

AUTHOR:

Prof Isaac Ntshoe¹Dr Ntsoaki Joyce Malebo¹

AFFILIATION:

¹Central University of
Technology, South AfricaDOI: <http://dx.doi.org/10.18820/2519593X/pie.v39.i2.10>

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KNOWLEDGE AND SPECIALISM IN CURRICULA OF PROFESSIONAL AND SECTORAL FIELDS OF PRACTICES IN SOUTH AFRICA: THE CASE OF UNIVERSITIES OF TECHNOLOGY

ABSTRACT

Although differentiation and specialism have become hallmarks of the modern economy, the degree and the efficacy of such differentiation, specialisation and the domains of knowledge in curricula offered in universities of technology (UoTs) persist in the context of the changing nature of jobs and occupations. This article examines the domains of specialist knowledge in curricula of selected professional and sectoral fields offered by universities of technology in South Africa. Purposive sampling was used to select the fields of practice. These fields were chosen because of differentiated knowledge bases on which these fields draw. The paper argues that the dual-facing interdisciplinary nature of knowledge of professional and sectoral fields of practice offered in UoTs, relative to their conceptuality, contextuality and professional coherence are central in the curriculum design process to enhance the quality of offerings.

Keywords: *Coherence; differentiation and specialism; dual facing; interdisciplinary; regions; professional and sectoral.*

1. BACKGROUND AND INTRODUCTION

The analysis of policies and practices on differentiation and the domains of knowledge and specialism in curricula of fields of practices intersect the broader global debates of total or partial abolition of the binary between the different institutional types in higher education. These changes are reflective of changing economic conditions of the twenty-first century through differentiation and diversification that permeated the higher education sector globally (Clark, 1983; Huisman, 2015; Neve, 1996; Ng'ethe, Subotzky & Afeti, 2009; Reichert, 2009; Rhoades, 1990; Van Vught, 2007).

In South Africa, policies and practices on the domain and structure of knowledge of the different institutional

types are located within the broader context of transformational agenda of the changing higher education landscape in the post-apartheid setting (Human Science Research Council, 1996; Council on Higher Education, 2000; Department of Education [DoE], 1997; DoE, 2001).

One of the features of the transformational policies affecting the higher education landscape in the post-apartheid setting is the creation of a differentiated and diversified single coordinated higher education within the global changing knowledge economies and markets (Castells, 1993; CHE, 2000; Department of Education, 1997; DoE, 2001; Badat, 2015). Specific contexts of policies on differentiation and diversity are the creation of new qualification structures created by the National Qualifications Framework (NQF) Act 67 of 2008 (DoE, 2007; CHE, 2013) and the context for qualification standards of the NQF level descriptors developed by the South African Qualifications Authority (SAQA) (Republic of South Africa, 1995).

Accordingly, the domain and structure of knowledge of curricula of professions and sectoral fields in the UoT sub-sector of higher education in this article are analysed within the contexts of specific policy frameworks and practices of differentiated and diversified higher education outlined above.

The discussions are predicated on the sociological nature of knowledge (Bernstein, 2000), the social realist perspective (Muller, 2009; Young & Muller, 2016) and on differentiated and diversified higher education policies in post-apartheid (Badat, 2015; CHE, 2000; DoE, 1997; 2001; Department of Higher Education & Training [DHET], 2013).

2. METHODOLOGY

Purposeful sampling was used to select curricula of medical laboratory science, radiography, engineering, accounting, business studies, hospitality, retail and tourism offered by UoTs as a sector to analyse knowledge differentiation and specialisation.

These programmes were chosen because first, even though some UoTs do offer programmes that address specific regional and local needs in line with the mandate of the sector, generally UoTs have a specific niche and mandate that are distinct from the mandates of other higher education institutional types. In particular, the knowledge of these fields first faces two ways – towards specialist disciplines (which may be one or more disciplines) and towards an occupational and sectoral field of practice. Second, the structure of knowledge in the programmes is distinctive with some drawing their knowledge base on “older” regions (Bernstein’s term) while some comprise “newer” regions drawing on procedural knowledge codified from practice (Wheelahan, 2007; Muller, 2009, Young & Muller, 2016). Third, whereas some of the programmes such as engineering, radiography and medical laboratory science have established professional bodies (Engineering Council of South Africa; Health Professional Council respectively), hospitality, retail, business studies and tourism have somewhat less established professional bodies.

Themes and issues derived from literature on sociology of knowledge, policies and frameworks on institutional differentiation and specialisation are:

- domains of knowledge in the fields of professional and sectoral fields of practice of UoTs in South Africa;
- curriculum content and sequencing;

- roles of professional bodies and induction into the profession; and
- conceptual, contextual and professional/occupational coherence of curricula of fields of practice.

3. DIFFERENTIATED AND DIVERSIFIED HIGHER EDUCATION

Differentiation and diversity in the higher education sector globally signal a deviation from the rigid binary lines between a university and the other institutional types, including but not limited to polytechnics, Technical Vocational Education and Training (TVET), universities of applied sciences and the erstwhile technikon sector in South Africa. Differentiation and diversification have varied from rigid differentiation between university sector and other institutions, to less rigid differentiation of roles and functions of the different institutions.

Globally, differentiation has assumed different definitions and descriptions. Differentiation could be described as emergence of new entities where social units change into two or more units as proposed by Smeler (1959, as paraphrased by Van Vaught, 2007). Furthermore, differentiation resulted in new functions emerging in a system where institutions in the system are assigned different roles and functions including the development of the graduate schools that are differentiated from undergraduate colleges, research-based institutions differentiated from teaching institutions and from other TVET and universities of technology or universities of applied sciences (Van Vaught, 2007:7). Thus, differentiation forms part of the increasing complexity of higher education systems that has “an outcome of three forces comprising a variety of the student population, the development of the labour market for graduates and the development of new disciplines” (Van Vaught, 2007:7).

Binary policies through which institutions have been rigidly differentiated in terms of their purposes in different contexts are akin to conceptions of differentiation of the division of labour in economic production through specialisation. For example, the binary policy of Norwegian higher education epitomised an implicit division of labour, because while one comprehensive law governed the system, there was explicit division of labour between research-based universities and other institutional types (Reichert, 2009). In contrast, there has been a growing move towards the blurring of the differences and boundaries between institutions. This process involves horizontal differentiation involving the expansion of multi- and trans-disciplinary programmes permitting students to take a variety of subjects across disciplines on the one hand, and vertical differentiation where colleges of advanced technology offer university programmes (Powell & Solga, 2010; Young, 2012).

The advent of institutional differentiation has been a contested issue in higher education in South Africa because of the historical inequalities and inequities in the higher education sector and the increasing demands for massification, globalisation and the knowledge economy (Human Sciences Research Council [HSRC], 1996). The assumption underpinning differentiation is that the acquisition and application of novel knowledge are dependent on continuous technological improvement and innovation, driven by the training capacity of higher education as well as the needs of industry and social reconstruction (DoE, 1997).

More importantly, there has been and still is some disagreement regarding the form that institutional differentiation was and is taking, with arguments in support of differentiation based on institutional types and institutional missions and programmes. The other view has been the differentiated institutional landscape in terms of institutional identities, “missions, social

and educational roles, academic qualification and programme mixes, institutional cultures and organisational forms and structures and practices of all institutions” (Badat, 2015:86–87).

However, the ongoing discussions on institutional differentiation have been guided by the notion of *purposeful* differentiation proposed in the White Paper (DoE, 1997) that recommends differentiation of the university sector in terms of institutional missions (Department of Higher Education and Training [DHET], 2014). This proposal has been justified in order to meet a variety of social, economic and educational student and employer needs (DHET, 2014).

Significantly, discussions on the probable shapes of institutional differentiation dates back to the policy of differentiation and diversity in higher education initially proposed by the Council for Higher Education (CHE, 2000) and endorsed by the National Plan on Higher Education (NPHE) (DoE, 2001). While the NPHE section 421, 50 endorsed the CHE's differentiation of social and educational mandates of institutions, it did not however support wholesale the CHE's proposal of differentiation and “diversity achieved through structural differentiation between different institutional types based on a distinction between teaching and research institutions” (DoE, 2001:51). The reservation has been on the potential danger of “introducing some elements of rigidity that would scupper institutions from capitalising on their strengths and reacting to needs of social, economic needs, labour market needs, in a changing regional, national and global context” (ibid:51). Rather, institutional differentiation is currently predicated on a “recognition that higher education has to fulfil many functions and that no single institution can serve all of society's needs” (DHET, 2014:82). In terms of this recognition, institutions have been encouraged to establish their own distinctive features, their unique visions and mission statements that distinguish them from other institutions in the higher education sector (DHET 2014). The policy makes opportunities for specialisation in the higher education sector possible to “enhance excellence and ensure the greatest returns on the use of limited resources” (DHET, 2014:87).

Specifically, the policy of purposeful differentiation saw the creation of a new university type, UoTs, the purpose of which was to prepare graduates, technologists and technicians for specific occupations and specific fields of practice (CHE, 2006). This has been captured in the Higher Education Qualifications Framework (HEQF) (DoE, 2007) that pioneered knowledge types generated by the universities as distinct from those by universities of technology (DoE, 2010). According to this classification, UoTs would offer mainly knowledge for different occupations and the applied side of knowledge and qualifications, while universities would advance disciplines predominantly as sources of knowledge and therefore award research-based qualifications (DoE, 2007). In terms of this proposal, distinction is made between curricula and qualifications that aim to produce disciplinary knowledge and curricula and qualifications that produce applied knowledge and production of professional technologists for specific occupations demanded in the workplace (DoE, 2007; Muller, 2009).

4. THEORETICAL AND CONCEPTUAL FRAMEWORKS

Differentiation and specialisation common in social sciences have become hallmark of social and economic development globally. In particular, the first study of differentiation is of course Durkheim's classic *The Division of Labour in Society* (1893). Extending Smith's theorem, Durkheim (1983) argues that implicitly, all societies reflect some division of labour that positively correlates with societal advancement because it increases as a society progresses (Young, 2012).

Similarly, conversations about institutional differentiation and specialisation in terms of which institutions are assigned specific mandates, roles and functions in South Africa and elsewhere are akin to differentiation and specialisation that characterised division of labour in industry (Ntshoe, 2014). This description of differentiated institutional roles and functions could be better explained in terms of Bernstein's knowledge differentiation that built on the work of Emile Durkheim (1983). Within this frame, a difference is made between the sacred and profane areas of esoteric knowledge, which provides a useful starting point in analysing knowledge of professional fields. Inside this context, two forms of disciplinary organisation, termed singulars and regions, are identified (Bernstein, 2000), to advance the idea of the nature of knowledge of fields of practices offered by UoTs as a starting point in the curriculum design process. Singulars refer to knowledge structures that are specialised into discrete discourse within their unique intellectual fields and practices such as physics, chemistry and history, which therefore are the bearers of knowledge (Bernstein, 1996).

Regions emerge from a process of "recontextualisation" (Bernstein's, 2000 term), describing the process of de-locating a discipline such as physics from its original source and relocating it in an educational setting as a region called physical science. Regions denote the process of selection of the disciplines (and parts of disciplines) and how they are applied to particular fields of practice (Bernstein, 2000). Regions border academic disciplines (singulars) and fields of practice preparing students for specific occupation such as medicine (Bernstein, 2000). As fields or practice, regions are interdisciplinary and multidisciplinary and dual facing, pointing inwardly towards underpinning disciplines and outwardly to the world of practice. Inherent in the dual-facing nature of professional knowledge is that it is both theoretical and practical, purposive and contextual (Bernstein, 2000). Young and Muller (2016) on the other hand argue that because professional practice is always in a context with a purpose outside itself, professional knowledge practice always relates to specific occupational sectors such as radiography, engineering technology, retail and human resources and therefore dissimilar to the knowledge of traditional disciplines. Thus, the knowledge of the fourth generation (newer) regions is more long-winded, less structured, controlled, sometime ambiguous and often contradictory about requirements of the profession to the academy (Muller, 2009).

Bernstein differentiates between the "traditional" regions such as engineering, medicine and architecture and the "new" (fourth generation) regions (Muller, 2009) including "cognitive science, management, business studies, communication and media" (Bernstein, 2000:) and hospitality and tourism in the human resource curriculum of universities (Muller, 2009; Wheelahan, 2007; Young & Muller, 2016). 'Older' regions have a stronger orientation to knowledge than do the 'newer' regions, in part because the communities of practice underpinning the 'newer' regions are more diffuse" (Wheelahan, 2007:54). Furthermore, fourth generation "regions are generally less organised, more ambiguous, often with contradictory hints about professional requirements to the academy" (Muller, 2009:214).

Additionally, "traditional" professions such as medicine and law, have established professional identity for their professionals embracing rigorous initiation into the "principles of the profession, standards, professional integrity, judgement and loyalty" (Beck & Young, 2005:188).

Alongside the differences of "traditional" and "newer" regions, curriculum design policy and practice of higher education, including those of UoTs in South Africa, are fundamentally shaped by generic modes including outcomes, emphasis on soft skills, core skills, graduate attributes

and employability skills. This perspective distinguishes the different units of competence, the outcome, into critical cross-field and specific outcomes. Specific outcomes involve skills that a graduate must be able to do and these pertain to specific levels (unit standards), specific learning areas and specific learning programmes (Muller, 2009). Critical outcomes, on the other hand, refer to generic transdisciplinary competencies that underlie all integrative skills (ibid). In particular, critical outcomes, now replaced by graduate attributes, have recently also influenced curriculum design in higher education in traditional universities and UoTs. These attributes underscore generic skills (Bennett, Dunne & Carré, 1999), transferable skills, soft skills or key skills (Mayer, 1992), core skills and employability skills (Preece, 1999). In the South African context, emphasis on an outcomes-based approach, originally intended to reform school education, has shifted somewhat to graduate attributes in curriculum design in higher education (Allais, 2003).

Another theoretical dimension in the conversations about the structure of knowledge is social and real aspects of knowledge. Building on the concept of structure of knowledge, Young (2008) draws on social realist perspectives, arguing that knowledge has both social and real dimensions: "Social because it recognizes the role of human agents in the production of knowledge, and realist in that it is context independent" (Young, 2008:12). Viewed from this perspective:

Social realist dimension supersedes 'constructivism' and therefore signals a shift from viewing knowledge in terms of construction – especially when this implies that we can construct the world as we see it, free of the consequences of how the world will react back on that construction. It signals a shift from viewing knowledge in terms of construction. (Maton & Moore, 2010:6)

Social realism underscores the significance of recognising the nature of knowledge and knowledge differentiation in the curriculum design process and how this knowledge differentiation influences educational experiences and results (Maton & Moore, 2010; Young, 2009).

This perspective creates a suitable framework to appreciate how some knowledge leans more towards specialisation while other knowledge leans more towards divergence (Young & Muller, 2010). Specialisation raises questions about sequence, pace and hierarchical organisation, while divergence relates to choice in terms of what to include in the curriculum or the absence of any objective criteria at all as another extreme (Young & Muller, 2010).

Lastly, three useful terms (yet generally unnuanced within the structure of knowledge framework when analysing the domains of knowledge into specific disciplinary areas in professional and sectoral fields of practice and the quality of programmes and curricula in higher education) are conceptual, contextual and professional or occupational coherence. Muller observes that conceptual coherence is similar to what Parry (2007) portrays as the fundamentals of the discipline (Muller, 2009). Similarly, conceptual coherence is analogous to what Merton (1973) describes as high codification, presuming a ladder of constructs and theoretical difficulty. Conceptual coherence portrays processes of "selection, sequence and pacing of the discipline-based knowledge that is an integral component of a degree and assumes a ladder of extraction and conceptual complexity" (Muller, 2009:216).

Contextual coherence, on the other hand, denotes the type of coherence appropriate to the region, illustrating in the curricula of UoTs the extent to which the degree programmes consider the context that students face when they go on work integrated learning (WIL) and

what they encounter in the workplace. Thus, contextual coherence describes “curricula that are segmentally connected where each segment is adequate to a context and sufficient to the purpose” (Muller, 2009:217). Professional coherence/workplace describes the extent to which theory informs practice. In this regard, emphasis is placed on professional coherence, where occupations of a particular field depend on specialist knowledge that is regulated by professional councils. Conversely, less emphasis will be placed on disciplinary knowledge in occupations with no autonomous professional association or council (Muller, 2009).

Notably, although conceptual and contextual coherence are critical in the curricula of professional and sectoral fields of practice, more conceptuality will be more critical where a curriculum has rigid and formal entry requirements and rigid curriculum specifications and requirements for WIL. Contextuality on the other hand will be more prominent where there is less emphasis on entry requirements to enter a programme and where apprenticeship, on the job practise and learning by doing are underscored (Young, 2006; Muller, 2009). The third dimension in the discussion of coherence is professional/occupational coherence denoting the extent to which professional bodies lay down the criteria for specific professions. As in the case of conceptual and contextual dimensions, occupational coherence is likely to be more prominent where such occupations depend on specialist knowledge certified by a professional body/council/association that prescribe the requirements for professional status. Conversely, occupations that rely largely on procedural knowledge collated from practice are less likely to have autonomous professional bodies (Young, 2011).

However, Muller warns of the temptation to attribute conceptual coherence to fields of sciences and contextual coherence to humanities, arguing that “conceptual denotes a quality analogous to verticality (from ‘hard’ to ‘soft’ in Becher’s [1989] terms); contextual dimension involves ensuring quality (from ‘pure’ to ‘applied’ in Becher’s terms)” (Muller, 2009: 217).

5. DISCUSSIONS AND IMPLICATIONS FOR POLICY AND PRACTICE

5.1 Distinctiveness of domains of knowledge in curricula of UoTs

Despite some overlaps between UoTs and other university types in producing and transmitting specialist knowledge, the distinctive feature of medical laboratory science, radiography, engineering, accounting, business studies, hospitality, retail and tourism offered in UoTs face towards the field of practice of particular occupations or sectors, not just their knowledge base. Furthermore, what distinguishes the curriculum of a university of technology is that its degrees are based on applied specialist knowledge related to the range of occupations offered by different faculties.

In this paper, a social realist approach has been employed as it provides a fresh angle acknowledging the sociological nature of knowledge of professional and sectoral fields of practice. The dual-facing nature of knowledge in the curricula of UoTs has recently generated some debates in the academic circle.

This raises curriculum issues that are not faced by those teaching academic degrees in traditional universities – which only have one focus – the organisation of knowledge itself. Regarding curriculum and pedagogy of the selected programmes above, a distinction between official regulative field (ORF) and pedagogic regulative discourses (PRD) (Bernsteinian terms) is critical. The ORF includes the “specialised departments and sub-agencies of the State and local educational authorities together with their research and system of inspectors” (Bernstein, 1990:192).

Accordingly, academics designing curricula of the selected professional and sectoral fields of practice need to be able to decode “official regulative discourses” referring to the basic concepts, theories, principles, rules and values of a discipline. Similarly, such academics should be able to decipher “pedagogic regulative discourses” of their respective disciplines involving sound knowledge and curriculum choices, sequencing, ways of transmitting subject knowledge, enacting the curriculum and how learning is assessed (Bernstein, 2000).

Following the comparison between the division of domains of knowledge in disciplines of traditional regions and specific disciplinary specialist knowledge of areas in professional and sectoral fields of practice, some observations are made. First, the curriculum of medical laboratory science, engineering, radiography, tourism and hospitality and business studies offered by UoTs are dual facing towards specialist disciplines and towards field of practice. Thus, their curricula prepare students for specific careers as technologists in specific professions and sectors and not general occupations. Second, even though the domain of knowledge of medical laboratory science, engineering, radiography, tourism and hospitality and business studies is distinct from the domains of knowledge in universities, the knowledge of medical laboratory science and radiography tend to draw on “older” regions including medicine and specifically, anatomy, pathophysiology and physiology. Therefore, the curricula of these fields tend to display a strong disciplinary knowledge base and gravitate more to strong “paradigmaticity” (Muller, 2009:210), more rigidly structured with very clear conditions for specific professions. Conversely, the knowledge domain of the fourth generation “region”, retail, business studies, hospitality and tourism tend to have a weaker disciplinary knowledge. Their knowledge is less structured and controlled and more equivocal and often ambiguous about requirements of the profession.

Furthermore, the fields of practice in medical laboratory science, radiography, engineering, accounting, business studies, hospitality, retail and tourism in UoTs in South Africa are interdisciplinary regions depicting the process of selection of the disciplines (and parts of disciplines) and how they are applied to particular fields of practice. These regions draw on both “older” and “newer” regions as recognised by the participants when describing curricula and content of their fields. The notion of regions ensures that decisions on what should be included in curricula of fields of practice are not made arbitrarily but are informed rather by the nature of knowledge of original disciplines from which they are derived.

The inward-looking, outward-facing nature of knowledge in curricula ensures exposure of technologists to specialised disciplinary knowledge of radiography, medical laboratory science, engineering, hospitality and tourism on the one hand, and to an outward-looking dimension by endowing students with knowledge essential for specific careers in partnership with professional bodies that in the main discharge regulatory roles and accreditation.

One of the issues in these debates has been the seeming conflation of theoretical knowledge and generic modes including core skills, competence and outcomes in the curricula of the fields of practice offered in UoTs. However, this conflation is specifically common but understandable in the curriculum design process of UoTs whose curriculum knowledge still reflects the mandate and roles of former technikons in terms of the knowledge they produce. It is argued further that generic pedagogical modes such as critical cross-field outcomes and other soft skills that characterise curriculum design in South Africa have some limitations. These modes are in some cases not only conflated with theoretical knowledge of fields, but

also tend to replace knowledge with the competence and skills that graduates require to be able to function in the workplace upon completion of their studies.

5.2 Curriculum content and careers in selected fields

The curriculum content of UoTs is interdisciplinary and multi-disciplinary and intentionally designed to prepare students for particular professions and occupations. The content therefore targets what students should know and what they should be able to do in specific professions and sectors. For example, the curriculum content and knowledge of radiography programmes exposes students to physiology, chemistry, physics, radiation therapy, nuclear medicine and ultrasound technology. Medical laboratory science on the other hand, exposes students to pharmacology, virology, pathophysiology, anatomy and physiology, chemical pathology, cellular pathology, haematology and microbiology. The common denominator in the content of the two programmes is that they both draw on medicine as one of the “older” regions and both deal with humans.

Engineering curriculum content on the other hand is made up of mathematics, science, core engineering modules, computer applications, communication and branch-specific engineering and practical activities. This content is equally interdisciplinary and multidisciplinary but deals with materials rather than humans. While theoretical knowledge is indispensable in the content of business studies, hospitality and tourism, emphasis is on how students would behave when they meet customers and clients in the different careers. Careers in hospitality include ownership and management of hotels, front offices, banqueting, food and beverage outlets, restaurants, guesthouses and coffee shops.

Thus, given the differentiated and specialised applied knowledge of the different fields of practice however, the content of curricula of knowledge of radiography, medical laboratory science and engineering are generally more rigidly structured, selected, sequenced and paced compared with the content of business studies, hospitality, retail and tourism. This is because the domains of knowledge of radiography and medical laboratory science that draw on traditional regions lean more to strong disciplinary knowledge and strong “paradigmaticity” (see Muller, 2009). Similarly, pedagogy of electrical engineering is strongly sequenced, ensuring that such students understand what comes before in order to understand what comes after. Conversely, the content and curricula of “fourth” generation technology comprising business studies, hospitality, retail and tourism regions are likely to be less sequenced and paced. Thus, the pedagogic regulative discourses of these fields of practice will therefore be very different in terms of curriculum choices, sequencing and ways of transmitting subject knowledge. Professional knowledge in the fields is selected and sequenced by lecturers and aligned with the skills students need to develop during work placement for WIL.

5.3 The role of professional bodies and induction into profession

Drawing on elements of medicine, namely anatomy, pathophysiology, physiology as a traditional region, the domains of knowledge in curricula and the training of medical laboratory science and radiography are strictly regulated by the Health Professional Council of South Africa (HPCSA). Medical laboratory science students are also expected to write the board examination administered by the Society of Medical Laboratory Technologists of South Africa (SMLTSA). Accordingly, the SMLTSA (representing the profession), HPCSA, UoTs (curriculum practices from previous technikons) all make inputs into curricula. This is true of the current recurriculation process from National Diploma and BTech, to a professional

degree in medical laboratory sciences. Wheelahan (2007) observes that fields whose domain of knowledge draw from “older” regions, display sound procedures of inner allegiance in professional character because of the

historical relations between the professions and their knowledge bases (the singulars). Stress is also placed on *collegiate* autonomy, collegiate control over training, and admission to the profession, through defining the boundaries of their knowledge base (Wheelahan, 2007:54).

Furthermore, students specialising in radiography and medical laboratory science drawing largely on regions of medicine including anatomy, are usually inducted into professional identity by exposing them to real clinical practice environments in hospitals under the mentorship of qualified practitioners, not only to experience the theory they have learnt, but also to expose them to the values, ethics, integrity and professional standards expected of them when they complete their studies. The introduction of radiography students to the real clinical environment introduces them to theoretical aspects of professional practice and ethics as well as radiation protection. They also undertake guided tours of radiology practices where they will be placed for the workplace learning part of WIL.

Engineering has forms of specialised knowledge that have a long history (e.g. electrical engineering) and is thus based on well-established bodies of knowledge. More importantly, the professional curricula of engineering rely on the specialist professional communities (e.g. ECSA) to decide what to include in curricula. External regulators ensure that the programmes are compatible with others, nationally and internationally.

Conversely, the fourth-generation regions such as business studies, hospitality, tourism and retail have generally less developed professional bodies with weak historical links between the professions they serve and somewhat less rigid entrance requirements. However, the South African Institute of Chartered Accountant (SAICA) is probably the established professional body that dictates what core skills and knowledge are to be covered in the subject matter for students to be accepted into the accounting professions as technologists. Recently also, there has been some attempts to establish a professional body to develop guidelines governing occupations in business studies including hospitality, tourism and retail. However, this body is largely semi-professional in that programmes such as hospitality, tourism and retail for example do not have the kind of direct links with professional bodies compared to professions in radiography, medical laboratory science and accounting.

5.4 Conceptual, contextual and professional coherence in curricula of fields of practice

Conceptual and contextual coherence are two terms currently inadequately nuanced when discussing the domains of knowledge of specialist disciplines of professional and sectoral fields of practice offered in UoTs especially in relation to quality and relevance of such programmes. Despite the importance of conceptual and contextual coherence in the curricula of professional and sectoral fields, these terms are generally underdeveloped and seldom if ever taken into account when analysing the curricula of professional and sectoral fields of practice.

The seeming inadequate account of conceptual and contextual/occupational coherence in curricula of professional and sectoral fields includes first, as part of pedagogic regulative discourse when designing curricula of professional and sectoral fields, conceptual coherence,

which ensures the selection, sequence and pacing of the discipline-based knowledge in a particular region offered in UoTs (*cf.* Muller, 2009). However, contextual coherence of curricula of business studies on the other hand ensure that the degree programmes take into account the context that students will encounter in the workplace (Muller, 2009).

Despite the distinction above, conceptual and contextual coherence are critical in enhancing the quality of curricula of professional and sectoral practice to ensure sufficient exposure of graduates to specialist disciplines, while ensuring that such curricula are relevant to the context. However, conceptuality and contextuality need to be understood in relative terms. Accordingly, relative conceptuality will be more prominent in the curricula of radiography and medical laboratory science as their curricula are more structured, more formal and their entry requirements more rigid. Conversely relative contextuality will be applicable in curricula of hospitality, tourism, retail and business studies whose curricula are less formal, have less rigid entry requirement and where prominence is largely given to on the job training and learning by doing.

As in the case of conceptual and contextual dimensions, occupational coherence is likely to be more prominent in radiography, medical laboratory science, engineering and accounting where such occupations depend on specialist knowledge certified by a professional body such as the HPCSA, ECSA and SAICA that prescribe the requirements to be a professional. Conversely, occupations in business studies, hospitality, retail and tourism that rely mostly on procedural knowledge collated from practice are less likely to have autonomous “professional” bodies (Young, 2011).

6. CONCLUSION

We argue that policies and practices on differentiation and specialisation in higher education institutions globally is analogous to the division of labour in industry as coined by Adam Smith and built on by Durkheim. In terms of this analogy, institutions are differentiated in terms of roles and functions to distribute different types of knowledge and skills for diverse professions and occupations. The global trend towards partial or total abolition of the binary between the different institutional types was a response to economic conditions of the twenty-first century.

In South Africa, ongoing differentiation and specialisation are an integral part of the transformational agenda of creating a differentiated and diversified single coordinated higher education system that responds to the historical inequities in the country, in order to respond to the changing global economies and markets. Accordingly, in comparison with other trends elsewhere, institutional differentiation in South Africa is described as purposefully governed by a number of legislations, policy regimes and frameworks in the post-apartheid setting. Thus, our paper locates the analysis of domains of knowledge differentiation and specialisation of curricula of the selected professional and sectoral fields of practice within the broader institutional differentiation in terms of institutional identities and cultures, missions, qualifications offered and programme mixes.

We argue that social realist theory and recontextualisation of regions from original disciplines to fields of practice in universities ensures that knowledge in curricula is not selected arbitrarily but with due consideration of the relevant disciplines on which the regions draw. These frameworks provide new lenses to appreciate the distinctive features of the curricula of radiography, medical laboratory science, engineering, retail, business studies, hospitality and tourism offered by UoTs in South Africa. In particular, Bernsteinian work on the

relationship between singulars and regions as well as the inherent interdisciplinary regions of fields of professional and sectoral fields of practice and especially the implications for curriculum design, selection of the disciplines or, parts of disciplines and their application in particular fields, are useful in the discourses of curriculum design.

We argue that the dual-facing nature of knowledge in the curriculum of fields of practice offered by UoTs is a useful concept to differentiate knowledge types and mandates of the latter sector from knowledge and mandates of traditional universities. This assumption enhances the relevance and quality of curricula of the fields of practice by ensuring that knowledge selected advances knowledge of specific disciplines on the one hand, while preparing technologists and technicians to do specific tasks and solve problems and challenges in specific occupations.

We conclude that the curricula of the fields of medical laboratory science, radiography and engineering exhibit deep disciplinary knowledge bases and drift more to intense “paradigmaticity” and to more inflexible curricular design with well-defined conditions for specific professions. In contrast, curricula of the fields of retail, business studies, hospitality and tourism tend to be less defined, organised and ambivalent about the requirements of professions.

Furthermore, students specialising in radiography, medical laboratory science, engineering and accounting that have established professional bodies are necessarily inducted into professional identity, including values, ethics, integrity and professional standards expected of them on completion of their studies. This is more so in the case of radiography and medical laboratory science as they deal with humans.

Lastly, despite their strong and weak knowledge bases respectively, the quality of curricula of fields study offered in UoTs in South Africa needs to be ascertained to the extent to which they guarantee relative conceptuality, contextuality and professional coherences. However, conceptuality is more noticeable in fields that have a strong knowledge base while contextuality is more prominent in fields that have a weak knowledge base.

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