ELICITING AND SHAPING TACIT KNOWING FOR META-INNOVATION:
A challenge for Management Education in the 21st Century Transitional University

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Purpose: This paper describes the implementation of and lessons learnt with an action research project on management teaching and learning in a 21st century transitional university. The project focuses on the problem of how to elicit and shape students' tacit knowing for meta-innovation and is part of a drive to find a new identity for the newly merged comprehensive University of Johannesburg (UJ).

Design/methodology/approach: The project under discussion focuses on an undergraduate module, Developing and Managing Innovation, presented by UJ since 2003 as part of the B.Com Intrapreneurial Management degree. This degree has been developed in the light of the recent requirements placed upon managers by the innovation era. Creating new knowledge is not simply a matter of processing objective information but rather of tapping tacit and often highly subjective insights, intuitions and hunches. To find ways to elicit and shape tacit knowing for meta-innovation, an extensive literature study was conducted and a model identified for this purpose. An action research spiral was constructed to validate the teaching and learning interventions.

Findings: The paper presents a teaching and learning framework to build theory that is in accord with the African Ubuntu spirit. The framework supports students within powerful learning environments to develop meta-cognition skills by focusing not only on the acquisition of explicit knowledge, but also on ways to elicit and shape tacit knowing.

Implications: A community of practice is the bedrock of powerful learning environments in which action and learning, improvisation and experimentation, tacit and explicit knowledge feed on each other to stretch the students' capacity for meta-innovation. This enables them to continually deploy their talents, knowledge, resourcefulness and creativity to best effect as managers and to transform their life and that of their business and of others.

Originality/value: The innovative curriculum and instructional design model generated in this project will assist UJ and other universities in transition to become engaged 21st century universities of excellence that can meet the societal, cultural and economic needs and interests of the national transformative agenda, aimed at shared growth and wealth in Africa.

Key words and phrases: engaged university, Ubuntu, community of practice, curriculum and instructional design, meta-innovation, tacit knowing.

INTRODUCTION

By and large, higher educational systems of the previous century focused primarily on maintenance learning and the creation of "knowers" – that is, people who know a lot about an existing field or area of specialisation. But the new innovation era of the 21st century calls for evolutionary learning and the empowerment of "learners" – that is, people capable of generating new knowledge and managing processes as appropriate responses to changing socio-cultural and biophysical environments. Evidently, knowledge is an essential by-product of learning, but the true focus of evolutionary learning is the transformation of social realities to produce increased shared personal, social and environmental well-being. Einstein and Russell (1955) considered that "we have to learn to think in a new way" in order to apply knowledge ethically and to provide creative solutions to the challenges that confront us. To learn to think in a new way – that is, to go beyond reductionism into a systemic mode – may depend on the ability to learn how to learn in new ways, since the dominant educational system is still grounded in reductionistic world views and continues to propagate outdated myths and values. In producing innovators, learning should move from an informed vision of "what should be" to a concrete reality of "what can be". New learning and innovation demand making sense of previous collected experiences and connecting patterns from the past to the present and the future. These experiences are stored as tacit knowledge in the human brain. Nonaka (1991) comments that

creating new knowledge is not simply a matter of processing objective information. Rather, it depends on tapping the tacit and often highly subjective insights, intuitions and hunches of employees, obtained through human experience and reflection. The challenge for teaching and learning in an engaged 21st century transitional university is to construct learning and teaching opportunities that emphasise student responsibility and enhance lifelong learning, such as planning learning, interacting with subject experts, lecturers and other students, researching, and assessing learning.

This paper describes the implementation of and lessons learnt with an action research project on management teaching and learning in a 21st century transitional university. The project focuses on the problem of how to elicit and shape students' tacit knowing for meta-innovation and is part of a drive to find a new identity and organisational structure and culture for the newly merged comprehensive University of Johannesburg.

EXPLORING THE CONTEXT

Higher education in South Africa is being challenged by government to create new institutional cultures and identities so as to become more responsive to societal needs and interests (Council on Higher Education, 2004a:125). To transform higher education, the South African government has reconfigured the landscape of public higher education institutions by means of mergers and incorporations. In this regard, the Government Gazette (Republic of South Africa, 2002:7) has urged merged higher education institutions to transcend the fragmentation, inequalities and inefficiencies of the apartheid past. The missions and programmes of the newly established South African institutions should be consistent with the vision and values of a non-racial, non-sexist and democratic society with the power to transform lives.

In 2005, the University of Johannesburg merged with a university of technology (technikon) to become a comprehensive contact university offering a wide spectrum of programmes – academic, professional and occupational. The new regional public university is in transition, seeking not only a new identity in the 21st century, but also to become a university of excellence, one which is conceptually located and meets the societal, cultural and economic needs and interests of the national transformative agenda, aimed at shared growth and wealth in Africa.

The South African transformative agenda includes political democratisation, economic development and reconstruction, and social policies aimed at improving the quality of life for all. The White Paper on Education (Department of Education, 1997) calls on education institutions to produce learners with critical, analytical, innovative problem-solving and communication skills. University graduates should become motivated, productive citizens committed to contributing to the common goals of society – the public good – through knowledge creation, acquisition and application in powerful learning environments appropriate for the African Renaissance in the knowledge-driven 21st century.

The "knowledge society" together with developments in information technology has led to the intensification of social relations that have broken down the boundaries between academia, industry and the state. Subotzky (1998:1) argues that a "market or entrepreneurial university" is characterised by its closer university–business, public–private partnerships. The entrepreneurial university could be in direct tension with the social purpose of higher education and its contribution towards the public good, social renewal and local basic development. Knowledge workers at entrepreneurial universities, warns Ruth (2001:14), must be wary of being co-opted by an ideology that reduces them to a market-service function, thereby undermining their critical and subversive potential to preserve the public good. Therefore, the addition of a democratically chosen government to the university/business interface may reconceptualise systems theory notions as well as the political system and industry as an economic system. Etzkowitz and Leydesdorff (2000:111) refer here to the "Triple Helix Model", which focuses conceptually on the state, academia and industry – paraphrased as "helices" – and on their interaction. The university/business/state network (befitting the thirst for innovative knowledge in the knowledge-driven 21st century) may open a window of opportunity for public policy intervention and support public–private business opportunities as well as socially engaged knowledge production and innovation in universities.

In 2001, an international conference titled "Human Capital for Socio-Economic Development: The Role for Higher Education" was held at the University of Fort Hare to challenge the role of the South African universities as engaged, catalysing agents in renewing the social, economic and cultural sectors of society. The conference (University of Fort Hare Conference Proceedings, 2001) provided a forum where stakeholders from the Southern African Development Corporation (SADC) and the African continent could anticipate issues, debate ideas and highlight best practice and innovation.

Campbell (2005:2-3) notes that the old "linear model of innovation and best practice", arranged in a sequential first-then order of basic research, applied research and experimental development, is being replaced by a new model of innovation that speaks more of a "paralleling" of basic research, applied research and experimental development either within the context of an individual helix or by connecting institutions/organisations across different sectors in a university/business/state network. These partnerships try to operate simultaneously across more than one "technology life cycle" and circulate and build new knowledge between different sites for mutual benefit. Tassey (2001:39-40) says that such partnerships can launch a new major technology life cycle or wave, emerging from basic university research driven by government values, to contribute to good and responsible society, and translated into concrete regional sustainable business activities. It reflects the flow of knowledge from science to technology and market commercialisation in a democratic and prosperous society. Such public–private partnership demands an engaged university.

THE ENGAGED UNIVERSITY

The "engaged university" regards students as citizens-to-be and citizens as permanent students for whom lifelong learning is the prerequisite of life (Barber, 2001). Engaged universities reach outward to the community on a communal and relational basis of learning, research and scholarship, and place a premium on collaboration, joint ventures and shared commitment. Prof Reggie Ngcobo, Interim Vice-Chancellor and Principal of the Tshwane University of Technology, remarked during a Higher Education Colloquium (Council on Higher Education, 2004b:2) that South Africa actually comprises two totally different worlds with different needs and opportunities available to them. On the one hand, Ngcobo says, there is the privileged minority that enjoys a standard of living second to none with opportunities to pick and choose from, while on the other hand there is the poverty-stricken majority, numbering millions, who are poles apart from the privileged minority in how they view the future. The engaged university needs to develop a future in which those poles are bridged. The notion of engagement is derived from a contextual-ecological view of the individual, who is in dynamic interaction with intersecting and overlapping contextual systems, who is active in his or her own development, and who alters learning environments through his or her own initiative. From this perspective, the engaged university commits itself to active involvement by institutions in their localities and regions. The "Triple Helix Model" has shifted the nexus of competition to ideas, and regional networks must become learning regions.

Engaged universities are marked by the parallel use of both Mode 1 and Mode 2 forms of knowledge production. Mode 1 knowledge production, as described by Gibbons, Limoges, Nowotny, Schwartzman, Scott and Trow (1994), is dominated by an academic agenda and is executed inside academia, and it focuses on analysis and fundamental knowledge (usually mono-disciplinary). Mode 2 knowledge production, in contrast, is solution-focused and oriented not only to analyses of problems, but also to designing solutions. Mode 2 knowledge is often transdisciplinary in nature. According to Gibbons *et al.* (1994:19), Mode 2 knowledge production is characterised by "a constant flow back and forth between the fundamental and the applied, between the theoretical and the practical". Mode 2 knowledge workers generate new knowledge in the context of application. There is a strong interplay between the "tacit" knowledge of the practitioners involved and the activities of Mode 1 knowledge workers in their zest to produce codified knowledge.

Van Aken (2002:4) remarks that, in the field of management, Mode 1 knowledge production is still dominant, based on surveys to explain phenomena, but Mode 2 knowledge production, which is based on case study research and qualitative theory building as a "design exemplar", is becoming more and more accepted. Modes 1 and 2 parallel knowledge production in the management field and can lead to tested and grounded professional rules applicable to managerial problem solving. Van Aken (2002:5) refers to such a rule in Tichy's TPC model stating that, if a given organisational change

hurts the real interests of a certain subgroup, one should use political interventions in the interest of the organisation as a whole rather than technical or cultural ones. Using a design exemplar to solve a particular problem, the manager still needs to act as an intrapreneur drawing on his or her explicit and tacit knowledge to understand the context, its dominant culture, its situation, its actors, etc. The combination of Modes 1 and 2 knowledge helps the intrapreneur to make relevant decisions within multiple paradigms and to undertake a series of meaningful interventions based on tested and grounded professional rules adapted to solve a particular problem. In producing innovators, learning should move from an informed vision of "what should be" to a concrete reality of "what can be". Inspired by theorists such as Argyris and Schön (1978) and Nelson and Winters (1982), innovation behaviour is seen as a learning process (Sundbo, 2001:173).

Excellence, innovation and local knowledge as well as equity and diversity are important factors in innovating the teaching and learning approach of the University of Johannesburg as an engaged 21st century university in transition. Its graduate outcomes need to be aligned to the new teaching and learning demands.

GRADUATE OUTCOMES

Intrapreneurs (or corporate entrepreneurs) are entrepreneurs that are found in large organisations (Pinchot, 1985). Intrapreneurship transforms organisations through strategic renewal – that is, the creation of new wealth through new combinations of resources. According to Sharkie (2003:6), it is important to focus on capabilities rather than resources.

First degrees are no longer considered as qualifications for a lifetime, but they are not regarded as preparation for only one or two years of work either. The knowledge resources that graduates take with them into the workplace have to last longer than that, so they must relate to a reasonable range of jobs, roles and workplaces. However, most of these knowledge resources will not become useful until they have been further transferred and resituated in one or more working contexts.

Gijselaers and Arts (2003:83) argue that recent research and audit reviews have shown that business and management higher education produces graduates who possess a lot of knowledge but are not yet capable of effectively using their acquired knowledge in a workplace context. The authors claim that university graduates often lack the "soft skills" or "transferring skills" to make their knowledge stock fluid, which is needed in working together with other people to pose and solve problems and respond to the challenges of change. Bridges (1992:50) defines transferring skills as meta-skills which enable an individual with some knowledge, learning, understanding or skill gained in one cognitive domain and/or social context to adapt, modify or extend it in such a way as to be able to apply it in another and to innovate.

According to Boshuizen (2003:16), business managers have to learn how to create new knowledge (in other words, to be innovative) for organisational competitiveness. The question whether a graduate must be "ready" for the labour market, or be a "finished product", is therefore irrelevant; instead the question should be whether a business student has enough stock-in-trade to get a job and start working as an apprentice or as a young professional in today's demanding business world and – possibly – continue to develop his or her competencies at the same time and create new knowledge, either with the help of a coach or supervisor or independently, not only during the first few years after entering the labour market, but also for the rest of his or her professional life.

The New Partnership for Africa's Development (NEPAD) was established for Africans by Africans through consensus to solve Africans' problems (Olagunju in University of Fort Hare Conference Proceedings, 2001:5). Olagunju states that the higher education system in South Africa is not producing the numbers and kinds of knowledge workers required to expand and intensify research and innovation on the African continent so as to reduce poverty. Graduates in this case study therefore "learn to be" innovative (meta-innovation) as opposed to only "learning about" innovation.

Nonaka (1991) comments that creating new knowledge is not simply a matter of processing objective information. Rather, it depends on tapping the "tacit" and often highly subjective insights, intuitions

and hunches of employees, obtained through human experience and reflection. This will be promoted in communities of practice.

A COMMUNITY OF PRACTICE

A community of practice is the bedrock of powerful learning environments in which action and learning, improvisation and experimentation, tacit and explicit knowledge feed on each other to stretch the capacity for meta-innovation of the intrapreneur students. Gijbels, Dochy and Van den Bossche (2005) argue for the establishment of a community of practice that allows a continuous state of flux between learning and reflection, embracing open-mindedness, commitment and responsibility. A community of practice is in synchrony with the model of the reflective practitioner and focuses on the interplay of the micro, meso and macro contexts and the notion of corporate, local and global citizenship. Pio (2005:3-4) refers to a wider community of all humanity and attests to a holistic view of the world in which each person's condition and actions are relevant to others. The teaching and learning approach in a community of practice views knowledge as inseparable from practice.

The way in which the management module is taught and studied is based on the premise that knowing how to manage must be complemented by having opportunities to manage and by reflecting on its impact. Teaching, learning, doing, reflecting and the continuous improvement and innovation of processes, products and services are seen as fundamentally complementary and as social phenomena. People organise their learning around the social communities of practice to which they belong. Knowledge is integrated in the life of communities that share common values, beliefs, languages, and ways of doing things. Empowerment – or the ability to contribute to a community – creates the potential for learning. Circumstances in which persons engage in real action that has consequences for both themselves and their community create the most powerful multi-modal learning environments. In order to become engaged professionals, intrapreneurial management students within a community of practice are sent on a journey of self-discovery, linking course concepts such as innovation that serves corporate interests and innovation serving the need to support the poor, within the larger framework of African citizenship.

UBUNTU AND THE ENGAGED PROFESSIONAL

To influence the ecology of student development, an engaged educational professional is committed and willing to be actively engaged in all relevant settings that influence educational outcomes and in collaborative partnerships with business, community structures and political entities. In the African context, the concept of "human capital", which emerged with the development of trade, is not acceptable to all stakeholders (Ruth, 2001:35). Ruth stresses the need for "relatedness to oneself and to society" – Ubuntu – coupled with our deepest dreams for love, hope, compassion, newness and justice. It implies a commitment to be a reflective practitioner, which is manifested by engaging in action research, among other things (Lapsley, 2002), in particular by engaging in emancipatory action research, which aims to help practitioners to develop a critical and self-critical understanding of their situation – that is, an understanding of the way both particular people and particular settings are shaped and reshaped discursively, culturally, socially and historically (Kemmis, 2001:92). It is based on emancipatory education, spirituality and ecology and is supported by systems thinking and the new sciences of complexity. "This worldview sees human beings as co-creating their reality through participation: through their experience, their imagination and intuition, their thinking and their action" (Reason & Bradbury, 1994:324).

The notion of engagement is derived from a contextual-ecological view of the individual, who is in dynamic interaction with intersecting and overlapping contextual systems, who is active in his or her own development, and who alters learning environments by his or her own initiative learning (Lapsley, 2002). An engaged professional constructs new knowledge through social interaction, collaboration and negotiation. These meta-innovation skills have to be nurtured with powerful constructivist learning environments embedded in a community of practice in the field of critical management education.

CRITICAL MANAGEMENT EDUCATION

Entrepreneurship, intrapreneurship and strategic innovation learning areas within the business management field are vitally important learning domains for improving the health and productivity of the South African, African and global economies. These learning areas establish, maintain and improve the ability of a society to produce, select, adapt, commercialise, and use knowledge, which is critical for sustained economic growth and improved living standards. Higher education is a critical pillar of human development worldwide (Ramphele in World Bank, 2002: Foreword) as it educates experts and managers of organisations in the private, public and voluntary sectors. University graduates have an impact on technology and science as well as on politics and social dynamics.

The new role for management educators and practitioners in the new innovation era embraces the mobilising of tacit knowing besides the development of explicit knowledge, whereby the educator becomes both an agent of emancipation and a figure of authority. Thanem and Wallenberg (2005:3) view this as a paradox of critical pedagogy. New theories on the emancipation of learners have prompted interest in collaborative forms of learning, sharing, inquiry and group participation. Lave and Wenger's (1991) communities-of-practice model has led to a number of workplace innovations and also to changed learning environments. In common with communities of practice, learning communities in education organisations are created together with advances in e-learning. In such learning networks, control power is distributed among participants rather than centred in a higher authority, for example the lecturer. Leadbeater (2000:132) argues that the locus of innovation is found in networks of learning.

SOCIAL CAPITAL GLUES NETWORKS OF LEARNING

The new role for management educators and practitioners in the new innovation era involves creating networks of learning for knowledge exploitation and creation. These learning networks can be externally or internally linked and are held together by relationships of social capital rather than structures or hierarchies. Social capital is built on reciprocal recognition, an ethic of trust and collaboration. Stewart and Tansley (2002:19) argue that managers, such as management educators and practitioners, must play an indirect rather than a direct role in shaping an organisational culture and learning. Such knowledge workers/managers have to create enabling learning environments that motivate, support and challenge individual as well as organisational learning. In such learning networks, employees/learners are increasingly expected to take responsibility for and be active in their own learning and development. To adapt to individual learning orientations (for example, surface or deep learning) and learning styles (for example, experimenting or reflecting), management educators and practitioners must be able to create "blended" learning solutions (for example, including in- and off-workplace/campus learning) to tap and develop everybody's talent. If such learning and work environments are enjoyable, lifelong learning becomes a matter of choice rather than a plight. Knowledge acquisition, exploitation, creation and innovation are becoming increasingly dependent on collaborative working and circulating social capital. Driscoll and Carliner (2005:88-89) describe blended learning as a learning programme in different formats, such as classroom and online learning, to achieve a common goal. Blended learning allows instructional designers to separate rote content focusing on lower order thinking skills, which can be easily taught online, from critical thinking skills, which can be better addressed in collaborative classroom tasks or capstone projects.

CIRCULATED SOCIAL CAPITAL EMPOWERS

In management literature, there are various power bases such as legitimate power, reward power, coercive power and referent or expert power, which refer to others empowering a person. Empowerment is a process by which one increasingly takes greater charge of oneself, one's life and one's future. It is an open-ended process, a journey without an end destination. However, one cannot become a self-empowered person. Empowerment is an intentional strategy that is either initiated externally solely by empowerment agents or solicited only by disempowered people (Hogan, 2000:12). It is a network created by its members. No educational process is ever neutral. According to Freire (1997), education can be designed either to maintain the existing situation – that is, the status quo and the values and culture of the dominant class, – or to liberate people, helping them to

become critical, free, active and responsible members of society. This requires educators to let go of some of their position and some of their legitimate and expert power and to emphasise the paradox of critical pedagogy whereby the educator is both an agent of emancipation and a figure of authority. Empowerment is about choice. It is important that power holders be prepared to share power and that individuals have sufficient courage and self-esteem to be proactive in the use of power (Hogan, 2000:7). Circulated knowledge improves the ability of members of a learning organisation to access and use existing knowledge and to generate new knowledge.

CRITICAL PEDAGOGY

The last decade has seen an expanding literature examining the content and teaching techniques of management education (for example Boje, 1996), and, according to Thanem and Wallenberg (2005:3), a number of contributors have discussed the importance of introducing both critical perspectives and critical teaching techniques into management education (for example, Case & Selvester, 2000; Currie & Knights, 2003). Thanem and Wallenberg (2005:3) argue that some of this research highlights the paradox of a critical pedagogy in which the teacher becomes both an agent of emancipation and a figure of authority (for example, Hagan, Miller & Johnson, 2003:247 and Perriton & Reynolds, 2004:66 & 72).

Ruth (2001:39) defines education as being intimately related to exploration, questioning and uncertainty. Both teachers and students, when constructing education, have to make choices in the struggle for power and influence. A constructivist orientation to engaged learning envisions students who are self-motivated, self-regulated, goal-directed learners who engage in strategic collaborative problem solving. They encounter tasks that are authentic, complex, thematic, interdisciplinary and integrative. Engaged learning embraces performance assessment and instructional models that are interactive, constructive and generative.

CONSTRUCTIVISM

To construct a new course, lecturers need to interact with learners to find answers to such questions as: "What is the life situation of the learners – their working, family and professional goals?", "What prior knowledge, experiences, and initial feelings do students usually have about this subject?", and "What are their learning goals, expectations, and preferred learning styles?" The programme team can use a range of teaching–learning interaction activities, arranged in a particular sequence so that the energy for learning increases and accumulates as learners go through the sequence. This usually requires, among other things, that a lecturer set up some activities that get students ready or prepared for later work, giving them opportunities to practise doing whatever it is to be learnt, with prompt feedback, while assessing the quality of their performance and allowing them to reflect on their learning. The goal is to create a sequence of teaching–learning interactions that build on each other to achieve stated learning outcomes. Learning opportunities include action learning, peer interaction and collaboration, and learning to learn. The implications of this shift to a knowledge-based society for strategic business management education are beginning to take shape. A new approach to knowledge and learning is needed, and constructivism as an innovative perspective on knowledge and learning comes to the foreground.
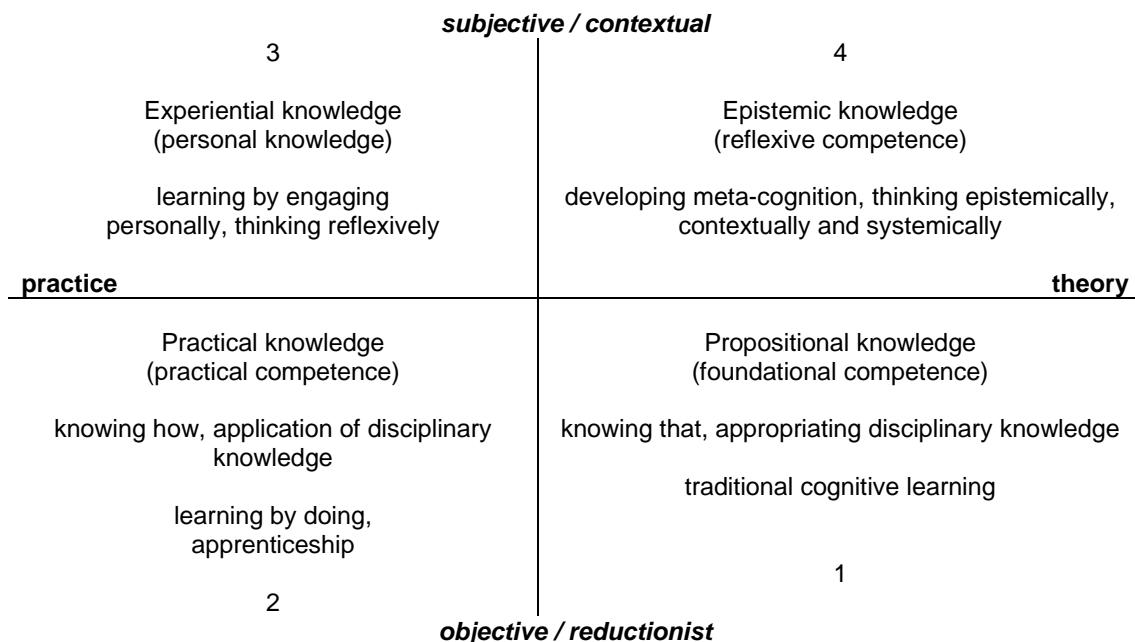
Constructivist education should do all of the following (Lapsley, 2002):

- Create complex learning environments and ecologically valid tasks that mirror the "fuzzy", ill-structured nature of real-life problems; this would include the use of case-based instruction, authentic tasks, and situated learning strategies
- Create learning environments that emphasise collaboration, social negotiation, and shared responsibility for learning
- Provide multiple representations of content, using analogies, examples, and metaphors
- Help students understand their own role in constructing knowledge
- Emphasise student-centred instruction, which includes inquiry and problem-based learning, ideally with co-operative learning groups.

CURRICULUM DESIGN FRAMEWORK FOR ELICITING AND SHAPING TACIT KNOWING FOR META-INNOVATION

The curriculum design framework for eliciting and shaping tacit knowing for meta-innovation is adapted from Luckett's (2001:49) model of an epistemically diverse curriculum for South African higher education in the 21st century. In this proposed model the curriculum is seen as an experience rather than a product or a plan, as a process or a play rather than a script. It describes powerful learning environments which endorse opportunity of access to a diverse learning cycle. Luckett's proposed model describes four ways of knowing and learning, including the traditional cognitive learning of propositional knowledge, learning by doing for the application of disciplinary knowledge, learning experientially, and developing epistemic cognition so as to be able to think reflexively and contextually about one's learning. It is suggested that such a curriculum could address both local and global dimensions of a higher education curriculum and hold a necessary balance between Mode 1 and Mode 2 knowledge production. Luckett (2001) suggests that if learners are introduced to all four ways of knowing and learning, these generic skills (both transferable and transferring skills) can be appropriately integrated into the curriculum (see Figure 1).

Figure 1: Diagram to illustrate a model of an epistemically diverse curriculum

subjective / contextual

3	4
Experiential knowledge (personal knowledge)	Epistemic knowledge (reflexive competence)
learning by engaging personally, thinking reflexively	developing meta-cognition, thinking epistemically, contextually and systematically

practice _____ **theory**

Practical knowledge (practical competence)	Propositional knowledge (foundational competence)
knowing how, application of disciplinary knowledge	knowing that, appropriating disciplinary knowledge
learning by doing, apprenticeship	traditional cognitive learning
2	1

objective / reductionist

Source: Luckett (2001:55)

Propositional Knowledge (quadrant 1)

Luckett (2001:56) is of the opinion that universities are traditionally good at dealing with the kind of teaching and learning that takes place in quadrant 1. It is based on the type of knowledge that Gibbons *et al.* (1994) have labelled Mode 1 knowledge. Knowledge production in this quadrant is often based on positivist, empiricist epistemology and a reductionist methodology; knowledge is viewed as objective, true and rational. This knowledge is important but the way of knowing in this quadrant should be challenged and complemented by other ways of knowing. This is usually the starting point of a curriculum in which students will need to gain knowledge and theory from a blend of support, materials and resources such as lectures, the Web and libraries and be assisted to build disciplinary conceptual frameworks. They will best achieve this if the epistemic rules, methods and conventions of the discipline (quadrant 4 thinking) are made explicit by their lecturers.

According to Luckett (2001:56), students in higher education should not be permitted to operate only within the first knowledge paradigm. If they do, they may remain locked into a mono-disciplinary world view, and their learning may fail to engage with real-world problems and contexts and their personal lives. They may also continue to believe that science is value-neutral and that their lecturers and textbooks are authoritative, and so be content to simply reproduce given knowledge, often for instrumentalist ends, for example to pass an examination.

Instead of simply reproducing disciplinary knowledge in this part of the curriculum, students should be encouraged via academic development – epistemic scaffolding – to develop their own conceptual frameworks and understandings and to analyse and evaluate "given" knowledge. They should be encouraged to undertake sound logical reasoning, build arguments, think critically and develop oral and written communication and presentation skills. At more advanced levels, they would begin to develop inquiry and research skills using the methods of the discipline.

Practical Knowledge (quadrant 2)

The way of knowing in quadrant 2 refers to the opportunities offered to students to gain practical competence. All curricula, according to Luckett (2001:56), should lead to some area of specialisation or career field which can provide a context for the application of knowledge learnt in the first quadrant and for the performance of appropriate practical tasks and assignments. The practical application of Mode 1 knowledge should not be limited by conceptualising it as the application of disciplinary knowledge and theory (learned in quadrant 1) to well-structured problems.

Experiential Knowledge (quadrant 3)

Experiential learning is one of the best ways to get students to engage with and commit themselves to their studies and future careers and entails critical epistemic shifts (Luckett, 2001:56). Here students should participate in the informed and critical questioning of accepted theories and views. They are encouraged to take risks and to solve ill-defined problems in unfamiliar situations that present themselves in unfamiliar forms associated with the messy situations in the authentic real-world. This way of thinking helps students to move away from dualistic, single-loop thinking in which they accept given knowledge as authoritative. Instead they will understand that knowledge is socially constructed and historically and culturally specific, and that their own judgements are contextually contingent. This often requires personal exposure to different interests, perspectives and subjectivities. The experience of some kind of "learnership" or service learning as a teaching–learning method could also provide an ideal learning context for developing and integrating some of the desirable personal and social generic skills, such as self-motivation and self-confidence, teamwork, social sensitivity, negotiation, mediation, leadership skills, Africanisation and innovation and creativity.

Effective experiential learning often occurs in a pedagogical relationship with a workplace mentor or mediator rather than in the more traditional modes of tutelage or apprenticeship found in quadrants 1 and 2. Thus, in quadrant 3, the role of the lecturer is that of facilitator and mediator rather than instructor. In this quadrant students should begin to gain control of and accept responsibility for their own learning. The role of the lecturer shifts into facilitator mode to prepare for and structure the learning experience and then to assist the learner to process and reflect on it afterwards. The focus should be on developing the learner's personal understanding. Skilled lecturers would be required to assist learners in becoming aware of their own learning processes and to undertake "double-loop learning" or self-reflexive thinking so as to become an engaged professional.

Epistemic Knowledge (quadrant 4)

The development of epistemic knowledge in quadrant 4 is the most intellectually demanding of the four ways of knowing represented in this model as it requires Modes 1 and 2 thinking and linking. This is the knowledge paradigm in which learners are encouraged to develop what Kitchener (1983) has termed "meta-cognition" (an awareness of how and why one thinks and learns as one does) and then "epistemic cognition" (the capacity to think epistemically, to recognise and evaluate the assumptions and limits of theories of knowledge from different perspectives and to be able to suggest workable consensual solutions). This demands high levels of reflexivity in a design situation. It is in this

quadrant of the curriculum that learners could develop the capacity for transferring (as opposed to transferable) generic skills. This requires an ability to stand back from one's own frames of reference and epistemology and also to recognise the validity of other ways of knowing. This process could also challenge students to rethink their assumptions about values, ethics and social responsibility and compare them with those of significant others. The development of high levels of reflexive contextualism may well be the best means of achieving the desirable social skills of "innovatability", such as the ability to manipulate different cultural symbols, operate in diverse social settings and develop complex notions of identity and citizenship. Students may also begin to think in systemic and transdisciplinary ways and begin to see connections between different disciplines. Ultimately, it is the ability to engage with and evaluate different theories of knowledge that will equip our students to deal with the complexities of human development in the 21st century learning and innovation era, beyond the "safety" of Western rationalism. Reflective practice sessions are used to develop some key capabilities such as critical thinking and critical analysis. Mentored by their teachers, students complete journals of their learning experiences, and also participate in open forums where they convey and analyse what has been learnt in that week. Peer feedback during these discussions has been instrumental in assisting individual students to relate their classroom learning to situations in the workplace. The learning portfolio of evidence shows the journey of each student through all four quadrants of learning.

LESSONS LEARNED: THE LEARNING PORTFOLIO

Luckett (2001:57) believes that students will find it difficult to operate in quadrant 4 if they have not been exposed to the other three ways of knowing, particularly to the experiential learning in quadrant 3. It is in returning to theory and reflecting on theory in the light of meaningful personal experiences, practices or critical incidents that learners will be encouraged to deal with epistemic plurality. In order to develop high levels of reflexive competence, most learners will require safe spaces where they can take risks and write and talk dialogically. The journey of each student is described and reflected upon in a personal portfolio on the learning and teaching in all four quadrants. Each of these individual portfolios reflects a challenge to find ways of eliciting and shaping tacit knowledge for meta-innovation in an engaged 21st century transitional programme of the University of Johannesburg. They show unique lifelong and lifewide ways to increase undergraduate intrapreneurial management students' capacity for meta-innovation in an African Renaissance era, advancing 21st century shared management and growth in Africa.

CONCLUSION AND RECOMMENDATIONS

This action research project highlights an engaging curriculum design framework for eliciting and shaping tacit knowing for meta-innovation, adapted from Luckett's (2001:49) proposed model of an epistemically diverse curriculum for South African higher education in the 21st century. The teaching and learning cycle supports students in developing skills in the broadest sense: enabling and equipping them to deploy their talent, knowledge, resourcefulness and creativity to best effect as managers and to transform their life, that of their business and also that of others. The project recognises a difference between knowing and knowledge. Knowing has to do with knowledge in action or being in action. People know much more than the knowledge they have. We know more than we think we know because action takes place in a context which itself scaffolds or affords knowing. With explicit knowledge, learning is seen as the end, while in the tacit dimension learning is seen as a means or a tool for problem posing and solving. The tacit dimension deals with the "know-how" that is best manifested in work practices and skills. The tacit resides in action, most often in participation and interaction with others. As a consequence, tacit knowledge can be distributed as a shared, socially constructed understanding that emerges from collaboration and common interest. Learning by doing with others offers learners the opportunity for in-depth participation in a particular "community of practice", where one learns gradually from being a participant observer while being coached and scaffolded by significant others so as actually to be a physicist, social scientist, historian, etcetera, in contrast to just learning about such professions.

The challenge for teaching and learning in an engaged 21st century transitional university is to construct a cost-effective learning and teaching system that promotes student responsibility. The University of Johannesburg should establish an interactive teaching and learning system consisting of

powerful multi-modal learning environments to facilitate lifelong and lifewide learning. Such an activity system emphasises planning complex learning systems that offer students diverse opportunities to gain equal applied competence; widening access to blended support, resources and media; stimulating interaction with subject experts, lecturers and other students; and promoting research and community upliftment. The typical student of the new millennium will have to be more self-directed in seeking information, with the educator as a navigator. The ability to express oneself is critical, as interaction will be necessary between members of communities of learning and practice. The fusion between learning and work will be closer than ever before. Collaborative learning is especially important for both. Newly merged comprehensive universities have a golden opportunity to integrate the existing learning programme of their parent institutions to offer a wide range of academic, professional and occupational programmes. Luckett's (2001:49) proposed model of an epistemically diverse curriculum for South African higher education in the 21st century is valuable for creating a comprehensive curriculum for the African Renaissance. Using the nested approach to modularisation makes modules reusable for cognate certificates, diplomas and degrees. A credit transfer and accumulation system and an associated learner tracking system can help build a seamless comprehensive curriculum offering the student lifelong and life-wide vertical, horizontal and diagonal progression.   Applied competence refers to students who can respond and operate on both theoretical and practical levels on and off campus. The emphasis in a certificate type of qualification will lay emphasis on practical application on and off campus with less emphasis on embedded theoretical knowledge. The emphasis in a degree type of qualification will lay the emphasis on theoretical knowledge and skills with lesser emphasis on practical and skills-based knowledge on and off campus. The emphasis in a diploma type of qualification will be on praxis, that is, on the application of both theoretical and practical knowledge and skills on and off campus.

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