

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/297375987>

Mapping our way to coherence, alignment and responsiveness

Article in *South African Journal of Higher Education* · January 2012

DOI: 10.20853/26-2-161

CITATIONS

6

READS

1,138

2 authors:



Marianne Bester

Stellenbosch University

5 PUBLICATIONS 17 CITATIONS

[SEE PROFILE](#)



Desireé Scholtz

Cape Peninsula University of Technology

17 PUBLICATIONS 49 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Work-integrated learning [View project](#)



The appropriateness of standardised tests for diploma programmes of study [View project](#)

Mapping our way to coherence, alignment and responsiveness

M. Bester

Curriculum Development
Centre for Higher Education Development
Cape Peninsula University of Technology
Cape Town, South Africa
e-mail: besterma@cput.ac.za

D. Scholtz

Teaching and Learning Co-ordinator
Faculty of Business
Cape Peninsula University of Technology
Cape Town, South Africa
e-mail: scholtzd@cput.ac.za

Abstract

Transformation of higher education in South Africa has resulted in an ongoing need to reflect critically on the relevance and responsiveness of higher education curricula. This article describes two inter-related aspects of curriculum mapping, namely the mapping process and the mapping tool. Based on a case study of a career-oriented business qualification, curriculum data such as subject guides are analysed, followed by a discussion on the findings that emanated from this analysis. Using a constructivist framework, the article argues how challenges, such as a lack of staff participation, a teacher-centred technicist approach to curriculum design, as a result of past curriculum development practices at Universities of Technology, can be addressed by using curriculum mapping both as a process and tool for curriculum review. We shall argue in this article that curriculum mapping, both as a process and a tool will encourage higher education lecturers to consider these key issues when designing curricula: • What do we teach? • Why do we teach what we teach? • What do our students learn? • How do our students learn? • How do we assess what students have learned? • How well should students perform in these assessment tasks to show that they have achieved the intended learning outcomes? These questions relate to the three levels of a curriculum, namely the intended (planned), the taught (created) and the learned (experienced). Curriculum mapping in this context is not used as an instrumentalist approach to curriculum review and design, but to illuminate the pedagogical relationships within a curriculum and to engender reflective conversations on how academics approach their curricula.

INTRODUCTION

Transformation of higher education in South Africa has resulted in an ongoing need to reflect critically on the relevance and responsiveness of higher education

curricula. If we argue that higher education curricula is about complex learning, then it is important to ask: How do we as higher education lecturers create curricula that would provide students with meaningful learning experiences as they progress along their higher education journey? Knight (2001, 370) argues that curricula that sustain complex learning ought to be ‘coherent and progressive’, emphasising that the key elements of a curriculum such as subject content, intended learning outcomes, teaching, learning and assessment strategies and methods should be closely aligned. We shall argue in this article that curriculum mapping, both as a process and a tool will encourage higher education lecturers to consider these key issues when designing curricula:

- What do we teach?
- Why do we teach what we teach?
- What do our students learn?
- How do our students learn?
- How do we assess what students have learned?
- How well should students perform in these assessment tasks to show that they have achieved the intended learning outcomes?

These questions relate to the three levels of a curriculum, namely the intended (planned), the taught (created) and the learned (experienced).

FOCUS OF THIS ARTICLE

This article sets out to describe, based on a constructivist-interpretivist approach, how two inter-related aspects of curriculum mapping, namely the mapping tool and the mapping process could be used by higher education institutions to illuminate the pedagogical relationships within a curriculum, while it also attempts to capture the dynamic interactions with relevant stakeholders and its milieu. However, it is important to note that mapping in this context forms part of what Cornbleth (1990, 6) regards as a ‘contextualised social practice’, which is shaped by dynamic interactions with relevant stakeholders and not on an instrumentalist approach to curriculum development and review.

Firstly, the curriculum review team will briefly describe past curriculum design practices at Universities of Technology (UoTs), formerly known as Technikons in SA. Secondly, the promulgation of the Higher Education Qualifications Framework (HEQF) in October 2007 by the Department of Education in South Africa compelling UoTs to review and re-design the bulk of their qualifications will be mentioned (SA, DoE 2007). Using a constructivist framework the authors will explain how challenges such as a lack of staff participation, a teacher-centred technicist approach to curriculum design as a result of past curriculum development practices at Universities of Technology, can be overcome by using curriculum mapping as a

process and tool for curriculum review. Based on a case study of a career-oriented business qualification, curriculum data, consisting of the official qualification documentation as well as institutional subject guides and related templates will be analysed, followed by a discussion on the findings that emanated from this analysis. Finally, the authors, who also acted as the curriculum review team in this case study, will outline curriculum mapping, both as a process and tool to steer the curriculum review process and to engage lecturing staff in reflective conversations about their current pedagogical practices.

CURRICULUM DEVELOPMENT CHALLENGES OF UNIVERSITIES OF TECHNOLOGY

The National Qualifications Framework (NQF) was the key policy initiative of the late 1990s for transforming education and training into a single national framework for learning achievements, making it easier for students to enter the education and training system, moving and progressing within the framework along learning pathways (Strydom, Hay and Strydom in Breier 2001, 38). The South African Qualifications Authority Act (SAQA Act no. 58 of 1995) established the South African Qualifications Authority (SAQA) as the body responsible for overseeing the implementation of the framework. SAQA states that the NQF is ‘primarily about systemic change ... a system is put in place that allows for adaptability, flexibility, responsiveness and accountability in setting standards; relevance, quality, creativity and accountability in the design and implementation of learning programmes; ensuring that the qualifications and standards and their delivery are of the degree of excellence that is specified’ (SAQA 2000, 7). The NQF also imposed a new way of devising learning programmes based on outcomes-based education within a demand-led stakeholder-based training and education system. Outcomes-based curricula of technikons during the late 1990s were mostly developed using a design-down curriculum process working down from large, complex, workplace-orientated outcomes to specific, enabling outcomes and tasks that would be responsive to the needs of employers.

Although UoTs had to move away from nationally prescribed syllabus-based curricula subject to rigid, bureaucratic control under the auspices of the Department of Education to outcomes-based curricula, the establishment of the NQF however, created an opportunity for technikons to have ‘a greater degree of autonomy at the institutional level of curriculum control’ (Naidoo and Cooke, in Breier 2001, 24). Technikons, responding to the discourse of accountability and efficiency as well as to the guiding principles of access, flexibility, portability and articulation of the NQF, created mechanisms such as modular subject structures to promote credit accumulation and transfer. It is important to acknowledge that the SA outcomes-based education framework of curriculum design entrenched ‘a narrow notion of skills’ (Allais 2011, 9) which resulted in technikons merely developing ‘a technical responsiveness in their students’, which in many cases was ‘reduced to a technicist

one in which students merely replicate a series of industry-related steps without the ability to engage with the concomitant knowledge related to the activity' (McKenna and Sutherland 2006, 19). Unfortunately, the remnants of this technicist, skills-based approach are still evident in current curriculum documentation of UoTs as well as the fact that many of these institutions at the time of developing these curricula had not progressed beyond a compliance mind-set of 'process-oriented administrative procedures' (Breier 2001, 25).

Since the majority of these outcomes-based curricula were conceptualised using a needs analysis and DACUM (Developing a Curriculum) process which included national stakeholder consensus initiated by a convenor technikon, many of the current academic staff members at UoTs did not previously actively participate in curriculum development. These DACUM initiatives focused mostly on functional task analysis appropriate to a specific occupation. In addition, the strong voices of employers, industry and even labour organisation in a politicised education and training environment in the period after 1994 resulted in a tendency to neglect disciplinary knowledge in favour of the development of workplace skills. Although Jansen (1998, 328) warned educational policy makers in the 1990s that 'curriculum content is a critical vehicle for giving meaning to a particular set of outcomes', the emphasis on the development of skills-based outcomes resulted in what Wheelahan (2010, 97) refers to as the displacement of disciplinary knowledge in many of Technikon curricula. The use of a convenor system in the Technikon era meant that only a limited number of senior academic staff from the convenor technikon usually consulted with industry, employers, professional bodies, and labour organisations in conceptualising these outcomes-based curricula. The curriculum development practices of the past, therefore, present particular challenges to academic staff involved in the HEQF curriculum review process.

The promulgation of the HEQF has far greater impact on the current undergraduate offerings of UoTs than that of traditional universities as outlined by Staak (2008) and Du Pré (2009, 76):

- Only a limited number of the current UoT qualifications feature in their current form on the HEQF and UoTs will have to engage in a major re-curriculation exercise as the HEQF impacts on all qualifications offered by UoTs.
- A new suite of 'HEQF-compliant' qualifications needs to be designed and developed. The approval and registration process of new HEQF compliant qualifications could be time consuming, cumbersome and restrictive since approval is dependent upon institutional capacity, quality assurance and performance criteria.
- Complex articulation issues need to be considered by UoTs, since only 50% of credits may be transferred from one qualification to the next.
- The offering of dual programmes in both diploma and degree streams have to be considered carefully taking into account that the nature and purpose of these qualifications differ significantly and that the offering of both streams might be

too resource intensive for many of the UoTs.

- Workplace learning has always been an important component of UoT curricula; funding implications and limited placement opportunities for students might negatively impact on this pedagogical practice of UoTs.

Supported by the use of curriculum mapping, both as a tool and process for curriculum review, the institution where this study was conducted, embarked on revising and aligning existing qualifications to meet the requirements of the Higher Education Qualifications Framework. The lack of critical involvement of lecturing staff in past curriculum review initiatives presented a particular challenge in terms of their curriculum orientation as well as their ability to engage with HEQF re-curriculation within a student-centred paradigm, supporting constructivist approaches to learning.

TEACHERS' APPROACHES TO CURRICULUM

Carl (1995, v) contends that teachers 'do not stand on the periphery and be onlookers', but should be 'active participants in the process of relevant curriculum development'. However, the limited involvement of UoT academics in previous curriculum reform initiatives seemed to influence their approach to curriculum renewal as well as their willingness to engage with the current HEQF re-curriculation process. Curriculum orientation is often defined as a collective set of beliefs about the intended, taught and experienced curriculum elements including statements of intent, programme conceptualisation, organisation and implementation (Chueng and Wong 2002). Snyder, Bolin and Zumwalt in Shawer, Gilmore and Banks-Joseph (2008, 1) argue that teachers usually adopt one of the following approaches or orientations to curriculum: fidelity, adaptation or enactment. These approaches to curriculum development and implementation and the role of the teacher are described as follows by Shawer et al. (2008, 2–3):

The fidelity approach emerges where curriculum change occurs through a centrally-controlled model which confines the role of the teacher to be a curriculum-transmitter. The teacher using this approach focuses mainly on covering the subject content and the curriculum documentation of this approach consists mainly of topics sub-divided into weekly teaching sessions. Limited evidence is available on how students will be encouraged to learn, the focus is mainly on imparting information and delivering of instruction.

The adaptation approach suggests that teachers are more actively involved by suggesting adjustments to the curriculum. Although teachers would adapt existing materials and topics, add new topics, leave out irrelevant elements of the curriculum and respond to student diversity and experiment with various teaching methods, the official curriculum, (similar to the fidelity approach) is still centrally and externally managed. It is important to note that the adaptation approach often does not involve communication between the external curriculum developers and the teachers who teach the curriculum in terms of the adaptations made by the teachers. The role of

the teacher in this approach is to adapt the official curriculum to suit the needs of relevant stakeholders such as students and employers. The role of the teacher is to be that of a curriculum-developer. (Shawer et al. 2008, 7).

The enactment approach suggests that curriculum is a result of the engagement and enactment of both teachers and students in teaching and learning experiences based on the curriculum. The role of the teacher in this approach is not to adapt the official curriculum to suit the needs of students and stakeholders, but to respond to the needs of students and stakeholders by creating a curriculum. These authors state that “the teachers have become curriculum-makers who assess students’ needs to derive curriculum themes, use strategies of curriculum-planning, curriculum-design, material-writing and curriculum-free topics. In addition, they improvise and develop and use their pedagogic techniques”. (Shawer et al. 2008, 3).

Cornbleth in Fraser and Bosanquet (2006, 282) argues that the way ‘we conceive of curriculum and curriculum making is important because our conceptions and ways of reasoning about curriculum reflect and shape how we see, think and talk about, study and act on the education made available to our students’. Since Universities of Technology operated in a regularised curriculum environment using prescriptive models of outcomes based education (Prideaux 2003, 268), with the participation of academics in the curriculum design process being restricted mostly to the roles of curriculum-transmitters (fidelity approach to curriculum) or curriculum-developers (adaptation approach to curriculum), we have found that only a small number of academics in our case study adopted a student-centred, curriculum-maker approach to curriculum. The limitations resulting from this lack of engagement with student-centred curriculum development were evident from the curriculum data discussed later in this article.

CONSTRUCTIVIST APPROACH TO CURRICULUM REVIEW AND RE-DESIGN

Given this need for curriculum review of UoT qualifications, academics are faced with profound challenges in engaging with the revision process as well as having to look critically and reflectively at current practices in teaching, learning and assessment. One of the objectives of the revised curriculum is to focus on teaching that leads to learning, where students learn by doing rather than being passive listeners and note-takers. As stated by McDonald and Van der Horst (2007, 9) ‘learning is a process of conceptual change whereby individuals construct new understandings of reality – a constructivist point of view’. Within the constructivist framework, ‘students must discover, construct and transform knowledge if they are able to make it their own’ (Amer 2006, 216). To this end, innovative learning activities and appropriate assessments that relate to intended learning outcomes should be developed in order for students to ‘construct new understandings of reality’. This relationship of components intended to create new opportunities for learning implies a strategy where the learning activities focus on student engagement to ensure that learning outcomes are achieved at the appropriate levels. According to Biggs (in McDonald

and Van Der Horst 2007, 9–10) ‘a good teaching system aligns teaching method and assessment to the learning activities stated in the objectives, so that all aspects of this system are in accord in supporting appropriate learning’.

Walsh (2007) explicates the principles of Biggs’s constructive alignment as follows:

- Good teaching develops higher order thinking skills.
- Learning takes place through active behaviour of students – it is what the student does to enable learning not what the lecturer does.
- Actively engaging students in learning.
- Constructive – any meaning/learning is constructed by the student in the course of their learning experience.
- Learning is a product of the student’s activities.

This system of constructive alignment, therefore, is based on the twin principles of constructivism in teaching and alignment in learning, i.e. by means of student-centred activities and the intentional alignment of outcomes, activities and assessment that ascribe to appropriate cognitive levels of learning. Anderson (2002, 259) cautions that a ‘poorly aligned curriculum results in our underestimating the effects of instruction on learning ... if teaching is neither aligned with standards or the assessments, then teaching is in vain’.

The theory and principles of constructive alignment noted above formed the backdrop against which curriculum revision was approached and operationalised. While Biggs’s (2001) theory of constructive alignment relates to what is learnt and how the learning and assessment take place, the cognitive complexities of knowledge and levels relate to Bloom’s revised taxonomy. Krathwohl (2002, 212) describes Bloom’s taxonomy as a ‘framework for classifying statements of what we expect or intend students to learn as a result of instruction’ and as ‘a means for determining the congruence of educational objectives, activities and assessments in a unit, course or curriculum’. There is a measure of synchronicity between Bloom’s notion of congruence and Biggs’s theory of constructive alignment. Bloom’s original six major categories ‘were ordered from simple to complex and from concrete to abstract and it was assumed that the taxonomy represented a cumulative hierarchy’ (Krathwohl 2002, 212). Hussey and Smith (2003, 362) claim that there is a perception that ‘first year students must describe second year students must explain, and evaluation should characterise their work in the third year’. However, the vertical scaffolding ‘must be replaced with the idea that these activities are visited and revisited as the students progress’ (Hussey and Smith 2003, 362). For example, *applying* knowledge would include any cognitive activity associated with *understanding* such as *interpreting, summarizing or explaining*.

USING SUBJECT GUIDES FOR CURRICULUM ANALYSIS AND EVALUATION

Instead of using the ‘official’ or intended curriculum stipulated in SAQA registered qualification documentation only, the curriculum review team, decided to use subject guides (the taught curriculum) as a means of analysing and evaluating the current offering. The rationale was that the information in the subject guides would be used to populate a curriculum map that would represent the current curriculum. Subject guides are usually compiled by subject lecturers to communicate organisational and pedagogical elements of their subjects to students. The use of subject guides as a data source was based on the premise that the learning outcomes, teaching and learning activities and assessment would provide insight into the contextual and conceptual underpinnings of subject offerings as well as the levels of complexity at which these outcomes and assessments were pitched. At the site of research, an institutional subject guide template that describes the key elements of an outcomes-based curriculum such as the intended learning outcomes; a list of topics or themes; a weekly schedule of teaching events and associated learning activities; the assessment methods and techniques as well as the assessment criteria are available to academics. For this study, six subject guides of the major subject offerings in a diploma qualification were evaluated in terms of subject content, constructive alignment, assessments and teaching and learning activities that would promote a student-centred pedagogy.

Given that outcomes-based education is the over-arching paradigm in which teaching and learning is meant to happen, the expected components of a subject guide, at the very least, would be: i) intended learning outcomes; ii) content; iii) teaching and learning activities; iv) assessment criteria, and v) assessment methods. However, the subject guides under discussion seemed to focus more on rules and procedures such as rules for assessment, plagiarism, details of the Learner Management System and class conduct. It became apparent that there were omissions and oversight in the core components that would represent a pedagogy of student-centred learning. For example, not all learning outcomes had appropriate teaching and learning activities; the mode of delivery was limited to lectures and class discussions; the assessment criteria did not indicate levels of attainment and assessments conformed to traditional written tests. In other words, constructive alignment with reference to learning outcomes, learning activities and assessments was either incomplete, inconsistent or misaligned. The subject content was divided into thematic units of learning based on the learning outcomes. One subject guide had an average of eight learning outcomes per unit of learning. These outcomes were delineated to atomised lower cognitive levels of skills and tasks. James (2005, 90) cautions that ‘if learning outcomes are defined too narrowly, they become impotent, in the sense that they refer to so little of a *de facto* learning process that they are simply uninformative’. In addition, it was not uncommon to find that the learning outcomes were conflated with assessment criteria, while the assessment methods were conflated with learning activities.

The subject guides of three of the six subjects revealed that the theoretical aspects were not sufficiently integrated with the practical aspects of the same

subjects. The practical components of these subjects were mostly computer-based learning activities, while the theoretical components of these subjects were mostly content-based lectures aimed at transmission of knowledge. Verbs such as ‘identify’, ‘describe’, ‘discuss’, ‘define’ and ‘recognise’ were frequently used in the intended learning outcomes of the theoretical components. The practical components were manual competency-based tasks that did not relate to the theory. Assessment tasks of the theoretical and practical components of these subjects also indicated a lack of integration and coherence.

USING A TEMPLATE TO FOCUS ON CONSTRUCTIVE ALIGNMENT AND COGNITIVE COMPLEXITY

The misalignment, inconsistencies and omission of data in the subject guides resulted in incomplete curriculum maps. A second level of information was required, that aligned the learning outcomes, the learning activities, assessment criteria and assessment methods. (See Table 1.) As suggested by Cowan, George and Pinheiro-Torres (2004, 446) ‘the purpose of the alignment matrix is to encourage ... systematic and iterative design, by enabling course or module designers to identify for themselves aspects of their designs which need further attention and refinement’. To this end a discussion session was held in which the principles of constructive alignment were espoused as a precursor to discerning whether ‘the learning outcomes are being taught, learnt, developed and assessed – effectively, reliably and validly’ (Cowan et al. 2004, 446).

Table 1: Constructive alignment template

Learning Outcome	Teaching and Learning Activity	Assessment Criteria	Assessment Method

The alignment process was advocated against the underpinning premises of: i) promoting student development; ii) improving the learning experience; iii) promoting deep learning, and iv) reflecting to improve existing practices which need further attention and refinement. The constructive alignment template was meant to be a reflective tool for lecturers to consider the efficacy of existing practices.

In order to illustrate the differences in interpretation of the template, the findings and discussion will be presented per subject:

- In **Subject A**, each unit of learning had a general outcome, that students should be able ‘to demonstrate an understanding of ...’, followed by a list of task level outcomes. This was accompanied by one broad assessment criterion designed to encompass several outcomes. The learning activities and assessment tasks were generalised to accommodate several learning outcomes. There was an apparent lack of specificity as to the alignment of components given the

generalizations for learning activities and assessments. The template for Subject A was reminiscent of the fidelity approach (Shawer et al., 2008), where subject content gained prominence and served as the basis for related practices. For this subject, the content for the units of learning was closely linked to the chapters in the prescribed textbook.

- For **Subject B**, the teaching and learning activities included lectures, group discussions, scenarios and case studies; the assessment criteria were repetitions of the learning outcomes and focused on students having to ‘define’, ‘list’, ‘identify’, ‘describe’ and ‘discuss’; the assessment tasks indicated formative and summative assessments, e.g. worksheets, class exercises, case studies, assignments and tests. The use of group discussions, scenarios and case studies suggested a mindset that signalled a workplace setting, where subject content was contextualised to mirror the world of work. By implication, given the context of career-oriented education in which this study was located, subject areas like business studies, ‘are created in response to occupational needs rather than through the inner structure of a subject’ (Silwer and Brenner in Barnett, Parry and Coate 2001, 437). This notion of an occupational discourse in favour of a disciplinary discourse, is affirmed by Barnett et al. (2001) who claim that knowledge fields like business studies are ‘orientated more towards their use-value to society, rather than to a disciplinary knowledge base’, with an ‘increased emphasis on “doing” rather than “knowing”’. This view is supported by Wheelahan (2010, 137) who states that ‘tying knowledge to workplace tasks and roles within units of competency, ... transforms the nature of knowledge by delocating it from the vertical discourse in which it is classified and by relocating it into a horizontal and segmented knowledge structure’. The absence of any context to the exit level outcomes of the programme or the scaffolding of cognitive challenges showed evidence of the ‘segmented knowledge structure’ of the taught curriculum. However, given the modes of teaching and learning activities, Subject B seemed more reflective of the adaptation approach (Shawer et al. 2008). The data suggest that there were attempts by the lecturer to incorporate different teaching methods and engage students more in the learning activities to enhance the learning experience.
- For **Subject C**, the learning outcomes had accompanying assessment tasks, i.e. tests and assignments with assessment criteria that provided details of the levels of learning required. However, no student learning activities were indicated. The focus seemed to be more on delivery and instruction than on student learning.
- **Subjects D, E and F** consisted of theoretical and practical components where the subject content showed a clear separation between theory and practice. The practical components were computer-based skills with the theoretical components mostly content-based lectures aimed at imparting information. The practical components of **Subject D, E and F** related mostly to the

intermediate stage of learning a physical skill characterised by responses that are habitual in terms of proficiency as described in the psychomotor domain of Simpson's taxonomy (1972). The theoretical components were mostly aimed at the development of lower levels of thinking skills in Subject D and E. In Subject F, as in Subject B, there appeared to be evidence of the lecturer adapting the curriculum to be more responsive to the needs of students and hence performing the role of curriculum-developer (Shawer et al. 2008).

Although the subject guides and the templates were meant to be used as data sources, the information proved to be inadequate for the review team to populate a curriculum map. The components for constructive alignment starting with the learning outcomes, required rewriting, revision and reframing. As stated by Hussey and Smith (2003, 359), if learning outcomes are not framed correctly, they 'are often misconceived and cannot serve the purpose' for which they were intended. To this end, a further level of reflexivity was necessary for lecturers to challenge their own assumptions of what constitutes teaching and learning in the discipline, i.e. for lecturers to engage in completing a curriculum map with more attention to formulating appropriate outcomes and strengthening constructive alignment.

CURRICULUM MAPPING AS A TOOL FOR CURRICULUM REVIEW

Curriculum mapping as an evaluation tool, was first introduced by English (1979; 1984) who advocated 'the use of mapping to ensure that the declared aims of a curriculum match those which are taught and learned' (Robley, Whittle and Murdoch-Eaton 2005, 224). The paper-based approach of curriculum mapping has been used extensively in curriculum development in the school system (K12) of the United States of America (Jacobs, 1997) but in recent years the use of curriculum mapping has gradually moved into higher education institutions. Harden (2001, 123) states that a curriculum is 'a sophisticated blend of educational strategies, course content, learning outcomes, educational experiences, assessment, the educational environment and the individual student's learning style, personal timetable and programme of work'. Yet, in today's context of higher education, the term curriculum is regarded by Barnett (1994, 45) as 'more than its knowledge components ... curriculum embraces the students' engagement with the offerings put before them'. If we view curriculum as a process that enables student learning and not as a product delivered to students (Fraser and Bosanquet 2006, 274), then a curriculum map, as 'a diagrammatic representation of the curriculum displaying the different elements of the curriculum and the interrelationships between these different elements' (Harden 2001, 125), is a meaningful way of curriculum engagement. The curriculum map as a tool encourages academics to engage critically with their pedagogic practice and to explore the concept of 'constructive alignment', underpinned by 'a constructivist understanding of the nature of learning, and an aligned design for teaching' (Biggs 1996 in Biggs 2003, 27).

Curriculum mapping helps to ensure that what is intended or planned is *aligned* to what is *taught or enacted*, and again aligned to what is *experienced* by students. What students have actually *learned* is evident from the *assessed* curriculum. Curriculum mapping at the site of research forms part of a cyclical, action research-based process (Figure 2) of capturing curriculum data in ‘real time’ (Uchiyama and Radin 2009, 272), which implies that the curriculum map is compiled using the taught and experienced curriculum rather than the intended curriculum. These curriculum maps provide a way of tracking the links and relationships between the curriculum as planned, as taught, and as experienced (Bath, Smith, Stein and Swann 2004; Prideaux 2003).

At the institution where this study was conducted, curriculum maps are mainly concerned with what is taught (intended learning outcomes, subject content and topics), how it is taught (teaching events), when it is taught (curriculum sequence and teaching schedule) and the measures used to determine whether students have achieved the intended learning outcomes (assessment methods and criteria). These key elements of a curriculum map are illustrated in Figure 1.

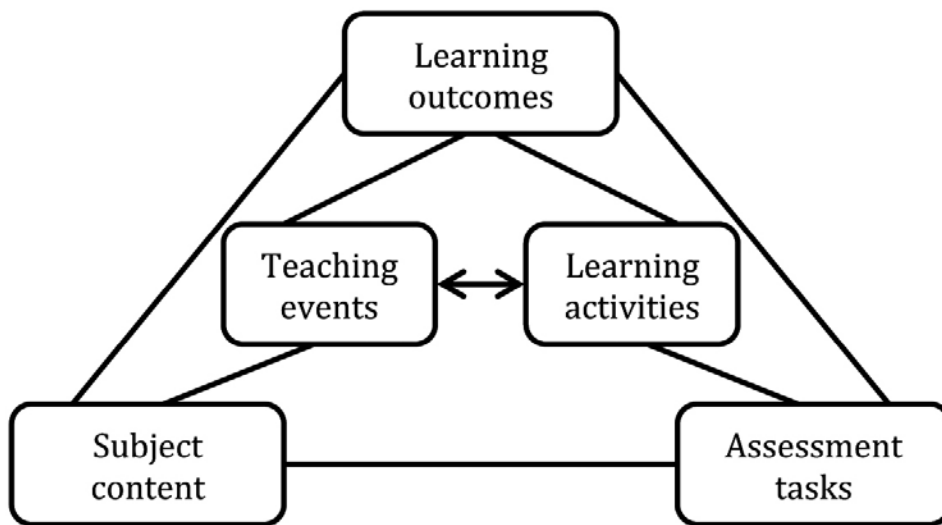


Figure 1: Key elements of a curriculum map (adapted from Harden 2001, 125)

In this representation of a curriculum map, it is important to note that the teaching-learning activities are placed in the centre, these activities relate to the role of the teacher as well as the role of the student in the curriculum. Related to these activities are the learning outcomes which play a pivotal role in determining what lecturers should teach and students should learn in terms of subject content (knowledge and skills) as well as how students' achievement of the learning outcomes should be assessed. Willett (2008, 788) and Harden (2001, 127) indicate that an extensive curriculum map contains the following elements: expected learning outcomes, curriculum content or areas of expertise covered, student assessment, learning

opportunities, learning location, learning resources, timetables, staff, curriculum management and students. It is important to note that subject content is a key element of this curriculum map, thus acknowledging the importance of disciplinary knowledge in the curriculum. These elements often form part of electronic curriculum mapping tools available worldwide, using custom-built or open-source solutions, as well as commercial software packages. For example, the curriculum map (CCMap 2010) used by Curtin University of Technology contains the following curriculum elements: i) unit information; ii) unit learning outcomes which are aligned to the graduate attributes and the development of higher order thinking skills; iii) assessment (assessment tasks by type, medium, format, role of the student, level of authenticity, level of supervision, mode, purpose, principle assessor and time schedule); iv) learning experiences (type, duration, frequency and predominantly student activity); v) learning resources (type, use and cost to student); vi) curriculum themes (linked to vision and objectives of institution), and vii) career development learning (Curtin University of Technology 2010). Oliver, Jones, Ferns and Tucker (2007) and Madiba (2011) indicate that curriculum maps are useful in:

- Gaining a holistic and comprehensive view of the curriculum across all the subject areas and levels of study.
- Working across different layers (macro, meso and micro) relevant to the HEQF re-curriculation process to ensure coherence and cooperation.
- Asking key pedagogical questions to stimulate debate in academic departments and faculties to improve the quality of teaching and improve student success.
- Assisting academics in creating unified, interdisciplinary units of learning that foster students' understanding of concepts, ideas and activities across different subject areas.
- Acting as a mechanism to foster debate and reflection on the key aspects of a curriculum in an academic department amongst colleagues.
- Integrating theoretical and practical elements of different subject areas.
- Ensuring a spread and variety of learning experiences and assessment tasks at appropriate levels of complexity.

A curriculum map should not be regarded as a static two-dimensional visual representation of various aspects only, but it should in fact be seen as dynamic, interactive visual representations, allowing us to look critically at the different facets, dimensions and complexities of teaching and learning in higher education.

CURRICULUM MAPPING AS A PROCESS FOR CURRICULUM REVIEW

Madiba (2011, 381) describes the use of curriculum mapping as a process and emphasises that it enables lecturing staff to have 'rich and authentic conversations' about their assumptions that inform their curricula. She adds that this reflective process becomes 'a reliable mechanism to steer the teaching and learning agenda

towards achieving the desired outcomes, namely student engagement, retention and success, curriculum and professional development' (Madiba 2011, 382). The curriculum mapping process at the programme level of a qualification consists of several inter-related aspects and phases of review and development (Oliver et al. 2007) as shown in Figure 2:

- *Situation analysis and comprehensive review of the existing programme:* A detailed situation analysis is conducted with external stakeholder feedback (including alumni, employers, industry and professional bodies). In addition, a programme review report is compiled of student performance, retention and graduation rates including feedback from current students and current staff on the effectiveness of curriculum as well as teaching-learning practices.

The curriculum mapping process described here often relates to programme review with the aim of:

- Promoting reflection on teaching and learning practices using a scholarly approach.
- Identifying and sharing good practice.
- Tracing trend data about student numbers and profile, retention, student progression, satisfaction and results.
- Identifying areas for improvement.
- Facilitating discussions in faculties on the continuous monitoring of, and reporting on, the academic performance of all programmes.

Mapping of the existing curriculum: The real value of curriculum mapping lies in the iterative, collaborative and dynamic nature of the process, whereby lecturers critically analyse the key elements of the taught curriculum using their subject guides. This process based on 'real time' data provides an opportunity for critical reflection and intense discussion on current practices as described by Howard (2007, 6): 'We have examined our course content, our required assignments, and our class activities to consider the alignment of courses typically taken during the same semester (horizontal alignment) and those taken in sequence (vertical alignment). We have drawn diagrams and made charts; we have listed and sorted; we have agreed and disagreed.'

Developing the new curriculum using curriculum maps: Based on the reflective process from the previous two phases, 'gaps' and 'redundancies' are identified. This is followed by academic staff revising their subject guides and by developing a preliminary curriculum to show alignment of learning outcomes of each subject with exit level outcomes of the qualification, with meaningful learning experiences and assessment tasks and that these are at the appropriate levels of cognitive complexity.

Approval and implementing the new curriculum: Final comprehensive curriculum maps of the new curricula are developed to form part of the institutional approval process for implementation of the revised or new programme.

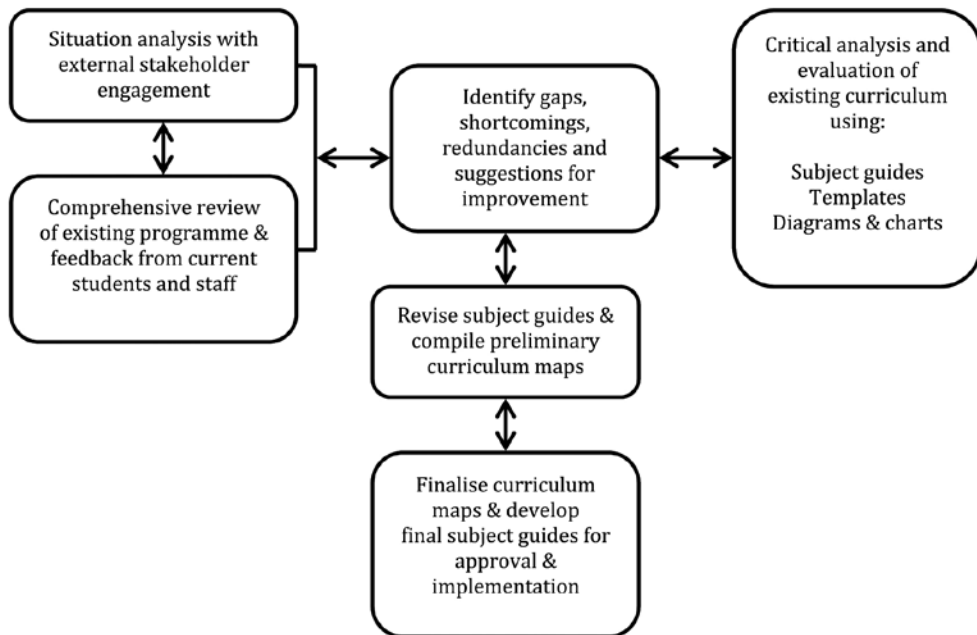


Figure 2: Curriculum mapping process (adapted from Oliver et al. 2007)

It should be noted that although the situational analysis is integral to the curriculum review and HEQF alignment process as indicated in Figure 2, the focus of this case study was on the use of subject guides as a means of analysing and evaluating the taught curriculum.

CONCLUSION

The current subject guides described earlier in this article, closely resemble the technician approach to curriculum development used by technicians during the late 1990s. In addition, the fact that many of the current academic staff members of UoTs did not actively participate in the development of these curricula encourages a fidelity or adaptation curriculum orientation. Both of these curriculum orientations bear resemblance to strong teacher-centred pedagogical practices characterised by knowledge transmission, passive students and curricula that lack coherence and alignment, which in turn limit the lecturers' ability to engage in curriculum review using curriculum maps. Even though the constructive alignment templates were meant to elicit a deeper analysis of teaching and learning practices, this was not always evident from the completed templates of the subjects investigated in this study. This research has shown that in practice, constructive alignment has proved to be more challenging for lecturers than finding a common thread to link the intended, delivered, experienced and assessed curriculum elements. Although we initially thought that the relational and pivotal nature of the curriculum map would engender

a deeper understanding of student-centred, coherent and aligned curricula, we have come to the conclusion that the process of curriculum mapping is in fact more useful. The curriculum mapping process conducted in a supportive environment, fosters increased lecturer participation in an iterative and collaborative manner, while also allowing lecturers to critically reflect on their own teaching practice and change their curriculum orientations to that of curriculum-maker.

REFERENCES

- Allais, S. 2011. What are the skills? Reflections on policy in South Africa in the light of international debates. Paper presented at the Global Labour University Conference, 28–30 September 2011. University of the Witwatersrand: Johannesburg.
- Amer, A. 2006. Reflections on Bloom's Revised Taxonomy. *Electronic Journal of Research in Educational Psychology* No. 8. 4(1): 213–230.
- Anderson, L. 2002. Curricular alignment: A re-examination. *Theory into Practice* 41(4): 255–264.
- Barnett, R. 1994. *The limits of competence: Knowledge, higher education and society*. London: Open University Press.
- Barnett, R., G. Parry and K. Coate. 2001. Conceptualising curriculum change. *Teaching in Higher Education* 6(4): 435–449.
- Bath, D., C. Smith, S. Stein and R. Swann. 2004. Beyond mapping and embedding graduate attributes: Bringing together quality assurance and action learning to create a validated and living curriculum. *Higher Education Research and Development* 23(3): 313–328.
- Biggs, J. 2001. The reflective institution: Assuring and enhancing the quality of teaching and learning. *Higher Education* 41:221–238.
- . 2003. *Teaching for quality learning at university: What the student does*. Second edition. Buckingham. Society for Research into Higher Education and Open University Press.
- Breier, M. 2001. Higher education curriculum development: The international and local debates. In *Curriculum restructuring in higher education in post-apartheid South Africa*, ed. M. Breier, 1–37. Bellville: University of the Western Cape.
- Carl, A. E. 1995. *Teacher empowerment through curriculum development: Theory into practice*. Kenwyn: Juta.
- Carnell, E. 2007. Conceptions of effective teaching in higher education: Extending the boundaries. *Teaching in Higher Education* 12(1): 25–40.
- Cheung, D. and H. Wong. 2002. Measuring teacher beliefs about alternative curriculum designs. *Curriculum Journal* 13(2): 225–248.
- Cornbleth, C. 1990. *Curriculum in context*. New York: The Falmer Press.
- Council on Higher Education (CHE): Higher Education Quality Committee (HEQC). 2004. Improving Teaching and Learning (ITL) Introduction to the HEQC's Improving Teaching and Learning Resources. Available at: <http://www.che.ac.za/documents/d000087/>. (Accessed on 21 May 2007).
- Cowan, J., J. George and A. Pinheiro-Torres. 2004. Alignment of developments in higher education. *Higher Education* 48:439–459.
- Curtin University of Technology. 2010. Curtin Curriculum Mapping Tool – User Guide.

- Version 2 of 5 March 2010. Available at: <http://boliver.ning.com/page/mapping-1>. (Accessed on 4 August 2011).
- DuPré, R. 2009. The place and role of universities of technology in SA. South African Technology Network (SATN). Bloemfontein: SATN. Available at: <http://satnonline.net/index>. (Accessed on 23 July 2008).
- Fraser, S. P. and A. M. Bosanquet. 2006. 'The curriculum? That's just a unit outline, isn't it?' *Studies in Higher Education* 31(3): 269–284.
- Harden, R. M. 2001. AMEE Guide no 21: Curriculum mapping: A tool for transparent and authentic teaching and learning. *Medical teacher* 23(2): 123–137.
- Howard, J. 2007. Curriculum development report of the Department of Education, Elon University. Available at: http://www.pdx.edu/sites/www.pdx.edu.caefiles/media_assets/Howard.pdf. (Accessed on 29 April 2011).
- Hussey, T. and P. Smit. 2003. The uses of learning outcomes. *Teaching in Higher Education* 8(3): 357–368.
- Jacobs, H. H. 1997. *Mapping the big picture: Integrating curriculum and assessment, K-12*. Alexandria: Association for Supervision and Curriculum Development.
- James, D. 2005. Importance and impotence? Learning, outcomes and research in further education. *Curriculum Journal* 16(1): 83–96.
- Jansen, J. D. 1998. Curriculum reform in South Africa: A critical analysis of outcomes-based education. *Cambridge Journal of Education* 28(3): 321–331.
- Khogali, S. E. O., J. M. Laidlaw and R. M. Harden. 2006. Study guides: A study of different formats. *Medical Teacher* 28(4): 375–377.
- Knight, P. T. 2001. Complexity and curriculum: A process approach to curriculum-making. *Teaching in Higher Education* 6(3): 369–381.
- Krathwohl, D. 2002. A revision of Bloom's Taxonomy: An overview. *Theory into Practice* 41(4): 212–218.
- Madiba, M. 2011. Curriculum mapping as inquiry in higher education. In *Curriculum inquiry in South African higher education: Some scholarly affirmations and challenges*, eds. E. M. Bitzer and M. M. Botha, 381–398. Stellenbosch: Sun Media.
- McDonald, R. and H. van der Horst. 2007. Curriculum alignment, globalization and quality assurance in South African education. *Journal of Curriculum Education* 39(1): 1–9.
- McKenna, S. and L. Sutherland. 2006. Balancing knowledge construction and skills training in universities of technology. *Perspectives in Education* 24(3): 15–24.
- National Commission on Higher Education. 1996. *A framework for transformation: Discussion document*. Pretoria: National Commission on Higher Education.
- Prideaux, D. 2003. ABC of learning and teaching in medicine: Curriculum Design. *British Medical Journal* 326:268–270.
- Robley, W., S. Whittle and D. Murdoch-Eaton. 2005. Mapping generic skills curricula: A recommended methodology. *Journal of Further and Higher Education* 29(3): 221–231.
- Shawer, S. F., D. Gilmore and S. R. Banks-Joseph. 2008. Student cognitive and affective development in the context of classroom-level curriculum development. *Journal of the Scholarship of Teaching and Learning* 8(1): 1–28.
- Simpson, E. J. 1972. *The classification of education objectives in the psychomotor domain*. Washington: Gryphon House.

- South Africa. Department of Education. 2007. Higher Education Qualifications Framework. *Government Gazette* no. 928 of 5 October 2007. Pretoria: Government Printer.
- South African Qualifications Authority. 2000. *The National Qualifications Framework and curriculum development*. Pretoria: South African Qualifications Authority.
- Staak, A. P. 2008. Higher Education Qualifications Framework: Implications and opportunities. Presentation at the South African Technology Network (SATN) First Annual Conference, 21–23 May 2008, Durban, South Africa. Available at: <http://satnonline.net/index>. (Accessed on 21 July 2008).
- Strydom, K., D. Hay and A. Strydom. 2001. Restructuring higher education curricula in South Africa: The leading policy formulation and implementation organisations. In *Curriculum restructuring in higher education in post-apartheid South Africa*, ed. M. Breier, 35–38. Bellville: University of the Western Cape.
- Sumsion, J. and J. Goodfellow. 2004. Identifying generic skills through curriculum mapping: A critical evaluation. *Higher Education Research and Development* 23(3): 329–346.
- Uchiyama, K. P. and J. L. Radin. 2009. Curriculum mapping in higher education: A vehicle for collaboration. *Innovation in Higher Education* 33:271–280.
- Walsh, A. 2007. An exploration of Biggs' constructive alignment in the context of work-based learning. *Assessment and Evaluation in Higher Education* 32(1): 79–87.
- Wheelahan, L. 2010. *Why knowledge matters in curriculum: A social realist argument*. London: Routledge.
- Willett, T. G. 2008. Current status of curriculum mapping in Canada and the UK. *Medical Education* 42:786–793.