

CHAPTER 5

A CONCEPTUAL FRAMEWORK AND DESIGN OF A QUALIFICATION IN MUSIC TECHNOLOGY

The purpose of this chapter is to develop a conceptual framework that identifies key concepts, draws relationships, and highlights meaningful interactions between the concepts that have emerged from the literature in preceding chapters. The conceptual framework will provide a foundation for the design of a new qualification (a certificate in Music Technology at NQF Level 5 in this case) and could also be used to critique other qualification designs in Music Technology. The qualification design in Music Technology will be positioned within a curriculum development model in order to show the relationship between the three levels of curriculum design, namely the design of a qualification, and the development and implementation of a learning programme.

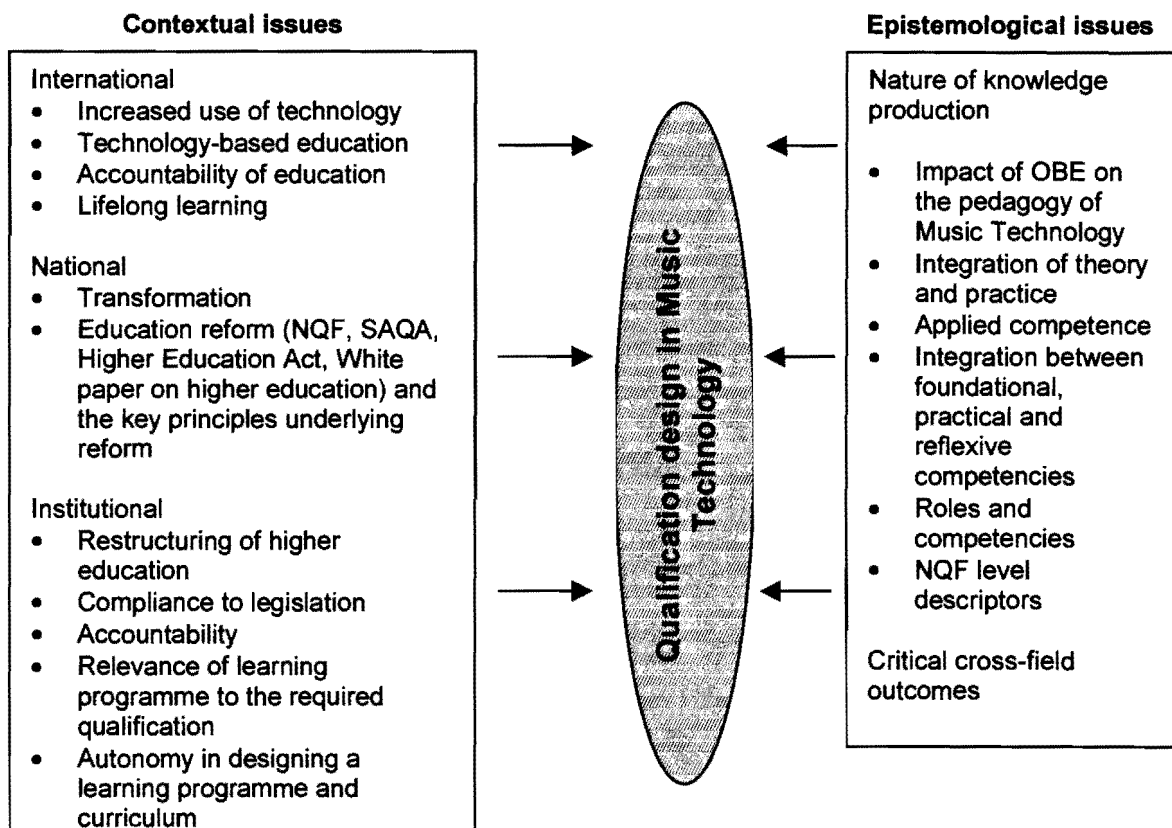
This chapter highlights the contributions of the study to education research by:

- Firstly, attempting to contextualize global trends in Music Technology to the South African socio-political and transformational conditions. This is sought through dealing with the challenges of designing a qualification in Music Technology that meets international trends whilst at the same time addressing the transformational agenda of accountability, redress and equity;
- Secondly, conceptually relating key concepts identified in the field of Music Technology and education policy that should guide the design of a qualification in Music Technology.
- Thirdly, in attempting to locate qualification design in Music Technology within a curriculum development framework, this study develops a holistic curriculum development model that includes three levels, namely the design of a qualification, and the development and implementation of a learning programme (for teaching, learning and assessment); and
- Finally, constructing an exemplar of a certificate qualification in Music Technology at NQF Level 5.

5.1 A conceptual framework

The concepts identified in Chapters 2, 3 and 4 relating to policy and the field of study of Music Technology have been grouped into two broad areas: contextual and epistemological issues (nature of knowledge and knowledge production). Only a selection of the key concepts that influence the design of the qualification in Music Technology will be discussed in the section that follows (see Appendix D for a complete list of concepts). These concepts and trends were extracted from the review of literature in Music Technology and education policy and initially assembled together, after which they were separated along the lines of contextual and epistemological issues. The justification for the separation was to indicate the changing contexts in which education finds itself globally as well as nationally and to highlight the dynamics of the field of Music Technology. The contextual and epistemological issues are therefore influential in constructing a new qualification. Their impact on qualification design is illustrated in Figure 5.1.

Figure 5.1: Illustration of the conceptual framework highlighting the concepts and issues that will inform qualification design in Music Technology



The interplay of the concepts relating to contextual and epistemological issues will now be examined in relation to the study.

5.1.1 Contextual issues

The contextual issues describe the international context and examine its influence on the national and institutional context in South Africa, with the focus on the design of a qualification in Music Technology. The demands made by socio-economic, cultural and philosophical factors globally pressurize higher education to transform. South African national education policy integrates these international pressures with the South African needs to transform society. Current education policies therefore, require institutions of higher learning to be accountable, relevant and to meet the needs of society (see Chapter 1.1).

5.1.1.1 International context

Global trends show an increased usage of technology. The rapid developments in technology in the latter part of the twentieth century, particularly with regard to the Internet, have demanded that education systems globally take cognisance of this trend. Technology in education has required education systems to create mechanisms for the inclusion of technology-based education programmes. This can be deduced, for example, from Tim Berners-Lee at CERN (European Particle Physics Laboratory), who already in 1989 facilitated the collaboration among scientists to work together on high-energy physics research using a specific Internet protocol (world-wide web or WWW) (Curtin *et al* 1998: 6). The ever-increasing technology-based programmes globally justify this phenomenon (Chapter 3.1). The impact of technology on the various disciplines as discussed in Chapter 3.1 (Design, Education and Biology) and in Music in Chapter 3.2 is a clear indication that disciplinary knowledge as well a pedagogy is being reshaped by current technology.

Apart from the technology explosion, higher education institutions internationally are being required to be accountable for the programmes they offer. In recent years there have been increasing calls in Western society for greater attention to be focussed on the outcomes of education. This phenomenon resulted from the public's calls for accountability, in that they wanted return on investments in education, which could be evaluated. Several countries

(including the USA and the UK) responded to these calls of accountability in the 1980s (Killen 1998:4).

Coupled with education accountability is the issue of lifelong learning (see Chapter 4.2.3). This is discernable in the adoption of OBE in Australasia, countries in Europe, the Pacific rim and North America (SAQA 2000c: 2) in which two approaches to OBE are identified: the learners' mastery of some traditional academic outcomes and some cross-discipline outcomes (for example, working co-operatively) and the emphasis on outcomes that are related to learners' future life roles (Killen 1998:4). All of these global trends impact on qualification design in Music Technology.

5.1.1.2 National context

Within the national policy context, the South African Ministry of Education responds to these global trends (Chapter 4.1.2), by taking cognisance of the issues of technology education, accountability and lifelong learning. These trends are enshrined in current education policy documents (see Chapter 1.6.5).

Transformation of the education system in South Africa, however, was instituted to address the imbalances created through the previous education system under the apartheid government prior to 1994 (Chapter 4.1). The NQF was instituted to bring about systemic and curricula change to the South African education landscape (Chapter 4.1.2). The primary reason behind the development of the NQF is to develop a single unified qualifications framework. Some of the objectives of the NQF are to have an integrated national framework for learning, facilitate access and mobility within education training and career paths, address the issues of redress and equity, and contribute to the full personal development of the learner. The design of a Music Technology qualification will therefore have to take into account all of these objectives of the NQF in order for the qualification to qualify as being transformational.

In order to ensure the development of the NQF, the SAQA Act of 1995 was passed to enable South Africa to develop this framework. SAQA's purpose is therefore to implement the NQF through: the registration of bodies responsible for establishing education and

training standards/qualifications, and the accreditation of bodies responsible for monitoring and auditing achievements in terms of such standards and achievements (SAQA 1997: 2-4). The Higher Education Act 101 of 1997 requires the establishing of the Council on Higher Education, a body whose responsibility it is to manage transformation in the higher education sector. A subsidiary of this body is the Higher Education Quality Committee, a quality assurance body that monitors the quality of learning programmes and teaching, learning and assessment of learning programmes towards meeting the purpose and competencies of the qualification. The White paper on Higher Education provides guidelines as to how higher education in South Africa needs to transform in terms of its structures, learning programmes and curriculum in order to realize the vision of national education policy. The Music Technology qualification will therefore have to subscribe to the expectations of the NQF and SAQA and ensure that it takes cognisance of the Higher Education Act 101 of 1997 and the transformational requirements enshrined in the White paper on education.

5.1.1.3 Institutional context

There are a number of limitations regarding Music Technology curricula offered by South African higher education institutions (Chapter 3.4). Although some of the South African Music Technology programmes reflect international trends (Chapter 3.4), they do not, however, take cognisance of the needs of the national job market and the expectations of national education policy. Several of the South African programmes are designed according to international curriculum trends and not particularly national ones. This raises concerns with regard to the issues of accountability, restructuring of higher education, compliance to legislation, relevance of learning programmes and autonomy in learner programmes design and curriculum.

The issue of accountability is central to all aspects within the institutional context. In terms of an institutions management structures, all decision making in terms of curriculum, teaching, learning and assessment is to involve the participation of all stakeholders and be structured in terms of the legislative requirements. The legislative requirements are the nationally registered learning achievements on the NQF. However, in the case of Music Technology this does not exist as yet.

Policy demands that institutions address the needs of society, the community and lifelong learning of its learners. This requires institutions to realign its existing structures and curricula to the principles of transformational OBE underpinned by critical cross-field outcomes. The re-structuring of higher education is vital to the transformation process, in that the learning programmes offered are to be made accessible to all learners in addressing the issues of access, redress and equity. Institutions, therefore, need to put in place mechanisms that will ensure mobility and transferability of knowledge, skills and values within the institution as well as between institutions.

Since all qualifications have to be registered on the NQF, qualifications, learning programmes, teaching, learning and assessment that are offered and/or take place within the institutional context have to take into account the qualification exit level outcomes. This is to ensure national standards are maintained. All learning programmes and assessment criteria need, therefore, to be designed against these exit level outcomes. The critical cross-field outcomes, which contribute towards lifelong learning, are in most cases embedded in the exit level outcomes and assessment criteria of the qualification. For the sake of relevance with regards to national socio-economic, employment and education needs, the exit level outcomes and critical cross-field outcomes of the qualification underpins all institutional teaching, learning, assessment and the design of learning programmes. Currently, learning programmes are restricted to the specific institution at which the learning programme is offered, rather than responding to any national standards in Music Technology.

A part of this diversity in learning programmes could be attributed to the differing notions surrounding the issue of autonomy. Autonomy within the higher education sector is a highly contentious issue, as I have discovered in my capacity as Chair of the Higher Education and Training SGB for Music. Higher education institutions are required by legislation to conform to the transformational agenda of national education policy. The autonomy of these institutions would therefore lie in the domain of the learning programme and curriculum, which each institution chooses to offer, and not with regard to nationally registered learning achievements. It is therefore clear that in the case of the Music Technology, institutions will need to generate learning programmes and assessment criteria based on the exit level outcomes of this qualification in Music Technology.

The international, national and institutional context all impact on the design of a qualification in Music Technology.

5.1.2 Epistemological issues

The role of knowledge production is a highly contentious one, especially in view of the transformational agenda of policy. Since knowledge is central to the process of qualification design, the issue of knowledge production will be examined in this section, initially through three questions and thereafter through critical discourse.

5.1.2.1 How is knowledge produced?

The differing perceptions of knowledge production held by the state, labour, business, providers of education and training, critical interest groups, the community and learners produce a tension with regards to how knowledge is produced. Current South African education policy requires knowledge to be socially constructed by different stakeholders reaching consensus (Chapter 4.1). This is in sharp contrast to the institutional view on knowledge production (Chapter 2.1.4). Up to now knowledge production at education institutions internationally as well as in South Africa has been the domain of academics. Traditionally, academics decided what knowledge is to be included in the curriculum (an exclusive process). The issue of knowledge production within the proposed qualification in this study, will have to take into account the social construction of knowledge, which ultimately will need to be reflected in the design of the qualification.

5.1.2.2 Who produces knowledge?

Academics who view themselves as custodians of disciplinary knowledge and who have up to now monopolized knowledge production are reluctant participants in the transformation process because education policy requires knowledge production to be a socially constructed, inclusive process. The fear that arises amongst academics with regard to the social construction of knowledge is the shift from “high standards” of the disciplinary nature of knowledge. Ironically, I have observed through my experience as chairperson of the SGB for Higher Education and Training that the voices of academia and business still dominate the standards generation process whereas certain voices (critical interest groups, the community and learners) are lost or unheard through stakeholder participation. This implies that academics still have the major influence on what knowledge is included in the

qualification design, despite transformational expectations of policy with regard to broad consultation on issues of knowledge production.

5.1.2.3 What knowledge is selected for the qualification in Music Technology?

Due to the long process in forming an SGB and designing qualifications in which knowledge issues are discussed, this study had identified and selected knowledge to be included in Music Technology qualifications (Chapters 2 and 3). This knowledge is embedded in the roles and competencies identified later in this chapter (see Chapter 5.1.2.8). Although this is a limitation of the study, an attempt is nevertheless made to provide a knowledge foundation that impacts on the conceptual framework and which serves to guide the SGB in the standards generation process.

5.1.2.4 The impact of OBE on the pedagogy of Music Technology

The different forms of OBE (Chapter 4.2) identified in this study also impact on how a qualification is designed. The generic use of the term OBE by the South African Ministry of Education and providers of education, has led to a perception that as long as the curricula are designed with learning outcomes, they conform to national policy requirements. This, however, is misleading and is not what South African policy dictates. The NQF as a key education policy requires a transformational OBE approach whereby the outcomes and criteria for assessment are underpinned by critical outcomes (Chapter 4.2.4). However, the data in Table 3.6 suggest that current education practices in South Africa at institutions offering Music conform to traditional and in a few cases transitional OBE where the focus is on the learners' mastery of some traditional academic outcomes and some cross-discipline outcomes. The shift in OBE approach at these Music institutions in South Africa (Chapter 3.4) occurs between traditional and transitional OBE, rather than transformational OBE.

The transformational OBE philosophy requires a high level of ownership, integration, synthesis, and functional application of prior learning (referred to later as recognition of prior learning or RPL) because learners need to respond to the complexities of real life (Spady 1994: 19). These transformational outcomes reflect a particular orientation to knowledge and to meeting the future needs of learners and of society in general.

5.1.2.5 The integration of theory and practice

The transformational OBE approach offers a dialogue between learners and the curriculum, where the learners interact with sources of knowledge, reconstruct knowledge and take responsibility for their own learning outcomes. In order to promote the skills required to enhance South Africa's education and economic competitiveness and help the convergence of general and vocational education, the transformational approach to OBE has to inform qualification design. The qualification design, therefore, needs to show an integration of theory and practice. Policy emphasizes what learners should know and be able to do. Currently most academic institutions still focus on the theoretical aspects of learning. These aspects are still highly valued, especially in university contexts. The application of this theoretical knowledge has not been fully exploited at such institutions of higher learning. Qualification design needs to show an integration of the theoretical and vocational (practical) aspects of learning in order to meet the transformational agenda of policy (for example, understanding the principles of signal processing and applying this knowledge to a studio/ live context).

5.1.2.6 Applied competence

Policy requires qualification design to take cognisance of the world of work and the world of professional practice (see Figure 4.1). The competencies required in the worlds of work and professional practice would enable future learners to make a contribution to themselves, their community, society, their country and the world. Therefore the knowledge component, which is to a large degree extracted from the requirements of the worlds of work and professional practice, needs to be manifested in the world of curriculum. By doing so, institutions of higher learning will be accountable to all stakeholders in education. The applied competence of learners is therefore vital to qualification design in that learners must demonstrate the knowledge and skills in a real, simulated and/or authentic context.

5.1.2.7 Integration between foundational, practical and reflexive competencies

One of the design features of a transformational OBE qualification is the integration of foundational (knowledge), practical (skills) and reflexive (evaluation/reflection) competencies. In the case of foundational competencies the learner will need to demonstrate an understanding of the knowledge and thinking which underpins the actions taken to solve problems, use technology, organize his/her work, work together with others,

seek knowledge of his/her peers, and the like. The practical competencies require the learner to demonstrate the ability, in an authentic context, to consider a range of possibilities for action, make considered decisions about which possibilities to follow, and to perform the chosen action. The capacity of the learner to demonstrate the ability to integrate or connect performance and decision making with understanding and with the ability to adapt to change and unforeseen circumstances and explain the reason behind these actions will underlie the reflexive competencies. All three competencies underpin a Music Technologist's primary role and therefore impact on the design of a qualification in Music Technology.

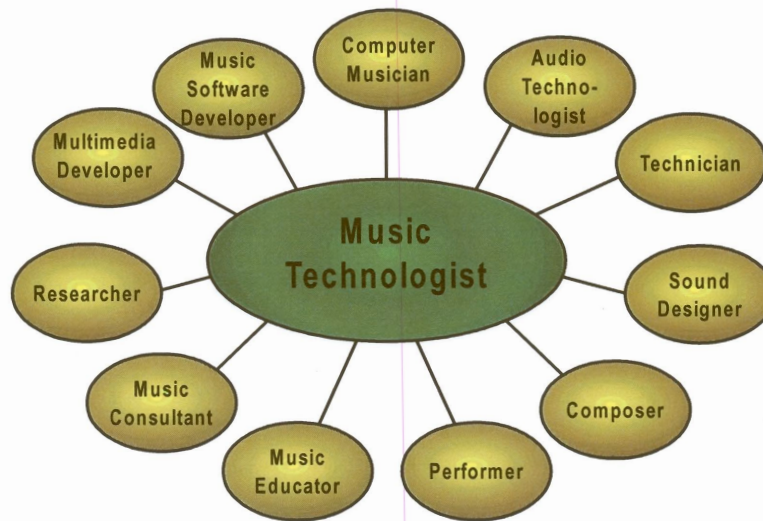
5.1.2.8 Identifying key roles and competencies

The selection of knowledge to be required in any qualification in Music Technology will be dependent on the expected roles and competencies of a Music Technologist. The overview presented in Chapter 3.3.3 indicates that most jobs in Music and Industry are influenced either entirely by, or by a core component of, Music Technology. Due to the newness of Music Technology as a field of study, the role and career path of a Music Technologist, both internationally as well as nationally, is at this point not clearly definable. It needs to be mentioned, however, that the Music Educators National Conference (MENC) in the USA (MENC 2001) has identified certain roles of the Music Technologist. Compared to the international roles, the MENC roles are limited, in that its focus is on three primary areas: Multimedia Publishing, Sound and Video Editing, and Technology-based Music Instruction Design. The other areas of employability are considered merely supplementary to the above three areas and not regarded as areas of specialization.

With regard to the ten core components of Music Technology offered internationally (see Chapter 3.3.1), it is apparent that most of these components already manifest themselves as career specializations within the existing Music Industry. Some of these career specializations are very recent developments. I used the data presented in Chapter 3.3 to identify the eleven primary areas of career specialization (see Figure 5.2). All of these eleven areas focus on the core components that underpin the field of Music Technology. In order to clearly define the roles and competencies needed for a qualification in Music Technology, I set out to identify the vital career paths that impact on the Music Technologist, together with their job descriptions. Other career paths (Music Business, Retail and

Copyright, and the like) also influence Music Technology, but to a lesser degree. These therefore, will not be elaborated upon in this thesis.

Figure 5.2: Primary career specializations for the Music Technologist



The primary career specializations provide key indicators for the roles and competencies expected of the Music Technologist. The Music Technologist's roles and competencies will need to integrate theory and practice, show applied competence, and integrate the foundational, practical and reflexive competencies. A brief description of the above-mentioned roles and competencies that follows, provides insight into the complexity of the work of the Music Technologist.

5.1.2.8.1 Computer Musician

A person who uses the computer to create, notate, record and manipulate music and sound in environments such as the entertainment and educational field, film industry and media or other kinds of multimedia products.

5.1.2.8.2 Audio Technologist

A person who has the knowledge and ability to apply well-established audio principles and techniques to audio problem-solving and audio engineering (such as recording, mixing, reinforcement and sound enhancement).

5.1.2.8.3 Technician

A person who provides technical support for music equipment and computer users. Such a person will install, analyse, service, trouble-shoot and configure music equipment, computer systems and networks, provide technical advice, and diagnose and correct music equipment and computer-related problems when they occur.

5.1.2.8.4 Sound Designer

A person responsible for the creation of a coherent and consistent overall sound style for a project utilizing moving images (video and film), as well as the recording, creation and/or transformation of sounds to this end.

5.1.2.8.5 Composer

A person who creates instrumental and/or vocal pieces, either to stand alone or to be combined with lyrics for a variety of mediums (film, jingles, video, and so forth), using a diversity of musical tools.

5.1.2.8.6 Performer

A person who specializes in the performance of music, either original, historical or cover-version material. Such a person's marketability is determined by his or her music skills. His/her work may involve solo playing, accompanying other musicians, or performing as part of a group.

5.1.2.8.7 Music Educator

A person involved in educating in Music at state-aided or independent education establishments and/or privately. Music educators' duties are governed by the level at which they educate, but for the most part they introduce learners to different aspects of music, the music industry and varying degrees of skill study pertaining to music.

5.1.2.8.8 Music Consultant

A person who provides direct support to customers of the Music Technology industry. Such persons are involved in sales, answer questions relating to music equipment, computer

hardware and software, maintaining and setting up music instructional laboratories, and provide support in areas of Music Technology and Music.

5.1.2.8.9 Researcher

A person who has primary responsibility for the timely and accurate production of statistical analyses, technical reports and research papers. Such a person serves as an expert on research methodology and the structuring, managing and carrying out of research.

5.1.2.8.10 Multimedia Developer

A person who works with the latest advances in desktop computer technology. Such a person draws on the skills of the computer programmer and the visual artist to integrate graphics, text, digital audio and video.

5.1.2.8.11 Music Software Developer

A person involved in creating, modifying and testing software programmes. These programmes can be either newly written or combined with or adapted from existing programmes.

5.1.2.8.12 Summary of a Music Technologist's role

Due to the diversity of roles that a Music Technologist is required to fulfil, educating in Music Technology will need to focus on several competency areas simultaneously, rather than specializing in a particular aspect of Music Technology as described above. The role of a Music Technologist would therefore be more one of a generalist than a specialist, where the Technologist requires a general knowledge and skills of all of the above-mentioned roles.

Music Technology can therefore be regarded as a field of study that coordinates and synthesizes various independent areas of technology, both traditional specializations (older technologies, for example those related to audio recording and mixing) and contemporary specializations (present technologies, for example those integrating Computer Music into the Games Industry and Multimedia), into a single coherent field of study. The knowledge that needs to be considered for a qualification in Music Technology therefore includes theoretical knowledge and practical skills, as well as applied competence in the field. The

selection of knowledge for the qualification in Music Technology is therefore dependent on the roles and competencies identified in this section.

5.1.2.9 Determining the level descriptors

Having established the roles and competencies (knowledge, skills and values) in the previous section, it is imperative to have these competencies pegged (located) at the appropriate level on the NQF. The pegging of these competencies, using the level descriptors, will indicate depth and breadth of knowledge and skills that are necessary to include in the design of the qualification in Music Technology.

Level descriptors attempt to describe the nature of learning achievement, its complexity and relative demand at each level of a qualifications framework. These level descriptors are broad, generic, qualitative statements against which specific learning outcomes can be compared and located. Thus, sets of level descriptors can be used in a general way to determine the pegging of qualifications on a framework. According to SAQA (2001: 2), these descriptors “describe learning across domains, disciplines, fields and learning pathways ... and are very general and highly abstract”.

In this research the design of the qualification in Music Technology is targeted at a certificate at NQF Level 5 (120 credits). In order to peg the Certificate at NQF Level 5, it is appropriate for standards generators to view NQF level descriptors at NQF Level 4 (Further Education and Training Certificate), which describes the learning assumed to be in place prior to the commencement of this qualification, and NQF Level 6 (Bachelor’s degree), which articulates the progression of learning beyond NQF Level 5. The NQF level descriptors (SAQA 2002: 39-41) stipulate the following applied competencies and autonomy of learners at Levels 4, 5 and 6. The qualification proposed in this study is located at NQF Level 5.

Table 5.1: Revised level descriptors for the NQF Levels 4 to 6 (SAQA 2002: 39-41)[sic]

NQF Level	Applied competence	Autonomy of learning
<i>Typically, a learning programme leading to the award of a qualification or unit standard at this level should develop learners who demonstrate:</i>		
<p>4 (FETC)</p>	<ul style="list-style-type: none"> . A fundamental knowledge base of the most important areas of one or more fields or disciplines, in addition to the fundamental areas of study, an informed understanding of the key terms, rules, concepts, established principles and theories in one or more fields or disciplines. . An understanding of the organization or operating environment as a system within a wider context. . An ability to apply essential methods, procedures and techniques of the field or discipline; an ability to apply and carry out actions by interpreting information from text and operational symbols or representations. . An ability to use their knowledge to solve common problems within a familiar context; an ability to adjust an application of a common solution within relevant parameters to meet the needs of small changes in the problem or operating context; an ability to motivate the change using relevant evidence. . A basic ability in gathering relevant information, analysis and evaluation skills. <p>An ability to communicate and present information reliably and accurately in writing and verbally.</p>	<ul style="list-style-type: none"> . A capacity to take responsibility for their own learning within a supervised environment. . Take decisions about and responsibility for actions. . Evaluate their own performance against given criteria. . A capacity to take the initiatives to address any shortcomings they find.
<p>5</p>	<ul style="list-style-type: none"> . A fundamental knowledge base of the main areas of one or more fields or disciplines; an informed understanding of the important terms, rules, concepts, principles and theories in one or more fields or disciplines. . An understanding of the organization or operating environment as a system within a wider context and in relation to society. . An ability to effectively apply essential methods, procedures and techniques of the field or discipline; an ability to interpret, convert and evaluate text and operational symbols or representations. . An ability to use their knowledge to solve well-defined problems both routine and unfamiliar within a familiar context; an ability to adjust an application of a solution within relevant parameters to meet the needs of changes in the problem or operating context; an ability to evaluate the change using relevant evidence. 	<ul style="list-style-type: none"> . A capacity to take responsibility for their own learning within a supervised environment. . Take decisions about and responsibility for actions. . Evaluate their own performance against given criteria.

continued overleaf

Table 5.1. Revised level descriptors for the NQF Levels 4 to 6 (SAQA 2002: 39-41)[sic] (continued)

NQF Level	Applied competence	Autonomy of learning
<i>Typically, a learning programme leading to the award of a qualification or unit standard at this level should develop learners who demonstrate:</i>		
5	<ul style="list-style-type: none"> . Efficient information-gathering, analysis and synthesis, and evaluation skills. Presentation skills using appropriate technological skills; an ability to communicate information coherently using basic conventions of an academic/professional discourse reliably in writing and verbally. 	
6	<ul style="list-style-type: none"> . A solid knowledge base in at least one discipline/field. . A sound understanding of one or more discipline/field's key terms, rules, concepts, established principles and theories; some awareness of how the discipline/field relates to cognate areas. . Effective selection and application of the central procedures, operations and techniques of a discipline/field. . An ability to solve well-defined but unfamiliar problems using correct procedures and appropriate evidence. . A critical analysis and synthesis of information; presentation of information using basic information technology. An ability to present and communicate information reliably and coherently, using academic/professional discourse conventions and formats appropriately. 	<ul style="list-style-type: none"> . A capacity to evaluate their own learning and identify their learning needs within a structured learning environment. . A capacity to take the initiative to address these needs. . A capacity to assist others with identifying learning needs.

The level descriptors should be understood as cumulative, that is each level subsumes the levels of learning achievement below it. Therefore the difference between Levels 4, 5 and 6 shows a progression of thinking (cognition), learning, and the role of the learner in relation to the educator from dependence on other-regulation towards full self-regulation and from close supervision to creative, self-directed learning.

5.1.3 The role of the critical cross-field outcomes on qualification design

The final epistemological issue deals with the relationship between critical cross-field outcomes (Chapter 4.2.4) and the nature of Music Technology (Chapter 2.4 and 3.7). In critical cross-field outcomes and in the nature of Music Technology, there is a suggestion that their roles complement each other, in that they both function as a tool and an enabler (Chapter 2.3, 2.7 and 4.2.4). The critical cross-field outcomes contribute towards lifelong

learning by empowering learners with knowledge, competencies, attitudes and values that will allow them to contribute to their own success, as well as to the success of their family, community and nation as a whole.

The primary focus, therefore, within transformational OBE is on the desired end results of education, with the emphasis on outcomes that are related to learners' future life roles through critical cross-field outcomes. These critical cross-field outcomes are seen by the NQF as tools that enable the flexibility and transferability of knowledge, competencies, attitudes and values from one context or problem situation to another. Embedded in these critical cross-field outcomes are the seeds for cultivating lifelong learning. The outcomes of qualification design in Music Technology need therefore to marry the outcomes of the field with the critical cross-field outcomes.

Using the concepts mentioned in the contextual and epistemological issues, the metaphor of marriage will be used to show the relationship between the design of a qualification, field of study (Music Technology) and current South African education policy. It is apparent from the contextual and epistemological issues discussed in Chapters 5.1.1 and 5.1.2 that an arranged marriage has been identified. Within this arranged marriage scenario, three possibilities exist. Firstly, within the education framework there is equal respect between both partners, where the expectations of the field of study and policy complement each other in qualification design. This would be the ideal case. In the second possibility, one partner dominates the other, thereby subduing the identity of the other. There is a danger that policy could dominate the field of study in qualification design. The third possibility could be a mismatch that results in an incompatible relationship, where policy and the field of study move in separate directions unrelated to each other. The present study proposes a qualification design that shows complementarity between the field of study and policy.

5.2 Curriculum development model

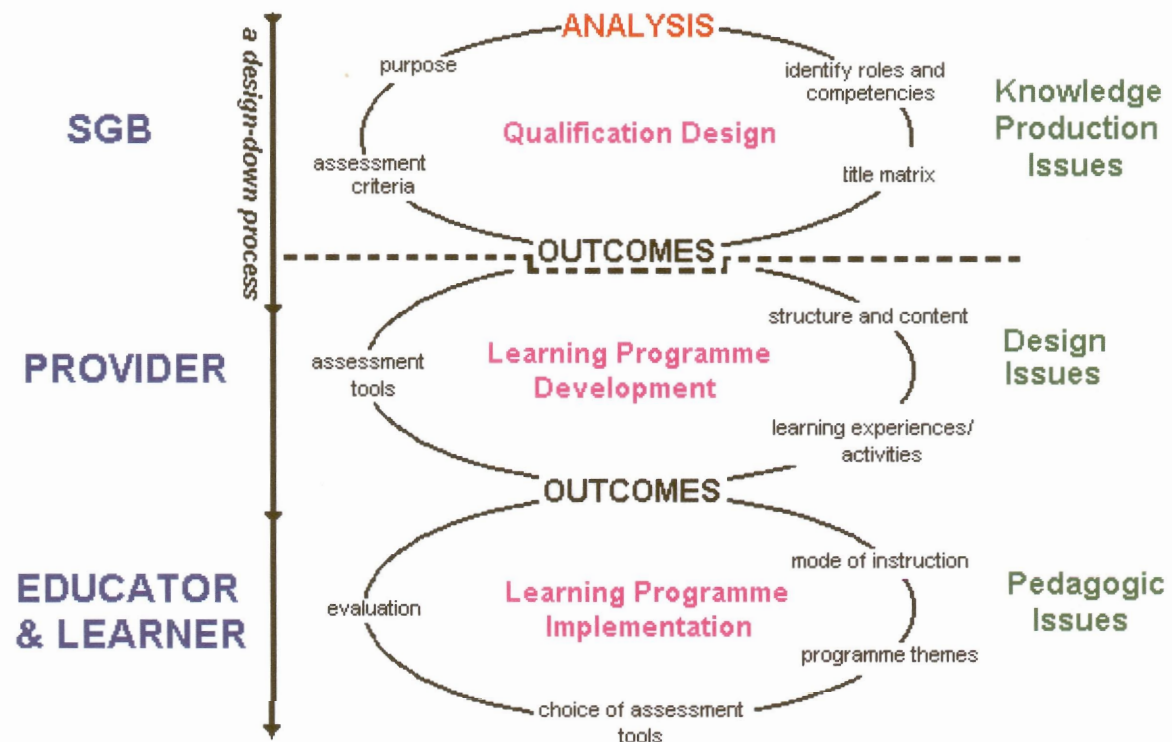
Qualification design is located within a curriculum development model. The proposed conceptual framework discussed in Chapter 5.1 through to Chapter 5.1.2.7 forms the main pillars of the design of a qualification in Music Technology. The concepts mentioned thus far need to be organized into some sort of system. This is reflected in the proposed model presented in Figure 5.3 by the author.

Existing curriculum development models (see Dixon 1998: 24-30) focus on design and pedagogical issues. The model proposed in this section adopts a holistic approach that includes two levels of curriculum development:

- Planning, Design and Development; and
- Implementation.

The third level (Evaluation) occurs once implementation of the qualification has taken place. Since this is an iterative process, review (basic evaluation) will occur at each stage and level. These three levels show the link between knowledge production issues, learning programme design and pedagogical (teaching/learning and assessment) issues. All three levels have to be considered in the design of a qualification, because the exit level outcomes of the qualification impacts on the entire curriculum development process.

Figure 5.3: A proposed curriculum development model



The model in Figure 5.3 has three cyclic units. The first cyclic unit is the level where the qualification is designed by the SGB for Music in the Higher Education and Training Band (HET) for NSB 02 Arts and Culture. Since the transformational OBE approach to curriculum development is a design-down²³ process, this study is located at the first level of the qualification design phase (the area above the dotted line). One cannot proceed to any of the other cyclic units if the first cyclic unit is not realized.

The second cyclic unit relates to the development of the learning programme that involves the providers of education, that is, course designers or planners. The final cyclic unit addresses the issues of teaching, learning and assessment. Since outcomes are central to the new education framework and tie the entire curriculum development process together, the exit level outcomes that are illustrated between the first (qualification design) and second (learning programme development) cyclic units (see “outcomes” in Figure 5.3) have been re-illustrated between cyclic units two and three (learning programme implementation). This is to emphasize that all aspects of the curriculum development process need to take cognisance of the exit level outcomes established by the SGB. The above model reflects the key principle of the OBE approach, that is the design down principle. In the design down principle, the outcomes of learning against the backdrop of the critical cross-field outcomes need to be established first. These outcomes will thereafter need to be used to develop learning programmes. All teaching and learning that follow have to be assessed against these learning outcomes.

During the qualifications design phase, an analysis of trends (both international and local) was undertaken, together with a review of international curricula, coupled with the examination of learner and industry needs (Chapter 3.3, 3.4 and 3.5). The next step in the process will be to identify key roles and competencies associated with careers (see Chapter 5.1.2.8). The analysis of these roles highlighted the knowledge, skills and values necessary for the qualification. Following these key roles, a title matrix (see Chapter 1.9 and 5.3.1) will be formulated that will be used as basis for the formulation of learning outcomes and criteria to be used to assess these outcomes. Once the learning outcomes have been identified, the purpose of the qualification will be clarified. This level of the qualification appears to be prescriptive, because the outcomes identified at this level affect national qualifications.

²³ Also referred to as a build-back approach where the curriculum design starts with abilities, skills, knowledge and attitudes that learners will have to demonstrate. It ensures that assessment is focussed on what the learners have achieved in relation to learning outcomes.

5.3 Qualification design process

The qualifications design process is a clearly structured process that follows certain key steps. An overview of the steps is as follows:

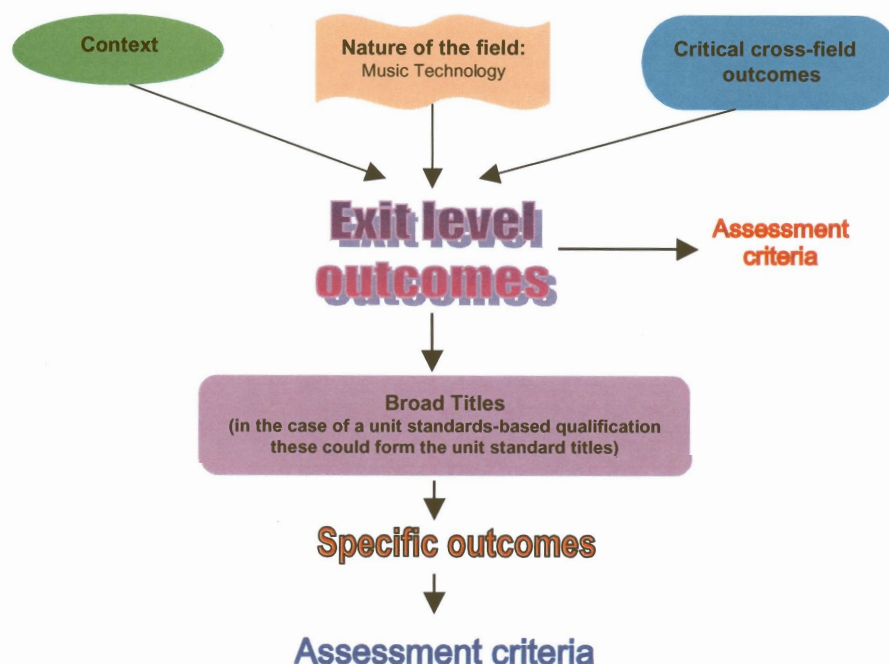
- Identifying key roles and competencies (see Chapter 5.1.2.8);
- Determining the descriptive statements of knowledge, skills and values that will guide the scope of knowledge, skills and values (see Chapter 5.1.2.9); and
- Constructing the proposed Certificate in Music Technology (see Chapter 5.3.1).

Since the steps dealing with key roles and competencies and the determining of the level descriptors have already been dealt with in Chapter 5.1.2.8 and 5.1.2.9 respectively, I shall now proceed with the construction of the whole qualification.

5.3.1 Constructing the proposed Certificate in Music Technology

The parameters provided by SAQA (2000a: 35-90) will be used as a guide in the construction of the Certificate in Music Technology. Figure 5.4 below provides an outline of the construction process.

Figure 5.4: Construction of the Certificate in Music Technology



The context, critical cross-field outcomes and nature of the field (in this case Music Technology) will be used to determine the exit level outcomes and assessment criteria for the qualification.

The SAQA parameters that will be used in this qualification are the three categories of learning competencies: Fundamental, Core and Elective (discussed in Chapter 4.1.4.5). This study focuses on the Core competencies. Fundamental competencies underpin the qualification, but these will not be discussed because learners would need to be proficient in these areas prior to gaining access to the qualification. The Elective competencies are optional modules from the broader Music/other disciplinary sector towards a general study in the discipline of Music/other discipline. To prevent duplication of these standards and outcomes, the competencies of the electives will not be elaborated upon in this study. The outcomes relating to electives will be generated under a generic Music/other qualification.

In order to engage in a study of Music Technology, it is imperative to first have a sound music background, since this forms the basis for the implementation of technology. Core Music competencies form the integral component in most Music qualifications. This Certificate in Music Technology will focus exclusively on the following Music Technology core competencies that have already been identified in Chapter 2.2, 3.3.1, 3.4 and 5.1.2.1. The core competencies will form the broad titles of a matrix around which exit level outcomes will be generated:

- Electronic Musical Instruments (EMI);
- MIDI Sequencing (MS);
- Music Notation (MN);
- Computer-based Education (CBE);
- Computer, Information Systems and Lab Management (CISLM);
- Multimedia and Digitized Media (MDM);
- Computer Music (CM);
- Audio Technology (AT); and
- Research (R).

Each broad title in this matrix will be used to generate exit level outcomes (ELOs) for the Certificate in Music Technology. The exit level outcomes form the core of this qualification.

In Table 5.2, I tabulate these exit level outcomes and the composition, requirements and elective options that are available to learners for the Certificate in Music Technology. The abbreviations (in brackets) correlate the exit level outcomes with the core competencies (stated above). The core competencies form the basis of the Certificate in Music Technology.

The specific outcomes for the core competency Internet and Telecommunications will be generated by the SGB for Physical, Mathematical, Computer and Life Sciences (NSB 10). In order to avoid duplication, these have not been generated in this certificate. However, since Internet and Telecommunications have been deemed compulsory by the National Department of Education (DoE 1997), this core competency has been categorized under Fundamental learning.

Table 5.2: Qualification construction for the Certificate in Music Technology

Fundamental learning
Language, Literacy and Communication
Basic Mathematic Literacy
Computer Literacy
Internet and Telecommunications (IT)

+

Core learning (exit level outcomes)
Perform musical works, process music data, synthesize and edit music timbres using electronic musical instruments (EMI) .
Sequence (MS), write ²⁴ (MN) and perform (CBE) musical works using MIDI related hardware and software.
Operate basic computer information systems (CISLM) to enable the integration of music and technology.
Create and produce musical products by applying multimedia packaging techniques and digital recording principles and techniques (MDM).
Compose original music products using computer-based hardware and software and fundamental programming skills (CM).
Engineer and produce audio products using audio technology (AT) .
Collect, analyse, organize and critically evaluate information in Music Technology (R).

+

continued overleaf

²⁴ The term "write" is preferred as opposed to "notate" because the former includes the music composition/creation process as well.

Table 5.2: Qualification construction for the Certificate in Music Technology (continued)

Elective learning
Music Industry, Business and Marketing
Music Copyright
Music Education
Informatics
Human Computer Interaction
Computer Programming
Music Librarianship
Instructional Design
Core Music Disciplines (Performance, Theory, Style and Genre, Composition, Harmony and Form, Orchestration and Arranging, Acoustics and Psycho-acoustics)

Fundamental + Core + Elective(s) = Certificate in Music Technology

Therefore, the Fundamental together with the Core and some of the Elective learning constitute the Certificate in Music Technology.

5.3.1.1 Title of qualification

Certificate in Music Technology

5.3.1.2 Rationale

Post-secondary institutions in South Africa are entrusted with a new skills development initiative to meet the needs of the individual, education, industry and society. This qualification in Music Technology is designed to produce key players in the music industry, as well as contribute to the diversification of the sector. The qualification attempts to facilitate the process of skills development and knowledge transfer by opening access to Music Technology to all learners who are interested in a career in Music Technology and historically disadvantaged learners who have the potential to succeed in Music Technology.

5.3.1.3 Purpose of the qualification

Learners who have achieved this qualification will have generic competence in Music Technology in applying established music fundamentals, principles and methods to use existing technologies in the field of music to compose, write, arrange, orchestrate, perform, engineer, synthesize, publish, reflect, operate, explain, identify and to solve technology related problems. Such a qualification:

- Provides the learner with a basis for further learning and development in the field of Music Technology;
- Provides career and learning opportunities for historically disadvantaged learners, who have been denied access to Music Technology;
- Satisfies the national needs of education transformation as required by civil society by affirming and integrating indigenous music knowledge systems;
- Addresses economic needs within the music industry in the form of the potential for employability, improved productivity and entrepreneurial skills; and
- Fulfils an academic need by broadening the structured music education framework.

5.3.1.4 Level

National Qualifications Framework Level 5.

5.3.1.5 Credits

A total of 120 credits will be assigned to the whole qualification. In order to accommodate prior learning, a minimum of 72 credits will have to be attained at NQF Level 5 with the remaining 48 credits at NQF Levels 4. This allocation will allow the majority of the adult learners, who are without formal qualifications and located in the Further Education and Training Band, access to this qualification.

5.3.1.6 Access to the qualification

All learners with a qualification at NQF Level 4 with Music as a major or who have the potential to pursue a study in Music, will be allowed access to the qualification. Learners who have acquired music knowledge and skills in non-formal and informal contexts at NQF Level 4 will have their prior learning recognized (RPL).

5.3.1.7 Organizing Field and Sub-Field for the qualification

Field: Culture and Arts (NSB 02)

Sub-Field: Music.

5.3.1.8 Learning assumed to be in place

The following competencies in terms of knowledge, skills and values are assumed to be in place at NQF Level 4:

- Language, Literacy and Communication;
- Basic Mathematic Literacy and Computer Literacy;
- Core music study areas (Music Performance, Music Theory, Music Composition).

5.3.1.9 International comparability

In order to check outcomes and assessment criteria, level of complexity and notional learning time, the learning outcomes of the Certificate in Music Technology will be compared with the following international qualifications to match the level of complexity in terms of knowledge, skills and values:

- Certificate in Music Technology Level 1 by the Technology Institute for Music Educators, US;
- National Certificate in Audio Visual Technology: Sound Technology by the Scottish Qualifications Authority;
- National Certificate in Music Technology (Level 5) by the New Zealand Qualifications Authority.

5.3.1.10 Integrated assessment

A combination of classroom work, essays, major projects, demonstrations and presentations need to be used to determine learner competence. This assessment is a continuous process undertaken throughout the programme. Assessors should also develop and conduct their own integrated assessment, pertaining to the specific and critical outcomes, in a manner which takes account of established assessment principles and makes use of a range of formative and summative assessment methods.

5.3.1.11 Recognition of prior learning (RPL)

The qualification can be achieved in part or completely through the recognition of prior learning. It will be the providers of education who will need to establish a policy and set in motion procedures for the recognition of prior learning.

5.3.1.12 Moderation

Moderation must include both internal and external moderation of assessment at the exit point of the qualification, unless ETQA policies specify otherwise. Internal moderation will take place by the programme manager. External moderation of coursework needs to be undertaken by academics or persons in the music industry that have a minimum qualification at NQF Level 6 in the Music Technology field. Alternatively, and especially with regard to the current lack of qualified moderators in South Africa, recognition of prior learning at an equivalent of NQF Level 6 should be allowed. Any institution offering learning that will enable the achievement of this qualification should be accredited as a provider with the relevant ETQA.

5.4 Outcomes

The outcomes of learning that are embodied in the exit level outcomes are the important milestones of achievement towards the completion of the qualification.

5.4.1 Exit level outcomes and assessment criteria

These exit level outcomes identified in this section represent the knowledge, competencies, attitudes and values which are flexible and transferable between contexts or problem situations. For ease of reference in cross checking the exit level outcomes and range statements against the assessment criteria, I have listed them in Table 5.3.

Table 5.3: Exit level outcomes and assessment criteria for the Certificate in Music Technology

Exit level outcomes	Assessment criteria
	<i>The learner should provide evidence of the following knowledge, skills and values in order to be declared competent:</i>
<p>Perform musical works, process music data, synthesize and edit music timbres using electronic musical instruments (EMI).</p>	<ul style="list-style-type: none"> • Connection of two or more music devices correctly to communicate with each other, taking into account one's own safety, the safety of others and the environment. • Performance of a melodic, rhythmic and/or accompaniment part using electronic musical instruments individually or with peers in a group demonstrating creativity and originality. • Improvisation of a melody, rhythm and/or harmonic progression in a diversity of music genres alone or in a group. • Creation of various tunings taking into account western, indigenous and other cultural musical temperaments. • Creation, synthesis and editing of timbres following systematically the principles of acoustics and sound design. • Identification of strengths, weaknesses and gaps in performance, processing, synthesis and editing and provide possible strategies to improve further practice/performance.
<p>Sequence (MS), write (MN) and perform (CBE) musical works using MIDI related hardware and software.</p>	<ul style="list-style-type: none"> • Composition of musical works embodying the principles of music composition, theory and harmony according to a logical process of data input, using MIDI hardware and software. The compositions will reflect a diversity of music styles and differing cultural genres. • Publish a printed music text using music notation software showing music notation design principles. • Performance of a diversity of musical arrangements, alone or in a group using music software in combination with other musical instruments. • Reflect critically on the process and product of sequencing, writing and performing identifying strengths, weaknesses and gaps and providing strategies for improving future actions.
<p>Operate basic computer information systems (CISLM) to enable the integration of music and technology.</p>	<ul style="list-style-type: none"> • Operation of basic information systems in terms of procedures such as the correct connection, installation, un-installation, exporting, importing, creating, editing and saving of data, use of Music Technology equipment, software and using standard hardware and software manual procedures. • Identification of possible problems in the operation and provide logical strategies to solve these problems heeding the safety of the individual and environment. • Explanation of the possibilities of correctly connecting different hardware devices to Music Technology devices and taking into account one's own safety and the safety of others.

continued overleaf

Table 5.3 (continued)

Exit level outcomes	Assessment criteria
	<i>The learner should provide evidence of the following knowledge, skills and values in order to be declared competent:</i>
<p>Create and produce musical products by applying multimedia packaging techniques and digital recording principles and techniques (MDM).</p>	<ul style="list-style-type: none"> • Creation of multimedia presentation in a group demonstrating the relationship of music to the arts and other disciplines, and taking cognisance of the different cultural genres. • Explanation of the processes involved in multimedia design and provision of alternative approaches. • Production of digital audio recordings according to the set systematic procedures for digital signal processing, storage, compression and decompression of audio data. • Critical reflection on the procedures followed in multimedia packaging as well as digital audio production providing strategies for improving future processes and products.
<p>Compose original music products, create and synthesize new instrumental timbres using computer-based hardware and software and fundamental programming skills (CM).</p>	<ul style="list-style-type: none"> • Composition of an original work using algorithmic composition software. • Creation, synthesis and editing of new patches/instrumental timbres using computer software. • Integration of new patches/instrumental timbres appropriately within an algorithmic composition environment to generate new compositions. • Evaluation of one's own composition and instrumental timbres and those of one's peers in terms of standard music composition criteria, principles of sound synthesis, alternate composition paths and setting new frontiers in the field.
<p>Engineer and produce audio products using audio technology (AT).</p>	<ul style="list-style-type: none"> • Engineer an audio performance within a "live" and studio context correctly in terms of signal flow, principles of acoustics, sound reproduction and enhancement and taking into account the safety of the audience and the environment. • Explanation of the logical procedures and processes followed in sound recording, mixing, processing and mastering. • Identification of possible problems associated with differing acoustic environments, audio equipment and providing appropriate alternative strategies for engineering of the performance. • Production of a complete audio product following the principles of tracking, overdubbing, mixing, processing and mastering and considering the safety of the performer(s) as well as recording engineer(s). • Reflect on the engineering and production process and products by identifying strengths, weaknesses and gaps and concisely providing strategies for improving future actions and products.

continued overleaf

Table 5.3 (continued)

Exit level outcomes	Assessment criteria
	<i>The learner should provide evidence of the following knowledge, skills and values in order to be declared competent:</i>
Collect, analyse, organize and critically evaluate information in Music Technology (R).	<ul style="list-style-type: none"> • Definition of a problem in Music Technology clearly taking into consideration the issues of relevance, and differing global, national, regional or local needs. • Writing of a research proposal clearly indicating the purpose, hypothesis, critical questions, research methodology, data collection procedures and issues of validity and reliability of data with regard to the research. • Explanation of the different approaches in research in Music Technology and identification of the appropriate approach within a given context.

In order for a qualification to be awarded, the learner has to meet the requirements stipulated by the exit level outcomes. The assessment criteria provide the mechanism for testing whether the exit level outcomes have been met.

5.4.2 Critical cross-field outcomes

The Certificate in Music Technology addresses the following critical cross-field outcomes (CCO) that contribute towards lifelong learning and are embedded in the exit level outcomes and assessment criteria for the qualification:

- CCO 1 Identify and solve problems relating to the connection and selection of Music Technology equipment and software.
- CCO 2 Work effectively with others as a member of a team, group, organization, or community.
- CCO 3 Organize and manage oneself and one's activities responsibly and effectively to maintain a logical working framework.
- CCO 4 Collect, analyse, organize and critically evaluate information acquired towards achieving a specific task(s).
- CCO 6 Use science and technology effectively and critically in the Music Technology environment, through the careful selection of electronic

analogue/digital equipment and show responsibility toward the environment and others.

CCO 8 Contribute to the full development of the learner and the social and economic development of the society at large, by making individuals aware of the importance of:

- i. Reflecting on and exploring a variety of strategies to learn more effectively;
- ii. Participating as a responsible citizen in the life of local, national and global communities;
- iii. Being culturally and aesthetically sensitive across a range of social contexts; and
- iv. Exploring education and career opportunities, and developing entrepreneurial opportunities within the Music Technology industry.

Providers of education will be guided by these exit level outcomes and assessment criteria towards designing learning programmes. Although the content of these learning programmes will differ, all evaluation will be conducted against the exit level outcomes and assessment criteria. Once the exit level outcomes have been met, the qualification may be awarded.

With reference to the proposed curriculum development model presented in Figure 5.1 for SGBs in qualification design, all five phases have been completed, namely:

- Analysis (Chapter 3.2, 3.3, 3.4 and 3.5),
- Identifying roles and competencies (Chapter 5.1.2.8),
- Title matrix (Chapter 5.3.1),
- Outcomes and assessment criteria (Chapter 5.4.1), and
- Purpose (Chapter 5.3.1.3).

This concludes the design of a Certificate qualification in Music Technology at NQF Level 5 based on the transformation requirements²⁴ of South African education policy. The credit allocation (minimum of 72 credits) for the exit level outcomes will have to be established by the providers according to their learning programmes and weighting of the exit level outcomes.

5.5 Summary

The generation of new qualifications within the transformational OBE paradigm requires an arranged marriage between policy and the field of study. It is clear that national education policy does affect the pedagogy of the field of Music Technology. This is discernable from policy expectations that are met in the exit level outcomes, RPL, access to historically disadvantaged learners, and the qualification being relevant to the demands of industry, fulfilling the needs of lifelong learning.

As illustrated in this chapter, the concepts relating to contextual as well as epistemological issues formed the basis of the conceptual framework that impacted on the qualification design in Music Technology. The new qualification had to then be located within the curriculum development process. This was achieved through the three-tier holistic curriculum development model in which the qualification design phase formed the first component. Using the design down process by taking cognisance of the study field, as well as transformational concerns as highlighted by national policy, the Certificate qualification in Music Technology was designed.

²⁴ In order to establish the transformational OBE approach one would need to compare this to the traditional approach so as to notice the difference. This qualification is transformational in that it:

- Integrates the worlds of curriculum, work and professional practice (see purpose of the qualification Chapter 5.3.1.3) and highlights the issues of relevance.
- Prepares the learner to be employable, and enriches social upliftment.
- Adopts the transformational OBE approach that is rooted in critical cross-field outcomes.
- Prepares the learner for lifelong learning.
- Takes into account indigenous knowledge systems.
- Recognizes prior learning (for music this is vital).
- Provides access to learners in the informal and non-formal sector.

The process followed in this study shifted the standards generation process from being a mere technician exercise towards an approach that is grounded in critical discourse which eventually produced a theory, by means of the conceptual framework for the future design of qualifications. The qualification design process adopted in this chapter, therefore, can be applied to any field of study that is located within a similar policy context.