Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT

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Abstract
Universities of technology (UoTs) achieve developmental impact through differentiated curricula, allowing graduates to undertake mid-level occupations in the workplace. This mandate differs from that at traditional universities in six respects: diploma-level entrants, labour market focus, workplace-oriented learning, applied research and innovation, practical graduate attributes, and symbiosis with the workplace on curriculum development.

These differents imply criteria for an ‘ideal curriculum’ at a UoT: demand among employers, affordable class-sizes, available qualified staff members, articulation to higher qualifications, and space to be created in the programme and qualification mix.

STEPS, a process of Strategic Transformation of Educational Programmes and Structures, was undertaken for eighteen months at CUT. Through work by twelve task teams, innovations in curricula and associated support mechanisms have emerged: including nine new qualifications related to environmental sustainability and service delivery, and the comprehensive re-engineering of selected other curricula. The sequence of the process and case studies of the innovations are considered.

THE PHILOSOPHY OF A UOT
Recent policy changes in the last decade have had a far-reaching impact on the South African higher education landscape (Du Pré 2010). The former Technikons were
empowered to award their own three and four year diplomas and became our current Universities of Technology (UoTs). Several were involved in mergers, with each other or traditional universities. The level and placement of these qualifications has been revisited in the Higher Education Qualifications Framework (2008), currently under review. These developments oblige UoTs to review who they admit and teach, what they teach, who teaches it, how they teach it, and what the overall outcomes should be. The Central University of Technology (CUT) has undertaken such a review in its Strategic Transformation of Educational Programmes and Structures (STEPS) process.

The prime purpose of UoTs such as CUT is to achieve a developmental impact on their region through differentiated curricula (Du Pré 2009): by admitting students with diploma- rather than degree-level university entry qualifications, and by equipping them with the graduate attributes and specific niche-oriented qualifications that will actually secure them mid-level jobs and a viable career path. This entails versatile academic staff, engaged in technology-infused teaching, and in innovatory research with external partners. In this way, UoTs will contribute to the broader community. These features embody the important differences in the philosophical and practical approach at UoTs to curricula – by which are understood not only the subject matter and competences inculcated in a qualification, but the range of teaching, learning and research processes involved.

Firstly, a UoT needs these products and processes to deal with development into the future as much as in the present. As the then Director General of the Free State Province emphasised at CUT’s mid-2010 curriculum-transformation conference: ‘The different key sectors [of our region] do not seem to be strategically positioned to deal with the 21’st century “unknown” challenges, and we often seem to be quick to fall back to traditional, “known” approaches and solutions’ (Nwaila 2010).

Secondly, there is the impact on UoT curricula of the knowledge society, through technology: we expect technology to infuse the content of curricula; enrich teaching methodologies, as well as extend coverage and improve quality with e-learning; apply technology to our social and economic issues, to ‘leapfrog’ stages of development; and respond to the career and vocational opportunities created by new technologies. Thus, a UoT produces graduates who are technologically savvy. As Nwaila put it, ‘A modern, knowledge-based economy demands human resources that are numerically and scientifically literate, technologically fluent, and skilled at problem solving, critical analysis and engagement’.

However, thirdly, given the realities of globalisation in the 21" century, UoT graduates also a need to have a deep disciplinary base as well as the broad ability to apply knowledge across changing situations (Volbrecht 2010); in other words, to be able to translate and apply core generic skills into the practical requirements of particular job demands and employment context. In sum, to perform any modern job in an innovative manner requires a mix of academic and vocational knowledge (Garrod 2010). At the societal level, globalization demands (Metcalf 2010) a more flexible workforce, greater breadth of knowledge, less routine work, and rising

Finally, for their qualifications and processes of teaching and learning to rise to these demands, UoTs as institutions have to be flexible themselves, reflecting and adapting in continuous and systematic interaction with their contexts (Johnson, Louw and Smit 2010).

THE APPROPRIATE INSTITUTIONAL FORM FOR A UOT: CUT’S VISION 2020

At the institutional level, CUT has sought to incorporate and elaborate these philosophical considerations into a framework for a distinctive and proficient UoT (Mthembu 2009), now called Vision 2020. This implies that CUT:

• Takes on a central developmental role, seeking to contribute in both a responsive and pro-active fashion to socio-economic advancement of its province and beyond, mindful of both current and future economic, social, environmental trends;

• Adopts an output/impact approach, attuning its curricula and research to the needs of its primary users (students, employers, research collaborators etc.), in their changing contexts;

• Furthers these aims in turn through carefully chosen and sustained strategic partnerships with stakeholders in business, government and civil society, the ‘triple helix’ model (Etzkowitz and Dzisah 2007), towards achieving quality social and technological innovations for partners on both sides; and

• Becomes a new-generation organisation (Marshall and Fisher, 2006), revisiting its own offerings, processes and structures for greater relevance to these commitments, as well as greater responsiveness and flexibility.

THE SIX DIFFERENTIA OF A UoT

Moving from distinctiveness of UoTs at the institutional level to the core business of teaching and learning within such institutions, six dimensions may be identified which we need to bear in mind by which UoTs differentiate their core business from other universities.

First and foremost is the student profile: at UoTs a much higher proportion of students have the equivalent of what used to be called secondary certificates rather than university exemption. This poses fundamental challenges for teaching methodologies and the learning environment. Second would be the intended attributes of UoT graduates – who would, for example, be specifically prepared for the workplace (Volbrecht 2010) and oriented towards professional competencies, rather than only being competent in generic critical judgment. To shape the UoT intake to these intended attributes, the third dimension is the nature of curricula in a UoT, which typically focuses on niches in the labour market (Metcalf 2010),
Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT

has a higher proportion of contextual than conceptual knowledge, and emphasises operational over strategic competencies (Gibbon 2010). This orientation is reflected in the importance accorded to work-integrated learning for UoT students.

Fourth, there is the learning environment and the student experience, which at a UoT often involves a greater use of new and technologically infused learning and teaching methodologies, cooperation in teams, and relevant media (Teichler 2010). A fifth dimension is the culture of the academic staff, which at a UoT places a greater emphasis on professional experience, the involvement of part-timers, and partnerships. This necessitates the cultivating of people with dual identities: what Mthembu (2009) has called ‘academic entrepreneurs’ (entrepreneurs and industrialists who are academically oriented) and ‘entrepreneurial academics’ (academics who venture into and equally thrive in entrepreneurial and industrial spaces). Indeed partnerships may enable a ‘revolving door’ between academics and industrialists, whose career paths span both industry and academia. As a result, sixth, the nature and intensity of research at a UoT tends to get its leverage though being applied, focussing on development problems, and involving industry-orientated consultancies (Garrod 2010).

When taken separately, none of these dimensions is decisive – in practice, each university strikes some balance between extremes. The challenge for our distinctiveness as UoTs will be in the choices we make about which way that balance is tilted. Whether viewed as broad contrasts or as a spectrum, these dimensions taken in conjunction will differentiate UoTs from other Universities. In this way we resist what Garrod called ‘mimetic isomorphism’ i.e. the tendency of UoTs misguidedly to emulate the mandate of traditional universities and thereby neglect their own distinctive role. Mthembu (2010) has emphasised the point: ‘Unlike at traditional universities, where aloofness, dispassionateness and distance from government, business and industry are virtues, these to us are vices’.

At CUT since the beginning of 2010 we have undertaken a transformation process that, within the framework of Vision 2020, attempts to implement new, differentiated and developmental curricula – in the broad sense defined earlier – that take their orientation from the six differentia identified above. The process is called STEPS, the Strategic Transformation of Educational Programmes and Structures. This has been a massive and concerted undertaking involving the majority of academics in different ways over an eighteen month period. It is described in the next section.

THE HISTORY AND MANDATE OF STEPS

The first step in STEPS was a large preparatory conference in mid-2010 with numerous international, local and CUT inputs, several of which have already been cited above. Importantly, the conference included inputs from high-level representatives of industry, government and parastatals, to express the broad expectations of large scale employers of CUT graduates.
The key insights were summarised in a ‘Bridging Document: Learnings from the Conference’ (2010a), and taken into a workshop of a hundred CUT academics and management staff in August 2010. This workshop, through intra- and inter-faculty discussion groups, identified key weaknesses and strengths in CUT qualifications and educational processes. As at the conference, the deliberations were informed by high level priorities from external stakeholders who participated throughout.

### Table 1: The Stages, Documents and Schedule of the STEPS process

| Knowledge sharing session | Preparatory STEPS Conference on Curriculum | Workshop on Strategic Transformation of Educational Programmes and Structures (STEPS) | Concurrent Task Teams planning detailed implementation of STEPS | Programme design and consultation by Task Teams | Recommendations, formulation of new curricula, and ‘mainstreaming’
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The workshop set the basis for twelve areas to be taken up by CUT academic and support staff in Task Teams. As Figure 1 indicates they are broadly of three kinds. The first kind of Task Teams (in the bottom two rows) were to deal with key aspects of the core business of a UoT, namely the admission of underprepared students, the addressing of their needs through innovative teaching and learning, the integration of theory and of practice of Work Integrated Learning (WIL) in the actual workplace. This section also includes an associated challenge, that of managing large classes.

The second kind of Task Team (in the middle of Figure 1) dealt with rationalisation and innovation in the four Faculties with separate Task Teams within the Humanities for Design and Education. In addition a Task Team dealt with the concerted introduction of continuing education. The third kind of Task Team (in the box at the top of Figure 1) covered six of the new problem-oriented, career-focussed, interdisciplinary curricula that had been identified at the workshop.
Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT

‘Connecting the dots’: STEPS Task Teams

The mandates for the Task Teams were set out in a ‘Synthesis Document’ (2010b), which went to Senate and was approved. During November 2010 each Task Team expanded its mandate into a set of objectives and an action plan, which were approved by top-management. In accordance with Vision 2020, each Team was given a budget to cover desk work on need, consultations with users and to recruit expert input. The Task Teams commenced their activities in January 2011. They presented their progress to the Vice-Chancellor at a mid-term workshop in April. A third document, the ‘Directions Document’ (2011a), followed the mid-term reporting. It allowed the Vice Chancellor to refine the mandates that he sent to the Faculties and the support components for the finalisation of recommendations.

In the last quarter of 2011, the recommendations from the task teams have been consolidated and brought to conclusion in four integrative documents. The first, ‘Rationalization and Innovation in the Faculties’ (2011b), provides a reflective consolidation of the STEPS outcomes over the previous eighteen months, while also briefly documenting what has been learned in the process and emphasising how the proposed changes express CUT’s distinctive strategy in responding to current developmental challenges and user demands. At the end of the document the outcomes are recapitulated, to hand them forward to the mainstream University processes for subsequent implementation. A second report, ‘Task teams with University-wide Significance’ (2011c) is organised in a similar way and covers: WIL, Teaching and Learning, Student Preparedness, Large Class Sizes, Continuing Education, and
Research. A third document tabulates and briefly summarizes the new curricula (‘New Interfaculty Qualifications Summary Table’, 2011d). A fourth document broadly quantifies the financial implications. The last document, the ‘Structures Report’, which at the time of publication is being finalised after consultation with the Faculties, will deal with the last ‘S’ in STEPS, namely streamlined academic structures for the organisation of programmes.

The reports were sent to Senate by the appropriate routes and thence to the Management Committee and Council. At the same time the innovations have been ‘mainstreamed’ with anchor persons to take each of them forward in the Faculties or Academic Support functions. In the first quarter of 2012, the new curricula will be sent for the Department of Higher Education and Training for approval under CUTs Program and Qualification Mix and to the Higher Education Quality Council for accreditation. Concurrently they will be incorporated into the University’s official and marketing documentation to be commenced in 2013.

CONCEPTUALISING CURRICULA: THE ‘IDEAL CUT QUALIFICATION’ AS A BASIS FOR DECISIONS

The STEPS Task Teams mentioned in the previous section that were mandated to produce the new or reorganised curricula used the conception of graduate attributes to link the philosophy and differentiators of a UoT to the criteria for ‘an ideal CUT qualification’ that they would apply in their curriculum development. We take these up in turn.

Graduate attributes

Graduate attributes are ‘the qualities, understandings, attitudes, values and abilities that individual universities articulate as the distinguishing features of their graduates’ (Volbrecht 2010). These have been captured in different schema (Garrod 2010, Teichler 2010) which we can synthesize into four key attributes, as follows, with more specific instances of each. UoT graduates are:

Trained to do something

- Technically competent: Sufficiently expert in the field to be able to be immediately productive and employable in the work environment;
- Computer numerate: Able to use the computer packages used in the specific work environment and sufficient conceptual ability to adapt to new packages;
- Business literate: Able to write clear reports and comprehend workplace documents.

Trained to question

- Conceptually able: Confident with conceptual material, as in the more abstract elements of the syllabus;
Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT

- Articulate: Able to test ideas and raise thoughts ‘one-on-one’ and in groups;
- Problem solving: Able to participate in actual innovation.

**Trained to innovate**

- Able to plan: With planning and project management skills;
- Connected: Able to source, assess and apply work-related information, e.g. from the internet;
- Innovative: Able to use knowledge and research products to produce something new: products, processes, services.

**Trained to interact**

- Socialized: Able to work with co-workers and supervisors;
- Articulate: Able to express themselves and offer ideas and opinions in discussion to peers and seniors;
- Able to work: Both in teams and independently, as embodied in the course teaching methodology.

Taken in conjunction, these attributes imply that UoT graduates arrive in the workplace able to take generic skills and to work in teams to apply them innovatively to concrete problems. Simply put, these are graduates who have learnt how to learn and been taught how to apply their knowledge.

**Ideal CUT qualification**

Taken together, the philosophy, differentiators and attributes suggest the following five criteria for an ‘ideal CUT qualification’, that Task Teams were expected to address in the development or re-engineering of curricula: demand, staff capacity, affordability, sustainability, and education distinctiveness and validity.

**Evidence of demand**

- The ideal CUT qualification is vocationally based, targeting a well-defined employer or group of employers;
- There is evidence that the workplace demand is sufficient to place all the expected graduates in the relevant career path, should they so choose;
- It has work-place integrated learning (WIL) fully integrated into the curriculum, with well-identified WIL placements for all students doing the course;
- The qualification is responding to an immediate need, but one which is expected to carry on into the foreseeable future.
Capacity to deliver as well as attract and hold staff

- The staff to deliver the ideal CUT qualification exists or can be attracted;
- Such staff will typically have the required links to both industry and academia;
- They would have at least a Masters and be able to add to the academic discourse in their fields.

Affordability

- The ideal CUT qualification is financially viable in that the projected costs and the overhead contribution are covered by the revenue expected. This typically requires a class size of at least 40 students;
- There is room for industry collaboration beyond the qualification itself – third stream income, industry alignment and research.

Sustainability

- The ideal CUT qualification can find a natural home within CUT;
- There is synergy with other CUT teaching, particularly across disciplinary boundaries creating cross pollination and also back-up;
- The qualification articulates with other courses in CUT, e.g. a diploma with an advanced diploma, possibly onward to master’s studies.

Educational distinctiveness and validity

- The ideal CUT qualification has at least an NQF level 6 (below this is the domain of the FET colleges) and can be pitched at level 6 or 7 typically as a Diploma or Advanced Diploma (formerly B.Tech.); i.e., it matches well with what CUT does and is set up to do;
- It targets school leavers who have passed grade 12 or equivalent;
- The learning outcomes include relevant skills for the typical path, including the technical skills required at the start of that career path, but with the ability to handle conceptual material, solve problems, apply knowledge and to interact with others integrated into the course.

The key lesson from STEPS is that the better CUT programmes are targeted and specific. Generic courses fail at a UoT level. A UoT graduate in a generic course does not compete well with his or her equivalent from a traditional university, whether because of the different focus of UoT staff, the different intake of UoT students, or just due to the reputation of the traditional university. A UoT gains its distinct advantage in a different way.

In its targeted qualifications, CUT aims to teach some generic skills; however, the skills are taught around concrete examples from a concrete work environment,
emphasising the link between theory and practice. Secondly, although it also teaches knowledge from different disciplines, it uses the work environment to allow the students to draw together the different disciplinary threads, rather than to leave it to the student to integrate the knowledge.

At the same time, a caution was in order: one must not overestimate the role of educational interventions in generating graduate competencies; nor underestimate the influence of professional certification and the limitations of planning information (Teichler 2010).

These criteria and considerations were to be borne in mind by Task Teams when developing new inter-faculty curricula advanced below, and also in re-engineering curricula as part of the rationalisations being undertaken in the Faculties.

CASE STUDIES

We have now equipped ourselves to look at some of the results of the individual task teams. This is done in four categories suggested by the Vice Chancellor for the monitoring of STEPS progress, namely programmes of University-wide significance, multi-disciplinary responses to user-defined problems, cutting-edge Faculty or programme changes that could establish CUT as a leader, and PQM implications. Under each of these categories one case study will be used to identify some of the important implications.

Programmes of university-wide significance – Work Integrated Learning (WIL)

A curriculum is more than a set of objectives, lectures, materials, activities, and assessment. In addition to the traditional contextual and conceptual knowledge base, the intended competencies and skills, the sequencing, and the assessment strategy, at a UoT there are some fundamental questions: the generation of knowledge and the extension of knowledge across disciplines, the integration of theory and workplace, and how to draw upon academic learning in a work environment (Engel-Hills et al. 2010).

The emphasis on outcomes in Vision 2020 has had an important implication for WIL at CUT. At the 2011 graduation survey, 1350 students disclosed their employment status. As Table 2 shows, of the 724 students who had had no WIL or poorly organised WIL, 63 per cent were ‘not working but looking for work’, that is 63 per cent were unemployed. On the other hand, of the remaining 626 students who had had WIL well integrated into their qualification, only 26 per cent were unemployed. WIL therefore decreased the probability of being unemployed from 63 per cent to 26 per cent. This is a massive difference.
Table 2: Work Integrated Learning (WIL) by Unemployment

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<th>Students surveyed (Number)</th>
<th>Not working but looking for work (Number)</th>
<th>Proportion unemployed (%)</th>
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<tr>
<td>No WIL or poor WIL</td>
<td>724</td>
<td>454</td>
<td>63</td>
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<tr>
<td>Adequate or good WIL</td>
<td>626</td>
<td>164</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>1350</td>
<td>618</td>
<td>46</td>
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There are many examples of WIL at CUT that are excellent, and which include preparing the students, working with industry to find the places, clearly defining the objectives, and assessing and monitoring the students. The key challenge for CUT was to ensure that all this is done and done well for every qualification.

CUT has some 70 undergraduate qualifications, of which 29 BTechs in principle have had their WIL covered in advance by the corresponding Diplomas. Of the remaining 42 qualifications, 23 had comprehensive WIL while 18 did not. Three of these were being discontinued and six being combined into a new Design and Studio Arts Qualification.

This left the eleven qualifications which have to be re-curriculated with WIL in mind. The re-curriculation will take place during 2012, and the first re-curriculated year will run in 2013, with WIL typically taking place in the second or third academic year. The Task Team set out a framework for key minimum standards and controls for the process of re-curriculating and integrating WIL, developed a workload formula and started to investigate software support.

Re-curriculating with WIL in mind involves a substantial rethink. If WIL is simply bolted onto an already full syllabus, there is not the time to achieve the intended outcome. Instead, for each outcome the optimal delivery mechanism needs to be chosen: problem-based learning, project-based learning, theoretical classroom-based learning, or workplace based learning. Critically, industry has to be engaged – what practices and technologies are required and what is the appropriate modality.

The relevant academics have already begun to identify and engage their industry counterparts and to get honest feedback on their qualifications; often, despite the seemingly ubiquitous presence of reference groups, for the first time. The results are often sobering, such as a marketing employer deliberately choosing hotel-school graduates over graduates with equivalent-level marketing qualifications. The employer was effectively arguing that the former have learnt through proper WIL to link theory to practice and to extend academic knowledge to the workplace; and that their ability to digest, apply and extend theory is in effect more important than the theory itself.

Multi-disciplinary responses to user-defined problems – Qualifications in renewable and sustainable energy

In researching the user environment for a UoT qualification in sustainable energy, the Task Team noted the widely available literature that human population growth
Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT

exerts all kinds of pressures; and that the need for a progressively improving lifestyle of prosperity (fresh water, adequate electricity, and travelling) will turn practices that were previously viewed as harmless into ones that are damaging to the natural environment and human populations. The impact of the proportion of carbon dioxide and other gases in the atmosphere is a strong case in point.

Within South Africa specifically, electricity production is currently operating close to its margins, and – by global standards – with an unacceptable carbon footprint. On the one hand, the current electrical generation and supply industries are well served by a large brigade of power plant workers, linesmen, municipal distribution workers electricians in the construction industry and eventually electricians in the maintenance part of shops, households, factories, farms mines, railways. Thus, there is ready infrastructure available for other kinds of technologies for the generation of electricity to be fed into the local or regional grids.

On the other hand, there is currently a significant drive for establishing a wide range of alternative energy technologies, notably solar and wind energy ventures. Given the price of electricity the concepts of sustainability and renewability are gaining popularity. Sustainability is a difficult concept that must be understood as more than a single application, e.g. farming practices or solar energy. Rather, sustainability is considered to be a specific way of examining at any kind of sectoral innovation, i.e. one that meets present needs without compromising the ability of future generations to meet their needs.

This Task Team followed the same process as others: benchmarking of other qualifications, unstructured interviews to formulate thinking, targeted interviews, an industry workshop, and discussions with future employers. The Task Team found that higher education institutions provide training in this field as technical backup to the industry. These were reviewed in detail. On the SAQA website a number of unit standards below Level 5 are registered in solar and wind energy, but not for instance in the use of biogas for the generation of electricity. Two qualification in RET at NQF 2 and 3 are registered by the WESETA. Both are low in the actual number of credits dedicated to RET.

The Task Team identified the need for multidisciplinary qualifications falling between the above mentioned technical qualifications and the research Masters and Doctorates being offered at traditional universities. The consultations made clear that the qualifications need to integrate basic science, electrical engineering, mechanical engineering, biosciences, health and safety, and management. An approach is required that is multi-disciplinary, where the integration is done in the organisation of the curriculum rather than thrown at the student to contextualise and connect.

The full suite will eventually be four qualifications, which will articulate with each other and thereby offer economies of synergy and scale. To begin, the flagship will be a three year Diploma in Sustainable Energy. The prospective diplomates are not primarily engineers with focus primarily on design, installation and maintenance. They are multifaceted professionals who will participate in recommending, conceiving and commissioning industry and government programmes. This Diploma will next
be articulated with an Advanced Diploma, with a stronger management focus.

In line with the graduate attributes identified above, the Diploma will equip its graduates to participate in multi-sector teams recommending an integrated approach to energy efficiency, in particular applying audits to advise on products and associated health and safety issues to optimise electricity use.

At a lower level, a Higher Certificate in Renewable Energy Technologies (NQF 5) is to be introduced aimed at persons with an insufficient matriculation score to enrol for a Diploma in Engineering. This course, over one year full-time, will be a technology-specific course. It will cover the installation and maintenance part of solar, photo-voltaic, wind, and biogas systems. The course will partly draw on and adapt modules of the three-year Diploma in Sustainable Energy. It will later be articulated with a second-year, Advanced Certificate.

The Team stressed that students will learn the same mathematics, physics and chemistry as other engineering Diploma students, and the same entrepreneurship and communication as other Management students, but while applying them with increasing specificity to the sustainable energy domain – thereby learning the issues, terminology and orders of magnitude that they will be using in their professional careers.

Cutting-edge faculty or programme changes that establish CUT as a leader – re-engineering the B.Ed.

At the outset of STEPS there were some 1,400 students in the five B.Ed. degrees of four year duration, namely Computer Sciences, Economic and Management Sciences, Languages, Natural Sciences, and Technology. However, despite the large class sizes, the high subject pass rates, and a recent reorganisation, influential stakeholders remained concerned about the quality of the programmes and the graduates.

The first initiative undertaken by the Task Team was to commission an external review of the existing B.Ed. programmes, conducted by senior curriculum experts with national policy experience from another university. The key diagnosis of the review (Harley and Mthiyane 2011) was

the absence of a guiding conceptual framework ... that makes the programme problematic. No matter how good the separate modules taught by individual academics in different sections, these seem rarely to build on or connect to one another. There is very little evidence that modules are designed to work together in an integrated, coherent way that moves a student towards becoming a competent novice teacher.

The conclusion reached by the external review panel was that the B.Ed. curriculum at CUT needed to be reconceptualised in its entirety.

A special two-day workshop was held to consider and take forward the findings of the review. A key principle emerging from the workshop was to reorient the B.Ed. curricula into an issues-oriented mode, organised under substantial themes:
such as working in the classroom, the importance of social context, the institutional arrangements of schooling, etc. This radically replaces the previous disciplinary silos such as Sociology of Education, Philosophy of Education, and Comparative Education. In the new arrangement, each of these disciplines contributes in an integrated fashion to each of the new issues-orientated curricula. This in turn requires each of the lecturing staff to master one or more of the new issue-oriented themes, and to work in theme teams. This by nature makes the offerings interdisciplinary, instead of the previous disciplinary arrangements.

A decisive advantage of this new thematic approach is that it has been accepted internationally, and that modern, up-to-date material and workbooks adapted to the South African context have been made freely available on Open Education Resources (Africa).

Other key principles embodied in the new curriculum are as follows:

- Careful attention will be given to the linkage, progression and logical sequencing of what is taught. Student needs will inform the sequencing and timetabling of learning.
- The new curriculum has been designed to support the values of the school and the kind of teacher CUT wishes to develop.
- The qualification will be taught as an integrated four-year programme, rather than three years with a fourth tacked on.
- The new qualification aligns with the Policy on the Minimum Requirements for Teacher Education Qualifications, which requires three teaching subjects as opposed to two previously.

Finally, perhaps the most important principle is that school-based learning – which is the particular form that WIL takes within the B.Ed. – provides the spine around which the programme is designed. The new qualification is structured around what the students need to know and will be able to do for each tranche of school-based learning distributed in each year of study.

A new curriculum incorporating these changes has been designed collaboratively. The qualification is already registered for SAQA and the CHE has approved CUT to teach it; and the change in content is less than 20 per cent, which means that any modifications may be undertaken internally.

The new B.Ed. aims to produce teachers who, inter alia, demonstrate competence in the relevant knowledge base of the subjects, in designing and improving learning programs, in effective communication, in applying statistical knowledge to managing their teaching, and in choosing and using suitable learning strategies.

The overall qualification will be quality-assured through regular benchmarking, external moderation of modular examinations, preparation and monitoring of the school-based learning, and lecturer review.
PQM rationalizations across faculties

The three case studies above have illustrated the STEPS innovations with new or comprehensively transformed curricula, alongside the improvement and extension of WIL, which becomes a critical pre-requisite to their being implemented in line with the UoT philosophy and mandate and CUT. In the STEPS process a total of nine such curricula were developed, as below:

New curricula addressing improved service delivery for development

• Higher certificate in Community Development Practice
• Advanced Diploma in Logistics and Transportation Management
• Advanced Diploma in Health Management.

New curricula addressing improved sustainable development

• Higher Certificate in Renewable Energy Technologies
• Diploma in Sustainable Energy
• Advanced Diploma in Agricultural Extension Officers
• Bachelors in Hydrology and Water Management.

Transformed curricula

• Diploma in Design and Studio Art
• B.Ed. in Senior Phase FET Teaching.

In addition, some Faculties were further spurred by the STEPS initiative to introduce yet other new courses that they had been contemplating: an IT Higher Certificate in the Faculty of Engineering and IT targeting identified employment opportunities, a Diploma in Forensic Sciences in the Faculty of Health and Environmental Sciences, and a Higher and Advanced Certificate for Accounting Technicians in the Faculty of Management.

Secondly, prompted by the need to better manage the challenge of large classes and enable the comprehensive introduction of WIL mentioned earlier, the Management Faculty is re-visiting the curriculation of other qualifications, in particular the Diplomas in Marketing, HR, Office Management, and Public Management.

These extensive changes in programmes have had important implications for the Programme and Qualification Mix. Space for new enrolments was created mainly by the decision to restrict intakes for certain over-large and previously ‘walk-in’ classes. These new places were applied to new qualifications whose host faculties are predominantly in the SET (Science, Engineering and Technology) category. The net result is a substantial improvement in CUTs SET proportion of approximately eleven percentage points. Additionally, this refocusing of qualifications should result in improved throughput and placement rates.
CONCLUSION

In summing up, we note that this article, like the STEPS process, has only lightly touched on the specifically theoretical aspects of curricula suitable for institutions oriented to equipping their diplomates or graduates for mid-level employment, and whether there is anything specific in the way UoT knowledge should be organised. The need has been noted earlier for a curriculum which has disciplinary depth as well as practical breadth, or, in other terminology, conceptual as well as contextual content (Gibbon 2010). We would add an orthogonal dimension, namely the integration of theory and practice, which aims to result in students who have learnt, have learnt how to learn, and have also been given practice in how to use theoretical knowledge in practical contexts. Curriculum theorists might further debate whether different disciplines are more sequential or discursive; and the extent to which UoT learning and indeed research are more ‘mode 2’ than ‘mode 1’, i.e. more team-based, multidisciplinary and applied than individual, disciplinary and theoretical (Gibbons et al. 1994). These topics may be taken up in further research.

By contrast, the strength of the STEPS process has been its practical rather than its theoretical nature. Although STEPS is still under way, there has been quite concrete progress with important deliverables for implementation. Firstly, we have seen that the research, consultation, and planning have been completed for the commencement of seven developmental new qualifications for 2013. Three of them are orientated to service delivery and four to sustainable development. In two other instances, Design and Education in the Faculty of Humanities, curricula have been completely reworked to align them to modern best practice, ‘helping the students to join the dots’ and thereby maximising the intended professional impact. The intricate documentation has been processed through the University decision-making structures, and is destined for the Higher Education authorities. Other curricula are being brought under review in the same way. All these new curricular developments are not only gains in themselves, but also serve as exemplars in each of the four Faculties, for the kind of new curricula in future that meet the criteria of the CUT ideal.

Similarly, in respect of optimising the core business of instruction, the crucial contribution of WIL to student’s finding employment has been identified. As a result, structures and curriculum revisions are envisaged for WIL to be brought to uniform high quality and made comprehensive. Similarly, transverse and faculty-specific modules have been conceived to address student under-preparedness. These have in turn necessitated a programme for the substantial rewriting of many of the remaining CUT qualifications. In addition initiatives and regulations are proposed to take care of lecturer under-preparedness.

Given this brief recapitulation, we may note what practical transformative substance has been given by STEPS to four the tenets of Vision 2020. Regarding development, the contribution of STEPS has been quite overt in developing nine new qualifications prioritised towards urgent and important national concerns, service
delivery and sustainability. The outcome/impact orientation of STEPS is more implicit yet more pervasive, in that the commitment to employed graduates exerts influence at all levels of curriculum development and delivery, as well as better WIL, better student preparedness and better teaching. These in turn entail the better links to stakeholders of various kinds that were involved in STEPS: extensive consultations on curriculum priorities, levels and content, as well as external interactions regarding student placements and related research collaborations. The fourth element is that of a new generation organisation. In involving over half the academic staff in reflecting on the future of the institution and, in concert with top management, planning the interventions to tackle it, STEPS has laid the foundation for making institutional change sustainable. In these ways, focussing on the central business of curriculum development, STEPS has helped to carry forward the distinctive mandate of a UoT in the case of CUT.

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