Futures studies and scenarios of degrees in universities of technology

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Abstract

This article is a reflection on the use of scenario analysis to examine the repercussions of offering degrees rather than diplomas in universities of technology. Scenarios are exploratory, discursive tools aimed at promoting discussion and reflection, rather than projections or extrapolations, in order to ascertain the consequences of actions as yet unperformed. In universities of technology, any future degree scenario must engage with the implications of current and changing society and the workplace. The use of scenario analysis is illustrated through a description of degree scenarios in the professional fields of Graphic Design and Emergency Medical Care. Issues of staff readiness, student employability and difficulties emerging from an unprepared society are just some of the issues raised in the degree scenarios. Through designing scenarios, staff are made more aware of the complexities of changing qualifications and can perhaps avoid some of the more obvious pitfalls and also generally adopt a more systematic approach.

Keywords: futures studies, scenarios, qualifications, diplomas, degrees, universities of technology

INTRODUCTION

This article is a reflection on the use of scenario analysis to examine possible future changes to university of technology qualifications, specifically a move from diplomas to degrees. The question then arises as to how to prepare both staff and institutions to operate in this changing higher education landscape.

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The article showcases the benefits of using a scenario approach as a reflective tool in order to prepare staff for such changes, even if it is not an approach typically used in the qualifications development field. To this end the article begins with a general discussion of the context in which a move to degrees is being discussed, and some of the forces and actors which need to be considered. This is followed by a discussion on scenario analysis in general and some of the foundational issues which need to be taken into account, where work and society are key players in any new qualification developments. Scenarios in the academic fields of Design Studies and Emergency Medical Care, designed by key staff in these fields, are then used to illustrate the scenario approach, and some of the foundational issues which arise.

In the Higher Education Qualification Sub-Framework (HEQSF), diplomas, while having some theoretical knowledge, are primarily vocationally focussed for industrial applications. Graduates are expected to be able to apply what they have learnt in relatively specific fields, and to have engaged in some form of work practice during their studies. In contrast, graduates with a degree are expected to have a stronger theoretical knowledge base which can be applied to a wider variety of contexts. Furthermore, they would be expected on graduation to demonstrate higher levels of initiative and responsibility than diploma graduates, but are not specifically required to gain work practice knowledge during their studies.

Over the last few years in discussions in Faculty Boards and in staffrooms there has been a call to replace many of our diplomas with degrees. The current requirement that all qualifications be resubmitted for review has sharpened interest in this possible change. In fact this has already happened in some instances where the diplomas have a high level of scientific and theoretical knowledge, even though they still have strong workplace learning components; Radiography, Biomedical Sciences and Education are current examples of this conversion.

There are many pressures from both outside and inside the university to offer degrees, either to replace diplomas or as a parallel offering. Much of the impetus arises from the perceived need to increase the scientific content of diplomas so that students are better able to adapt to increasingly complex workplaces and to respond to issues such as environmental sustainability, a pressure raised in the Design scenarios. In fact, the issue of sustainability has already been raised in futures studies of universities in general across the world (Blass and Woods 2012). Improved work responsiveness raises an additional important point concerning irreversible future developments: as universities of technology we are ‘locked-in’ to acknowledging work and society more generally in the design of our curricula. All curriculum initiatives must pass through this point of evaluation in some way. Thus, even though the HEQSF does not stipulate work experience as part of

degrees, lecturers themselves may decide to include such experience in order to satisfy professional outcomes or even graduate attributes.

Then there are issues of improved status for staff, students and the university if degrees were more routinely on offer. Difficulties, however, arise when issues of access to higher education and access for success are discussed: Would, for example, offering degrees serve to exclude more students from higher education? Then there is the issue of employability of graduates in the light of the loss of more practice-orientated experiences, and even the suitability of current staff to offer degrees, particularly where they have over the years developed knowledge and skills in more practice-based offerings. Thus any move to offer degrees should not be taken lightly given the potentially contradictory pressures at play which, even if they are not directly resolvable, at least need to be discussed by Faculty.

Thus the purpose of this article is to provide a discursive space which underlines some of the complexities, advantages and disadvantages of offering degrees. The discussion on degrees and diplomas offered is important in its own right. It requires us to look into possible futures of education and training in relation to the world of work and the role of various qualifications. A useful way to do this is to set out a combination of a diagnosis of the present situation and dynamics, and scenarios about possible future dynamics. This is what the article sets out to do, and in so doing it showcases an approach to consider future developments.

In the remainder of this introduction, we will do two things. First, we will introduce the notion of future studies and general scenario approaches. Second, we will discuss some foundational issues about the role of future studies in deciding on and shaping of actions.

When we make choices about the design of curriculum we are also imagining what society will look like four years on. We are looking into the future. There are a wide range of tried and tested future-looking methods in science, technical innovation, and general business studies (what will markets be like in future?). These can range from mathematical modelling (for example predicting fish populations in the future given current and future quotas) to expert opinion (Delphi method). These methods have two things in common. Firstly, they assume that futures will unfold in a stepwise and inevitable fashion. However, this is often not the case as complex forces are at play in determining the future (De Laat 2000). For example, the predicted case of the electric car replacing petrol/diesel cars has not happened at the scale originally predicted in the 1970s. Rather, more fuel efficient, environmentally friendly petrol cars and some hybrids have been developed.

A second trend in future studies is that the act of designing is separate from what might occur in the future, and that whatever is designed will be suited to or fit in with what will unfold. A different view is that designs actively change the future (De Laat 2000). For example, drawing on an example from technology advances, the advent of laptops fundamentally changed how people could work enabling them to work anywhere at anytime and communicate such work to others. What is designed is thus an actor in determining future developments rather than a passive addition.

Scenarios are exploratory, discursive tools aimed at promoting discussion and reflection, rather than projections or extrapolations, in order to ascertain the consequences of actions as yet unperformed. In designing scenarios we attempt to take a developing situation (in this case the prospect of offering degrees at universities of technology) and using some information from current discussions to develop a broadly defined, possible and plausible future (Wright et al. 2012). The next stage of analysis is to pose the question, 'if these events were to occur then what would the implications be?' (Alcamo 2008). Typically, the scenario sets out an initial position and, in the form of a narrative, the main factors which influence developments, but more than one narrative is offered in order to provide for more critical discussion.

Scenario work has generated different methodological foci. Scenarios may be combined with Delphi techniques, for example, or the focus may be on how powerful groups work to preserve their interests as events unfold. Scenarios can also be used as a tool to compare different developmental strategies or, more commonly, to anticipate the future (Wright et al 2013).

The scenarios focus on the status of degrees in a South African context. They explore the status of offering and having a degree by the different role players. This is the departure point that sets a series of events in motion some intentionally and others unintentionally. The events are unpacked as consequences or repercussions of the events that spark off other repercussions and consequences.

The present discussion of degrees and diplomas and related case studies of degree scenarios are anticipatory types of scenarios (Alcamo 2008) and have been developed by lecturers in the fields of Health Science and Design. These scenarios, it is hoped, can be used to stimulate discussion in faculties, and even serve to improve the qualifications ultimately offered.

The purpose of the cases is simply to raise the awareness of managers and decision makers about the uncertainty of the future and to alert them to emerging problems and possible surprises in the business environment that may influence how we prepare students today. For example, by offering new qualifications one must also consider the environment in which they will be offered and practised; managers and decision makers would need to 'think big' about a problem

or a change, and its impacts or the domino effect that one change can have. Issues underpinning the way scenarios may unfold, in particular related to the relationship between university and work, are now discussed, bearing in mind the lock-in to work and society.

Universities and workplaces are different institutions in that they have different goals – learning versus production, for example – and have to work together as universities of technology aim to prepare students for work. This initial and visible difference can lead to two lines of thought, both of which relate to the design and showcasing of scenarios concerning the introduction of degrees in this article.

One line of thought is that of nurturing new ways of thinking in the curriculum within the protected space of the university. The new ways of thinking may need to be nurtured and protected because they are as yet not fully accepted by society, even though they may clearly have benefits when seen from the point of view of the creative lecturer. Universities, because of their separateness, can provide this protected space. These sorts of arguments can be related to the strategic niche management concepts of fit or stretch (Hoogma et al 2002). Where there is 'fit' a new idea or technology is well matched to current societal conditions and needs and can be relatively easily inserted. Thus current curricula which meet the perceived needs of workplaces would have a strong fit. New curriculum ideas ('stretch'), on the other hand, may need space in which to develop before they are put into action. Where there is stretch the new can only be inserted into society with some effort on the part of its promoters (the lecturers and the university). But fit/stretch can also apply to society to the extent that society itself may need to be changed if it is to embrace the new, and this is some of the work that needs to be done by promoters.

In the second line of thought, it is not only protected spaces within universities which enable innovation but also new or 'third spaces'. When universities and workplaces come into contact with one another there are both similarities and differences and gaps between them. More specifically, work knowledge is essentially used to enhance the productivity, innovativeness and skills base of the firm whereas in the academy knowledge is concerned with the mastery of disciplines and their (possible) application in the world. Differences between the institutions may serve to challenge and disrupt the previously held knowledge of the other. The processes of disruption are that knowledge and practice may be questioned. A new zone of potential knowledge development, a third space, can be opened up between the two systems such that 'potentially shared or jointly constructed objects' may arise and be identified (Engestrom 2001, 136).

Such spaces and the tools of scenarios within them are furthermore seen as developmental in that they provide a reflective space for others – academics and

even work representatives – to work across differences in order to come up with hybrid solutions. In this model, unlike typical organisational learning models, the stimulus for learning and development is the recognition of contradictions or difficulties between practices, which may result in successive cycles of learning.

A further observation on third spaces and development, with particular relevance to diploma/degree relationships and developments, concerns the possibility of take up of innovations where previous, functioning methods already exist. There is adherence to the old and thus difficulty in taking up the new. For optimal uptake and development of the new, it first needs to be recognisable and communicable to adherents of the old methods. If the innovation is too different from the previous method then there may be such resistance that the new withers. However, if the innovation is too similar to the previous methods then uptake will be easy but there will be little significant change. There is thus a trade-off between the degree of difference between old and new practices, and their uptake within institutions (Nooteboom 1999). This sort of tension can be seen in all the cases where staff wish to introduce degrees where diplomas already exist. Though similar to the strategic management concepts of fit or stretch, the point here is that lack of fit may sometimes be used as a resource for further developments.

CONTEXT AND METHOD FOR SCENARIO WRITING

Our University of Technology had already researched and published in the field of curriculum and its relationship to work practice within our university Work Integrated Learning Research Unit over a period of ten years. We were interested in new potential avenues for research into the curriculum and work. In 2012 discussions were begun with Professor Arie Rip of the University of Twente, and continued at a work integrated learning research day, in which the possibility of marrying future studies and curriculum development was raised. Interested staff from departments aiming to offer degrees were then invited to a day-long workshop in 2013, led by Professor Rip, in which research into futures studies was discussed, and proposals for curriculum scenarios planned, presented and critiqued by the group. Staff were also provided with readings on scenario analysis. Five potential subject areas for degree curriculum scenarios were identified. Staff developed more than one scenario in each subject area in order to illustrate different types of possibilities and tensions. Over a period of four months of reiterative writing and editing these were developed into written documents and combined into a volume for use by the university community. Two of these subject areas, Design and Emergency Medical Care, were selected for this article as these best illustrated the tensions and possibilities emerging in

the development of degrees in a university of technology. These scenarios were written by the authors of the article. The scenarios in these subject areas are now described.

DESIGN STUDIES SCENARIOS (GRAPHIC DESIGN)

The issue of offering degrees has long been the subject of curriculum meetings and workshops in the Design Faculty, and was initially suggested and promoted by Faculty Management. In the initial presentation of offering the degree all staff seemed to be for it and were excited about these changes. At first glance it seemed as if it was just about how to restructure the course curriculum to adequately address this new offering; some staff even assumed it would just be the same offering under a different name. Staff appeared to be supportive and even proud of the idea of offering degrees – students also seemed to support and feel a sense of pride around a future degree offering.

However, when changes were needed to make this possible, staff members – i.e. those who would have to actually design the new qualifications – seemed to be uneasy. What, for example, were the implications for new or changed content and practices? Questions arose around current staff qualifications to offer the degree and access to the degree course for students given the education system of public schools. Some questions were also raised around what such a qualification would be able to bring to the industry, society and university, and how industry would view such graduates. A basic issue is that the upward pressure to have degrees rather than diplomas and other, lower-level certificates can improve qualifications but also creates a distance to what is actually required in the professional and proto-professional practices of the graduates. Then there is the issue of a rapidly changing technological environment which any form of training may struggle to keep up with.

It was clear that changes in any situation and particularly here were going to be troublesome. Investigations would take time and changes were quite possibly going to be slow. However, scenario approaches may help staff to understand better what is involved in changing to a degree even before they have embarked on this course.

Scenario 1: Degrees for status

In this scenario the focus is the benefits that staff enthusiastically take on, even though curriculum is not at first the primary issue. Many staff perceive themselves as ‘not quite as good as university staff’. But now the Dean provides the opportunity for advancement through generous sabbaticals and replacement staffing so that staff can improve their qualifications, with many staff now

able to pursue doctoral studies both at home and abroad. This enables them also to engage in research and to publish, which also pleases the Dean and the university research office which is attempting to improve both numbers of staff with doctorates and the overall research output of the university. This is in itself important for raising the status of the university in national and international rankings. But the benefits are not only for staff. Students perceive the degrees offered as having higher status as the department now develops a higher profile in the country. Students who would previously have studied at other universities or private colleges choose to study at the university in the knowledge that their employability options are improved with a degree from the university. As the department becomes well known and respected, students can more easily sell themselves overseas as well.

On the downside this is a long process and not all staff are initially fully on board. Many find it difficult to advance academically and much effort needs to be put into their master's and doctoral supervision. The Dean realises that he has to attract more academically orientated staff as well, and this is initially perceived as a threat to the existing staff. Some staff who cannot 'make the cut' have to be retrenched within the new regime. An unforeseen difficulty with students also arises. In diploma studies a lower-level school qualification only is required, but now students can only apply with a higher school standard, and at first the pool of potential applicants is reduced and this is only turned around years later as the status of the university becomes well known; so there is an extended turn-around period which has implications for enrolments and hence funding. A further difficulty which needs to be addressed is the increased period of study which means that students have to study for longer before they can earn. But this is eventually counterbalanced by the higher wages students earn and what they can contribute to the company or their own business.

Scenario 2: Collapse of degrees and the 'qualified unemployed'

While status remains important, many actors think the curriculum should reflect the higher level of qualifications that goes with a university degree, and start working towards it. But, would industry 'miss' the more intermediate, ready to produce work, diplomates? And, how would industry cope with the higher wages commensurate with higher qualifications?

The discussions and negotiations in the faculty referred to these broader considerations, but also focused on a curriculum that deserved to be called a university degree curriculum. In such a new curriculum there should, for example, be more theory. Furthermore, there is an opportunity to pay more attention to the creative aspects of Graphic Design. Then there is also the potential to respond

to the growing national and international impetus for students who can work sustainably, both in terms of the types of projects they take on and the materials they use.

Some of these curriculum elements could be put in place quickly, because faculty members had been interested in them and could now put them into place, not constrained by the practice-orientation of the previous diploma curriculum. Some of these new elements were even tried out in part with existing diploma students and further developed into learning and assessment activities. Thus the new degree curriculum could start almost immediately.

Four years later, the degree graduates started to enter the workplaces. This led to disappointments from both sides. The graduates found there was insufficient space for their creativity in the workplaces they entered. Some of the employers found that they were missing the practical skills necessary in the workplace. At first, further training was done by the university so that the degree had more practice-based components, but at a point, employers found it easier to attract graphic designers with the adequate skills from other universities or even from abroad. That quickly became the rule rather than the exception. The university Graphic Design graduates moved to other kinds of jobs (based on the fact that they had a degree), if they could find them.

Two years into the new situation, the *Mail & Guardian* newspaper devoted a background article to this situation, where some South African higher education institutions (HEIs) had moved to what was effectively education for unemployability. This caused an outcry, with critical questions in Parliament, and a movement among students to reconsider the curriculum. For the university, the immediate problem was the reduction in student numbers. They had to respond, and respond quickly. They chose to reinstate the diploma curriculum, taking the risk that there would be no return to a degree.

Scenario 3: Degrees for an uncertain future

With rapidly changing work practices, for Graphic Design as well as generally, there is a structural problem: the curriculum that appeared adequate for work practices at time t may not be adequate anymore at time $t + 3/4$, when the students got their diploma or even degree. One line of thought was that diplomas were much more adaptable to changing work needs than the more heavily theorised degrees. But degrees may have a more general description of content; and be more outcomes-based which allows for change, while the diplomas tended to give a blow-by-blow account of what was to be taught, with a focus on technology.

Graphic Designers live in a rapidly evolving world where print is just one option among many. So posters, billboards, magazines, pamphlets and booklets,

which are currently paper-based, will all also be produced online or be projected from devices. Specialised graphic design skills will be easy to access online, and templates will enable anyone to design for their own needs. Software that is special for graphic design work will be as common as Micrsosoft Word is today. Specialised information such as file formats and saving options for art work will become irrelevant as software and technology that will do these things automatically will be freely available.

Education will be online, universities will have difficulty in creating flexible curriculums as the three or four-year qualification planned in advance may be completely outdated by the time students graduate due to the turn-around of technology developments, even for a third world country like South Africa. Lecturers will have difficulty in staying abreast of new developments in industry. The slow turn-around of universities for change and the red tape to get the smallest thing changed will leave universities in the dark soon. At the rate that technology and the needs of people are changing, designing qualifications that would be able to deal with these rapid developments will be a tall order.

Faculty Management recognises the challenge, but in the present curriculum structures cannot do much else than invite guest lecturers to talk about new developments and challenges. Students can then recognise the challenge, but that is not the same as actually acquiring the competencies and skills to function in the brave new world. Experiments in project-based learning are started. This then reveals a basic problem for a future-oriented curriculum: the learning outcomes have to be assessed, but there is no simply given standard against which they can be assessed. The targets are moving targets.

Universities of technology, following the tradition of the technikons, rely on their close links with the worlds of work, but that may imply being conservative, accommodating the present situation rather than what the world will be like in another five to ten years. These are larger issues than what diploma or bachelor's degree students can be asked to understand and contribute to. Some visionaries propose restructuring the curriculum and including an open-ended part. The university has recognised the structural problem, and supports a few faculties to experiment with new curriculum structures. Graphic Design is one of the pilot degree courses in this scheme. It turns out to be working well within the university. Some examples of these pilot schemes are: the Graphic Design Department holds supplier and company meetings (with professional bodies) on campus so that students and staff become aware of new developments; students do projects via the Internet on new initiatives in the field; and the curriculum is broken down and redone every year in December in order to include new ideas.

These all help staff and students to keep up but the problem of the fixed curriculum still persists. There is only so much more which can be added to

an already full programme and then there is the difficulty of which elements to remove to open up space for the new developments.

Comment on the scenarios

In scenario 1, degrees for status, the change to degrees helps but sets in motion unintended consequences (such as increased fees); there are thus repercussions or a 'domino effect' that staff and faculty may not have originally considered. For example, the need for graduates with knowledge of environmental issues is one impetus for the addition of more theory leading towards the introduction of a degree rather than a diploma. When this is modelled in a scenario, however, further difficulties (secondary contradictions) are seen to arise, such as the need for more qualified staff, and this difficulty stimulates further reflection and the development of different models.

In scenario 2, degree introduction is initially successful but there is too weak a relationship between the new qualification and the actual practices at work. The distance between the two is large and there is little fit between the new degree and the world of work; uptake is thus made difficult (Nooteboom 1999). In the third scenario, the rapidly changing nature of technology makes any qualification difficult to design, even though a degree may ultimately, because of its more theoretically general nature, be more appropriate. However, these rapid changes in society, rather than being seen as a threat, may open up 'third spaces' for the emergence of new developments (Engestrom 2001).

EMERGENCY MEDICAL CARE (EMC) CASE STUDIES

Prehospital emergency care in South Africa has advanced rapidly in the last 20 years. From humble beginnings with various short courses, this vocation has turned its focus to professionalisation with the development of undergraduate qualifications (Castle and Owen 2003, 29). Most notably, South African paramedics have become more employable in the international market, which offers the promise of improved wages and working conditions, and subsequently a similar trend in skills migration has been seen as compared to other allied health professions (Binks 2011).

A basic issue is that the upward pressure to have degrees, rather than diplomas and other, lower-level certificates, can improve qualifications but also create a distance to what is actually required in the proto-professional practices of EMC. The upgrading of proto-professionals, so that their own knowledge becomes more imperative and medical oversight is not always necessary (even if there will be a tension with the authority ascribed to EMC), is a situation that can be

further explored by creating scenarios. Taking this situation as the starting point is important because EMC practitioners, at all levels of qualification, will have to exercise judgment to respond adequately to an urgent and concrete situation. How can the quality of that judgment be assured, and which accountability or liability aspects play a role?

Scenario 1: Degrees and diagnostics

The first scenario explores how quality of judgement can be addressed in degree curricula, where one can be intellectually ambitious. The entrance point is the degree programme in the context of the introduction of a subject for diagnostics. In past qualifications the underlying concepts of diagnostic reasoning and philosophy did not form a formal part of the curriculum. Diagnostic reasoning supersedes the more routine activities that come automatically to practitioners as they draw on their tacit know-how to solve problems. Now the situation changes as what is observed does not necessarily fit into existing well-known patterns and the practitioners experience 'surprise' (Schon 1995). The problem itself has to be reframed and new approaches designed on the spot which requires some knowledge of diagnostics. This difficulty of problems requiring more than routine and/or tacit responses has left especially novice practitioners underequipped to manage complicated patients. This may have, in turn, led to poor patient management.

In response to this, the new degree curriculum has made provision for a formal course in diagnostics, whose outcomes align to similar courses in medicine and other allied health professions. With improved diagnostic reasoning skills novice paramedics may be better equipped and may also have a shorter and less steep learning curve when entering independent practice. This is a laudable aim, but students who are currently undergoing practice training report that they are frustrated, as many of the mentors they are working with do not share the same reasoning philosophy. Thus, newly qualified paramedics with improved diagnostic training may face challenges, as they may find themselves in the right, but in disagreement with a more senior colleague, who does not share a similar level of insight. This may hamper workplace learning and relationships, as the novice paramedic may not have the skills to articulate a diplomatic argument to convince a more senior colleague, and in the long run patient care may suffer.

Scenario 2: Embedded practices

The second scenario starts with the lower-level practitioners who often are the first to encounter the emergency situation, and suggests the need for such practitioners to undergo more theoretical training, perhaps in the form of a bachelor's degree,

in order to avoid possible disaster. All sorts of rules and protocols have been articulated already, so that their task could be formulated as applying the rules to a concrete situation. But rules are never fully adequate, and concrete situations have lots of complications. So, ad hoc, and sometimes split-second decisions are in order. The skills to do so can be acquired, but most often in practice through experience and exchange of experiences between practitioners. However, in concrete situations, EMC practitioners must address novel situations, and may have to deviate from what the rules prescribe. They should have a certain amount of discretion to do this, but one could ask what sort of competence is necessary to justify such discretion. And there is a question of accountability, and even liability, if the practitioner deviates from the rules and things go wrong. One example is the use of 'drug-induced intubation', basically the use of sedatives and other drugs to enable the opening of airways. The practice is culturally embedded and widely used, based on its apparent efficacy and the fact that practitioners feel comfortable with its use.

Practices such as intubation are products of high levels of discretion, in combination with limited understanding of theoretical or scientific principles and low levels of accountability. In addition they are often self-perpetuating, becoming culturally embedded and perceptually obligatory in the minds of practitioners as the practice norm. Practices such as the one discussed above are potentially harmful, not only to patients but to the practitioner agency and the goal of professionalisation.

Comment on the scenarios

In both scenarios, EMC students, once qualified, with improved diagnostic skills and clinical reasoning such as would be included in degrees, may have the potential to improve clinical decision making (Crosskerry 2009) in the field. This may reduce the risk of harm, which novice practitioners pose inherently (Singh et al 2007). It also has the potential to improve the capacity of mentorship in the clinical setting in addition to more direct improvements in pre-hospital care, triage and patient routing. This may further build practitioner agency and add to the quality of workplace learning experiences, such as quality assurance programmes and patient care reviews.

The example of introducing diagnostics into the undergraduate EMC curriculum (scenario 1), even though this may not be acceptable under current work conditions, illustrates the difficulties of 'jumping the gun' by introducing an innovation too soon into an as yet unprepared society; the innovation may be snuffed out at an early stage. Through being developed in the university curriculum it is possible to extend the theory and practice of EMC. In addition,

when such diagnostically trained students are given exposure to the field for short periods in weekend experiential work, it may be possible to change society somewhat so that the additional theory training is more acceptable. Here the future curriculum innovation could be described as 'stretch-stretch' as there is both a new product (a stretched curriculum) and an attempt to change society to receive it (a stretched society) (Hoogma 2002).

CONCLUSION

Those implementing changes need to be aware of the often different needs and competencies of students, staff and industry. But this is not a reason to stop any forward looking development of the qualifications, it is just that all the complexities need to be examined and the best possible new developments supported. Staff can also look at these different and often competing advantages and difficulties and develop some sort of in-between vision for the future. Imagination of the future occurs all the time, and in informal ways. Managers and planners may want to be more systematic, and this can lead them to the use of scenarios.

From these brief indications it is clear that the scenarios play out in a world full of tensions. Some of the tensions are resolved to some extent, while of necessity, other tensions will then remain unresolved. There is no one best way. But the ways that will eventually be followed will be better because they take the insights from the scenarios into consideration.

The cases in the article wrestle with the specific issues involved in choices for diploma or degree, and show that articulating possible futures adds another level to the discussion. In doing so, they refer to wider issues, about universities of technology in South Africa and about the processes of transformation. Thus, the scenario method and the cases in the article can be seen as a stepping stone to further discussions about the future universities of technology. One such further development could be the establishment of a central unit concerned with future developments in society and technology, which could inform and guide senior staff in decision making.

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