. Rather, this paper establishes the potential use of motivational email messages as a tool to engage students in learning mathematics within higher education.

The data presented in this article emanates from a larger project (Aungamuthu, 2009), which made use of a case study research design within the interpretive paradigm. The project was a case of Foundation

students' perceptions of learning mathematics with the aid of Information and Communications Technology (ICT).

A case study design was considered appropriate as the project was exploratory as opposed to empirical in nature; seeking to understand and gain insights into participants' experiences of learning with the aid of ICT; generalisation was not a priority. The project was about a particular phenomenon, experienced by a particular group of students, in a particular place at a particular point in time, studied with a particular set of research methods; reflective of the bounded nature of the project. It was the bounded nature of the project that made it a case study. I describe the methods used in the project before discussing the motivational email messages which are the focus of this article.

Purposive sampling was used to consider participants for the project. Of the 90 students from the 2008 cohort of Foundation students 13 volunteered to be participants in the project. Data was collected by conducting face-to-face semi-structured interviews with each participant. In all 13 interviews were conducted; data saturation occurred after ten interviews. Hence there was no need to call for more volunteers. Given the exploratory nature of the project, data saturation is considered suitable in deciding whether to sample further or not.

An inductive thematic content analysis was carried out by reading across interview transcripts: coding of the transcripts involved capturing the essence of a participant's statements with a phrase of no more than five words. By looking for possible relationships between codes, related codes were clustered together to form sub-themes. Similarly, related sub-themes were clustered together to form themes. These themes and sub-themes were validated in three ways: by comparison to findings in the research literature surrounding learning with ICT; by making use of peer debriefing which involved explaining the study and the process by which codes, sub-themes and themes were constructed to a colleague teaching Foundation Mathematics at the Westville campus of UKZN; and by a panel discussion, with participants constituting the panel, to establish cultural validity. At the end of the panel discussion, participants left with a sense that their experiences had been accurately captured. The validation process allowed for the refinement of codes, sub-themes and themes, giving the researcher a more nuanced understanding of the phenomenon being studied.

Why were the motivational email messages sent? Amidst students' poor preparation for tutorials, low levels of enthusiasm for mathematics, the mediocre quality of work submitted, and poor performance on tutorial and monthly tests; there was the growing sense that students were not investing themselves in their studies. To this end, it was decided to use email messages to motivate the entire cohort of Foundation Mathematics students. This was done with the hope that this would get them to take their studies seriously and so invest in their academic identities.

Initially, the motivational messages were sent out twice a month. This would be after a test or when it was sensed that students needed their spirits to be lifted. During the first semester of 2008, a few students wrote back saying that they liked the messages because it gave them encouragement. This prompted the sending out of messages weekly in the second semester. During the June and November examination period, one email message was sent out to wish students good luck for their examinations.

The nature of the motivational email messages had two aspects to it. The first aspect, which was usually never more than a sentence or two, was a personal message from me offering a few words of encouragement together with a gentle prompting of students to reflect on their academic behaviour. The second aspect took the form of an email attachment, usually a PowerPoint slideshow, which narrated brief stories of people overcoming difficult situations in their lives. The attachments consisted of pictures with

annotated text and accompanying soothing music. Each attachment emphasised the importance of staying true to your dream by working hard. The attachments also emphasised the need for a person to learn from setbacks in order to move closer to achieving a dream. These attachments were sent to me by friends and family. I found them inspirational and motivating and thus decided to send them to my students.

FINDINGS AND DISCUSSION

In this section I present and discuss three themes that emanated from the data analysis of the semi-structured interviews with participants. These themes reflect the extent to which the motivational email messages developed participants' academic identities in mathematics. The messages helped participants form new actual and designated identities; in the process aiding participants' acquisition of academic practices and behaviours valued by academia thereby highlighting the use of motivational email messages as a learning tool within higher education. Further, the themes reveal how participants experienced the academic culture of the university.

Persistence

Participants explained that the email motivations helped them to persist with their studies.

> The message that was there [in my email] was helpful coz when you think of giving up coz like during exams with all the stresses but then if we have that kind of motivation it is much better (Nomonde).

> The motivations and solutions ya coz like at some point you feel like eish like you realize that you are drowning… …And then you go to your emails and you realise that there are messages that encourage you then you feel better than you were (Thulani).

The stress associated with their academic workload and the impending examinations caused anxiety for these students, making participants feel that they could not succeed with their university studies. The stress associated with their academic workload mirrors the feelings of Foundation students in Keke's (2008) study. Other participants spoke of their disillusionment with their university studies as a result of their poor performance on tests. These experiences filled participants with negativity towards their studies, causing them to construct negative actual identities, such as giving up on their studies.

Through their engagement with the email messages, participants' negativity was replaced with motivation to persevere with their studies, allowing them to construct new, empowering actual identities in their study of mathematics.

> You see like when you you have read the motivation most of the time you feel like as if eish I can go back in my room and do something else (pause) because what is being said in the motivation, it is what I needed to hear (pause) but I was not sure about it…(Khumalo).

> For myself if I asked myself where I am right now and the advice [from the email motivations], what am I prepared to do for instance if I got a problem and the next question am I willing to make a difference or just continue the way things are right now (Moe).

> Instantly it doesn't do anything but when you need them 'cos you feel down or the marks are not so great, you have something to go to or if you fail, you still have someone to go to (Se).

The email messages seemingly got participants to refocus their energies on their studies, making them want to succeed in their academic endeavours. The email messages prompted participants to question their learning strategies and to think about taking on alternative learning strategies. The participants'

comments above reveal that the email messages not only rejuvenated their focus on their studies, but engaged participants in self-reflection. The messages helped participants take stock of themselves thereby forcing them to question their actions.

Through their self-reflection, participants began to make decisions about their learning. By investing in themselves, students engage and take ownership of their academic identity (de Kadt & Mathonsi, 2003; McKenna, 2004). In effect the messages engaged participants' identities, moving participants beyond their feelings of self-doubt, prompting them to confront their academic ways of being and grapple with their emerging academic identity. Through this confrontation with their inner thoughts and feelings, participants opened themselves to the possibility of further developing their academic ways of being by envisioning and following positive designated identities.

Psychosocial Support

Participants felt that the motivational email messages gave them a psychosocial lifeline. The messages made them feel connected to, and supported by, the university:

> It makes you feel happy coz like if you going through a rough time and someone says you are not alone may be there are people who care about you and maybe you working hard, just have to go through your work then you see that eish I'm not that bad. Maybe you can look at yourself the other way round rather than finding it difficult and stressful (Thulani).

Participants' feelings of loneliness and worry were replaced with feelings of composure and connectedness. Participants took solace in feeling cared for, giving them the confidence to regain belief in themselves. Their renewed mental and emotional fortitude helped participants engage with mathematics, allowing them to see that they could understand the work.

Numerous studies show how the literacy practices expected in the academy can seem confusing and can even lead to feelings of exclusion (for example, de Kadt & Mathonsi, 2003; Lillis 2003). Students may come to feel that their ways of seeing the world and of reading, writing, and being within it are not valued by the university. They may also become aware that new ways are expected of them but be unclear as to what these could be (McKenna, 2004). By feeling connected to the university through the person of their lecturer, participants were able to find a space to consider these anxieties, even though such a consideration was admittedly difficult to articulate. The psychosocial connections provided by the motivational email messages helped the students to engage with the target academic identity.

> Ja and for the motivations I think they really helped cos like they give us more moral to know that like everyone as you always said that everyone can do mathematics (Tokyo).

By facilitating participants' scripting of new actual and designated identities, the email messages helped participants believe that they could achieve their academic goals. This belief gave participants the confidence to engage with the study of mathematics.

Other participants explained that living away from their families during their academic studies prevented them from freely accessing their family's support:

> ...some of us are very far away from their homes therefore we do need some sort of motivation (Nomonde).

> 'cos now even I did badly in first semester but now with the [emails] and coming to consultations [with the lecturer] I know that it helps, there's someone there to help me when I've got problems 'cos I'm not at home. At home they always supported me (Lu).

Nomonde and Lu both illustrate the feelings of being untethered from their familiar support networks when they need it most on entering the foreign culture of the university. The personal correspondence with their lecturer provided some sense of connection to what could be perceived as an intimidating institution.

The email motivational messages provided participants with 'somebody' to go to for support, and this 'somebody' was a member of the university thereby acting as a mentor. The email messages replaced their feelings of self-doubt, isolation and loneliness with feelings of support and guidance.

> It does encourage you, does encourage you 'cos you know you are never alone, there's always someone there (Lu).

> There are times when you need them [email motivations]...Yes, some of them [email motivations] I print it out and hang them on the wall (Se).

The messages gave participants something tangible to hold onto, to support them and to guide them. Given students' feelings of alienation and isolation within higher education institutions in South Africa (de Kadt & Mathonsi, 2003; Department of Education, 2008), the motivational email messages helped students feel part of the university. The feelings of isolation and loneliness which initially formed negative actual identities within participants were replaced with feelings of support and belonging. This allowed participants to write new actual and designated identities for themselves, which in turn facilitated their acquisition of more positive learning strategies that are synonymous with good academic behaviour.

In feeling psychosocially supported by, and connected to, the university, participants began to see themselves as students of the university. The email motivations created a climate of psychosocial support for participants which allowed them to create new learning trajectories for themselves. The learning climate has been acknowledged as a factor that affects student learning (Downey, 2008; Killen, 2007). By seeing themselves as students of the university - fledgling members of this new community - participants identified with the academic practices that are valued by the university. In effect, the email messages spoke to participants' psychosocial needs thereby opening participants up to the possibility of adopting some of the academic practices valued by the university.

Student-lecturer bond

Related to the previous two themes, is the theme of the student-lecturer bond. Participants explained that the motivational email messages helped them see that their lecturer cared for them.

> ... errrr 'cos sometimes we tend to forget what we came here for, but when we see lecturers who are, who, who see the potential in us and who keep reminding us what we came here for it's nice just to know that you know lecturers are there for you (Siphamandla).

> And then with the motivations I said, I always tell my friends later I think Mr Y got a sense about the SFP students 'cos every time we are down and about to say it's enough of maths and I'm not doing it and you get this motivation and you ask yourself okay can you read our minds at times? Now I realise that [pause] it keeps us going (Tsepo).

While we have indicated that students often battle with adopting what seems to them to be mysterious academic practices, we should also acknowledge that they may be more concerned with forging new social identities (McKenna, 2004). Some participants indicated that they were distracted by the social freedoms associated with student university life. These distractions shifted participants' focus away from their studies. Other participants felt like giving up studying mathematics. The email messages helped participants refocus their efforts on their studies and, in so doing they developed a bond with their lecturer.

Through the development of this bond with their lecturer, participants felt motivated and confident to succeed with their studies.

> It creates a more relaxable, it's like ya I respect you as an adult but errrrerrrr it don't just see you as someone who is far, who just came to do his work and teach me and then go away, you know what I'm saying, it's very different. It's that special relationship, it's that this man you can trust you can consult, he is there to help you, he cares. So that you get motivated, like say you, this man is putting so much work on me, why am I not doing, returning the favour (SSK SD-4000).

As the above participant explained, the student-lecturer bond helped him see that he was not 'far' from his lecturer. In other words, by reducing the social distance between student and lecturer, the email messages helped forge and strengthen the student-lecturer bond for the participant.

Through the development of this bond, participants saw that their lecturer was interested in them and their futures. The interview data indicates that this belief in them by a member of the university community played an important role in their motivation to work.

> At least now we, we come for consultations we always know that okay I'll get motivated, I'll go try a new idea, try different ways of doing things, I'll see where it takes me (Lu).

Students are notorious for not using support structures made available to them. In this case there was an excellent uptake of consultations with the lecturer. I would argue that the personal communication by email had forged a relationship between the student and lecturer that is impossible to forge in the context of a mathematics lecture. On the basis of this relationship, these students felt comfortable and safe enough to schedule consultations where mathematics problems could be worked through individually. Participants started to use the help that was available to them and were willing to risk engaging with new strategies of approaching their studies. Participants were increasingly open to exploring new academic ways of being. While difficult to attribute a causal relationship between the emails and the 81% module pass rate achieved by students in the November 2008 examination, at the very least the pass rate is an indicator of students' willingness to invest themselves in the study of mathematics.

CONCLUSION: WHAT DOES THIS SIGNAL FOR HIGHER EDUCATION?

The data presented in this article gives a glimpse into Foundation students' experience of university; signalling students' need for multiple layers of support during their studies. Foundation students are concerned about their university studies but often fall prey to the stresses associated with their academic workload. Feeling vulnerable and isolated they become disillusioned with their studies, filling their thoughts with negativity.

However, through the use of personal communication, in this case email correspondence, participants rekindled their desire and determination to succeed with their university studies. The email messages provided participants with the emotional strength to persist with their studies. The messages provided them with psychosocial support thereby allowing participants to forge a bond with their lecturer. In effect the email messages opened participants to new academic ways of being, allowing them to risk engagement with new learning strategies by facilitating their construction of new actual and designated identities.

Email motivation messages can be used to foster a bond with students and so contribute towards developing a pedagogy of caring by higher education practitioners. Through a pedagogy of caring, higher education practitioners can reduce the social and cultural gap between student and lecturer, and

student and university. Through the reduction of this cultural gap, higher education practitioners can begin to provide students with epistemological access. Through a pedagogy of caring, universities may become sites of social and cultural dialogue, understanding and respect; and so work towards socially inclusive educational practices.

REFERENCES

Aungamuthu, Y. (2009) *An exploration of foundation students' perceptions of learning mathematics with the aid of Information and Communication Technology*. Unpublished Masters Thesis, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

Badat, S. (2007) *Higher Education Transformation in South Africa Post 1994*. Braamfontein: Centre for Education Policy Development.

Bloch, J. (2002) 'Student/teacher interaction via email: the social context of Internet discourse' *Journal of Second Language Writing* 11 pp.117-134.

Bourdieu, P. & Passeron, J.C. (1994) 'Introduction: Language and the relationships to language in the teaching situation' In P. Bourdieu, J.C. Passeron & M. de Saint Martin (Eds.) *Academic Discourse: Linguistic Misunderstanding and Professorial Power*. Cambridge: Polity Press. pp.1-34.

de Kadt, E. & Mathonsi, N. (2003) 'Writing in English with an "African voice": ownership, identity and learning' *Journal for Language Teaching* 37(1) pp.92-103.

de Wet, C. (2003) 'Eastern Cape educators perceptions of the cause and the scope of school violence' *Acta Criminologica*16(3) pp.89-106.

Department of Education. (2007) *Schools that Work*. Pretoria: Government Printers.

Department of Education. (2008) *Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions*. Pretoria: Government Printers.

Department of Education. (2009) Ministerial Committee Report on a National Education Evaluation and Development Unit. *Government Gazette* 526(32133). Pretoria: Government Printers.

Downey, J.A. (2008) 'Recommendations for fostering educational resilience in the classroom' *Preventing School Failure* 53(1) pp.56-64.

Griessel-Roux, E., Ebersohn, L., Smit, B. & Eloff, I. (2005) 'HIV/AIDS programmes: what do learners want? *South African Journal of Education*' 25(4) pp.253-257.

Hassini, E. (2006) 'Student–instructor communication: The role of email' *Computers & Education* 47 pp.29-40.

Hepburn, A. (2002) 'Increasing primary education access for children in AIDS-affected areas' *Perspectives in Education* 20(2) pp.87-98.

Hu, C., Wong, A.F.I., Cheah, H.M. & Wong, P. (2009) 'Patterns of email use by teachers and implications: A Singapore experience' *Computers & Education* 53 pp.623-631.

Huysamen, G.K. (2000) 'The differential validity of matriculation and university performance as predictors of post-first-year performance' *South African Journal of Higher Education* 14(1) pp.146-151.

Hwang, Y. (2008) 'A preliminary examination of the factors for knowledge sharing in technology mediated learning' *Journal of Information Systems Education* 19(4) pp.419-429.

Joubert, R., de Waal, E. & Rossouw, J. (2004) 'Discipline: Impact on access to equal educational opportunities' *Perspectives in Education* 22(3) pp.77-87.

Keke, B. (2008) *Science Foundation Students' experiences at a tertiary institution*. Unpublished Masters Thesis, University of KwaZulu-Natal, Durban, South Africa.

Killen, R. (2007) *Teaching strategies for outcomes-based education* (2 ed.) Cape Town: Juta.

Kim, C. (2008) 'Using email to enable e^3 (effective, efficient, and engaging) learning' *Distance Education* 29(2) pp.187-198.

Kim, C. & Keller, J.M. (2008) 'Effects of motivational and volitional email messages (MVEM) with personal messages on undergraduate students' motivation, study habits and achievement' *British Journal of Educational Technology* 39(1) pp.36-51.

Lave, J. & Wenger, E. (1991) *Situated learning*. Cambridge: Cambridge University Press.

Lillis, T. (2003) 'Student writing as "Academic Literacies": Drawing on Bakhtin to move from critique to design' *Language and Education* 17(3) pp.192-207.

Maree, J., & Cherian, L. (2004) 'Hitting the headlines - the veil on corporal punishment in South Africa lifted' *Acta Criminologica* 17(3) pp.72-85.

McKenna, S. (2004) 'The intersection between academic literacies and student identities' South African Journal of Higher Education 18(3) pp.269-280.

Moletsane, R., Morrell, R., Unterhalter, E. & Epstein, D. (2002) 'Instituting gender equality in schools: Working in an HIV/AIDS environment' *Perspectives in Education* 20(2) pp.37-54.

Morrow, W. (2007) *Learning to teach in South Africa*. Cape Town: HSRC Press.

Murphy, E. & Manzanares, M.A.R. (2008) 'Contradictions between the virtual and physical high school classroom: A third generation Activity Theory perspective' *British Journal of Educational Technology* 39(6) pp.1061-1072.

Ngidi, D.P. & Sibaya, P.T. (2002) 'Black teachers personality dimensions and work-related stress factors' *South African Journal of Psychology* 32(3) pp.7-15.

Scott, I., Yeld, N. & Hendry, J. (2007) *A case for improving teaching and learning in South African higher education. Higher Education Monitor Series 6* Pretoria: Council on Higher Education.

Sfard, A. & Prusak, A. (2005) 'Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity' *Educational researcher* 34(4) pp.14-22.

Smith, C.D., Whiteley, H.E. & Smith, S. (1999) 'Using email for teaching' *Computers & Education* 33 pp.15-25.

Taylor, M., Jinabhai, C.C., Naidoo, K., Kleinschmidt, I. & Dlamini, S.B. (2003) 'An epidemiological perspective of substance use among high school pupils in rural KwaZulu-Natal' *South African Medical Journal* 93(2) pp.136-140.

Valadez, J.R. & Duran, R. (2007) 'Redefining the digital divide: Beyond access to computers and the Internet' *The High School Journal* 90(3) pp.31-44.

Wojecki, A. (2007) 'What's identity got to do with it, anyway?' Constructing adult learner identities in the workplace' *Studies in the Education of Adults* 39(1) pp.168-182.

Social and academic integration in an extended curriculum programme

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ABSTRACT

Extended curricula have been introduced in a number of programmes in South Africa as one mechanism for addressing issues of equitable access, the low throughput rate in higher education and the need to articulate better the gap between school and higher education practices. This article considers the extended curriculum programme in Dental Technology at the Durban University of Technology and argues that in order to achieve these multiple aims, such programmes have to provide a broad range of inputs which consider the learners in both social and academic ways. Dental Technology has offered an extended curriculum programme since 1995. In 2003 the programme was re-curriculated to comply with Department of Education funding criteria. The Dental Technology extended curriculum has evolved to include a range of interventions which support learners as they adjust to university life and which induct them into the discipline-specific norms of the Dental Technologist. It is through the integrated development of academic and information literacies as well as the conscious concern with social integration that this programme has succeeded. Analysis of semi-structured interviews with learners and staff of the Dental Technology programme shows that this intervention is successful specifically because it takes note of a combination of multi-faceted issues. It mediates learners' acquisition of complex concepts and nomenclature while at the same time narrows the gap between the literacy practices of school and tertiary education. The explicit foregrounding of academic literacy practices through real tasks in the specific discipline promotes the acquisition of analytical, reading and writing practices and conceptual understanding. In addition, it was recognised that attention to social integration issues led to more settled learners who were consequently able to enjoy academic success. Social integration was achieved through a well-defined mentorship programme running parallel with the academic programme.

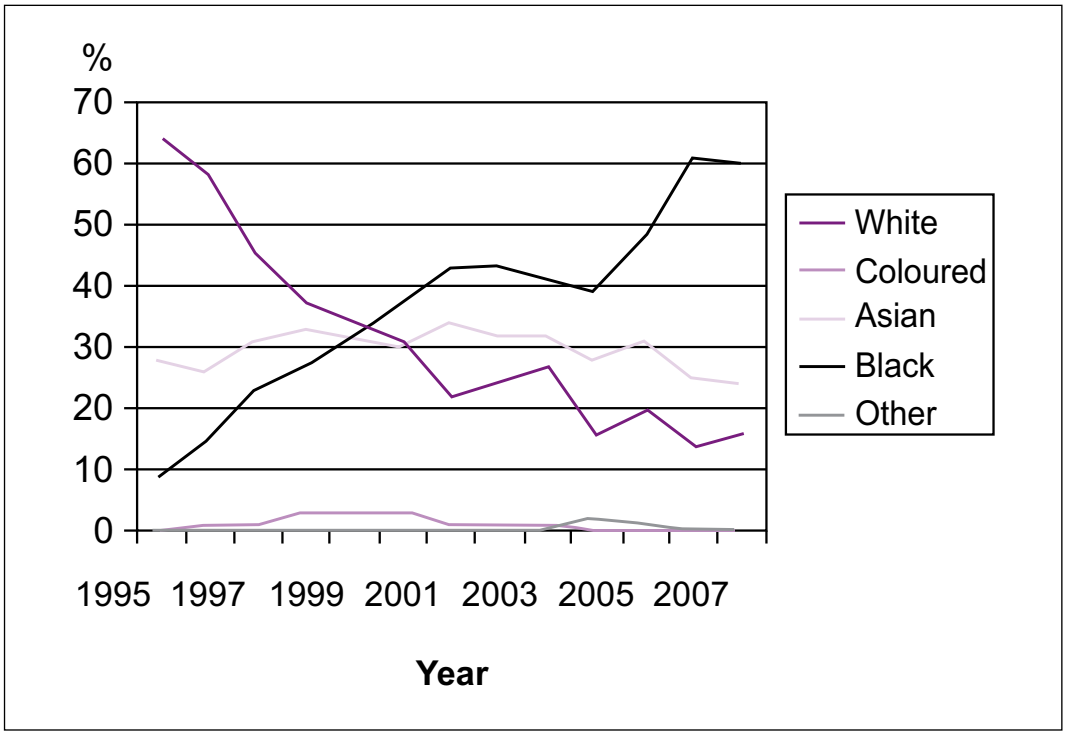
INTRODUCTION

Poor throughput rates remain problematic at most institutions of higher learning. Of those that pass Grade 12 examinations, only 24% of learners obtained the matriculation exemption required to enter traditional universities. From this scenario, it is perhaps unsurprising that participation in higher education sits at a low of 16% (Scott, Yell & Hendry, 2007: 10). For those successful few who make it into higher education, the picture gets no rosier. South Africa's university graduation rate is reported as one of the lowest in the world (Letseka & Maile, 2008). They report that 'one in three university students and one in two technikon (now university of technology) students dropped out from institutes of higher learning between 2000 and 2004' (2008: 6). It is thus argued that universities will require substantial academic and social interventions if throughput rates are to be improved and students prevented from dropping out of higher education.

The racial demographic profiles at universities have improved in the tertiary sector but this has presented new challenges as learners' performance remains compromised, especially amongst those coming from the former Department of Education and Training (DET) schools (Jansen, 2006; Gussendorf, Liebenberg & Houston, 2004; Hay & Marais, 2004; van Wyk, 2002; Nair, 2002; Koch & Synders, 2001; Futter, 1999). Many learners have a significant chance of being underprepared for tertiary education.

Since South Africa became a democracy in 1994, institutions of higher education have faced two specific challenges; improving equity of access and improving quality throughput. Improving equity of access is a problem stemming from South Africa's apartheid past when institutions were only permitted to enrol learners from specific racial groups (Bunting, 2002). Foundational provision was mooted as a means of improving equity of access, and at the same time, providing remedial or additional provision to improve success rates. In 1995 the Dental Technology programme at Technikon Natal (now Durban University of Technology) introduced an extended curriculum programme (ECP). This was initially seen as an intervention to address the imbalanced racial demographics of the programme and it was highly successful in this regard. The demographics of the programme shifted fundamentally between 1995 and 2007 (see Figure 1).

Figure 1
Enrolment in Dental Technology by Race Group1995-2007



However, the throughput rate was declining. The average throughput rate between 1998 and 2003 for the Dental Technology diploma was 20%, while for the institution as a whole for the same period it was 25%. By comparison the national average, in 2005, was 15% (2005 HEMIS Database, 2006).

Thus the programme needed to shift the focus from equity of access to 'equity of outcomes' (Department of Education [DoE] 1997). In 2005 the programme was accepted for funding as part of the DoE foundation provision initiative and the programme became known as the Dental Technology Extended Curriculum Programme (ECP). Participants have been placed on the ECP because they have been identified as

having the necessary academic potential for success in tertiary education but as lacking specific academic proficiencies to be accepted directly into the three-year programme without additional interventions. The focus thus changed from physical access into the institution to what Morrow (1993: 3) calls 'epistemological access'; access to the ways of making knowledge required of dental technology students.

This article begins by discussing the terminology and models of foundational provision with a particular focus on extended curricula. The paper then looks at how staff and students in the Dental Technology extended curriculum programme perceive the programme. The central argument arising from the data is that there is no one factor that can be regarded as the determinant of a successful programme, but that success arose from the mindful consideration of the curriculum as a whole, and of the students in particular.

THE DIFFERENCE BETWEEN EXTENDED CURRICULA, ADD-ON FOUNDATION COURSES AND BRIDGING PROGRAMMES

Definitions of the various programmes that have been developed in South Africa to address underpreparedness of learners are difficult to establish. Often the terms foundation, bridging, augmented and access are used interchangeably (Hay & Marais, 2004). I argue that 'access' and 'bridging' programmes have a shared backwards focus while extended curriculum programmes are one form of foundational provision where the focus is on the skills and practices required of students within their registered programme.

Access/Bridging programmes are those programmes that allow learners, who do not meet the necessary academic entry requirements, to enter tertiary education programmes in preparation for mainstream/traditional programmes. These programmes are not credit-bearing and have traditionally not been state funded.

Augmented/Add-on programmes are the addition of academic interventions to an existing programme. The interventions are in addition to the workload and are usually limited to extra tutorials (Timm, 2005).

Extended curriculum programmes are interventions which are a combination of credit-bearing and additional academic support modules. The credit-bearing subjects usually attract state subsidy whilst the additional academic support programmes are funded through specific state grants. An extended curriculum is 'primarily intended to enable learners who are under prepared for the standard programme to gain a sound foundation for successfully completing the programme' (Scott, 2001: 18) but at the same time allows the learner to achieve credits towards specific qualifications. These programmes 'provide for learners to extend their period of study by a year while carrying a lighter load in the first two years' (de Klerk *et al*, 2005: 1). The Department of Education (2006: 2) defines extended curricula programmes as

> … a first undergraduate degree or diploma programme that incorporates a substantial foundational provision that is additional to the coursework prescribed for the regular programme. The foundational provision must be (a) equivalent to one or two semesters of full-time study, (b) designed to articulate effectively with the regular elements of the programme, and (c) formally planned, scheduled and regulated as an integral part of the programme.

The differences in approach between bridging type programmes and extended curricula are not simply structural. In the former, the focus is on certain 'lacks' within the student him/herself that need to be addressed before he/she is ready to tackle the expectations of higher education. In the extended curricula, the issue of underpreparedness is acknowledged alongside a more critical look at the curriculum itself.

The practices expected of a student - both academic and those related to the vocational nature of the Dental Technology diploma - are not taken to be 'commonsense' but as needing critique and interrogation by academics themselves. These practices are then made explicit and transparent within the foundation provision. This philosophical shift from 'filling in the gaps' to 'providing epistemological access' is far from complete but is an important part of the history of the Dental Technology Extended Curriculum Programme.

This paper now discusses the key factors which students and staff raised in interviews to explain this success. In doing this a complex picture arises which suggests that extended curriculum success relates to a system of people and structures that are mindful of the student in holistic ways.

METHODOLOGY

In order to deepen our understanding of what contributes to the success of the Dental Technology ECP, I asked two questions:

- What do learners perceive to be indicators of success or failure of the ECP?
- What do staff perceive to be indicators of success or failure of the ECP?

This study sought to understand the ways in which staff and students made sense of the ECP, in particular I was interested in whether the programme was perceived as successful or not and what explanations were provided for this perception. The data was collected by means of individual semi-structured interviews with seven Dental Technology teaching staff from the Department of Dental Sciences and nine learners who are in their second, third, fourth or fifth years of study.

Scott (2001:2) argues that 'Higher Education (HE), the 1997 White Paper and the 2001 National Plan for Higher Education (NPHE) have recognised the need for special measures, particularly academic development programmes, to facilitate the success of talented students from disadvantaged educational backgrounds'. Learners are placed on the ECP after being identified through a series of placement tests. While these learners meet the minimum entrance requirements for Diploma study, they do not qualify in terms of the standard entry requirements for the Dental Technology programme.

DISCUSSION

In interviews with staff and students, it was evident that everyone considered the ECP as a successful endeavour. It is of course possible that such a response was related to power issues given that the interviewer had been Head of Department at the time of the interviews. However a great attempt was made to try to engage the interviewees at a personal level and to reassure them that authentic, personal understandings were valued. It would also be incorrect to give the impression that there were no negative views expressed by students about the programme. But these were usually related to the initial feeling of disappointment at being placed within the ECP (a four year programme) and not the three year diploma. In all of these fairly unstructured interviews the participants discussed their experiences of success and their explanations for this success.

I grouped these explanations as perceived by the students and staff into two main categories. The first involved the extent to which the programme helped students to adopt the literacy practices of the dental technology programme. The second involved the ways in which the course was structured to take social integration of students into account.

1. Negotiating the academic gap

While the gap between the educational practices of school and higher education makes the transition difficult for any student, students from disadvantaged backgrounds find this particularly problematic (Scott *et al*, 2007). This is in part because the teaching and learning practices of these students' school experience are often greatly at odds with the expectations they encounter at university (Jansen, 2006; Gussendorf, Liebenberg & Houston, 2004; Hay & Marais, 2004; van Wyk, 2002; Nair, 2002; Koch & Synders, 2001; Futter, 1999). This is confirmed by a Dental Technology lecturer with a good knowledge of the schooling system of such students. She states that in under-resourced schools:

> …you don't get to do assignments and projects as much as you do in your Model C schools[1] and so with the Model C schools they expose you to different types of thinking and not just doing. They want you to go out there and find the research and apply it to your studies, whereas with the black schools, it is more like they give you, they spoon feed you what you should know - not that you go out there and find out and resource different materials for your studies.

It is widely believed by academics at the coalface that learners entering tertiary education are underprepared. Another lecturer in this study stated:

> The other challenge that I - the other problem that I'm greatly concerned with is the results of what they attained in matric. Um, what's on paper and the potential of the student is quite different. They do not speak the same language if you may say that. And that for me is the greatest challenge. The students come in with this false sense of security that they are actually competent people, competent learners, um, the challenge for me is making them competent in terms of being responsible and accountable.

These problems are exacerbated in technical programmes such as Dental Technology as learners are required to learn a new and very foreign nomenclature and set of practices. This study found that if the development of academic practices and the acquisition of discipline specific nomenclature are integrated within the discipline specific subjects themselves then significant learning occurs. This practice was recognised by the learners themselves as this quote illustrates:

> Ja, that subject was very helpful because we get to like, act as a lecturer, be in front of the students, tell - educate the …students about what is going on in dental technology and everything.

What was important to learners was the fact that academic literacy development was offered within a credit-bearing diploma subject. Learners believed that the fact that they were able to produce acceptable Dental Technology work with the assistance, support and developmental feedback of the academic literacy lecturer contributed to their development. While the lecturer responsible for this section of the module was not a dental technologist, the materials were developed in conjunction with dental technology lecturers and related directly to the discipline. Students indicated in the interviews that there was collaborative learning in a partnership with the academic literacy lecturer.

> Because that subject, you know, as a whole, put everything together for you. We were kind of like given that - the lecturer she's not with dental but she learnt from us, so from the little knowledge that we had from tooth morphology and stuff, we'll pitch it back to her so in a way, we kind of like, it's like helping us understand our work much better, because in academic literacy we worked as a class, as a group so we had presentations, … those kind of things.

1 For a brief time before the first democratic election in South Africa in 1994, government schools that chose to open their doors to all race groups were termed 'Model C' schools. Although all schools are now open to all races, the term has entered the South African vernacular and come to mean government subsidised schools that were previously designated 'whites-only'.

Not only did academic literacy facilitate a better academic understanding it also contributed significantly to helping learners manage their time as assignments due for other classes were plotted out and planned in the academic literacy class. The development of academic literacy as being about Dental Technology practices meant shifts from earlier notions of it being about generic academic writing and autonomous skills, such as time management or note-taking. This understanding evolved over time. This entailed a regular, structured and close relationship between the discipline experts and the academic literacy lecturer. As academic literacy development became increasingly tied to the topics and practices of the discipline so the commitment of the students to this subject increased. Importantly, this academic literacy class was also seen as a space in which the new and often alienating tertiary environment could be discussed and the students' views were appreciated.

> In that course the lecturer gets to tell us how to do our assignments, how to adjust, how to manage our time as foundation students and just, we talk about most of everything, like if we have problems maybe that she can help us with.

One of the most important skills associated with dental technology is that of drawing, with clear disciplinary norms of the features of such drawings. The subject, Dental Drawings and Carvings, was thus developed as a crucial way in which students were prepared in their first year of study. Learners were required to pass this subject to proceed academically to the next year. As with academic literacy, this subject is a space in which to develop a particular disciplinary practice in a way that the mainstream curriculum does not allow. Learners embrace this exposure because they enjoy and see value in these interventions.

> When I came to the institute I was not computer literate, I couldn't draw to save my life and being on the programme and having somebody to teach you, okay, this - when you look at an object don't just look at like from just what you see, look at it with an eye, like, I was kind of like given that artistic knowledge to know, to help me in a way that now when I do crown and bridge, like two years later, I still have that knowledge as to that. Whenever I'm carving or drawing I must just - those small details, they change everything, so it was the thought of like getting to know everything and you know. It was quite good.

Moreover, learners' responses were such that they support the findings of previous research that found that the benefits of foundation provision is far greater when the course content is immediate and directly related and thus relevant to the qualification for which they have registered (McKenna, 2004; Warren, 1998).

> At first I was like, okay, so it was like extended first year but my knowledge was I'm doing a foundation course and that was not good but then when I came to the programme in the system it kind of like clicked that I'm not really doing a foundation course where I'm just going to do it now, that I can just change my mind later, it was kind of like a stepping stone for me in dental skills, dental technology skills, so at first I was a bit hesitant but then….

It is thus concluded that when foundational provision is developed to allow for epistemological access, this cannot be understood in a generic manner, particularly given the specific vocational nature of most university of technology qualifications. The integrated manner in which the provision was embedded within the practices and content of the discipline had a positive impact on the students' navigation of the school-university discipline gap.

It must be noted that although learners reported positively as indicated above, it was only in hindsight that they were, upon reflection, able to see these benefits. A few indicated in the interviews that their initial

reaction to being placed on the programme was negative. This finding is consistent with those of Wood and Lithauer (2005: 1008) who reported: 'Although some of the students did not realise the value of the programme when they were doing it, in hindsight they did acknowledge that it did help them'.

Interestingly, learners argued that their peers who were not placed on the ECP were at a disadvantage as they had not been explicitly inducted into the expected practices of their qualification.

> Some of them wish that they were [ECP learners] - they think that it is unfair that [they] were accepted as the mainstream [learners] whereas we have this background of ECP so they think it would have been better for them to enter the ECP first and then come to the mainstream.
>
> Actually they [mainstream students] came up to me for help most of the time because I've done some of the practical work.

Given the improved success of those learners successfully completing the ECP coupled with their own recognition of the benefits of the ECP, I suggest that all learners would benefit from the tuition offered in the foundation provision.

2. Becoming socially integrated

The benefits that accrue from mentorship programmes are well documented (Blunt & Conolly, 2006; Wood & Lithauer, 2005; van Wyk & Daniels, 2004; Furlong & Maynard, 1995). Mentoring plays an important role in the Department of Dental Sciences' efforts to integrate ECP learners into the programme and into the tertiary environment. Peer mentoring was introduced into the department in 1998 and the programme has developed to the point where it is considered vital to the integration of learners. In addition to the integration benefits to individual learners, the mentorship programme is an important link between the learners and the academic staff. One of the indicators of poor performance of learners in tertiary education can be attributed to the fact that they have 'no experience in the milieu of tertiary education' (Martin, cited in Martin, Blanc & Arendale, 1994: 95). Mentoring is seen as a mechanism providing 'psychological guidance and support', influence and inspiration to a protégé (Charoux, cited in Blunt & Conolly, 2006: 199). The benefits of mentoring are significant and should be considered, within the context of higher education, as a vehicle to improve learner performance.

The learners in this study indicated that personal caring and interest shown towards them proved to be effective; this accords with similar findings in the literature (Blunt & Conolly, 2006). Mentoring aims to discover and unleash the inherent potential in learners (van Wyk & Daniels, 2004), especially for those learners with compromised matriculation passes and school backgrounds. For learners to be able to commit fully to their studies they must feel content in the learning environment. The perceived support enables learner performance (Wood & Lithauer, 2005). One purpose of mentoring - to be a mechanism to achieve the growth of professional knowledge (Furlong & Maynard, 1995) - was particularly relevant in this study. Students indicated that they appreciated the technical disciplinary know-how of their mentors.

Rutherford & Matlou (1998) indicate that the majority of learners entering South African tertiary education can be classified as 'at-risk learners'. Many come from rural areas and have difficulty in adjusting to city life. Moreover, the institutions that they attend are large and they can become alienated in the system. In addition, they very often have financial difficulties. Also, they may come from 'highly regimented schools and have succeeded by following instructions' (Rutherford & Matlou, 1998: 153). When they arrive at university, they generally find that the expectations of them in terms of personal autonomy and strange academic practices overwhelming. 'They may spend the first few weeks of term in a fog, trying to adjust to a very alien environment' (Rutherford & Matlou, 1998: 154).

It is to these learners that peer mentoring is of particular advantage. At-risk learners often find it easier to relate to their peers rather than to the traditional university systems (Clulow & Brennan, 1998). Learners reported as follows:

> The mentorship programme. It is really helpful. There are some of the things that you could like tell your peer, somebody or a mentor and there is stuff that you can't really go to your lecturer and talk to.

> It's a very good concept. The mentorship, yes, I think it should be an ongoing programme because students do benefit from that. You need somebody, somebody who is on your level to speak to, if you're finding difficulties. Sometimes it's very hard to approach a lecturer, especially being new, in the new tertiary environment and stuff. You find it easier to talk to your peers rather than your lecturers, ja, somebody who can actually relate to what you're going through, who understands what you're going through, so I think it's a positive programme and it is good and should go on.

The Dental Technology ECP programme makes use of peer mentorship to assist learners to experience a smooth transition into the tertiary environment under the informed guidance of senior learners who have already navigated the path before them. Mentors are recruited from third and fourth year learners. Mentoring positions are advertised within the Dental Technology programme. Prospective mentors are interviewed and then selected. They are paid a nominal fee for their services.

An interesting belief expressed by some learners was that mentors were, *per se*, a motivating factor in challenging learners to achieve academically by frequently questioning their mentees about how they were performing academically. A learner noted:

> Yes, I think this [mentorship programme] is a very good programme for me, because like they concentrate, they want to know how you're doing with your pracs and they do it every day. There's no way that you can just tell them that no, I'm doing well.

CONCLUSION

The study showed that a holistic approach to the integration of learners into the milieu of tertiary education coupled with a well-defined academic programme with specific emphasis on Dental Technology practices was understood to be responsible for learner success.

Significant in the success has been the integration of academic literacy practices within specific discipline subjects. These results are supported in the literature (McKenna, 2003; Warren, 1998). The learners recognised the value of the foundational provision. Learning cannot occur in an academic vacuum. It is vital that the social well-being of a learner is addressed. The ECP has recognised the need for a mentorship programme, which results in the learners being socially integrated within the programme and within the institution as a whole. Thus, it is concluded that the success of the ECP cannot be attributed to one factor alone, but rather to a number of factors. These include addressing learner integration holistically, the whole being greater than the sum of its parts.

REFERENCES

Bass, G.H. (2007) *An Investigation of the Perceptions of Learners and Staff in respect of the Dental Technology Extended First Year Programme*. M.Ed. (Higher Education) Thesis, University of KwaZulu-Natal, Durban, South Africa.

Blunt, R.J.S. & Conolly, J. (2006) 'Perceptions of Mentoring: Expectations of a Key Resource for Higher Education' *South African Journal of Higher Education* 20(2) pp.195-208.

Bunting, I. 2002. 'The Higher Education Landscape under Apartheid' In N. Cloete, R. Fehnel, P. Maassen, T. Moja, H. Perold & T. Gibbon (Eds.) *Transformation in Higher Education: Global Pressures and Local Realities in South Africa*. Lansdowne: Juta. pp.58-86.

Clulow, V. & Brennan, L. (1998) 'Study and School of Therapeutic and Rehabilitative Studies: The Role of Relationship Constellations' In S. Goodlad (Ed.) *Mentoring and Tutoring by Students*. London: Kogan Page pp.19-32.

de Klerk, E., Schoeman, A., van Denventer, I. & van Schalkwyk, S. (2005) 'The Extended Degree Programme at Stellenbosch University (1995-2004): An Impact Study' Unpublished research paper, University of Stellenbosch, South Africa.

Department of Education. (1997) Education White Paper 3: A Programme for the Transformation of Higher Education. Government Gazette No.18207, August. Pretoria: Government Printers.

Department of Education. (2006) Funding for Foundational Provision in Formally Approved Programmes: 2007/8 to 2009/10. Pretoria: Government Printers.

Durban University of Technology (DUT). (2007) *Institutional Audit 2007*. Durban: Durban University of Technology, South Africa.

Furlong, J. & Maynard, T. (1995) *Mentoring Student Teachers: The Growth of Professional Knowledge*. London: Routledge.

Futter, M.J. 1999. 'A Strategy for the Recruitment of Underrepresented Disadvantaged Black Students to the Department of Physiotherapy, University of Cape Town' *South African Journal of Physiotherapy 55*(4) pp.11-15.

Grussendorf, S., Liebenberg, M. & Houston, J. (2004) 'Selection for the Science Foundation Programme (University of Natal): The Development of a Selection Instrument' *South African Journal of Higher Education* 18(1) pp.265-272.

Hay, H.R. & Marais, F. (2004) 'Bridging Programmes: Gain, Pain or All in Vain: Perspectives in Higher Education' *South African Journal of Higher Education* 18(2) pp.59-75.

HEMIS Database 2005. (2006) 'Summaries of Key Graduation Rates in Public Higher Education Institutions in 2005' Email attachment from Appelgryn, J. Deputy Director, Department of Education to Bass G.H. 6 August 2007.

Jansen, J. (2006) 'We Have Settled for a Dual School System that Nurtures Pupil's Vain Hopes' *Sunday Independent*, 31 December, p.8.

Koch, E. & Synders, M. (2001) 'The Effect of Video Supplemental Instruction on the Academic Performance in Mathematics of Disadvantaged Learners' *South African Journal of Higher Education* 15(1) pp.138-146.

Letseka, M. & Maile, S. (2008) *High University Drop-out rates: A Threat to South Africa's Future*. Pretoria: HSRC Press.

Martin, D., Blanc, R. & Arendale, D. (1994) *Mentorship in the Classroom: Making the Implicit Explicit* http://teaching.uchicago.edu/pod/martin.html (Accessed 20 May 2007).

McKenna, S. (2003) 'Changing Discourses of Academic Development at a South African Technikon 1991 to 2002' South African Journal of Higher Education 17(2) pp.60-67.

McKenna, S. (2004) *A Critical Investigation into Discourses that Construct Academic Literacy at the Durban Institute of Technology*. Ph.D. (Education) Thesis, Rhodes University, Grahamstown, South Africa.

Morrow, W. (1993) 'Epistemological Access in the University' *AD Issues* 1 pp.3-4.

Nair, P.A.P. (2002) 'A Theoretical Framework for an Access Programme Encompassing Further Education Training: Remedy for Educational Wastage?' *South African Journal of Higher Education* 16(2) pp.94-103.

Rutherford, M. & Matlou, M. (1998) 'A Student-student Mentoring Programme for Freshman Students' In S. Goodlad (Ed.) *Mentoring and Tutoring by Students*. London: Kogan Page. pp.151-164.

Scott, I., Yeld, N. & Hendry, J. (2007) *A Case for Improving Teaching and Learning in South African Higher Education. Higher Education Monitor Series 6*. Pretoria: Council on Higher Education.

Scott, I. (2001) 'Public Funding for Academic Development: Analysis and Proposals' Individual submission to the Ministry of Education in response to the 2001 Discussion Document *Funding of Public Higher Education: A New Framework*. Cape Town: University of Cape Town, South Africa.

Timm, D.N. (2005) *The Evaluation of the Augmented Programme for ND Analytical Chemistry at the ML Sultan Technikon for the Period 1994-1999*. MSc Thesis, University of South Africa, Pretoria.

van Wyk, A. (2002) 'A University Bridging Course Focusing on Academic Reading and Writing Skills' *Journal for Language Teaching* 36(3&4) pp.220-232.

van Wyk, J-A. & Daniels, F. (2004) 'An Integrated Mentoring Strategy for Service Learning in Higher Education' *South African Journal of Higher Education* 18(2) pp.359-370.

Warren, D. (1998) 'Educational Intervention in Higher Education: from "Academic Support" to "Academic Development"' *South African Journal of Higher Education* 12(3) pp.76-87.

Wood, L.A. & Lithauer, P. (2005) 'The 'Added Value' of a Foundation Programme' *South African Journal of Higher Education* 19(5) pp.1002-1019.

Collaborative learning of mathematics by educationally disadvantaged students at a university

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ABSTRACT

This paper reports on a qualitative study of how collaborative learning as a pedagogic intervention was implemented in the Centre for Science Access (CSA) in a South African university. Students in the CSA are from educationally disadvantaged backgrounds. Collaborative learning was implemented to improve the mathematics knowledge and skills of these students. Collaborative learning involves organising students to work in pairs or in small groups to achieve shared goals or learning outcomes.

INTRODUCTION

In the past decade, South Africa has been undergoing a steady transformation relating to the need to widen access in the higher education sector. As a result there has been an increase in the number of educationally disadvantaged black men and women studying for science degrees. However these students enter higher education from diverse backgrounds and with different levels of social, educational, cultural and academic preparedness (Hartman & Warren, 1994). The knowledge and skills that these students bring with them on entry to university ultimately have an effect on their subsequent learning. Prior knowledge of a subject is essential for subsequent learning to occur and prior knowledge is a foundation on which new knowledge is built (Ausubel, Entwine, Gagne & Briggs, cited in Holtman & McKenzie, 1994: 276).

Researchers find that there has been a steady decline in the mathematics skills and knowledge among first year students in South Africa (du Preez, Steyn and Owen, 2008: 1). There is also a concern that students lack academic skills, including the lack of fundamental mathematical concepts and communication skills in mathematics. Similar observations were noted by researchers in the United States; first year students lack basic skills in mathematics and also lack proficiency in English. Hence there is a need for remedial courses in mathematics and English (Graff & Leiffer, cited in du Preez *et al*, 2008: 50).

In 2008, South African students were exposed to Outcomes Based Education (OBE); a new curriculum and teaching philosophy. It is not surprising that this cohort's progress in the higher education system has been subjected to scrutiny. The results in mathematics and physics were disappointing throughout the country. In 2009 a large number of students who wrote the new National Senior Certificate (NSC) registered at higher education institutions. Given the enrolment of the large number of underperforming students, strategies are required to increase student success (Wolmarans, Smit, Collier-Reed & Leather, 2009).

This paper reports on an intervention strategy implemented by the Centre for Science Access (CSA) at a South African university to improve the mathematics knowledge and skills of students. Students were required to work in pairs or groups comprising of four students in order to learn mathematics collaboratively. The major research question being:

- How was collaborative learning experienced by the students?

COLLABORATIVE LEARNING APPROACHES

Smith & MacGregor (1992: 1) describe collaborative learning as

> An umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. Usually, students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product.

Collaborative learning activities vary widely, but most centre on students' exploration or application of the course material. Collaborative learning does not preclude students from also working independently. Students are given an opportunity to work independently of each other and to construct their own meaning so that they can make a contribution to the group discussion.

Collaborative learning attracts interest because it addresses several major concerns related to improving student learning. The essence of collaborative learning is that as students work together, they are actively involved and deepen their understanding of what is being studied. According to Barkley *et al* (2004: 4), collaborative learning is characterised by:

- active rather than passive learning
- equal contribution as members of the group
- a guide who facilitates rather than transmits information
- equal sharing by the facilitator and students in the teaching and learning experience
- acceptance of responsibility for learning by the individual student, as well as the group in which the student finds him/herself
- enhancement, through the articulation of ideas in a small group, of a student's ability to reflect on his or her assumptions and thought processes
- enhancement of student success and retention of learnt material
- acknowledgement of the value of diversity and of harnessing it in the learning process.

Further, Gokhale (1995) points out that collaborative learning promotes critical thinking and despite the advantages of collaborative learning there is little evidence of its implementation or of its effectiveness in higher education institutions.

ASSUMPTIONS ABOUT LEARNING

Collaborative learning takes on a variety of forms and is practised by teachers in various disciplines. It is linked to a number of important assumptions about learners and the learning process. These assumptions include: educationally disadvantaged students are diverse and are underprepared; students learning in groups; mathematics dialogue is an important component of collaborative learning; and the power of technology cannot be underestimated.

Educationally disadvantaged students are diverse and are underprepared

In the South African context, educational disadvantage is due to the unequal distribution of resources, poor infrastructure and poor quality teaching. This may be attributed to the fact that a large number of teachers especially in mathematics and science are underqualified or unqualified (Phurutse, 2005).

Wenger (1998) argues that learning is not the mere acquisition of knowledge, i.e. only related to the cognitive aspect of learning. Learning, he maintains, is a process of social participation. Members are involved in relationships over time and communities of practice are developed around those things that matter to the people. Learning transforms who we are and what we can do; it is an experience of identity.

According to Webb, Nemer & Ing (2006) many current conceptions of learning, especially social-cognitive and social-constructivist perspectives, highlight the central importance of student participation in social interaction. In Vygotsky's (1978) view, for example, people learn concepts and strategies during interaction with others who are more knowledgeable and then internalise those concepts. Expressing and defending their beliefs and opinions and questioning others' ideas helps students to recognise, clarify, and repair inconsistencies in their own thinking. Using a group approach to learn mathematics is just another way of completing a task. The more heads working together, the sooner the task will be complete.

Students need to be actively involved in the learning process. They construct their own meaning and knowledge by connecting new information and concepts to what they already know, build hierarchies of understanding through the process of assimilation and accommodation. Mathematics is learned when students engage in their own invention and impose their own sense of investigation and structure. It is important for teachers to examine students' thinking about mathematics so that students engage in relevant tasks to build more valid perceptions of mathematics (National Council of Teachers of Mathematics, 1991).

Brodie (2007) points out that the new curriculum in South African schools required mathematics lessons be learner-centred. Learners should be encouraged to participate and contribute to the lesson. Learner talk is essential, because it allows the learners to express and clarify their own ideas. When the learners discuss ideas with each other, the teacher is able to determine what the learners know and detect misconceptions.

Students learning in groups

Davis (1993) points out those students learn better when they are actively involved in the process and students who work especially in collaborative groups appear to be more satisfied with their classes. Other researchers (cited in Smith & Macgregor, 1992) report that students working in small groups tend to learn more of what is taught and retain it longer.

Peer teaching is a process whereby students teach their fellow students. Examples of peer teaching models are Supplemental Instruction and Mathematics Workshops/ Seminars. Mathematics Workshops are advocated by, among others, Triesman (cited in Smith & MacGregor, 1992) who was concerned about minority students in the University of California at Berkley. They experienced academic difficulty especially with traditional tutoring. Instead of remedial programmes, senior students are used to conduct mathematics workshops. These workshops are built around small group problem-solving where peer teaching is emphasised.

Mathematics dialogue is an important component of collaborative learning

In South Africa, there are eleven official languages and the language issue is a complex one. There is a continuing debate regarding which language should be used to teach mathematics in multilingual classrooms. Many teachers and students regard English as an international language and that English

is important for higher education, jobs and hence a better life (Setati, 2008). English is a medium of instruction in almost all the universities in South Africa but is a second language for most students in the Centre for Science Access. The communication of mathematics ideas and concepts in the classroom may take place through various forms of language. We need to consider the place for language in mathematics classrooms. This may be spoken, written, formal or informal, between students and teacher or between student and student/s. In many 'real world' problem-solving situations an understanding of a problem is developed by talking to others who have an interest in solutions. The symbolic approach is an integral part of teaching mathematics. However when teaching educationally disadvantaged students I adopt a developmental approach. It is recommended that teachers delay the use of symbols until proper meanings have been negotiated by the students (Pimm, cited in Simmons, 1993).

The power of technology cannot be underestimated

A number of institutions, worldwide and in South Africa, are adapting their modes of delivery to include the use of integrated technologies. The need for technology literacy as well as the fact that some of our students are already experienced technology users must be taken into consideration (Broere, Geyser & Kruger, 2002).

RESEARCH DESIGN AND PEDAGOGICAL INTERVENTION

The Foundation Mathematics Module is a year-long module. The students are divided into five groups with an average of 36 students. For each of these groups, five lectures (45 minutes each) and a tutorial (2 hours and 30 minutes) were conducted per week. One of the groups, taught by the researcher, was the experimental group. The other four groups formed the control group, and were exposed to traditional methods of instruction.

The lectures and tutorials for the experimental group took into account the background of the Foundation Mathematics students, especially the type of schooling to which they were exposed. We first outlined the tutorial intervention. Students were required to come to each tutorial with their attempts for the relevant tutorial questions, which were given to them at the beginning of the semester. At the beginning of the semester students were put into three groups, and a demonstrator was assigned to each group. Each demonstrator was a senior third year student. For each tutorial the demonstrator first looked at the attempts of his/her students to the tutorial questions. This was done with the aim of assisting the students with their difficulties and to correct student misconceptions. Before the semester began, those demonstrators were trained on how to conduct the tutorials. Weekly meetings were then held with demonstrators to obtain feedback about their students' prior knowledge, mathematical skills and progress. Feedback was received from the demonstrators during these meetings and also during each tutorial session. Those feedbacks were useful, informative, and influenced the pedagogical intervention. The lecturer then implemented remedial measures during the tutorial. To encourage active learning, students worked in pairs or small groups during the tutorials.

In class, for 20 minutes I taught, discussed concepts and did a few illustrative examples. Students were then divided into eight groups, consisting of four or five students, and worked on given questions. I then visited the different groups and assisted the students where necessary. After about ten minutes some of the students wrote their solutions on the chalkboard. If students had any queries, other students helped to resolve them. I only intervened when there were misconceptions, and when disputes arose among the students.

Outside the class session, each of the eight groups researched one of the following topics in mathematics: Number patterns, Sets, Polygons, Pascal's triangle, Pythagoras, Trigonometry, Surface Areas, and Geometry. For each topic students had to read their notes and supplement their content knowledge.

Students were required to use the library and search the World Wide Web for information related to their topic. A double lecture was set aside to [a] assist students to access information on the internet, and [b] to demonstrate and discuss exemplars so that students would know what was expected of them. Each group did a write-up of about four pages. The first stage of this required students to submit a draft after two weeks. These drafts were marked by the lecturers and demonstrators. Positive and constructive feedback was provided so that the students could improve their attempts. Students made the necessary changes and improvements, and submitted the final version after a week. A member from each of the groups did an oral presentation of ten minutes in class, which was then followed by questions and queries from class members. These served a two-fold purpose: to determine how much the students learned from their research on the topic, and whether, it was of mutual benefit to the rest of the students. The written and oral presentations were assessed by the lecturer.

At the beginning of the second semester *The Geometers sketch-pad* (GSP), a software program, was installed for the CSA students. A double period (once-off booking) was used to teach the students how to use sketch-pad. Students were required to use the computers in the Local Area Network (LAN) and do exercises on curve sketching, by working in pairs. This offered the students the experience of working with many examples within a few minutes. They could see the results as they interacted with the software. It also afforded them the opportunity to practice the different types of graphs, which is an essential skill in mathematics.

Sketch-pad allowed students to sketch graphs, to get a greater understanding of graphs, and how to interpret graphs. They were also taught to solve equations graphically. The students then used this software program to complete some of the exercises (see Appendix A). Outside the normal lectures, the students worked in pairs to give them confidence and to support each other.

DATA ANALYSIS AND FINDINGS

Focus group interviews, the primary sources of data, were recorded and transcribed (see Appendix B). These interviews were then analysed to determine patterns and themes. Since I was the coordinator of the Foundation Mathematics module and I taught one of the classes, I saw myself as a data source. I observed the students in the class and in the LAN when they worked on collaborative learning tasks.

Interacting with peers

Students were asked to relate their experiences when they worked in groups. There was a strong notion of sharing in the students' explanations of their collaborative learning experiences:

> We come with different problems to solve together and all benefit.

> Learning in groups makes things easy. Someone knows another method, a better method an easy method to solve equations yeah we share those things then collaborative learning is good.

The above excerpts indicate that students did not understand certain things in class and worked in their groups to find solutions. The individual's activities were with peers, interactive in nature and were of mutual benefit to all members in the group. With the assistance of more capable peers they were able to solve equations and improve their understanding of mathematics. Of greater significance was that they were able to find other (easier) methods of solving equations and their learning of mathematics was enhanced. This is also consistent with Vygotsky's (1978) view that learning takes place *via* mediation within a social context and students are able to solve problems in collaboration with more capable peers.

Collaborative learning also served to show some students the gaps in their understanding.

> … I thought I knew everything, but when I joined in groups I saw the things that are missing. That is when I saw that group work was good.

Dlamin (not real name) was one of the few students who did mathematics on the higher grade in school and was confident of doing well in foundation mathematics. However while assisting other members in the group he realised that there were gaps in his knowledge. Another group leader, Hlengs pointed out that by teaching others, one's own understanding of mathematics improves.

One of the most important attributes of collaborative learning is the sharing of ideas and values. Students can specialise in knowledge and content and teach one another. Luvan had the following to say: 'Each one teach one'. I was surprised that this has multiple meanings. I knew the phrase from Laubach (cited in Ngaka, 2004), a missionary, who used the strategy 'each one teach one' to fight communism and to win people over to Christianity. That strategy also had a strong undercurrent of self-improvement and modernisation. However, this approach is interpreted differently by the participants in this study. Students from particular provinces often come into higher education with a good understanding of one aspect of mathematics, e.g. students in Kwa-Zulu Natal (KZN) seem to be good in Trigonometry and they teach this to students who are not from the KZN province. Also, one student was able to see the potential of collaborative learning in studies in future.

> Yes it will help in other faculties and careers next year. Start early and is a preparation for the future.

AN ARENA FOR ACTIVE LEARNING AND COMMUNICATION STRATEGIES

> The one who knew, is the one who wrote. Those who don't know just watch and did not benefit.

> …benefits, …only to those members who participate in the group, And not to those who just listen. In mathematics must get down to work - everyone takes part and see the solution, then it can be good.

The development of social and team skills are a critical learning outcome. Many employers require employees to be eager to engage in teamwork. The students recognised that communication skills are important for active learning in groups:

> If you don't know how to talk to a person, not in the group you can't tell the person that you are wrong.

> Being within the group shows that there are communication skills and listening skills.

It is often easier to decipher a useful strategy when communication goes awry in the course of learning collaboratively. Students recognised, for example, disruptive communication tactics:

> … when some know the solutions and everybody wants to speak at the same time. We want to show others that we know…

> If you make a noise and not focusing, end up spoiling everything…

There were students who did not participate and just watched, thus obstructing the communication processes in Collaborative Learning. Passive participation was not always a sign of laziness, however. It appeared to be linked, too, with scepticism on the part of some students as to the value of collaborative or cooperative learning for themselves as particularly individualistic students:

> We came to varsity as individuals to work for yourself, I had a belief that I can do it by myself.

> Person like me who cannot study with another, I like to study on my own.

Such perceptions may have accounted for what appeared to be resistance from a few students to change from the previous experiences of learning. In most schools, teachers had taken the responsibility to do most of the work for the students. The emphasis was on procedures (recipes) and right answers. It is difficult to change the classroom culture that existed in most of the schools. Many researchers have pointed out that there would always be resistance from students who do not prefer working in groups and engage in active learning (Weimer, 2002; Felder & Brent, 2007) and indeed the above two excerpts are an indication that some students preferred to learn independently.

Language, of course, is closely tied up with communication skills. Bernstein *et al* (2007) point out that achievement in mathematics and science is very closely correlated to proficiency in the language of instruction. The language issue added to the diversity of the students in the experimental group. Most of the students in the CSA spoke isi-Zulu (140) while 44 spoke other languages. In the collaborative learning group 31 spoke isi-Zulu while five spoke other languages. In the November examination, set in English, less than 10% of the students solved the word problem. One student remarked:

> English is a problem. Is a barrier if there are papers set in English?

Democracy appeared to dictate the choice of language used in the Collaborative Learning opportunities:

> Language was a problem but was ignored. Everyone was expected to speak the majority language in the group.

However, when the understanding of difficult concepts was the students' priority, they discovered that it was

> … better to mix English with the mother tongue. There are problems that need more explanations so need to translate…

> I feel that some fail to explain things in English. It is better to explain things e.g. in Zulu than English, people can understand better.

There appears to be a difference in the language used by some teachers in mathematics and the language used by students especially those from educationally disadvantaged backgrounds. I have been involved in mathematics education for over 20 years and I always encourage the students to learn, speak and use the language of mathematics. Despite these efforts, some students have difficulty in understanding certain concepts in mathematics. However, it seems likely that it was just the different 'language' which accounted for the greater success the students appeared to have in helping their peers. One student had the following to say:

> Some of the things that we did not understand in class, our classmates were able to help and discuss.

SOCIOLOGICAL DIMENSION

Learning is an experience of identity and can transform a person. Learning is not just an accumulation of skills and information, but a process of becoming a certain person or emulating a certain person. Conversely, we also would like to avoid to becoming a certain person (Wenger, 1998). Siya, one of the

students was always quiet and reserved in class but wanted to 'understand the world of mathematics' so that he could be 'like one of those great masters …'. In the first semester he was disorganised in his work and was struggling in mathematics. I had some doubts that he would pass the Foundation Mathematics programme. In the June examination he managed to get 40% and then proceeded into the second semester. Prior to the final examination he came regularly for consultation and he had to work very hard to obtain a pass. He obtained 50% and was able to proceed into the first year of the BSc degree. I was pleasantly surprised that he scored 60% for mathematics.

According to Tinto (1997), meeting people and making friends for first year students is a major preoccupation of student life. The groups, which developed within the classroom, extended beyond it to provide further support to meet the challenges of academic life. Two students had the following to say:

> As a diverse group there are different cultures. We like to learn about each other and interested in the type rituals. Make new friends, socialise and interested in that person … and … help us prepare for the exam.

Students had the opportunity to work with other students from diverse backgrounds. They made new friends and learned about other cultures and rituals. Some students informed me that they studied in the library while others formed study groups in their residences. I also arranged for students demonstrators to be on standby so that they could assist these students especially when preparing for tests and examinations.

COLLABORATIVE LEARNING AS ONE OF A NUMBER OF LEARNING STRATEGIES (WAYS OF LEARNING INCLUDING TECHNOLOGICAL SUPPORT)

The learning categories are not mutually exclusive or superior or inferior to one another. Shroeder (1993) points out that students and lecturers have different views and styles of learning. Students should be able to choose the learning category that suits their individual style of learning. There was some evidence from the focus groups that students recognised different ways of learning:

> Group work alone does not help a person. You also need time all by yourself to understand.

Students often pointed out that while working in groups they seem to understand the work being discussed. But when working alone they experience difficulty in recalling what was discussed. It is important that members in the group have a good understanding of concepts and procedures before engaging in self-study, especially when preparing for a test or examination. However this does not mean that group work should precede self-study. At times I find it useful to grapple with the problem or concept before listening to other members of the group. Hence I may be able to make a meaningful contribution to the group and learn from the insights of others in the group.

As part of the collaborative learning task, students, working in pairs, were required to use computer programs to do research topics in mathematics. They were also required to use the Sketch-Pad (an electronic resource) to sketch graphs and solve equations graphically. Although the students did not comment specifically on the experience of working collaboratively with the computer program, I observed that they were engrossed in their tasks and were able to sketch graphs quickly and hence were able to save valuable time. Two students had the following to say:

> There are some graphs, do not know where to start, it gives you an idea, where to start.

> I found the Sketch-Pad was very useful and collaborative learning has helped me a lot. Sketch-Pad can be used for drawing straight lines. It can also be used for trig graphs and factorization.

STUDENTS' PERFORMANCE

From the findings, it is clear that the data indicates that a great deal of benefit was accrued by this methodology. While qualitative data cannot be measured in a mathematics test, the data provides information that is essential to measure graduate attributes and for success at a tertiary level of education.

In the November examination the overall pass rate for the Foundation Mathematics module in 2007 was 63% (see Appendix C1/C2). However, students in the collaborative learning group - 26 out of 36 students passed, achieved a pass rate of 72% (see Table 1). Of particular note is the marked increase of students in the 60-74% category, from 13.9% to 25%; an increase from five to nine. It is reasonable to assume that the majority of these students had been in the 50-59% range in June. There has been a notable improvement in the performance of those students in the middle order. This could be attributed to the pedagogic intervention and the fact that Foundation Mathematics is a year-long module. However, this may also be attributed to various other factors and requires further investigation.

Table 1
Comparison of marks for the experimental group

Range of marks	Pre-Test (March)		Examination (June)		Examination (November)	
	Number of students	%	Number of students	%	Number of students	%
75+	1	2.8	1	2.8	1	2.8
60-74	2	5.6	5	13.9	9	25
50-59	7	19.4	16	44.4	16	44.4
40-49	10	27.8	12	33.3	8	22.2
< 40	16	44.4	2	5.6	2	5.6
Total	36	100	36	100	36	100

CONCLUSION

Most of the students in the experimental group showed a significant improvement in their mathematics results at the end of the year. The students benefited from collaborative learning in more ways than one: improved their skills and knowledge in mathematics; made new friends; and learned about other cultures. Collaborative learning supports the notion that students should be socialised into the ways of talking and being actively involved in a community of mathematicians.

Further research should be conducted to verify the findings of this study. Firstly, what aspects of collaborative learning seem to enhance the students' performance in mathematics? Secondly, how can resistance to active learning strategies from staff and students be overcome? Thirdly, how can English second-language students from different backgrounds be accommodated in the curriculum and in the teaching and learning of mathematics?

REFERENCES

Barkley, E., Cross, P., & Major, H. (2004) *Collaborative Learning Techniques* (1st ed.) San Francisco: Jossey-Bass.

Bernstein, A., Rule, S. & Simkins, C. (2007) *Doubling for Growth: Addressing the mathematics and science challenges in South Africa's schools*. Johannesburg: Centre for Science Development. http://www.nuimm.ie/staff/dpringle/igu/reports/South_Afrca2.pdf (Accessed 23 April 2011).

Brodie, K. (2007) 'Dialogue in mathematics classrooms: beyond question and answer methods' *Pythagoras* 66 pp.3-13.

Broere, I., Geyser, H.C. & Kruger, M. (2002) 'Technology development: imperatives for higher education' *South African Journal of Higher Education* 16(3) pp.5-12.

Davis, B.G. (1993) 'Tools for Teaching' http://teaching.berkeley.edu/bgd/collaborative.html (Accessed 02 March 2007).

du Preez, J., Steyn, T. and Owen, R. (2008) 'Mathematical preparedness for tertiary mathematics – a need for focused intervention in the first year?' *Perspectives in Education* 26(1) pp.49-62.

Felder, R.M. & Brent, R. (2007) 'Sermons for Grumpy Campers' *Chemical Engineering Education* 41(3) pp.181-182.

Gokhale, A. (1995) 'Collaborative Learning Enhances Critical Thinking' http://scholar.lib.vt.edu/ejournals/JTE/jte-v7n1/gokhale.jte-v7n1.html (Accessed 6 June 2007).

Hartman, N. & Warren, D. (1994) 'Perspectives on a framework for curriculum development created for use in the faculty of social science and humanities' Conference on 'Challenging Educational Policies and Practices' Durban, South Africa.

Holtman, L. & McKenzie, B. (1994) 'Pre-Instruction & Post-Instruction Testing: assessing students existing conceptual knowledge & predicting their academic performance' Conference on 'Challenging Educational Policies and Practices' Durban, South Africa.

National Council of Teachers of Mathematics. (1991) *Curriculum and Evaluation Standards for School Mathematics*. NCTM: Virginia, US.

Ngaka, W. (2004) *An inquiry into the dynamics of intergenerational learning in Urcoda's adult literacy class in Arua district*, Uganda. Unpublished Thesis, University of KwaZulu-Natal, South Africa.

Phurutse, M.C. (2005) *Factors affecting teaching and learning in South African public schools*. Cape Town: HSRC Press.

Schroeder, C. (1993) 'New Students - New Learning Styles' http://virtualschool.edu/mon/Academia/KierseyLearningStyles.html (Accessed 20 May 2008).

Setati, M. (2008) 'Using Language as a transparent resource in the teaching and Learning of Mathematics' *Pythagoras 67* pp.14-25.

Simmons, M. (1993) *The Effective Teaching of Mathematics*. Hong Kong: Longman Group UK Limited.

Smith, B.L. & MacGregor, J.T. (1992) 'What is collaborative learning?' http://www.google.co.za/search?hl=en&source=hp&q=Smith%2C+B%2C+L.+%26++MacGregor%2C+J%2C+T.+%281992%29.+&btnG=Google+Search&meta=&aq=f&aqi=&aql=&oq=&gs_rfai= (Accessed 20 July 2008).

Tinto, V. (1997) *Learning Better Together: The Impact of Learning Communities on Student Success.* http://www.mcli.dist.maricopa.edu/fsd/c2006/docs/learningbettertogether.pdf (Accessed 20 July 2008).

Vygotsky, L.S. (1978). *Mind in Society. The Development of Higher Psychological Processes*. Cambridge, Massachusetts: Harvard University Press.

Webb, N.M., Nemer, K.M. & Ing, M. (2006) 'Small-group reflections: Parallels between teacher discourse and student behavior in peer-directed groups' *Journal of the Learning Sciences* 15(1) pp.63-119.

Weimer, M. (2002) *Learner-Centred Teaching*. San Francisco: Jossey-Bass.

Wenger, E. (1998) Communities of Practice. Learning, Meaning, and Identity. Cambridge: Cambridge University Press.

Wolmarans, N., Smit, R., Collier-Reed, B. & Leather, H. (2009) 'Addressing concerns with the NSC: An analysis of first-year student performance in Mathematics and Physics' Proceedings of the Conference of the South African Association for Research in Mathematics, Science and Technology Education, Durban pp.276-286.

Wood, L. & Free, L. (2004) 'Made to measure foundation programmes' *The Value of Academic Development for Higher Education* Conference Proceedings of the South African Association for Academic Development. Port Elizabeth, South Africa pp.242-250.

APPENDIX A

CL TASK USING THE GSP

With the aid of the sketch-pad complete the following:

1. Factorize : $2\chi^2 - 5\chi - 18$ and $42\chi^2 - 96\chi - 24$ (4)

2. $\frac{\chi^2 - 3\chi - 4}{\chi - 1} \leq 0$ (6)

3. Solve : $2^x = \frac{\chi}{2}$ (5)

4. Determine the max and min values of $f(\chi) = \chi + \frac{2}{\chi}$ (5)

Total: 20 marks.

APPENDIX B

Instrument: Focus group interview:

1. Describe how you experienced Collaboratively Learning of mathematics:
   (discuss what worked well, your interaction with your group members, your learning experiences etc…

……

……

……

……

2. Were there any problems / conflicts? If, so discuss…

……

……

3. Would you recommend CL for foundation students next year?

……

……

……

……

……

……

3. Any other comments/suggestions you would like to make?

……

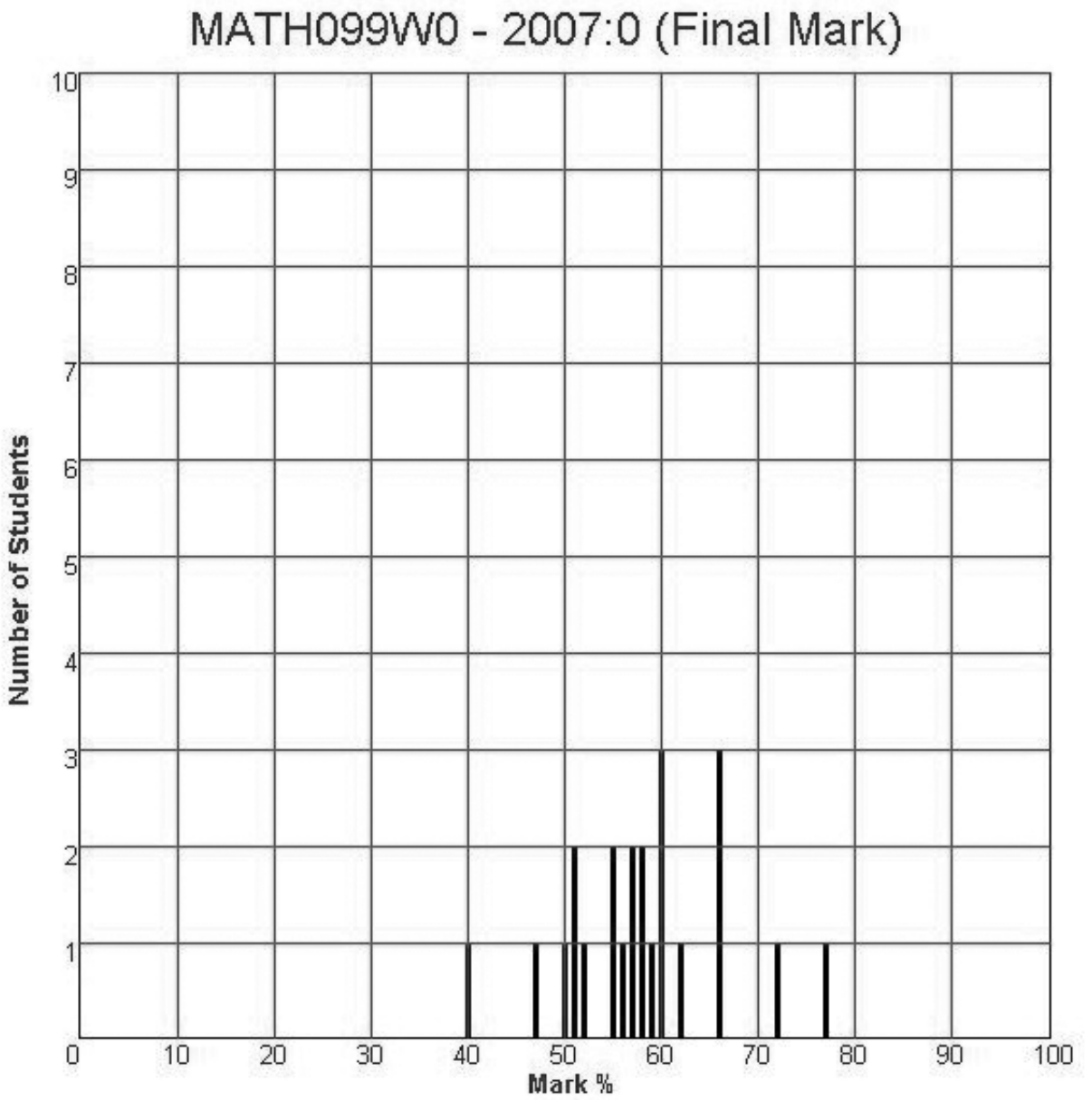
……

……

Thank you once again for your participation and co-operation.
25 July 2007

APPENDIX C1

MATHS 099 EXAMINATION MARKS



Count=23 Minimum=40 Maximum=77 Range=37
Mean=58.04 Median=58. Mode=60,66 Peak=3
Variance=65.68 Standard Deviation=8.1
Pearson 1=-0.242 Pearson 2=0.015

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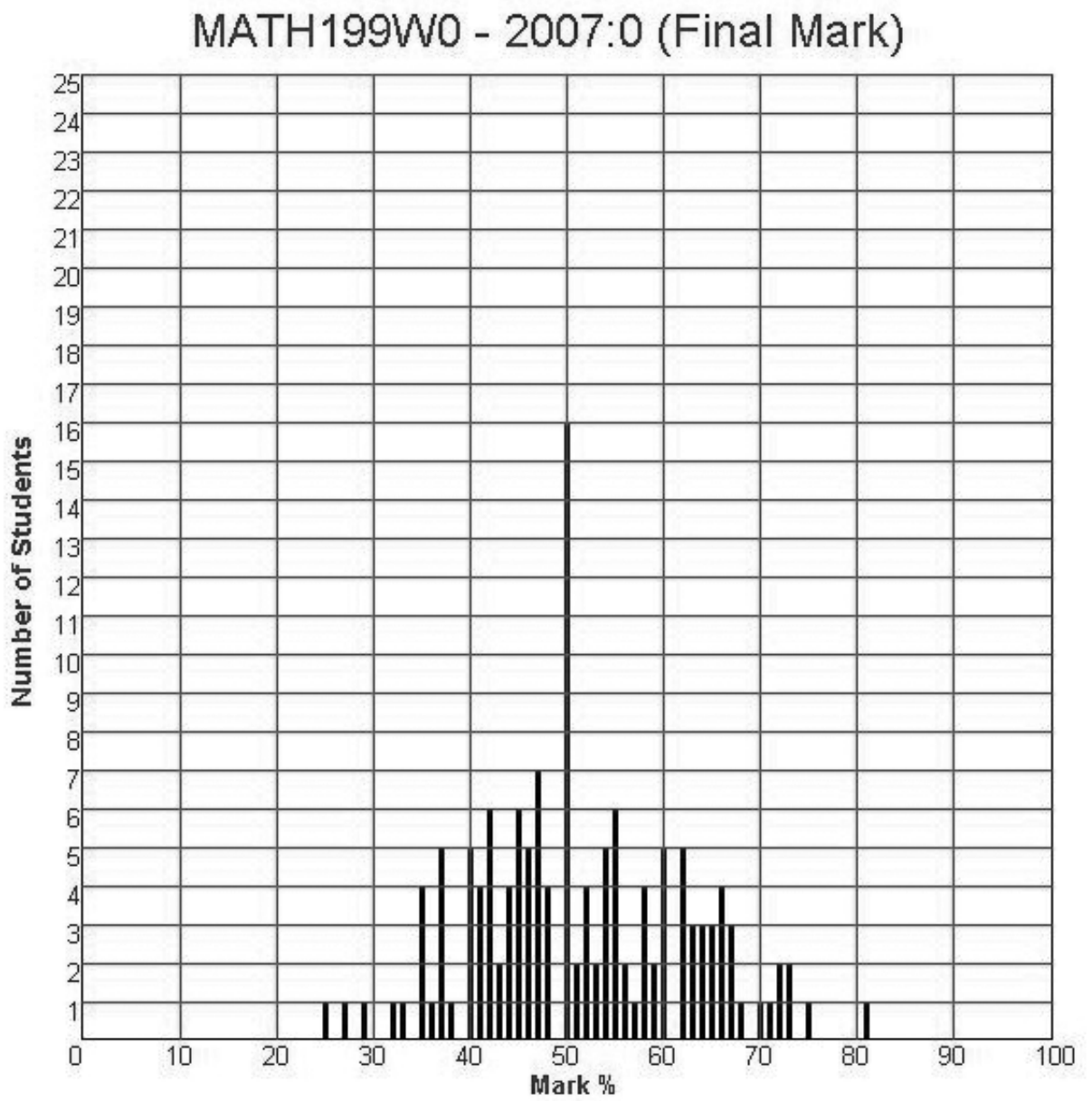
APPENDIX C2

MATHS 199 EXAMINATION MARKS



Notes for Contributors

Manuscripts should be sent to the Editor. They should be typed in double space, in A4 format, in MS Word and should not exceed 5000 words in length, excluding tables, figures and references. Manuscripts may be submitted by e-mail or on a CD. Tables and figures must be typed on separate sheets and not included as part of the text. Their positions should be indicated in the manuscript. They should be numbered by Arabic numerals. Each manuscript should be accompanied by a title page and an Abstract of 100-150 words on a separate sheet. Manuscripts not conforming to these requirements will not be considered for publication.

The full postal and e-mail address of the author should be included on the title page. Proofs will be sent to authors if there is sufficient time to do so. They should be corrected and returned within 48 hours of receipt. The editor reserves the right to publish without proofs having been signed-off by the author.

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The IIE offers qualifications from higher certificate to Honours degree level in four faculties: Business, Applied Humanities, Leisure and Information Technology.

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