

**An investigation into curriculum alignment
in building construction curricula**

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List of acronyms and abbreviations

ABCON	Association of Building and Civil Contractors
BGSCE	Botswana General Certificate of Secondary Education
BIDPA	Botswana Institute of Development and Policy Analysis
BOCCIM	Botswana confederation of Commerce, Industry and Manpower
BOTA	Botswana Training Authority
BTEP	Botswana Technical Education Programme
CDG	Curriculum Development Group
CPRN	Construction and Property Review Newspaper
CITF	Construction Industry Training Fund
DEBES	Department of Building and Engineering Services
DVET	Department of Vocational Education and Training
GTC	Gaborone Technical College
JC	Junior Secondary School Leaving Certificate
NEC	National Education Council
OBE	Outcomes Based Education
PAC	Programme Advisory Committee
QAA	Quality Assurance and Assessment Unit
SSC	Story Centred Curriculum
VET	Vocational Education and Training
UNESCO	United Nations Educational, Scientific Cultural Organization

Executive summary

The nature of objectives of vocational education and training (VET) in Botswana identifies it as a national strategy aimed at augmenting economic growth and development. This assigns importance to investments on VET as a form of investment in human capital targeted at the economy and specifically to meet labour market needs. Thus, educational accountability, prompted by economic, technological and structural changes is of great importance to the major stakeholders of VET.

This research examines a VET curriculum, specifically the Botswana Technical Education Programme-building construction curriculum, in regard to the degree of alignment between the curricula and the training needs of the building construction curricula. At the core of the research is the need to investigate the fitness for purpose of the curricula designed to provide skilled manpower to the building and construction industry.

The research results indicates that:

- there is a sharp contrast between the broad occupational needs of the industry and the focus of the written curriculum. The written curriculum is skewed towards the provision of training at the unskilled occupation levels while the human resource needs of the industry are within the technical and professional skilled occupational areas;

- vocational educators have developed the written curriculum at the micro level of the building construction industry, while the industry requires programmes to address macro level goals of the industry;

- the BTEP validation model presented responds to concerns of internal quality control processes in curriculum development (performing various vetting functions on the document). It does not provide overall guidance for alignment strategies to be used to ensure alignment of the curriculum and the training needs of the industry;
- the tension between employers from the industry on the one hand, and vocational educators on the other, stems from criticisms that vocational programmes are out-of-touch with the realities of the industry;
- VET educators are not acting as brokers of government policy. Government has a very clear policy on the role and purpose of VET and has provided a direction for the role of VET in this regard.

Further research needs to be concerned with the wider economic implications of having a supply driven VET sector as opposed to, at minimum, striving to create a balance between the supply and demand side of vocational training.

The VET sector in Botswana also needs to be concerned with building industry/education partnerships to address issues of workforce development. Future research needs to identify ways in which VET educators can maintain currency of knowledge and thus keep VET curriculum relevant.

Chapter 1

General introduction, statement of the problem and overview of the study

1.1 Introduction

Vocational education and training (VET) is currently under scrutiny in Botswana and there is implicit tension between the three major stakeholders: government, employers and vocational educators.

The government needs to improve strategies to respond to the manpower needs of the country and, VET is seen as a means of providing these necessary skills. This type of economic argument influenced by both the social efficiency and human capital theories is used in favour of VET and remains important in political debates and a powerful influence on economic and education policies.

Vocational educators have an interest in providing knowledge and skill to learners, while being pressured by prevailing economic and social conditions to respond to the challenges of the relatively high levels of unemployment and the demand for a more flexible and skilled labour force.

Employers on the other hand, prompted by industry sectors need to boost percentage growth rates in their respective sectors. Adequate and appropriately trained skilled workers, particularly citizens, will help to provide this. Employers are concerned that the perspective of educational planners is focussed inwards on the education system and not on the needs of the industry with regard to providing the required specialized manpower.

Botswana Training Authority (BOTA), the regulatory body for VET, reinforces the need for negotiating interests of the stakeholders in education in line with the government's national development plans and the vision for Botswana. The role of this organization is to promote partnership in the development of programmes to ensure that there is alignment and that programmes developed are in line with government's policy of diversification and meets the needs of employers.

1.2 The context of VET in Botswana

Purpose

Within the context of Botswana, VET is seen as a key contributor to the development of a competent national human resource. Botswana's vision is to increase the skills level of its work force for effective participation in the global economy and knowledge society. Consequently, the role of VET in this regard, has specific social, economic and political purposes. This vision of VET overshadows the traditional view of VET as an alternative route in the education structure and places an emphasis towards a greater gain.

The core responsibility of VET is outlined by the Ministry of Education as, “. . . *life-long education and training that is relevant and responsive to the rapid technological development and the changing socio-economic environment*” (Ministry of Education 2001:3). Specific goals in relation to VET are:

- to produce employable and self-employable individuals; and,
- to increase skills levels for effective participation in the global economy and knowledge society.

In respect of these goals, curricula at all levels will have components of VET curricula. Specifically at the post school level, VET programmes will be geared to meet the demand of the current and future economic needs.

This role of VET is embedded in the theme of the 9th national development plan 2003 – 2009 'Towards Realisation of Vision 2016: *Sustainable and Diversified Development Through Competitiveness in Global Markets*. A focus of Botswana during this period will be on human resource development (skills, knowledge, attitude and values). This focus intertwines the political, social and economic roles of VET. The challenge for Botswana will be on how to use VET to prepare a skilled labour force for the 21st century and its subsequent use in the contribution to economic diversification and economic growth. This is understandably a big challenge given the small size of the Botswana market in relation to global competitiveness and its national development plan based on diversification of the economy.

This discussion on the 'context of VET' will be continued in section 2.4 with a focus on the challenges regarding the nature of VET, curricula, types of VET programmes, government investment and initiatives, and future plans.

1.3 Theoretical framework

1.3.1 Introduction

An understanding of philosophic positions or knowledge bases of the past is critical for curriculum leaders as this leads to decisions of restructuring or refining education systems. Philosophy embodies what the curriculum developers value, and in the case of Botswana, what policy makers value and want measured. Wiles and Boni (1993:41) suggest that there are essential questions that override the value choices of major educational philosophies:

- (1) “What is education for?” and,
- (2) “What kind of citizens and kind of society do we want? ”.

In the context of Botswana a vision has been created for the society at its 50th year of independence, “by the year 2016, the education system will empower citizens to become the best producers of goods and services” (Vision 2016 Document, 1997:2). The Vision 2016 document guides the policy direction and creates a vision of VET in terms of purpose and practice.

1.3.1.2 Philosophic perspectives of VET

The debates on the purpose of VET have changed very little since the early part of the 20th century when the debate centered on the place of VET in public education. Snedden and Prosser, social efficiency advocates argued that VET should respond directly to specific labour force needs identified by industry (Drost 1967 in Hyslop-Margison 2000:2). On the other hand, Dewy (1916: 308) argued that VET should be designed to meet the individual needs for personal fulfilment and preparation for life. These dual themes are deeply entrenched in creating a philosophic platform for VET in Botswana.

Of the philosophies which have influenced education (post modernism, reconstructionism, progressivism, essentialism, perennialism and pragmatism) three underlie the practice of VET. These are reconstructionism, essentialism and pragmatism. In the case of Botswana there is considerable evidence of the arguments and philosophy of the essentialism and pragmatism (dualism of philosophy) in documents which guide education policies.

(a) Essentialism (based on the premise of social efficiency theory), i.e, education should meet the demands of the labour market.

The Revised National Policy on Education 1994 states that,

education should prepare Botswana for the transition from a traditional agro-based economy to the industrial economy that the country aspires to.

The Vision 2016 document 1997 states that,

.... by 2016 Botswana will have a system of quality education that is able to adapt to the changing needs of the country as the world around us changes.

(b) Pragmatism

Arguments on the basis of pragmatism as advocated by John Dewey also influence VET in Botswana. Elements of pragmatism are included in the revised national policy on VET, where access and equity in VET is given priority. Access is emphasised in stating that programmes should be developed at higher skill levels and that a wider range of programmes should be made available. This is in line with the concept of '*education for all*' in Botswana, as this simultaneously means '*vocational education for all*' (DVET, 1992:4).

While improvements in the relevance, quality, and access to education lie at the core of the vision for the future for Botswana, it is the scope and purpose of VET in Botswana which will determine the dominant philosophies which will prevail. VET in Botswana is connected through broad areas of social, economic and pragmatic platforms.

1.4 Background to the research

The implicit tension between the three major stakeholders of the VET system awakens concerns with regard to the external accountability of the VET sector. Educational accountability here refers to concerns from the major stakeholders, in particular the employers, regarding what students know and can do as a result of their educational experiences.

Several studies, (NEC Report 1997, DVET Report 1992, Survey of Private VET Institutions 1997, Revised National Policy on Education 1994) indicate that employers from various trade

areas in Botswana found that further training was needed for new graduates to adapt to their work environments. The general criticism was that the present education and training programmes were failing to meet the practical requirements of employment.

VET curriculum thrives on relevance, and in an effort to evaluate this relevance, this research thesis will use the concept of curriculum alignment as put forward by Glatthorn (1997:26-34), to analyze the level of alignment between the BTEP – building construction programme and the training needs of the building and construction industry.

Schank (2002:1-15) advocates that every good curriculum should tell a story. The story should be one that the graduates of such a program might actually do in real life or might actually need to know about possibly because he/she is likely to manage or work together with someone who performs that role. *This is known as the story centered curriculum (SCC).*

The concept of the SCC could be used to promote educational accountability and relevance with regard to developing and implementing curriculum to ensure alignment to labour market needs.

Similar to the arguments of Schank's story centered curriculum is the *international vocational education standard model* proposed by Mansfield (2001:31). The model proposes that training standards should be developed with a close link to labour market needs. These standards should be based on;

- (a) employment specification – what the learner needs to be able to do in employment and,
- (b) learning specification – what the learner needs to learn to be effective in employment.

Curriculum alignment as used in this research thesis will embrace the concept of the SCC and the proposed international model for development of standards to examine the relevance of the

BTEP-building construction curriculum. A more detailed discussion of curriculum alignment is presented in the review of literature, section 2.7.

1.5 Problem formulation and research questions

The purpose of this study is to investigate the degree of alignment of the BTEP- building construction programme with the training needs of the construction industry. The problem statement was formulated against the background of concerns from representatives of the building construction industry regarding lack of trained labour (citizens) within the industry and the subsequent impact this has on the industry (Muluzi 2003; SATRN working paper 2003).

The researcher will therefore, question the relevance of BTEP-building construction curriculum as a response to providing a more skilled workforce to the Botswana building and construction industry. At the core of the research is the need to find out, *'To what extent is there alignment between the BTEP curricula and the training needs (broad occupational) of the construction industry?'*

The research findings will be used to inform the curriculum development team of the strengths and or weaknesses in the design and content. It could also be used to determine if the programme aims, goals and objectives address training needs within the industry.

Research questions

The research has two questions and one sub question. These are:

1. To what extent is there alignment between the BTEP building construction curricula and the training needs of the building and construction industry?
 - 1.1 What are the human resource needs within the building construction industry for the next 5 – 10 years?

2. What processes are used to ensure alignment of the BTEP- building construction curriculum to the training needs of the building and construction industry?

1.6 Research design and methodology

The research design will use a qualitative approach. Qualitative research in this context will place an emphasis on understanding the views and experiences of selected research respondents regarding the level of alignment between the BTEP curricula and the training needs of the construction industry.

1.6.1 Data collection methods

The research will use two data collection methods, (1) interview and (2) document analysis.

Interviews

The interview as a method was chosen because of its fitness for purpose. This method allows those being interviewed to relate their personal experiences in context of the wider research topic. The researcher is interested in understanding their experiences and in comparing varied experiences to provide comprehensive and credible data. The interview method allows the researcher to be actively involved in the data gathering process and to explore in depth the experiences, motivations and reasoning of the research respondents.

The research will use the semi-structured interview format where the interviewer plans a general structure of questions by deciding in advance what main areas/main questions will be covered in the interview.

The design of questions is an important feature in gathering data for this research. Therefore the open-ended question format which allows a greater degree of interaction in the interview process and which allows for immediate clarification will be used. With the open-ended design

of questions, probes and prompts will be used to encourage response, to encourage response in greater detail and to allow for clarity for both the researcher and the respondents.

The pre-planned questions will allow the interviewer to structure the interview. Probes and prompts will ensure that the interviewee has a degree of freedom regarding what to talk about, how much to say and how to express ideas/thoughts/comments.

The semi-structured interview method will be explored further to allow for group interviews with two (2) to three (3) persons. However, the process will begin with one-to-one personal, intensive interviews. The researcher will request permission to record the interview sessions.

Document analysis

Document analysis as a research method pertains to the process of examining and understanding the contents in documents from a source external to the researcher. Document analysis is chosen as a complimentary research method to the interview because of the value of this method in providing relevant data through building on past research. The researcher is therefore interested in using this process because it forms a resource base from which data gathered during this research can be legitimated, can be refuted or can be corroborated. This researcher will use the following documents:

Documents	Type of data	Research questions
internal data		
the written curriculum (BTEP – building construction curriculum)	description of the curriculum	1, 1.1
reports and minutes of meetings: from the curriculum development team, programme advisory team, team meetings of lecturers and assessors	recommendations and selection of content areas written curriculum, data on the delivery and implementation issues regarding delivery of the curriculum	1, 1.1, 2,

external data		
articles from the media sources – relevant to the building and construction industry in Botswana, specifically, but also regional and international	articles published on the building and construction industry in Botswana as well as regionally (SADC) and general articles about the construction industry internationally	1, 1.1, 2,
data from journals, text books	articles written on any of the themes and or concepts within the context of this research	1, 1.1, 2,
data from government agencies within and external to Botswana		
data from International agencies, eg. ILO, UNESCO, World Bank		

Table 1.1 Research data sources

The researcher will be keen to evaluate the authenticity of these documents as well as ensuring that the data are fit for purpose with regard to dates, accuracy and relevance.

1.7 The research population and key sample groups

Sampling strategy

The researcher will use purposive sampling to select respondents for the research sample. Purposive sampling is selected to provide the researcher with the opportunity to increase the range and scope of data and also to select the experiences with the right focus for the research. The research population will comprise of the following groups:

Description of research sample	Experience with the curriculum/data expected
building and construction companies which offer work experience places to candidates on the programme and which are involved with the verification process of the programme. Referred to as industry representatives	they would be able to make an assessment of the relevance of the written curriculum to the industry.
BTEP curriculum development group Referred to as the CDG	experience with the development processes of the written curriculum.
candidates pursuing the BTEP building construction programme. Referred to as candidates.	day to day experience with the written curriculum of the BTEP – building construction programme.
lecturers -staff implementing the curriculum (teaching and assessing). Referred to as lecturers.	day to day experience with the development, delivery and implementation of the curriculum.

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Table 1.2 Description of research population

1.8 Validity and reliability

To ensure trustworthiness of the data gathered the researcher will seek to use the following steps:

- use of a carefully designed semi- structured interview schedule to ensure that wording biases are eliminated, questions are direct and focused, the items reflect the aims of the research, the language and reading levels are appropriate to the respondents;
- use of purposive sampling to carefully select respondents with relevant experiences within the framework of the research context;
- review documents relevant to the context of the research being mindful to check accuracy and authenticity of data sources and the data itself;
- interpret and report research findings as per the data analysis plan developed;
- seek permission to tape/record interviews;
- use of respondent validation/member checks and peer feedback.

1.9 Data analysis

The research will use inductive data analysis techniques to interpret data gathered from the multiple sources indicated in the research sample as well as from sources identified in the analysis of documents. Inductive data analysis techniques will enable the researcher to describe the data sets in more detail and to ease the process of logical development of arguments. The specific techniques which will be used is the constant comparative method.

This method is introduced in more detail in section 3.5

1.9 Research constraints

Research constraints will be discussed in sections 3.9 and 5.4.

1.11 Overview of the research

The first chapter provides general introduction and background information on the research as well as providing a context of the vocational education sector in Botswana. The research problem and specific research questions with brief information on the research design are discussed.

Chapter two through the review of literature introduces and discusses definitions of curriculum, vocational education and training, focusing on the challenges occurring specifically in Botswana, and the responses being sought to address these. The chapter also introduces the building and construction industry, which is the main focus of the research.

Chapter three outlines in depth the research design and methodology used to investigate the level of alignment between the building construction curriculum and the training needs of the industry. The research respondents, data collection sources, and methods are described. Issues of data analysis procedures, validity and reliability are explained in an effort to show transparency of the processes and to encourage confidence in the research processes.

Chapter four is the presentation of research findings on the research questions. The presentation is structured through the use of themes which emerged from the data analysis procedures as well as those designed in the research process.

Chapter five discusses the research findings through wider issues of its implications of external educational accountability. The chapter also provides a section on limitations in the research design and recommendations for future research.

Chapter 2

A review of literature on current development and reforms with particular reference to vocational education and training (VET) in Botswana

2.1 Introduction

The review of literature is located within the context of vocational education and training (VET) as the VET curriculum forms one of the central themes of this research thesis. This chapter focuses on the concept of an extended view of curriculum alignment with a view to investigating the level of alignment of the BTEP-building construction curriculum to the training needs of the building construction industry.

The chapter also discusses orientations of curriculum through ideas of its key dimensions, conflicting conceptions and trends in its definition. These definitions are located within a broader discussion of contrasting theories and perspectives shaped by views presented by curriculum theorists since the 19th century.

2.2 Defining curriculum: key dimensions and concepts

A growing body of expert opinion has been guiding our understanding of curriculum since the early 19th century, yet scholars of curriculum have not agreed on a precise definition. Ornstein (1993:1) states that curriculum as a field of study is elusive and fragmentary and what it is supposed to entail is open to a good deal of debate and even misunderstanding. While Smith and Lovat (2003:xi) expressed a similar opinion, the key issue is the fact that multiple meanings were expressed through different educational contexts. To understand more

adequately the broad range of beliefs written of curriculum, it may be useful to relate some of these conflicting conceptions, indicated in table 2.1

concepts of curriculum	controlling Mode	function
cumulative tradition of organized knowledge	"permanent" studies "essential" studies and skills established disciplines	cultural inheritance skilled learner specialized knowledge production
modes of thought	disciplinary inquiry reflective thinking	specialized knowledge production personal – social problem solving
race experience	cultural norms for thinking and acting	cultural assimilation
guided experience	community life felt needs	effective living self-realization
planned learning environment	(electic)	facilitative education process
cognitive/affective content and process	(electic)	gain knowledge, develop skills alter affective processes
instructional plan	stated intentions for instruction	(eclectic)
instructional ends	identification of ends* (*maybe construed as behavioural objectives)	attainment of measurable ends

Table: 2.1 Conflicting conceptions of curriculum

Source: D. Tanner and L. Tanner (1980:37)

D. Tanner (1980) and L. Tanner (1980:38-40) saw limitations of each view presented, and argued that given the dynamic nature of knowledge, education should have bound beyond itself, and put forward the following definition:

Curriculum is that reconstruction of knowledge and experience systematically developed under auspices of the school (or university) to enable the learner to increase his or her control of knowledge and experience.

One of the interesting challenges in seeking to present and concur with a definition on curriculum is the breath of information provided on curriculum as a concept. Each definition emphasizes different priorities and avenues to further thought.

2.2.1 Trends in defining curriculum

The way we conceive of curriculum influences the way we think, develop and present curriculum. Smith and Lovat (2003:9) suggest that there is an underlying politico-economic

philosophy which impacts on education and curriculum. In presenting this argument they add another dimension from which to view curriculum, that is, to look at trends in its definition. Each definition of curriculum is set at a particular time within a particular socio-political and economic context. In the context of curriculum development in Botswana, this trend of defining the curriculum is also true. This view is shared by Pandy and Moorad (2003: 145 -147), in their description of pre-colonial and colonial education in Botswana, which they described as, “along the lines of *social stratification and saving souls rather than improving economic and social life*”. However, in post-independence Botswana (1977 onwards), curricula have an emphasis of education for ‘Kagisano’ (social harmony), equipping individuals to participate effectively in the society.

Trends in defining curriculum also involve defining curriculum by the type of design. This study focuses on a vocational curriculum and VET curriculum lends itself to the dominant use of the technical curriculum design. With the technical curriculum design, knowledge is organized around the analysis of performance task and process sequencing.

Each curriculum design provides an economical basis on which to examine curriculum through ideas of curriculum purpose, content, method, organization and evaluation. To analyse and discuss all the designs would be a massive undertaking and beyond the scope of this research. However, it is perhaps timely to consider the working definition of curriculum to be used in this research.

2.2.2 Working definition of curriculum

The definition provided by Tanner and Tanner (1980:38-40) will guide our discussions and provide focus towards a working definition of curriculum.

Curriculum is that reconstruction of knowledge and experience systematically developed under auspices of the school (or university) to

enable the learner to increase his or her control of knowledge and experience.

This definition invites curriculum developers to a wider platform from which they may share their views and shape the design of curriculum. The working definition will embody curriculum as a formal process, 'under the auspices of the school'. It will embrace a more global view to include aspects of informal education - learning experiences outside the formal process of the school as alluded to by Finch and Crunkilton (1993:5), and shown in figure 2.1 Such a view embodies the personal development of the individual with regard to preparation for the role as citizen of a country. Within the context of Botswana this global view of curriculum is presented as a vision for the future and is seen as a reinvigoration of the five national principles in the curriculum. These are democracy, development, self-reliance, unity, and botho.

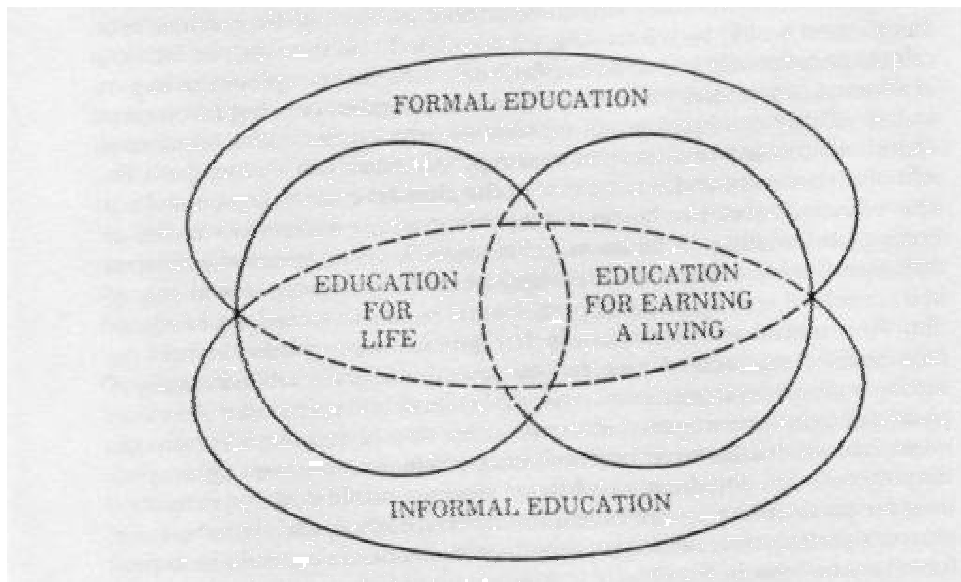


Figure 2.1 Working definition of curriculum

source: Finch and Crunkilton (1993:8)

For the purpose of this research, the focus of curriculum will be on the documents which have been formally constructed to provide the content areas and contribute to learning experiences of BTEP-building construction programme. Specifically, the research will focus on relevance of the content. Content is considered on the basis of what is selected for teaching/learning in regard to the training needs of the building construction industry.

The curriculum being examined in this research is a VET post school curriculum. It is therefore important to share ideas on ways of identifying VET.

2.3 Towards a definition of vocational education and training (VET)

Several assumptions, both explicit and implicit underlie the concept of VET. There is therefore a need to explain the concept and to examine the current context in which VET is placed in Botswana.

Early foundations and identification of vocational education have its roots in the apprenticeship programmes. With the apprenticeship programme, curriculum was organized with basic knowledge developed in classroom settings and learners placed with an experienced tradesman for applied skill practice (knowledge, attitude and knowledge of specific trade) as a way of knowing. The learning-teaching process involved mainly observation and imitation. This historical perspective of VET identifies it as *a way of knowing*.

VET in Botswana is also identified by the role it serves, its purpose. Several purposes may be identified, among them broader categories of political, economic and social. As an economic policy, VET is used to support business growth and competitiveness by providing highly skilled workers to meet the workforce demands of the technological and knowledge economy. As a social policy, VET is used to address concerns of unemployment and training through the provision of useful skills to the unemployed, thus enabling them to find productive employment. The economic arguments used in Botswana imply that training for the type of skills which match the demand for labour market will increase productivity and contribute to national economic development. Additionally, Atchoarena and Delluc (2002:38) in reflection on VET in Sub-Saharan Africa, identified VET with economic and social purposes. These included the

fight against poverty and the integration of young people into the working world. Thus the major objectives which would be pursued by countries are, to train the workforce for self employment and to raise the productivity of the informal sector.

In providing perspectives of VET in Africa, Yamada (2001: 92) cite Ideological motivations of VET. This includes providing a wide variety of subjects to make VET more attractive to youth and lead to a change from aspirations for white collar jobs to manual employment. Botswana also uses this concept, but greater emphasis is placed on its use not in terms of ideological motivations but rather for 'creating access for all' leading to diversification of the economy and sustainable economic development.

The American philosopher, John Dewey, (1916:307) conceptualises vocational education as an enabling force. In his view, vocational aspects of education gives learners the power to choose their vocation in life. In this regard VET enables individuals to be prepared for effective participation in the world of work and citizenship. Similarly in Botswana, for the individual, VET "mediates the opportunity for livelihood, i.e. gives material security, personal identity and the chance for social integration" (Department of Vocational Education and Training 1992:14).

The changes in the new relationships introduced between man and his work through the current scientific and technological revolution presents yet another way of identifying VET. While Moodie (2002:252-254) relates this as teleological characteristics of VET, UNESCO indicates this perspective of VET as crucial to achieving the Millennium Development Goals.

To this end UNESCO has reconceptualised its view of VET against the backdrop of the emerging challenges of the 21st century. UNESCO's view of VET now embodies a shift from the narrow task of VET of providing occupation and industry specific skills to a broader role

of, “workforce development and life-long learning for sustainable development and citizenship” (UNESCO –UNEVOC bulletin 2004). The specific view of VET as promoted by UNESCO states,

‘ . . . VET of the future must not only prepare individuals for employment in the information society, but also make them responsible citizens who give due consideration to preserving the integrity of their environment and the welfare of others’ UNESCO (1999: 5).

A pragmatic view of VET lies in viewing it as, liberal vocationalisation, neither academic nor occupationist, a practical curriculum which takes into account the emergence of new forms of knowledge and changes in the nature of work (Mansfield 2004; Silver and Brennan 1988 in Yeomans, Dewey 1916).

Botswana’s own pragmatic view of VET, outlines that, “for the society as a whole VET is a substantial precondition for economic growth, equity or social opportunities and social change” (Department of Technical and Vocational Education 1992:15). Within Botswana, VET cannot be practised in isolation.

Moodie (2002:260) makes a salient point in offering an alternative approach to identifying vocational education and training, when he creates his own hybrid of VET. For him it would be problematic to identify VET on the basis of one characteristic. He suggests identifying VET on a unique combination of characteristics: epistemological (its theory of knowledge), teleological (the purpose it serves) and pragmatic (neither academic nor practical).

2.3.1 Working definition of VET

A comprehensive view of VET, similar to the views expressed by Moodie’s unique combination of characteristics above, will be used in this research (Moodie 2002:249-263). The working definition embraces perspectives of VET being a pivotal force in the preparation for effective

participation in the world of work and for responsible citizenship. This idea aligns VET to strategies and the processes of human resource development and not just an alternate stream in the educational sector.

The working definition also presents VET as an enabling force towards the competitiveness of nations. Additionally, it embraces the restructured thoughts of UNESCO as a major catalyst in achievement of the millennium development goals.

The perceptions of VET give rise to questions of the VET curriculum. The next sections will therefore consider the challenges within the VET sector.

2.4 The context of VET in Botswana – challenges within the VET sector

(a) The nature of VET

The VET system in Botswana is characterized as reactive in nature, i.e. developing courses/programmes to fill immediate skills gaps. Figure 2.2 explains the task and the challenge for a more proactive VET system towards realization of the expanded vision of Education for All -Jomtien Framework 1990, and the vision for Botswana. Both cover the need to provide formal education activities for citizens who need to be equipped with a range of skills as a strategy for prosperity for all and preparation of personal fulfilment in life.

A proactive VET system should be able to:

- identify skills needed in the short, medium and long term;
- Identify strategies to develop, hone and retain these skills or alternatively to fill knowledge and skill gaps based on changes in the population.

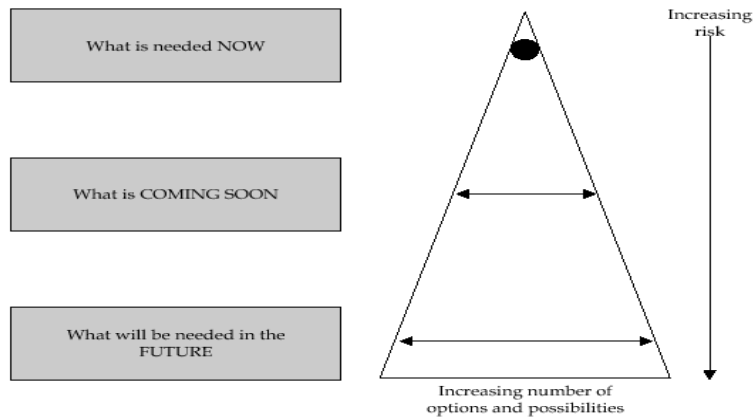


Figure 2.2 : Challenge of VET system in Botswana

source: Mansfield (2001:9)

Botswana is cognizant of the fact that the pace of educational change has lagged behind the pace of national development and that education has not been adequately geared to the needs of the country and the job market. A more proactive VET system is necessary, particularly at a time when one of the prime economic concern is built on diversification of the economy.

(b) VET curricula

One decade after independence, with the formation of a National Commission on Education, the commission reported that, “ . . . there are fresh demands in terms of attitudes, skills and abilities, but the education system has been slow in responding to this”. Additionally the report states that education in Botswana must be organized to serve development needs identified in successive national development plans. Specifically, the education system should, “produce productive citizens capable of manning the existing positions in the economy and of creating new opportunities for self-employment or employment of others” (National Commission on Education Report 1976: 1-26).

Twenty-three years later, as a response to the NEC report, in 2000 the Department of Vocational and Training (DVET) introduced a new national qualification, the Botswana Technical Education Programme (BTEP). The purpose of the new qualification is, to

qualitatively and quantitatively improve the provision of post school pre-service and in-service vocational education and training to alleviate skills shortage in a diversifying economy.

As at 2004, Botswana holds the 62nd spot (of 101 countries) on the rankings for business competitiveness. Business competitiveness criteria look at productivity, labour market, finance, management practices, attitudes and values (World competitiveness year book 2004). This holds an alarming reality for education policy makers as in other words, this means that 61 other countries are functioning on higher educational and technological levels than Botswana in the world markets. These rankings provide an appreciation of the areas for development and specifically where emphasis should be focused to improve the competitive edge. The position of 62 on the rankings for business competitiveness provides enough room for concern for training with reference to skills, knowledge and competencies provided to enhance labour force requirements. In a keynote address given by the vice Chancellor of University of Botswana, he challenged educators to “draw up programmes that address difficulties that Botswana face” (Botswana Daily News August 26, 2004:7).

(c) Management of VET

The responsibility for VET is shared amongst several providers both public and private. Post school VET is managed by the stakeholders listed below:

- (a) Ministry of Education with the DVET being the main provider. Programmes are offered through technical colleges and vocational training centres.
- (b) Local communities, with technical and financial assistance from Government, (specific reference to Botswana Brigades).
- (c) The Ministry of Labour and Home Affairs, which has responsibility for the management of the apprenticeship programme, (delivery and Implementation are shared with DVET).

- (d) Third level VET is offered by the University of Botswana through (i) the Faculty of Engineering and Technology, (ii) National Health Institute, (iii) College of Agriculture and other Government departments (e.g. the Roads Training Centre in the department of Roads Transport and Safety, Botswana Institute of Administration and Commerce and Botswana Defence Force). Programmes are offered from certificate to diploma levels -inclusive of technician level programmes.
- (e) In addition, there are private vocational schools registered with the Ministry of Education and the Botswana Training Authority.

This shared responsibility of VET heightens concerns for the administration of the VET sector. At present there is need for clarity of roles between the bodies established to oversee the VET sector. These are the Botswana Training Authority, the Tertiary Education Council, Ministry of Labour and DVET.

(d) Types of VET programmes

Figure 2.3 indicates the programme levels within the formal education structure being offered in Botswana.

- The *academic route (1)* at the tertiary level is managed by the university of Botswana. The Ministry of Education has primary responsibility and day to day management of the BGCSE (equivalent to the O'Level qualification) and the Junior Secondary School Leaving Certificate through the Department of Secondary Education.
- The post school –VET *college-based programme (2)* is also the responsibility of the Ministry of Education, through DVET.
- The Ministry of Labour has primary responsibility of the *apprenticeship programmes (3a and 3b)*.

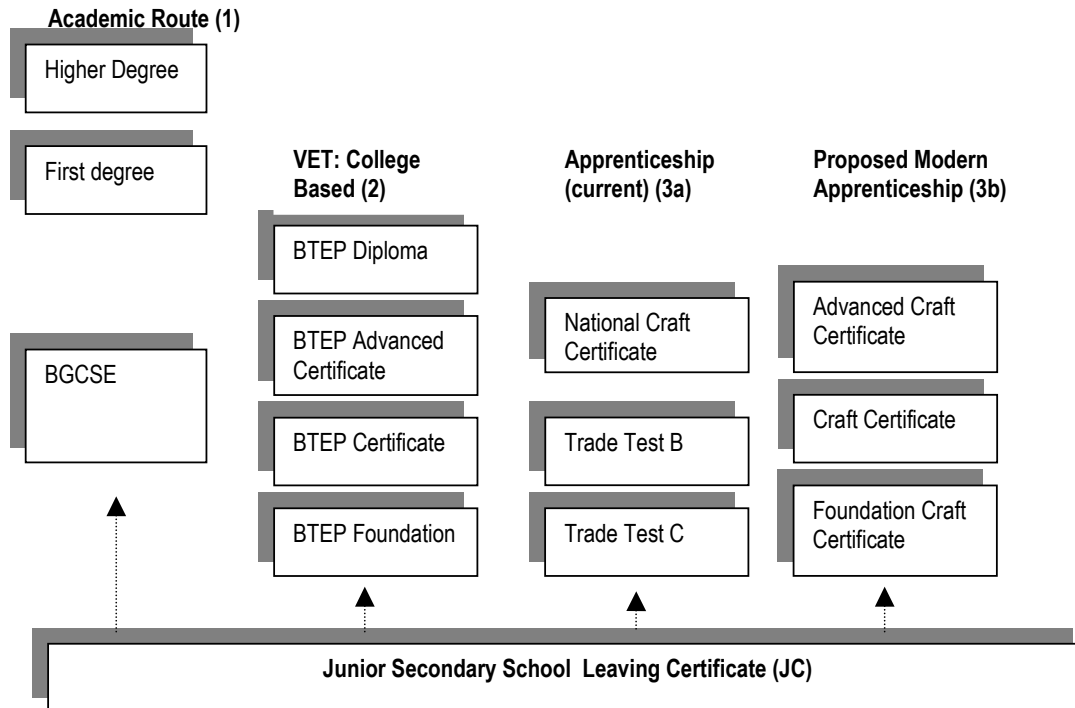


Figure 2.3: Botswana education structure

2.4.1.1 Government initiatives and investment in VET

Investment in VET is a priority of the Government of Botswana as human resource development is seen as indispensable for economic diversification and creation of employment. To achieve its vision for the year 2016, Botswana requires a total annual net flow of trained citizen manpower of 40,250 between 2000 and 2010, distributed as follows: commercial, clerical, business & public administration (27%), education training (18%), transport and communication (15%), craft trade and industrial programmes, construction trades and engineering and allied programmes (each around 10%), others (total of 30%) (BIDPA 2001). In acknowledging its responsibility the government has:

developed new national qualifications

- the Botswana Technical Education Programme, with four levels of qualification
- the Botswana National Vocational Qualification (BNVQ) to be offered at three levels

established a teacher training college for VET (1999) to train its own citizens, thus reducing its reliance on expatriate teachers

Increased availability and access to VET programmes

- enrolment by women now generally accounts for 40% of places in all six technical colleges
- expanded infrastructure in its six (6) technical colleges
- work- in- progress for upgrading of other facilities to technical college status
- completed design work on two new colleges of Applied Arts and Technology (expected to be completed by 2009).

established regulatory bodies and developed act and policies

- Botswana Training Authority
- Botswana Tertiary Education Council
- Botswana Examinations Council
- National Policy on Vocational Education 1977
- Vocational Training Act enacted in 1988.

2.4.1.2 Future plans

Policy documents acknowledge substantial concerns about the quality, access and fragmentation of qualification in the system. To this end there are discussions regarding the establishment of a National Qualifications Framework and the development of a national human resource development strategy. This will ensure alignment of a skills development strategy to the economic development plan. Targets have also been set for the establishing and incorporating of quality assurance framework, strengthening partnerships with industry and the wider community in the development, and implementation of curriculum.

One recent development in the VET sector in Botswana is the introduction of the, Botswana Technical Education Programme (BEPT). This new qualification will be discussed in the next section.

2.5 The Botswana technical education programme (BTEP)

2.5.1 Introduction

This research paper uses the BTEP – building construction programme as the focus of the study on curricula alignment. It is therefore necessary to provide information to give an understanding of the new qualification.

2.5.1.2 The new national qualification

The BTEP introduced in the year 2000 is the first response of an OBE curricula in Botswana. It marks a major shift in the development of curriculum in Botswana in that, this is the first national VET qualification developed in Botswana by its own people. The BTEP is promoted as a response to the diagnosis of identified weakness in VET curricula and is an attempt to align VET curricula more closely to the needs of industry.

OBE is introduced from a policy perspective stated in the strategic plan of the Ministry of Education 2001 – 2006. This is identified as Goal 3.3, “to provide quality education and training through relevant responsive and outcomes based curricula at all levels of the education system by January 2006”. BTEP has introduced elements of the OBE system in the development of its curriculum. (Much of the emphasis on elements of OBE practices is placed on the writing of the content areas (learning outcomes for each unit). However, OBE in Botswana is in itself still unclear, since a curriculum policy document has not been formulated by the Ministry of Education nor has a decision been taken on approach to be taken within the broad philosophy of OBE.

The BTEP qualification through its initial proposed offering of 25 programmes (refer to Appendix 1), is developed to meet the country’s economic and development objectives for the

21st century. The curriculum has variations of the reconstructionist view of education, where a vision of what the society will be is outlined and the role of the TEVT sector is underscored and stated in all policy documents which drive the education process. The programme is based on economic premise that the country's economic performance is linked to the level of skills and ability of the nation's workforce. This is similar to economic arguments for the development of technical and vocational education initiative (TEVI) and GNVQ in the UK.

2.5.1.3 The purpose

BTEP *aims to produce flexible, adaptable, multi-skilled and trainable young people for employment* (Department of Vocational Education 1999). The qualification mandates broad vocational, rather than specific job training and an integration of academic and vocational content. This is similar to the Carl D. Perkins Vocational and Technology Act of 1990, USA, which requires programmes to provide students with a general understanding of 'all aspects of the industry'.

Figure 2.4 shows the qualification structure. Each level of the programme offers an exit qualification and forms a building block to another level of the qualification within or external to the structure as well as to the world of work.

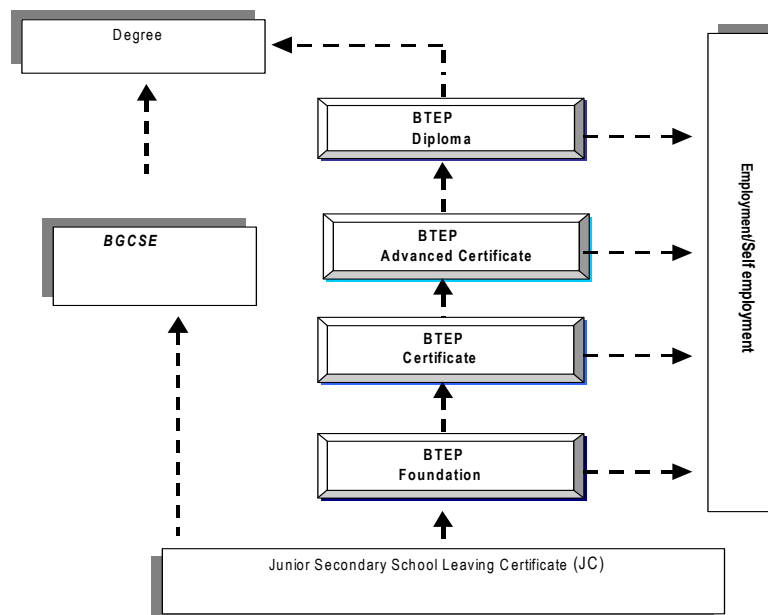


Figure 2.4 : BTEP qualification structure

Source: DVET 2001

The BTEP programme and in particular the curriculum of the building construction programme will be discussed further with regard to the degree of curriculum alignment to the training needs of the building and construction industry. The specific discussion will focus on the relevance of the curriculum in fulfilling its purpose to provide a skilled labour force for the industry (sections 2.9 – 2.10).

2.6 Conceptual framework

2.6.1 Introduction

The need to develop VET curriculum to meet the demands of the economy is one of the challenges highlighted in the National Policy of Vocational Education and Training. A reform, if you will, with regard to content and direction of curricula. The policy document states that emphasis should be placed on developing curricula with adaptability to technological change, increased productivity, and diversification of the economy (Botswana 1997).

2.6.1.1. The background

Observations from employers that VET graduates display substandard performance prompted Botswana Training Authority to have a consultative meeting to provide employers with an invitation to, 'influence what the VET system should deliver' (Botswana, Daily News, March 31, 2004 : 6). These observations and comments have been reported since 1994. Specifically, findings from research conducted 1994 – 1997 on VET curricula in Botswana, state that participants of the programmes (qualified artisans) thought that VET curricula was not providing adequate practical skills, knowledge of work and work experience. Employers who participated in the research concurred with this statement and added that graduates only had theoretical knowledge and were unable to function on their own at the workplace.

This research will put forward the use of an expanded concept of curriculum alignment (Glatthorn 1999: 26-34), juxtaposed with the story centered curriculum (Shank 2002: 1-15), and the international vocational education standard model proposed by Mansfield (2001:31) to analyse the level of alignment between the BTEP - building construction curriculum and the training needs of the Botswana building construction industry.

2.6.2 Curriculum alignment

2.6.2.1 The generic concept

The term curriculum alignment gained prominence through details of the book, 'Deciding what to Teach and Test: Developing, Aligning and Auditing the Curriculum,' written by Fenwick English in 1992. For English, the term ensures that three elements, the teacher (the taught curriculum), the test (the tested curriculum) and, the curriculum (the written curriculum), are

connected, are *aligned*. His analysis involved the use of two methods of establishing and ensuring a fit between the written, the taught and the tested curriculum.

In later years the concept of curriculum of alignment put forward by English was faulted as being too restrictive, too narrow in its focus, and linked to 'educational quality control measures' (Wargra 1997, 1999; Glatthorn 1999; Anderson 2002)

2.6.2.2 Curriculum alignment -a problem of definition

Curriculum alignment, is a term which is widely used in education and, much of the research in this regard has focused on its use with the standards based reform movement. Specifically, the relationship between achievement and the centralised curriculum in the United States of America. (English 1992, 1997; Warga 1997, 1999; Webb 1997; Anderson 2002; Gorin and Blanchard 2004). A single technical definition has not been advanced and agreed on among curriculum scholars since the work of English in 1992.

The oxford dictionary (1996), defines alignment as, 'to place or bring in line, or into correct relative position'. This captures an important thought, that is, alignment is not a yes or no question. Alignment speaks to a relationship between identified or agreed elements/standards.

Curriculum alignment can be embraced as a policy or as a method of analysing the relationship between various dimensions of curriculum. When identified as a policy the following definitions may be used:

National Center for Research on Evaluation, Standards and Student Testing (CRESST)

(a) Lining up goals, standards, curriculum, capacity and outcome measures

(b) Larger meaning:

The logic between policy goals and the strategies enacted to meet those

goals

Webb 1997

When applied to education, alignment refers to how well all policy elements in a system work together to guide instruction and ultimately, student learning .

When alignment is identified as a method of analysis, given stated criteria, the following definitions may be used:

English 1992

A process to improve the match between the formal instruction that occurs in the school and the classroom and that which any test will measure

Anderson: 2002

A strong link between objectives and assessment, between objectives and instructional activities and materials, between assessment and instructional activities and material (content validity, content coverage, and opportunity to learn).

Allen 2004

Alignment involves clarifying the relationship between what students do in their courses and what faculty expect them to learn.

Alignment can be expanded to be used in a much wider context than the generic concept used by its first major proponent. It is this expanded use of concept of curriculum alignment which will be introduced in next section.

2.7.2.3 Expanding the concept of curriculum alignment

Glatthorn (1999:26) argued that curriculum alignment is a tool, a framework, which if reflected on could be moved beyond its restricted use (focusing on the taught, tested and written curriculum). He develops an argument for a more constructive use of curriculum alignment. This constructive use states that if expanded curriculum alignment will bring into congruence several dimensions of curriculum to shape opportunities for learning. These dimensions are

the hidden, excluded, recommended, written, supported, tested, taught, and learned curriculum. A brief summary of each of the eight dimensions is given in table 2.3.

Dimensions of curriculum	
hidden	<p>Smith and Lovat (2003:34) describe the hidden curriculum as, 'outcomes from teaching/learning activities which are not part of the explicit intentions of the curriculum developers'. The hidden curriculum conveys both positive and negative social and educational messages to learners through instructional materials, practices and policies within the institution.</p> <p>The role of the teacher is to recognize the hidden aspects of the curriculum and to control and or improve the negative impact.</p>
excluded/null	This describes what has been left out of the curriculum intentionally or unintentionally, specific to content areas.

Dimensions of curriculum	
recommended	This is the content as put forward by professional bodies, subject matter experts relevant to the specified area of learning.
written	This is the document produced by the institution, educational or professional body and includes learning material developed to compliment learning activities of the stated programme.
supported	This can be summarized as, curriculum prescribed in specified text books, software, and multimedia materials. Ornstein and Hunkins (1993:361) suggest that because the support curriculum is written in large quantities of data, it may discourage conceptual thinking and critical analysis. The supported curriculum is not geared to meet the specific needs and or interests of learners. On the other hand the support curriculum if selected with care can support the learning experience in a positive way.
tested	Used broadly refers to formative and summative assessments developed and used for a programme of study.
taught/actual	The curriculum as delivered by teachers/instructors/facilitator.
learned	Burstein and Winters suggest the learned curriculum reflects what students <u>know and can do</u> as a result of their educational experience as opposed to <u>what students learn</u> . (Burstein and Winters 1994 in Anderson 2002: 255).

Table 2.2 Dimensions of curriculum

The premise of Glatthorn's concept of curriculum alignment lies in

- (a) understanding both the interactions and the level of the inconsistency between the different dimensions of curriculum;
- (b) then, finding the discrepancy level between the most important dimensions;
- (c) in the final analysis, to align the curriculum the researcher should find out what can be done to narrow the gap between the dimensions.

Working definition

It is elements of this expanded concept of curriculum alignment which will guide my investigation in this research. In particular, the research will focus on investigating the level of discrepancy between: (a) the written; and (b) the excluded curriculum of the BTEP-building construction curriculum. The assumption in using these two dimensions of curriculum is that the alignment analysis ought to identify content from the excluded curriculum which should have been included in the written curriculum to create a higher degree of alignment. This

assumption will in turn create a focus on the implications with regard to external accountability of the written curriculum (BTEP-building construction programme) developed as a response to meet the labour market needs of the building construction industry.

2.7 Alignment models

A review of current practice and relevant literature identifies four major approaches of analyzing alignment. While these are not the only models used, these four and specific elements within each will enable the researcher to establish a relevant criteria, which is presented in table 2.5 for investigating the level of alignment. A brief overview of each model is provided.

Alignment Models	
Webb model	<p>Originally developed by Norman Webb, this model provides a reliable set of procedures and criteria for conducting alignment analysis studies. The process combines expert judgements and quantified coding and analysis of standards and assessments. In the first stage, expert reviewers agree on the criteria to be used by first determining the 'depth of knowledge' required by each objective or benchmark of the content standard being analysed and code each using one of four levels of knowledge: (a) recall, (b) skill/concept, (c) strategic thinking, and (d) extended thinking.</p> <p>The second stage, the content ratings and codes, is statistically analysed to produce statistics and reports on four criteria of alignment for each standard: (1) categorical concurrence, (2) dept-of-knowledge, (3) range of knowledge correspondence, and (4) balance or representation.</p> <p>The product of the analysis is a set of statistics for each standard.</p>
Survey of enacted curriculum (SEC)	<p>This model uses a content matrix or template that allows for comparison across standards, instruction, curriculum, assessments. The content matrix and language have two dimensions for categorizing subject content: content topics and cognitive demands (or expectations for student performance).</p> <p>The process produces content maps and graphs to portray differences and similarities .</p>
Alignment Models	Alignment Models
Achieve	<p>This model provides an in-depth qualitative and quantitative analysis using a panel of content experts. The panel judges the degree of alignment using five criteria: content centrality, performance centrality,</p>

	challenge, balance, and range. Achieve also provides for standards benchmarking against exemplary and international standards, augmentation analysis and policy audits.
Council for basic education	Uses criteria to measure the degree by which standards, curriculum and assessments are aligned, these include content, content balance, rigor, and item response types

Table 2.3 Alignment Models

Source: Council of Chief State School Officers 2002

Note: these models have been primarily used in regard to alignment of state content standards and assessments

2.7.1 Establishing the criteria for investigating the level of curriculum alignment

This research will use a combination of approaches to identify the level of alignment.

The overarching criteria to be used will be the concept of the expanded use of alignment (Glatthorn 1999:26-34). To strengthen this concept the researcher will use elements of the survey enacted curriculum and achieve models as well as the concept of the story centered curriculum (Shank 2002:1-15).

The specific criteria is set out as follows:

In investigating the extent to which the BTEP-building construction curriculum is aligned to the training needs of the building construction industry, the research will seek to use the following criteria as explained in table 2.5:

Criteria	Explanation of each criteria
----------	------------------------------

1	The expanded concept of curriculum alignment		<p>The interactions and the level of inconsistency between the (a) written and (b) excluded curriculum will be used as the method to analyse the level of alignment.</p> <p>The analysis of the level of inconsistency is important in regard to the educational significance of the curriculum in meeting its desired outcome <i>'To reflect the training needs of the industry and responsive to the technological change and societal needs'</i> (Department of Vocational Education and Training 2001).</p>
2	Pedagogical implications		Use of technology, materials and tools: Identification of opportunities created for learners to develop skills and confidence using state-of-the art equipment and other technology as used in industry.
3	Content focus (combined elements of the SEC, Achieve and Webb Models)	2(a)	<p>Depth of knowledge : In this section of the analysis the research will look at cognitive complexity (demand) of the 'technical skills' in the written curriculum. Each unit and specific learning outcome make a certain type of cognitive demand (e.g. demonstrate, identify, compare etc.). In this regard the analysis will examine the level of challenge posed to learners.</p> <p>The choice of verb describes the nature and extent of the intended outcome. Oliver (2002:44) suggests that 'not all verbs are amenable to use in OBE curriculum'. The choice of verb will be analysed when completing the analysis of cognitive complexity with this in mind.</p> <p>The process will involve an analysis of the written curriculum, through the use of unit titles/ learning outcomes/unit summary.</p>
4	Benchmarking standards (categorical concurrence) (achieve model)		Benchmarking the BTEP – building construction curriculum (content areas through use of unit titles) to standards of curriculum of countries with whom Botswana, competes in the SADC region (in particular South Africa which has established registered construction companies in Botswana competing with local companies) and internationally

Table 2.4 Criteria for analysing curricula alignment

2.8 The BTEP- building construction programme – concerns for curriculum alignment with industry training needs

2.8.1 Introduction

It is appropriate at this point to provide details of the curriculum, developed as a response to providing a pool of skilled labour to meet the needs of the building and construction industry.

The stated intention of the Department of Vocational Education and Training (DVET) with regard to the development of the building construction programme, was that the programme should *reflect the training needs of the industry and be responsive to technological change and societal needs* (Department of Vocational Education and Training: 2001). To analyse the level of curricula alignment, we will begin with a look at the programme structure through its major content areas.

2.8.1.1 Programme structure and content

The programme provides an orientation to four occupational areas in the construction industry: these are bricklaying and plastering, plumbing, carpentry and joinery and painting and decorating. These are classified as basic occupational levels in the construction Table 2.6 shows the programme structure and major content areas.

The programme consist of 22 credits, each of which is seen as a building block towards a qualification in the construction industry. These are further divided into three categories of units. These are mandatory key skills, mandatory vocational and elective vocational, with mandatory work experience and external project units.

The focus on these four occupational areas excludes concerns for shortage of citizen labour at the 'skilled levels' in the construction industry. It also does not address the demand for training in areas of construction related engineering, architecture, financial accounting and construction management (refer to section 2.7.1.1).

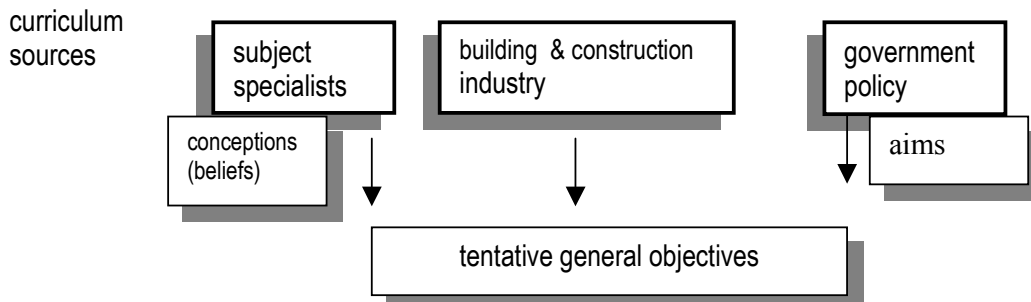
	Foundation level	Certificate level
	Mandatory key skills units (7 credits)	Mandatory key skills units (7 credits)

1	Communication skills 1	1	Communication skills 2
2	Numeracy 1	2	Numeracy 2
3	Information and communication technology 1	3	Information and communication technology 2
4	Basic entrepreneurial skills	4	Investigating your business idea
5	Personal and interpersonal skills 1	5	Personal and interpersonal skills 2
	Mandatory vocational units (6 credits)		Mandatory vocational units (8 credits)
1	Building science-an introduction	1	Building service: water supply and drainage
2	Construction craft-an introduction	2	Finishes to domestic building
3	The construction industry-an introduction	3	Site preparation and concrete work
4	Building drawing 1	4	Major building element 1
5	Building drawing 2	5	Major building element 2
6	Construction health and safety	6	Building drawing 3
	Elective vocational units (6 credits)	7	Properties and uses of construction material
1	Bricklaying and plastering 1	8	Power tools
2	Bricklaying and plastering 2	9	Secondary elements of a building
3	Carpentry and joinery 1		Elective vocational units (4 credits)
4	Carpentry and joinery 2	1	Bricklaying and plastering 3
5	Plumbing 1	2	Plumbing 3
6	Plumbing 2	3	Carpentry and joinery 3
7	Painting and decorating 1	4	Painting and decorating 3
8	Painting and decorating 2	5	Slabs and paving
1	Work experience (1 credit)	6	Electricity in domestic housing: an introduction
1	External project (1 credit)	1	Work experience (1 credit)
	Total credits (22)	1	External project (1 credit)
			Total credits (22)

Table 2.5: Programme structure at foundation and certificate levels

2.8.1.2 Curriculum development process

The lynchpin of the design system is a syllabus based approach. Figure 2.5 illustrates in part the process of development. This is based on a combination of Tyler's systematic design for curriculum and Walker's Deliberative Model (1975).



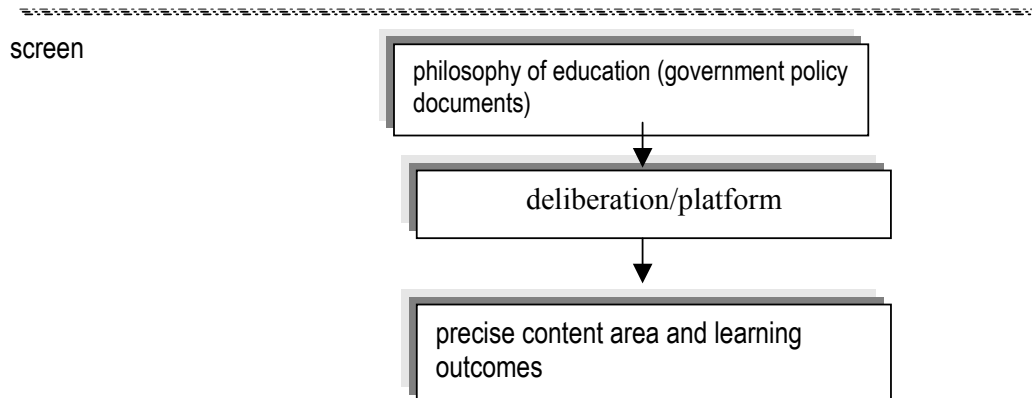


Figure 2.5: The BTEP –building construction curriculum design process

The design of a curriculum involves a negotiation of what should be learned and how it should be organised for teaching. The BTEP curricula is highly influenced by Tyler's (1949:1-2) systematic design where the negotiations of content involve resolution based on four questions. The negotiation of content is carried out at different levels of curriculum planning. These are explained using the four questions listed below as a guide:

Tyler's four questions	Curriculum sources
1. What educational purposes should the school seek to attain?	government policy documents on economic and human resource development, education ACTS and policies
2. How can learning experiences be selected which are likely to be useful in attaining these objectives?	ministry of education documents on curriculum development policies, framework; building and construction industry; subject area experts,

3. How can learning experiences be organized for effective instruction?	ministry of education documents on curriculum development policies, framework; building and construction industry; teachers/lecturers; curriculum developers
4. How can the effectiveness of learning experiences be evaluated?	ministry of education documents on curriculum development policies, framework; building and construction industry; teachers/lecturers; curriculum developers; learners

Table 2.6: Curriculum content sources

A challenge to curriculum developers is centered around aligning in-school and out-of-school success standards which would structure the curriculum to close the gap between the school based standards and the requirements of work. This challenge is addressed at the phase of deliberation/platform of figure 2.5 and is carried out by the curriculum development group and the programme advisory committee.

2.9 Challenges facing the building construction industry in Botswana – a case for aligning curriculum with industry training needs

2.9.1 Introduction

Underpinning the research focus is the need to be concerned with what students have learned as a result of their school experience. The research seeks to investigate the opportunities created within the written curriculum to build knowledge and skill geared towards developing a pool of skilled citizen labour force for the building and construction industry. This section will provide a background to the building construction industry in Botswana and provide information on some of the challenges being experienced which gives rise to the need for curriculum alignment in relation to the training needs of the industry.

2.9.1.1 The building and construction industry (Botswana)

The building and construction industry is classified broadly speaking into building and civil engineering sub sections. The civil engineering category is capital and skills intensive and has a higher concentration of foreign firms with a large pool of foreign labour. The industry comprises of approximately 1000 registered construction companies (central statistics 2001). These companies vary in size from small, medium, large to international companies. The composition of the industry is spread over the following areas:

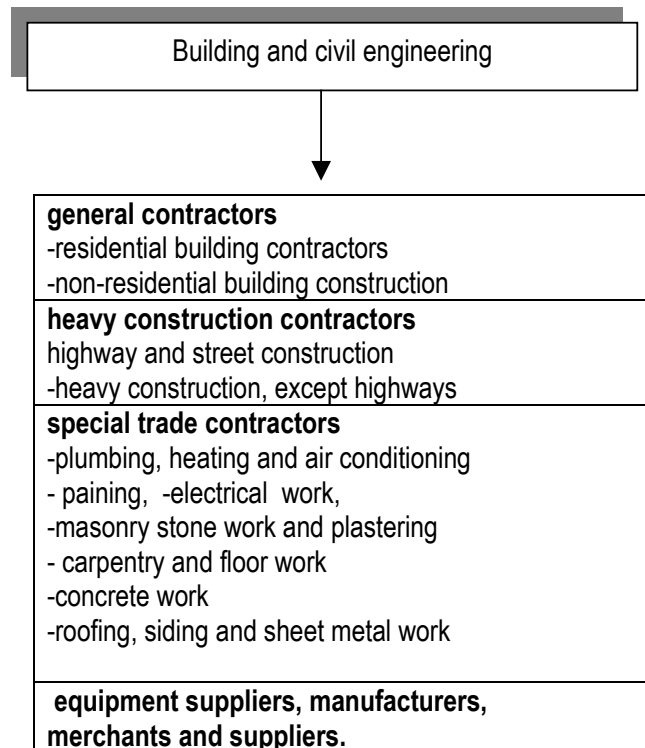


Table 2.7: Composition of the building construction industry

The industry is cyclical in nature and has a reactive approach to business where contractors bid for jobs on open tender. It has a dependence on government projects and thus has artificial boom times at the beginning of period of a national development plan and or in an election year.

2.9.1.2 Challenges to the Industry

(a) Training profile

The chairperson of the Association of Building Construction Industry (ABCON) has indicated that a paradigm shift is required in the area of curriculum development. A major concern is that there is not enough effort by educators to address the labour market needs, in terms of skills needed by the industry. It is important, he stated, that curriculum development reflects the needs and priorities of the industry. This is corroborated by sources such as (SATRN Working Paper 4, 2003: 8-19; Chtereve and Foster 1999:1- 4; Mmegi Newspaper August 8, 2003:16-17). These sources also indicate that training in areas of construction related engineering, architecture, financial accounting, management, are not covered in the curriculum in Botswana and these skills are in short supply among citizens.

The industry continues to rely heavily on expatriate labour in a wide variety of professional and technical skills areas. Information from the Botswana Daily News June 21, 2004 and a study ten years earlier by the Botswana Confederation of Commerce, Industry and Manpower (BOCCIM) in 1994, corroborates this statement. The Minister of Labour and Home Affairs in his address to the National Congress of the Association of Botswana Building and Civil engineering Contractors (ABCON) in June 2004, indicated that 'much still remains to be done in the areas of human resource development and capacity building'. The statement of the Minister is supported in various research papers and print media documents (Brian Silungwe, CPRN March 2003, Kali Muluzi CPRN August 2003, Minister of Works at ABCON congress 2003, Botswana Gazette August 13, 2003, SATRN Working paper No. 4 2003). The need to empower citizens through training is further echoed in the Botswana Institute of Development and Policy Analysis (BIDPA) study on the construction industry in 2003. The research findings indicate that *'lack of trained labour among citizens' is a huge barrier for local firms bidding for multi-million Pula projects.*

A report by the Auditor General's office to Parliament in 2004 indicates that government is facing huge cash drain through dishonoured building contracts. The report points to *'shoddy work, poor delivery and abandonment of projects by contractors within the industry costing the government millions*. In 2003 the Minister of Works and Transport, *challenged the industry to be more professional and strive for timely completion of projects* (CPRN August 2003:12). Various reports from contractors indicate that there is a problem of shoddy/incomplete work. In a CPRN interview one citizen contractor indicated that *many contractors were not mature enough to compete in the industry and that some failed to supervise their projects which resulted in shoddy work*.

A survey conducted of companies connected to welding technology in the construction Industry in 2000 (Chterev and Foster1999:4), noted that quality control of material and welding processes applied was absent on most jobs.

Palalani (2000:5) suggested that one of the reasons for the poor quality work was the lack of experience and qualifications/training.

The lack of trained manpower (citizen staff in skilled positions) may have a direct link to the training programmes aimed at building capacity in the construction industry in Botswana. Table 2.8 indicates training programmes relevant to the industry which are available in Botswana. These programmes are concentrated mainly at the unskilled occupational levels.

Third level VET – University of Botswana	Post secondary VET – certificate level	Apprenticeships
diploma in building and civil engineering	certificate level – building construction (BTEP)	bricklaying and plasterer plumber, pipe fitter, painter and decorator carpenter and joiner
certificate in construction	CITF: short certificate courses (8 weeks)	

	bricklaying, plastering, wall and floor tiling, carpentry, plumbing, concrete work, painting and decorating, site surveying, steel fixing, welding, shuttering.	
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Table 2.8 : Building construction and related occupational programmes on offer in Botswana

2.9.1.3 The building and construction industry expectations of VET

At a regional conference on technical and vocational education and training held in Gaborone, Botswana in 2003, the chairperson of the ABCON highlighted the critical need for a closer working relationship between vocational educators and industry experts in the development and implementation of training programmes.

The concerns of the industry point to a new context of development of VET curriculum to be considered. Within this new context are concerns for how education prepares candidates for the world of work, the ABCON chairperson also indicated that the industry has preference for industry driven training in which content was negotiated (industry and vocational educators) to determine occupational and employability skills and designed around the occupational skills of the industry. Additionally he indicated that there were concerns regarding the professional identity and knowledge of vocational educators implementing curriculum. Specific concerns relate to the 'currency of their knowledge of the industry, technical competence, practical work experience and the need for them to keep-up-to-date with work place practices and technology.

2.10 Summary

Employers have been calling for an examination of VET curricula with regard to the content and nature of educational experiences provided to VET participants since 1994. A report to the Permanent Secretary, Ministry of Education in 1991, indicates specifically the plight of the

building construction industry, 'Many construction companies in the country are complaining about the poor quality of VET products' (Botswana 1991).

The basis of the argument from employers lies in a call for educational accountability. The problems with regard to poor quality of curriculum and lack of coordination in the VET system debated since 1994 still persists. Employers as the primary vocal stakeholders believe that the effective development of occupational and employability skills requires that the perspective of educational planners must be focused outward towards the employers (demand driven).

The current situation of a supply driven VET system does not auger well for alignment of curriculum with labour market needs.

Chapter 3

Research design and methodology

3.1 Introduction

This research explores through a qualitative methodology, one of the significant concepts in curriculum studies. The concept of, *the gap between the ideal and the actual curriculum, between the operationilzing of the intention*, identified by Stenhouse (1975:3). In the context of this research, it is the level of alignment existing between the BTEP- building construction curriculum, designed as a response to provide a skilled labour force in line with the training needs of the building construction industry. This research will therefore be a process of providing descriptive details of the participants of the research and other authors of documents identified as relevant to the research question.

3.2 Research population and sampling

The research population and the sampling procedures and selection used allowed the researcher to gain access to relevant data sources to address the research questions. The following sub groups comprise the research population.

Sub-groups within the target population
building and construction companies which offer work experience places to candidates and which are involved with the verification process of the programme They will be referred to as industry representatives.
BTEP curriculum development group. They will be referred to as the CDG.
candidates pursuing the BTEP - building construction programme
staff implementing the curriculum (teaching and assessing). They will be referred to as lecturers.

Table 3.1 Description of research population

Mason (2002:121) identifies one element in sampling which is critical to this research. That is, the sample selection needs to be useful and meaningful in the context of how well it will allow the researcher to generate data which advances the focus of the research question. The selection of the sample is based on a purposive sampling strategy. This strategy will be explained in the next section.

Purposive sampling

Purposive sampling or 'Judgement' sampling as referred to in Zikmund (1994:368) can be explained as the selection of a sample based on the researcher's judgement regarding appropriate characteristics required of sample members. Lincoln and Guba (1985:198) state that, "All sampling is done with a purpose in mind". In the context of this research, this sampling strategy has been used to build confidence in the research findings. Purposive sampling strategy allowed the researcher to use working knowledge based on of the focus of the research, to select respondents who represent the range of experiences with the BTEP - building and construction curriculum, and the building construction industry in Botswana which would provide access to data with the right focus. Each sub group has had prolonged engagement with the industry and or the curriculum. This aspect of sampling requires the researcher to select sub groups for practical as well as strategic reasons.

Mason (2002:135) suggests that when sampling researchers should, "reflect upon the logic through which they intend to develop and test explanations and the kinds of arguments they wish to make". With this in mind the following sample was selected.

Description of research sample	Sample Size	Experience with the curriculum/data expected data
building and construction	12 companies	they would be able to make an

companies which offer work experience opportunities to candidates on the programme and which are involved with the verification process of the programme		assessment of the relevance of the written curriculum to the industry.
BTEP curriculum development group (CDG) Note: four members of the team are on study leave outside of the country	Five of nine persons	experience with the development processes of the written curriculum.
candidates pursuing the BTEP - building construction programme Note: three candidates were not available during the interview period.	24 of the 27 candidates	day to day experience with the written curriculum.
staff implementing the written curriculum- Lecturers	10 lecturers	day to day experience with the development, delivery and implementation of the curriculum

Table 3.2 The research sample

The question of sample size is critical in a conventional quantitative study as it directly influences the generalizability of study results. However, these sub categories and the sample size thereof are not intended to be representative of the larger research population. Instead they were selected to allow for the generation of data to develop an explanation of their varied experiences in the context of the research. It is their experiences and the knowledge of these experiences which is critical to the research.

3.3 Research methodology

3.3.1 Data collection – an introduction

The focus of the research and the specific research questions allowed for data to be drawn from two sources these are: (a) interviews, which was the dominant data collection strategy, and (b) document analysis.

The methods are complementary and the researcher found them to offer a comprehensiveness that would otherwise not be offered in this research with the use of only one of the two

methods. The two methods used together enhanced the quality of the data and one source was also used to corroborate the other.

3.3.1.1 Interviews

The interview as defined by Choen and Manion (1989:307) is a “two person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information and focused on content specified by research objectives”. Qualitative researchers operate from the perspective that knowledge is situated and contextual (Mason 2002: 63). In this regard, the position of this researcher is that respondent’s knowledge, views, understanding and experiences are meaningful to the data the research questions are designed to explore. The interview as a research method is ideally suited to collect data in this context.

The interview as used within this research gave the researcher access to a fuller and fairer representation of the perspectives of the research participants. The quality of data would not be as adequately represented if document analysis, survey or observations were used as stand alone methods of generating data or used together.

The interview as a method of collecting data was selected as the predominant method as the direct interaction allowed the researcher a greater opportunity not only to obtain data, (through listening, probing, gaining access to experiences) but to have immediate and greater depth and clarity on the data provided.

Interview schedule

In a qualitative study the most common types of interviews used, range on a continuum from the structured to the relatively unstructured format. The common element in the interview

formats is that the questions are designed to reveal what is important to understand about the research topic.

In this research the semi-structured interview format was selected. This format was used to allow face-to-face interviews. The semi-structured interview format was selected because this type of interview is particularly useful in evoking personal experience and perspectives. Mason (2002:63) identifies this interview structure as allowing the interviewer to construct or reconstruct meaningful data through dialogic interaction as opposed to simply obtaining data.

Figure 3.1 explains the development process of the interview schedule. Each question was phrased as a building block to the research focus. Questions were developed around each research question and other themes within the context of the research.

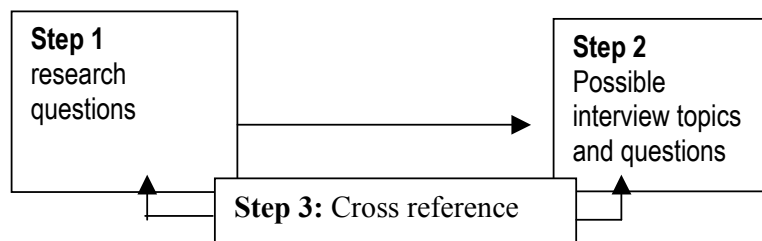


Figure 3.1: Overview of planning structure for interview schedule

Open ended questions were developed for this purpose and used with probes to provide the guarantee of involvement and yielding of useful data. The open ended nature of the questions allowed the participants to respond based on their own experience, rather than pre-arranged responses. The interview schedule comprised various types of questions, for example, (experience, opinion/value, and knowledge questions). The interview schedules for each sub group are attached as Appendix 2 - 5.

The researcher used probes and prompts to gain a deeper understanding of the interviewees' perspectives and to add richness to the data. Three types of probes were used, they are (a)

detail-orientated probes, to follow up questions, comments to get more details (b) elaboration probes, designed to encourage the interviewee to say more, e.g. 'tell me more about this/that,' 'please give me an example,' and (c) clarification probes, used when the interviewer required clarification on responses.

Effective communication was encouraged during the initial stages of the interviews conducted when the researcher reminded the interviewee of the purpose of the interview, encouraged preliminary personal introductions. Each interview was conducted at the convenience of the interviewee. The researcher initiated contact first with written communication (letter, fax, e-mail), then through verbal communication, using the telephone.

The personal experience and perspectives of the sample groups were key to obtaining appropriate data for the research questions. Thus, the researcher allowed a degree of flexibility in the sequence of the questions, and the opportunity to further add details to questions asked during the interview if the participant thought of additional information.

The preparation of the draft interview schedule also involved the preparation of a statement of purpose. This statement introduced the researcher, outlined the purpose of the interview, indicated how the results of the study would be used, a statement of confidentiality, explanation of note-taking during the interview and a request for permission to record the interview.

Pre-test of the interview schedule

A pilot interview schedule was prepared and discussed with work colleagues within DVET – Programme Development and Delivery Unit. This was done to evaluate and improve the interview schedule and procedure. The interview schedule for the candidates was pre-tested with five candidates. Specifically, the researcher wanted to test for clarity of questions and to ascertain a time frame to allocate to each interview.

3.3.1.2 Document analysis

Document analysis is the use of secondary data gathered and recorded by someone else prior to and for purposes other than the current needs of the researcher Zikmund (1994:112).

Document analysis allows researchers to build on past research.

The researcher selected document analysis as the complementary research method based on the strength of this method in regard to the value added through the use of text as a resource base. Additionally, data found in texts could challenge and or and legitimate data from the interviews and would enable a deeper understanding through the history and relevance of data.

There are obvious pitfalls which a researcher needs to guard against with the use of secondary data, some of these are, outdated information, and lack of information to verify the data's accuracy. With this in mind, careful attention was given to using information from journals/periodicals, cross checking data from multiple sources, using data published by government agencies and international bodies and using media sources.

Document analysis in this research also involved a content analysis survey of media headlines on topics related to the building and construction industry which appeared in international, regional and local journals, newspapers as well as documents used in the development and implementation process of the curriculum. The documents and document sources used are as follows:

Documents	Type of data
internal data	
the written curriculum (BTEP – building construction curriculum	description of the curriculum

minutes of meetings from the programme advisory team	Information provided on the development process of the curriculum
minutes of meetings and reports of lecturers	data on the delivery and implementation of the curriculum
reports from industry representatives	
external data	
articles from the media sources – relevant to the building and construction industry in Botswana, specifically but also regional and international	Articles published on the building and construction industry in Botswana as well as regionally (SADC) and general articles about the construction industry internationally
data from journals and text books	Articles written on any of the themes and or concepts within the context of this research
data from government agencies within and external to Botswana	
data from international agencies, eg. ILO, UNESCO, World Bank	

Table 3.3 Research documents

3.4 Ethical concerns

The researcher as an employee within the Department of Vocational Education and Training requested permission from DVET to conduct the research using one of the programmes developed by the department as the focus of the research.

- This involved obtaining permission to:
 - access and use documents in the department relevant to the programme;
 - interview the candidates and staff within the Gaborone Technical College;
 - consent from industry representative to be interviewed
- assuring the respondents of confidentiality of their responses. Thus, in the presentation of findings and discussion of the data, the researcher has not identified verbatim comments with names of respondents.

3.5 Data analysis procedures

The inductive approach was used to analyze data gathered. With this method of what was important to analyze, was the statement of facts inductively derived from interviews and document analysis. The specific method within the inductive approach used was the constant

comparative approach. The constant comparative approach will be discussed in more detail in section 4.6.

Two modes of analysis were used in this research. Analysis was carried out concurrently with data collection as well as collecting the data and subsequent data analysis. This latter approach was more formal and detailed. A mechanical process of sorting the descriptive data collected and also physically separating data, was used in arranging interview transcripts and notes from document analysis and breaking it into manageable units of data to increase the researcher's understanding of the data. The process involved the following:

- memos to self about the data
- selection of themes and coding categories by research questions
- numbering pages of interview scripts, affixing dates and names
- labelling recorded tapes
- word-processing interview scripts
- modifying data codes and themes and arranging units of data
- making copies of units of data

3.6 The constant comparative method

The constant comparative method of analysis, involves a combination of inductive category coding with simultaneous comparisons of all units of meaning obtained (Mykut and Morehouse 1994:134). As each new unit of meaning was selected for analysis, it was compared to all other units of meaning and subsequently grouped according to its meaning. Figure 4.2 shows the development of each stage of the process as used by the researcher. One section has been added to the process by the researcher; this is the process described by the caption in the circle '*refine the categories in line with the research questions*'.

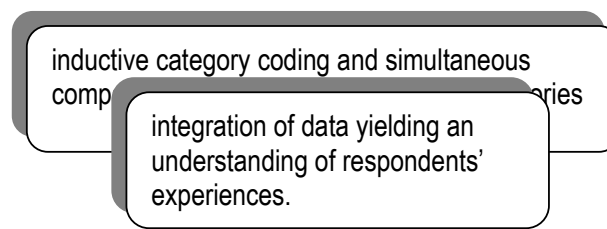
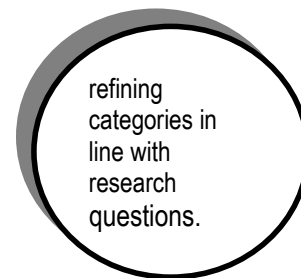


Figure 3.2: Constant comparative method of data analysis Adapted from: Maykut and Morehouse 1994:135

3.7 Data management

Note taking and tape recording were used to preserve data collected in the interviews. However, only one of the sub-groups within the research population, the candidates, gave



permission to be taped, therefore note taking was used with all other sub-groups within the sample population.

The researcher sought to use tape recording to preserve data collected for a number of reasons. These are, to guard against interviewer biases, to evaluate and classify data and to enable the process of validity.

3.8 Validity and reliability

Qualitative researchers in particular are concerned with the accuracy and comprehensiveness of data collected to establish trustworthiness, and to persuade readers that the findings of the research are factual and worth reading.

Reliability as indicated by Lincoln and Guba (1985:292) is not sought for its own sake, but as a precondition for validity. The research design of this study then, was designed to control and minimize threats to the internal validity and to ensure that credible findings and interpretations would be produced. It is these measures that will be explained.

In any interpretive study it is necessary for the researcher to situate himself/herself in relations to the context of the research, and to declare possible biases that might influence the interpretation of data. My position with regard to this point, is that I am an employee within the Department of Technical and Vocational Education and Training.

The research was carried out after a period of five years of working experience with the department. I therefore have an understanding of the work culture, and my position as a principal education officer in the Human Resource Management and Development Unit, provided opportunities to build trust with both the internal and external sub groups in the research population. I would therefore have an understanding of any misinformation introduced in particular by the sub-groups of respondents (internal research population-candidates, lecturers). My work with the department also provided me with knowledge of documents, from various stages of the developmental process of the curriculum development process prior to beginning the research as well as during the early stages of the research. However, I did not have ready access to all document and in some cases permission had to be given. One advantage is that I had prior knowledge of the content of the curriculum prior to beginning the research study and this allowed me to become familiar with the curriculum outline to be able to communicate freely with research respondents. I therefore had a better opportunity to follow and understand their conversation during the interviews without interrupting them to explain concepts. In addition, I attended local conferences and followed information on the building and construction industry through various print media locally. This knowledge enabled me to gain confidence in interviewing the respondents from the industry.

The concept of using more than one methods to collect data was used in this research to add comprehensiveness to the data collection. The researcher used document analysis

recognizing that existing data from journals, text books and other media sources would provide richness and robustness to the data from the interviews, by providing parallel datasets and another view of the big picture, as well as corroborate and provide reassurance in the research findings.

Peer de-briefing was also used after data collection from the interviews. The de-briefing sessions were used to check the adequacy of the data provided during the interview process as well as allowing the interviewer to seek further clarification from additional data sources.

The use of member checks or respondent validation was used particularly in the instances where the interviews were not recorded. The researcher typed the notes from the interviews and asked the respondents to verify the data recorded. The process also allowed the respondents to add further information if they thought it was necessary or to suggest removal of specific aspects of data from the interview report.

The purposive sampling strategy was also used to give confidence to the findings of the research. Respondents were selected based on their varied experience with the building and construction industry and also on their knowledge and experience with the BTEP- building construction curriculum.

3.9 Limitations of the study

Choosing a qualitative approach such as this, limits the capacity to generalize study findings. In the first instance, the respondents from the building construction industry were limited to the companies which are involved with the programme either through offering work experience placements or with the verification process. These are the companies with detailed knowledge

of the curriculum. Thus, the comments of the industry representatives cannot be generalized to represent views of the wider construction industry.

While efforts were made initially to have two persons collecting data, during interviews, this was discontinued following the first three interviews with the candidates, after respondents expressed preference for one interviewer. The initial thought of having two persons present during the interview process was to minimize interviewer bias. To minimize any biases the respondents agreed to provide respondent validation to the notes taken during the interview.

Chapter 4

Presentation of research findings

4.1 Introduction

This chapter brings together analysis of responses from interview data as well as document analysis to determine the level of alignment of the BTEP-building construction curriculum to the training needs of the building and construction industry.

The data presented were obtained from research respondents identified in the previous chapter as well as documents relevant to the research questions. The presentation of data is structured in two sections using each research question and themes which emerged from the analysis of data. Each section will conclude with a summary of findings relevant to the research question.

Section one provides a report on research questions 1 and 1.1, which reads

- **'To what extent is there alignment between the BTEP Building Construction curricula and the training needs of the building and construction industry?'**
- **'What are the human resource needs within the Building Construction Industry for the next 5 – 10 years?'**

The focus of the presentation is on the adequacy of the content in regard to its ability to provide the required skilled manpower for the building and construction industry.

Section two presents data in relation to research question 2, which reads,

- ***'What processes are used to ensure alignment of the BTEP- building construction curriculum to the training needs of the industry?'***

The presentation is centered around data provided by the respondents from the curriculum development group, industry representatives, lecturers. In addition, it includes content analysis of documents from DVET on the development of the curriculum as well as documents relevant to the wider VET sector in Botswana.

4.2 Section 1: presentation of research findings - question 1

The presentation of findings focuses on analysis of the interview question:

■ **'To what extent is there a match between the training needs of the building and construction industry and the educational priorities(vocational units) of the building construction curriculum?'**

Additional interview questions were used to probe and thus engage respondents in providing data. These questions are:

- (a) Is the content of the programme adequate for the needs of the industry?
- (b) Have you identified gaps in the written curriculum?
- (c) With regard to skill development, how does this programme compare with other training programmes (same level) locally and regionally?

Responses were analyzed using the following themes that emerged from interview data:

(a) content focus

(b) gaps in the written curriculum in relation to (i) content areas excluded (ii) opportunity for skill development (ii) use of appropriate technology, and (iii) benchmarking the curriculum to examine a range of knowledge provided.

4.2.1(a) Theme- content focus

Overwhelmingly, the respondents indicated that the focus of the curriculum does not match the needs of the industry (95% candidates, 97% lecturers and 100% industry representatives).

In highlighting the point that the programme is not focused on the training needs of the industry lecturers made reference to curriculum development documents which indicate that, candidates who have achieved (are successful) in the programme are being prepared for employment in the following areas of the industry:

bricklayer and plaster assistant
carpenter and joiner assistant
plumber assistant
painter and decorator assistant
floor and wall tiling
paving
assistant storekeeper at a builder's merchant or construction site

Source: Programme validation document 2000:20

These areas, they state, are classified as unskilled occupational areas and not within the professional and technical skills categories needed within the industry.

Respondents stated that the programme, *'catered to the very basic occupational levels of the industry and that the industry was saturated with these skills'*. In addition, they added that the country already has two institutions focussing on programmes at this level. In their opinion the programme should focus on filling the skill and knowledge gaps at the technical and professional levels of the industry where the need for skilled labourers is greater. These technical and professional levels identified by respondents are listed in section 4.1.3

4.2.1 (b) Theme – content areas excluded from the written curriculum

In further exploration of the content of the programme, respondents were asked whether the content of the programme proved to be adequate for the needs of the industry. The adequacy

of the programme was further probed using the theme gaps in the written curriculum. These are gaps in relation to:

- content/occupational areas excluded;
- benchmarking the curriculum to other curriculum programmes locally and regionally to examine range of knowledge provided;
- cognitive complexity of learning outcomes and performance criteria;
- balance of theory versus practical sessions;
- use of appropriate technology.

Three sub groups the industry representatives, candidates and lecturers were asked this question. Industry representatives were selected because of their knowledge and exposure to the needs of the industry in the first instance and also as employers of VET candidates. Lecturers were chosen in their capacity as the ones charged with the responsibility of preparing candidates for employment. They are the first point of contact for industry representatives and candidates alike with regard to the level of preparedness of candidates for the world of work. Their experience with the curriculum and their assessment of the document would therefore provide valuable data to the research findings. Candidates were chosen to provide views on the curriculum as they are the ones being prepared for employment and further learning.

Respondents agreed that critical content areas (in light of the written curriculum providing learners with required knowledge, understanding and skills for the workforce), were excluded from the curriculum. In addition, they indicated that some content areas needed more depth to provide a more meaningful learning experience and to prepare candidates for work in the industry.

In the first instance, respondents identified content on broad occupational areas which was excluded as:

- architecture
- civil engineering
- surveying (land and quantity) and technicians
- construction management

Inclusion of content on these occupational areas, industry representatives and lecturers indicated, would have benefited candidates by *providing orientation to a wider range of occupational areas within the industry*. Candidates stated that the inclusion of these areas would have enabled them to position themselves in terms of making '*a better choice*' on long term career goals as well as providing information on occupational clusters within the industry.

With regard to specific content areas which have been excluded from the curriculum, candidates expressed concern that content on the areas listed below were excluded.

- computer applications in building construction
- associated maths and science for building construction
- accounting/cost control
- scheduling and schedule control of projects
- construction surveying and project layout
- safety (policies, inspections, regulatory frameworks)
- glazing (in particular for commercial buildings)
- reading and interpreting plans
- scaffolding
- environmental law
- job site administration

They further explained that while on the 40 hours work experience they were '*simply amazed*' at what industry expected of them in terms of the knowledge of these area. They admitted they '*were embarrassed by their ignorance at times*'.

Industry representatives in particular remarked that *content areas termed as 'basic' to any curriculum for a general building construction programme* were not included in the written curriculum. These areas they identified as:

- construction business practices
- computer applications in building construction, construction graphics
- associated maths and science for building construction
- construction accounting
- scheduling and schedule control of projects
- construction surveying and project layout
- safety (policies, inspections, compliance, regulatory frameworks)
- glazing (in particular for commercial buildings)
- reading and interpreting plans
- scaffolding
- construction law
- job site administration

Glazing was singled out as a content area, which ought to have been included in the curriculum since a significant number of commercial and government buildings use this in the construction of buildings. The practice, they indicated, has been widely used in Botswana since the mid 1980s, and even more so in the multi-floor high rise buildings.

Industry representatives also expressed concern that computer applications and construction graphics were excluded. Those associated with the verification process of the programme indicated that on their visits to the college, the candidates were seen using *outdated drawing boards and other manual equipment for drawing*. This they said was *unsatisfactory and unfair to the candidates* as the industry preferred candidates who have the ability to use computer software for drawings.

The absence of associated mathematics or technical mathematics was a point of contention with all respondents. This they pointed out was fundamental to the programme.

A compilation of responses given of the basic content areas which have been excluded from the curriculum are:

- construction business practices
- computer applications in building construction , construction graphics
- associated maths and science for building construction
- basic drawing techniques
- construction accounting: budgeting/cost, accounting/cost control
- scheduling and schedule control of projects
- construction surveying and project layout
- safety (procedures, policies, inspections, records, audits, compliance, regulatory frameworks)
- glazing (in particular for commercial buildings)
- reading and interpreting plans
- scaffolding
- environmental law, construction law
- job site administration

Interior design as an occupational area was identified by approximately 5 % of candidates, however industry representatives and lecturers indicated that this was not a priority area for the industry at this time. They saw it as a *'nice-to-have occupational area'* when the curriculum development addresses basic content and occupation levels and when the building industry in Botswana becomes more developed and sophisticated.

4.1.2 (b) Gaps in the written curriculum: theme benchmarking the written curriculum to examine range of knowledge provided

Gaps in the written curriculum were also analysed through benchmarking the BTEP curriculum with that of other building construction programmes offered within the SADC region as well as programmes offered locally.

Respondents were also asked their views on programmes offered through CITF, apprenticeships and from neighbouring South Africa. An overview of the programmes is provided in table 4.1 Benchmarking in this instance is used to show the broad occupational

areas within the building and construction industry provided through other programmes external to the BTEP curricula

Respondents indicated that the competence based and apprenticeship programmes focused on the development of one specific skill within an occupation cluster, and that the training is done on a construction site where learners have more opportunity to *master the skill while doing the job*. While the mastery of one specific skill was seen as an advantage initially, respondents were also quick to point out that the focus on one particular skill or occupational cluster could also be to the detriment of the learner, in that he/she was only introduced to one skill and thus less marketable to the industry. It is here that the BTEP has an advantage over the apprenticeship programme as the BTEP focuses on four occupational areas.

Respondents were also in agreement that the apprenticeship and competence based programmes offer learners more opportunity for skill development, in terms of the emphasis given to hands-on/practical sessions in these programmes. The BTEP offers a mandatory 40 hours work experience programme, whereas the apprenticeship and competence based programmes requires that 75% of the learning programme be spent in the industry where they have direct contact with learning opportunities on a construction site. The BTEP curriculum has one major disadvantage in relation to contact with industry, in that it is essentially a college based programme where all learning takes place on the college compound (with the exception of the mandatory 40 hours work experience). Lecturers and candidates felt that learners from the BTEP programme would become *jack-of-all-trades and master of none*.

Table 4.1, column 3, shows the range of occupations within the building and construction programme offered in neighbouring South Africa. With regard to the range of knowledge provided, respondents indicated a preference as follows:

- the programmes offered in South Africa; as six specialised occupational areas are provided with two programmes offering general curriculum on building/construction technology. The programmes also have the added learning opportunity of one year industry experience. Respondents indicated that these occupational areas are relevant to the industry in Botswana.
- the competence based programmes; however, while the competence based programmes appeared attractive in terms of the range of occupational areas covered (13 areas), it was pointed out that these were short courses, often referred to as '*crash courses*'. The period of learning did not appear attractive or trusted by research respondents with regard to ability to cover meaningful content. Again the programmes in South Africa and the BTEP were given an advantage in terms of duration. The BTEP curriculum gives a 12 – 18 months duration and the programmes in South Africa require 3 years full time for a diploma or 2 years for senior certificate level.
- respondents were not as receptive to the university of Botswana programmes. The reason given is that the university is not known for offering programmes in VET but rather for programmes of an academic related nature.

The curriculum outline of the three-year diploma in building and construction offered in South Africa is presented in table 4.1. Industry representatives indicate that this would have been a more appropriate curriculum for Botswana rather than the curriculum provided by the BTEP. The curriculum outline they stated, *provides learners with a more realistic picture of the day to day work in the industry above the craftsmanship level*. In particular the one year industry experience component will provide learners with an *invaluable opportunity to work-and-learn* with a construction company.

BTEP	Programmes offered in Botswana	Programmes offered within the SADC Region
<p>Building and construction Programme:</p> <ul style="list-style-type: none"> ■ Bricklayer and plasterer ■ plumber pipe fitter ■ painter and decorator ■ carpenter joiner <p>Note: focus on four occupational areas</p>	<p>Competence based training courses (8 weeks)</p> <ul style="list-style-type: none"> ■ bricklaying ■ electrical installation ■ plastering ■ concrete work ■ wall and floor tiling ■ site surveying ■ carpentry ■ steel fixing ■ plumbing ■ welding ■ painting and decorating ■ shuttering ■ site management <p>Apprenticeship trades in Botswana relevant to the building and construction industry (4 years)</p> <ul style="list-style-type: none"> ■ bricklayer and plasterer ■ plumber pipe fitter ■ painter and decorator ■ carpenter joiner <p>University of Botswana</p> <ul style="list-style-type: none"> ■ certificate – construction engineering ■ diploma - building and civil engineering (2 years) with 8 weeks industrial training 	<ul style="list-style-type: none"> ■ civil engineering ■ building ■ architectural technology ■ construction technology ■ quantity surveying ■ land surveying ■ interior design ■ construction management <p>Note: separate three-year programmes focusing on a range of occupational areas</p>

Table 4.1: Benchmarking the BTEP curriculum to examine range of knowledge provided

Year 1	Year 2:	Year 3
<ul style="list-style-type: none"> ■ applied building science 1 ■ communication 1 ■ computer applications 1 ■ construction management 1 ■ quantity surveying 1 ■ construction technology 1 ■ site surveying 	<ul style="list-style-type: none"> ■ experiential training/attachment in industry for one year inclusive of preparing projects, technical reports and assignments for the following subjects; ■ building practice 1 ■ building practice II ■ construction management II ■ construction technology II ■ quantity surveying II 	<ul style="list-style-type: none"> ■ construction accounting III ■ construction management III ■ price analysis and estimating III ■ quantity surveying III ■ structures and concrete III

Table 4.2: Curriculum for the three -year diploma in building and construction studies
Source: Prospectus for Technikons in South Africa 2004

4.1.2 (b) iii Gaps in the written curriculum: theme - cognitive complexity

Respondents (lecturers, industry representatives and candidates) all indicated dissatisfaction with the choice of action verbs used in most of the learning outcomes and performance criteria within the learning unit specifications.

Candidates and lecturers in particular felt that the choice of verbs, for example *identify, state, list*, and *describe* did not provide enough challenge and denied candidates opportunities to learn more about the topics presented.

Lecturers felt the choice of verbs limited opportunities they could create to broaden the experience of candidates. Terms such as *'shallow'*, *'not enough depth'* *'not challenging enough'*, and *'written at a low level'*, were used to describe the learning outcomes and performance criteria in the learning unit specifications. The carpentry and plumbing units were indicated as examples of units which did not provide enough depth in relation to what was expected of learners in the industry after completion of the programme.

To illustrate the point made by the candidates and lecturers, the lecturer for plumbing benchmarked a course outline for a plumbing unit with a similar purpose, that is, *Plumbing and Pipefitting Mechanic: Individual must be able to perform plumbing and pipefitting systems installation, service and repair commercial and residential construction*. The units are attached as Appendix 6 – 7. The purpose of comparison is to demonstrate the difference in the learning opportunities provided to candidates. The alternative unit when discussed, the lecturer said, would provide more *rigour, depth and challenge* and thus would offer a broader learning experience which is more relevant to the industry.

In addition a summary of all the learning units of the BTEP-building and construction programme is provided as Appendix 8. The summary provides an appreciation of the

comments on cognitive complexity made by respondents. The verbs used indicate what the candidate is expected to do – end product of each unit, 'what the student is expected to do, is indicated in bold.

Candidates, lecturers and industry representatives, question the choice of active verbs in light of the challenge it presents to learners and also in light of the performance that is expected of them on the work site. Workers on the construction site, industry representatives state, are expected to think critically and solve problems. However, the choice of verbs used with the programme minimizes this process of critical thinking.

4.1.2 (b) iv Gaps in the written curriculum: theme-balance of theory versus practical sessions

Respondents indicated that the programme has more theory-related units than opportunities for skill development (practical units). This imbalance was particularly worrying for candidates and industry representatives as they indicate that it, *limits the opportunity to learn, develop and practice skills necessary for work within the construction industry*. Respondents indicated that the imbalance was represented by a less than 50% practical sessions or opportunity for candidates to demonstrate the required skills in the written curriculum.

Respondents from the curriculum development group indicated in retrospect that the nature of the programme required a minimum weighting of 60% practical and 40% theory. The reason they state, is that the nature of work in the industry requires more hands-on job related functions. Practical sessions would provide opportunities for learners to learn and demonstrate the required skills with a degree of confidence within the learning programme. Underpinning

knowledge and understanding components specific to that skill would then be embedded in the practical sessions.

Respondents from the curriculum development group also pointed out that *they had not taken-on-board a requirement by industry stating that the programme should be more skills based as opposed to knowledge based.*

4.1.3 Presentation of research findings for research question 1.1

The discussion of this question involves the analysis of responses to the question: ***‘What are the human resource needs of the building and construction industry for the next five – 10 years?’*** In addition, document analysis from the print media of topics relevant to the building and construction industry in Botswana was also used to complement information and corroborate data from the interviews.

Overwhelmingly, respondents stated that the following broad occupational areas are needed:

- | | |
|--|---------------------------|
| ■ quantity surveyors | ■ architects |
| ■ urban and regional planners | ■ civil engineers |
| ■ cartographers and surveyors | ■ cost estimators |
| ■ drafters | ■ engineering technicians |
| ■ construction managers and builders | ■ project managers |
| ■ building construction inspectors (electrical, elevator, mechanical, plumbing, public, works, home) | |

specific skill areas within the broad occupational areas

- | | |
|--------------------|--------------------------|
| ■ cost estimators | ■ architectural drafting |
| ■ site supervisors | ■ construction managers |
| ■ galzers | ■ building maintenance |

These areas they indicate are regarded as within the skilled occupational areas and currently Botswana is experiencing a shortage of citizen staff in these areas.

Botswana Institute for Development and Policy Analysis (BIDPA) acknowledges skills shortage in these professional areas and indicated that this shortage may be compounded by the fact that training efforts in Botswana have concentrated on craftsmanship level training (SATRN Working Paper 4:17). The report also indicated that there was a lack of management information within construction firms resulting in the inability to monitor project costs and forecast cash requirements. This was cited as a major reason for voluntary and forced liquidations of firms and also resulted in delays and construction costs increased by well above 30% of the budgeted costs (Construction Review, June 2004:3; Tswilo 2004: Daily News, June 21, 2004).

The Daily News of June 21, 2004 also reported the Minister of Labour and Home Affairs as saying that *“the Building and Construction Industry continues to rely heavily on non-citizen (expatriate) labour in a wide variety of professional and technical skills.”* The Minister also acknowledged that *the country had lagged behind in the area of human resource development and capacity building for the industry.* Additionally, in 2003, in a drive to boost citizen empowerment, Debswana Mining Company suspended construction for all major projects by the company, because of a shortage of citizen contractors (Botswana Gazette, August 13, 2003- Mogapi).

The critical need for a skilled labour force above the craftsmanship level is also evidenced by the staff complement required by the department of building and engineering services (DEBES). A staff complement of between 3,000 and 4, 000 is projected for the new planning period 2004 – 2009. Additionally, the department will be responsible for indirect employment of over 10,000 persons within the industry (Baxter, 2004).

4.1.4 Summary – Research Question 1

When the written curriculum is examined against the criteria of the gap between the written and excluded curriculum, inclusive of cognitive complexity and range of knowledge provided it is found that the written curriculum does not meet the expectations of industry. The learning expectations are lowered for candidates because the written curriculum is skewed towards provision of basic occupational levels while industry requires workers at technical and professional skill levels.

Respondents indicated appreciation of the efforts of DVET in developing this curriculum but expressed concerns for an immediate review of the programme content. Candidates and lecturers indicated the curriculum development group should have '*researched*' curriculum for the industry locally, within the SADC Region, and also internationally to see what was being offered before deciding on the curriculum for the BTEP. This industry research would have provided information on occupational competencies, which are sustaining or in over supply and also would reflect broader workplace goals. Additionally, they felt that if the programme had been piloted before being implemented the issues of appropriate content could have been addressed.

4.3 Section 2 – presentation of data on research question 2:

Presentation of data for research question 2, focuses on the question: '***What processes are used to ensure alignment of the curriculum to the training needs of the building and construction industry?***'

Respondents from the curriculum development group (CDG) make reference to the curriculum development process chart shown in figure 4.1. Two processes are embedded. They are identified by the boxes with grey shaded areas (a) research – establishing the need and (b)

validation – confirmation that the programme meets industry requirements using the QAA validation model.

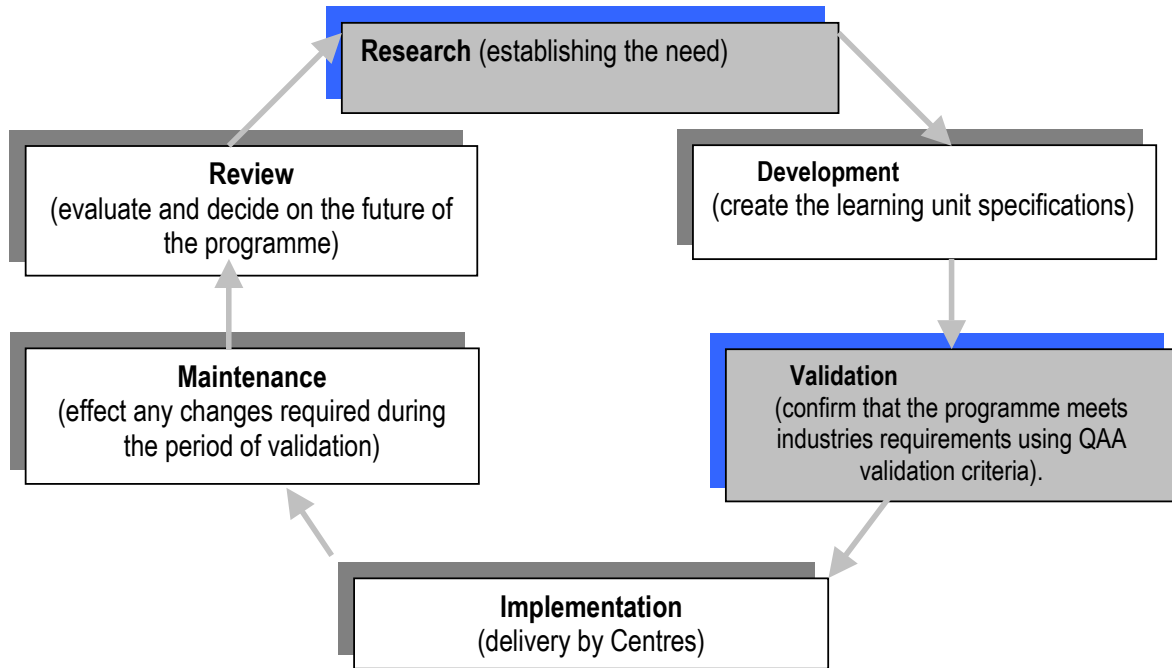


Figure 4.1 BTEP curriculum development process chart

Three strategies used to ensure alignment identified within the two processes are consultation with industry, formation of a programme advisory committee (PAC), and the validation process.

- (a) consultation with industry: this occurs at the very first stage of the curriculum development process where the CDG invites comments from industry through an agreed format for the selection of content areas. In this instance the consultation involved a survey of 35 companies using a mailed questionnaire, observation and interviews conducted on nine construction sites. The questionnaire used in the survey is attached as Appendix 10 and, was also used to gather data during the observations and interviews.

- (b) use of programme advisory committee (PAC): representatives identified by the CDG from the industry are invited to sit on a committee to provide advise on the content and structure of the programme. The committee becomes effective after the initial research is carried out with industry to establish content. The composition of the committee is attached as Appendix 9.
- (c) the validation process: there are two aspects to this process (1) an internal quality control of procedures to be followed by the CDG, and (2) the actual validation of the programme. This involves a validation panel comprising of a combination of educators and industry representatives who question the appropriateness of the content of the programme with regard to the needs of the industry. The structure of the validation process is attached as Appendix 11.

While the curriculum development group indicated that at the time of development they felt these measures (a, b and c above) would have been sufficient to ensure alignment to the needs of the industry, in retrospect they felt that inviting industry representatives to write learning unit specifications would also have been appropriate and beneficial. Other research respondent groups also indicated that this would have indeed been very beneficial to the alignment process. Assistance in this area, they state, would have ensured that the right competencies required by industry would have been identified as well as the expectation that the learning units would have been written at the desired cognitive complexity level. Lecturers and candidates pointed out that some of the learning unit specifications had outdated information, and in some cases inappropriate equipment were identified for use in the programme.

Lecturers and industry representatives indicated that the process of consultation to establish programme content should have included focus group meetings with various occupational

clusters of the industry, prospective candidates as well as lecturers on the programme. Consultation with industry, they indicated, should not be a, *one-off process*, but rather it should occur at various stages, initially to collect data, then to provide further comment and negotiate the content of the written curriculum. This consultative process, they added, should have included a thorough research where information is gathered on similar programmes and trends influencing identification of competencies and technology (emerging, sustaining and retiring) in the industry locally, regionally and internationally. Respondents questioned the method of consultation used by the CDG, i.e. the use of the mailed questionnaire with the pre-selected content areas. This they said would not have provided avenues for meaningful discussion or consultation.

The lecturers and industry representatives felt that the level of competence of the curriculum development team with regard to their experience in developing curriculum and specifically an outcomes based curriculum, affected their ability to develop a programme aligned to the needs of the industry. Specific reference was made to the qualification of the curriculum development group members. Lecturers indicated that the choice to focus the programme on basic occupational areas of bricklayer and plasterer, carpenter and joiner, plumbing, painter and decorator matched the occupational background and qualification of the curriculum development team (refer to Appendix 9).

Respondents were not satisfied with the ability of the validation model to ensure alignment to the training needs of the industry. The model in itself represents measures to cover internal quality control of the curriculum in regard to various vetting functions on the document. With regard to the validation panel, they expressed concern with the nomination of technical experts, the time used by the panel to scrutinize the document. Preference was indicated for a panel of experts of varying occupational clusters in the industry to work with the CDG at various periods

within the development process to ensure that occupational and employment skills required by industry were included.

Summary – research question 2

Respondents agree that the alignment strategies used are not enough to ensure that the broader workplace goals and future direction of the programme are in line with the needs of industry. They questioned the commitment of vocational educators in regard to educational accountability.

Chapter 5

Discussion of findings, limitations in research design and recommendations for future research

5.1 Introduction

The organization of discussion in this chapter considers wider issues of external educational accountability of the VET sector. The review of literature and, in particular section 2.3 identifies the purpose of VET in Botswana as being closely aligned to economic policy to support business growth and competitiveness by providing highly skilled workers to meet the workforce demands. Interpreted at the curriculum development level, the challenge for VET in Botswana lies in:

- identifying the skills which are needed both in the short, medium, and long term periods
- deciding:
 - what is most useful for learners to know about these skills
 - what criteria should be used to select knowledge
 - who should plan and who should develop curriculum
- aligning curricula and educational experiences to meet skills/competencies identified.

5.2 Discussion of findings relevant to questions 1 and 1.1

Research findings for questions 1 and 1.1 show that the written curriculum does not reflect an understanding of the broad goals of the building and construction industry, nor does the written curriculum address forecast of new developments in the industry.

In the first instance, the focus of the findings looks at the fitness of purpose of the curriculum with regard to the adequacy for the written curriculum to prepare candidates to fill the skills and knowledge gaps in the industry.

The findings of the research indicate a sharp contrast between the broad occupational needs of the industry and the focus of the written curriculum.

The broad occupational needs of the industry identified by research findings point to a need for curriculum to address development of skills at technical and professional occupational levels of the industry. However, when the curriculum content is examined it becomes apparent that the focus of the curriculum is skewed to development of skills at basic occupational levels of the industry. Table 5.1 shows the contrast in the occupational clusters in terms of what is needed by industry and what is provided by the written curriculum.

The four occupational areas emphasised in the written curriculum are:	The broad occupational needs of the industry are skills at the technical and professional levels – these are identified as:	
<ul style="list-style-type: none"> ■ bricklayer and plasterer ■ carpenter and joiner ■ plumber ■ painter and decorator 	<ul style="list-style-type: none"> ■ quantity surveyors ■ urban and regional planners ■ cartographers and surveyors ■ drafters ■ construction managers and builders ■ building construction inspectors (electrical, elevator, mechanical, plumbing, public, works, home) 	<ul style="list-style-type: none"> ■ architects ■ civil engineers ■ cost estimators ■ engineering technicians ■ project managers

Table 5.1 Contrast of occupational areas

The focus of the written curriculum prepares candidates for occupational levels classified as unskilled areas and therefore outside of the areas of critical needs. The industry, respondents agree, is *flooded* with these unskilled areas. The oversupply of these skills has occurred because this is the level at which curriculum development has concentrated in the VET sector since 1986.

The findings suggest that the CDG was unable to interpret the purpose of the programme at a functional level. DVET identifies the programme goal by stating that *'candidates who complete the BTEP in building construction will have a significant range of skills, knowledge and understanding in the building construction industry that should help them to find employment'* (Programme validation document, 2001:8). However, the written curriculum focuses on four occupational clusters in the industry and prepares candidates for employment in areas where the industry has an over supply, refer to section 4.2.1 (a).

A further interpretation of the mis-match of the written curriculum in relation to industry needs could mean on the one hand that the process of *deliberation* in Figure 2.5 was not clearly structured or the goal of the programme was not communicated effectively at the deliberation process. On the other hand, this could reflect 'power coercive strategies' (Smith and Lovat 2003 :198 and section 2.2.1 of this thesis) of vocational educators who want to remain in control. The vocational sector has been criticized for perpetuating a supply driven VET sector (sections 1.1; 2.9.1.3, and 2.10).

Section 2.6 makes reference to the fact that the BTEP curriculum is an OBE curriculum, however, neither the Ministry of Education nor DVET has a clear policy on the OBE approach to be used in Botswana. The harsh reality then is that the central principles of the OBE approach, used to strengthen the conditions for enabling learners to be equipped with knowledge and competence to be successful after leaving the education system, have not been taken into account by the curriculum developers. This means that a fundamental step in the OBE design and what Spady (1994:19) refers to as the *'golden rules of OBE curriculum design'* was not taken into consideration. The rule states, *consistently, systematically and creatively: (a) design down from your significant culminating outcomes (broad goals or exit*

goals) to establish the enabling outcomes on which they depend. This rule is hailed as a sound approach to establishing priorities of curriculum content and structure and a framework for shaping educational experiences to achieve broad or exit goals.

The findings also suggest that vocational educators have developed the written curriculum at the micro level of the building construction industry while the industry requires programmes to address macro level goals of the industry. This is evidenced from the findings in section 4.2.1 (a) and table 5.1. Respondents questioned if vocational educators considered the consequences of their decisions and the impact this will have on the industry and learners in general.

5.2.1 Discussion of research findings – research question 2

For respondents, the BTEP validation model presented in Appendix 11, responds to concerns of internal quality control processes in curriculum development (performing various vetting functions on the document). It does not provide overall guidance for alignment strategies to be used to ensure alignment of curriculum to the training needs of the industry.

Respondents indicate preference for strategies that recognized the impact of external factors on the curriculum. Reference was made of, (a) a thorough environmental scan where the CDG and the PAC would research other curriculum outlines for various programmes in the building and construction industry locally as well as within the SADC and internationally, (b) more effective consultation with industry representatives where thorough consultation is carried out to identify occupational needs which are emergent, sustaining and retiring; where job analyses are carried out, (c) CDG members to become more involved with current industry practices (d) consultation which should also be carried out with lecturers and prospective candidates.

When probed about the survey method and the instrument used, members of the group admitted that it did not provide enough opportunities for industry to influence the content. The questionnaire asked industry representatives to select from pre arranged content areas. The group members did not facilitate discussions or meetings with industry representatives to allow them to influence the content in a meaningful way.

Respondents (lecturers and industry representatives) were not impressed with the composition of the committee and the resultant output in terms of the curriculum approved by the committee. Also they wondered if they were given adequate terms of reference based on the needs of the industry. When documents from the PAC were examined, it was clear that they had indeed provided advice on the selection of the four basic occupational areas. However, it was also clear that the PAC gave this advice with the understanding that programmes would also be developed concurrently in civil engineering. To date the curriculum development group (CDG) has not completed any development work in this area.

While research respondents liked the idea of the validation panel, they were not convinced of its effectiveness at this stage in the programme. The validation process takes place after the CDG and PAC have taken a period of two years of work to develop the curriculum. Respondents agree that the panel of experts should be meeting the PAC and CDG at other stages and facilitating processes where actual workmen (site foremen and other occupational groups) meet to discuss and suggest content input.

5.3 Summary – discussion of research questions 1, 1.1. and 2

Research findings point to the factors contributing to the tensions between the major stakeholders of VET mentioned in section 1.1. There is evidence from the research that

suggests that VET educators are not acting as brokers of government policy. Government has a very clear policy on the role and purpose of VET and has provided a direction for the role of VET in this regard. Government interests have moved beyond immediate skills' needs, and concerns itself with future skills needs towards diversification of the economy.

The tension between employers from the industry on the one hand and vocational educators on the other stems from criticisms that vocational programmes are out-of-touch with the realities of the industry. Research findings suggest that this criticism has much justification. More significant evidence comes from an examination of the content of the written curriculum itself. Findings indicate that there is a significant gap between the written and excluded curriculum (what industry would have required the curriculum to offer) as stated below:

- Respondents refer to the content areas which have been excluded as '*very basic content*', which should have been included in any curricula to prepare candidates for work in the building and construction industry (refer to section 4.2.1 (b))

- The research results indicate that the process used to determine the technical skills to be included in the programme ought to have focused on expanding the cognitive and affective skills. This would ensure a broader view of required skills as well as provision of a true reflection of the work of the industry in terms of the range of knowledge provided.

The research findings concur with the statement made by the ABCON chairperson in sections 2.10.1.1 (a) and 2.10.1.3. He remarked that a paradigm shift is required in the area of curriculum development stemming from the fact there was not enough effort by educators to address labour market needs. He further expressed the need for a closer working relationship between educators and industry experts in the development and implementation of training

programmes where content is negotiated to determine occupational and employability skills for the industry.

5.4 Limitations of the research design

To contribute to validity and reliability of data, the researcher would have liked to have included a larger number of respondents from industry. Unfortunately this was not possible as only a limited number of companies are currently involved with the programme. The extent of their involvement is limited to offering workplace attachment and with the verification process at one technical college in Botswana. It is recommended that when the written curriculum is offered in other colleges that a study be carried out to include the building and construction companies involved.

5.5 Recommendations for further research

The findings suggest that consideration needs to be given to using effective curriculum alignment strategies and that they should be implemented throughout the design and development stages of the curriculum. The review of literature suggests two models to address this these are

(a) the international vocational training standard model proposed by Mansfield (2001).

The model suggests that vocational standards should comprise of (i) employment specification -what does the student need to be able to do in employment? This would involve a functional analysis of work activity relevant to a specific skill, and (ii) the learning specification - what does the student need to learn to be effective in employment? This involves an analysis of the cognitive and affective skills used to support learning;

(b) the story-centred curriculum proposed by Schank (2002). The concept of the story-centred curriculum in respect of the building and construction industry, looks at

developing an integrated story of the work of the industry. The goal of the written curriculum would then be influenced by the macro level goal of the industry, 'What does a worker need to know and be able to contribute to effective delivery of construction or related occupations in Botswana?

Also, further research needs to be concerned with the wider economic implications of having a supply driven VET sector as opposed to, at minimum striving to create a balance between the supply and demand side of vocational training. At present, vocational educators control the training market by determining what they will supply. Future research needs to identify a framework for collaboration between industry and VET educators as well as to identify strategies to remove the barriers which currently exist.

The VET sector in Botswana needs to be concerned with building industry/education partnerships to address issues of workforce development. Finally, future research needs to identify ways in which VET educators can maintain currency of knowledge and thus keep VET curriculum relevant.

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Appendix No. 1

Programmes within the BTEP qualification structure

Foundation and Certificate Programmes available as of 2001	
Foundation	Certificate
hairdressing and beauty therapy	hairdressing and beauty therapy
information and communications technology	information and communications technology
clothing, design and textiles	clothing, design and textiles
hospitality and tourism	hospitality operations
business	business
electrical and mechanical engineering	electrical and mechanical engineering
	tourism
building construction	building construction
	multimedia
foundation and certificate programmes to be developed as of 2003	
Foundation	Certificate
agriculture	agriculture
performing arts	performing arts
sport, games, recreation and leisure	sport, games, recreation and leisure
health and social care	health and social care
manufacturing and production technology	manufacturing and production technology
science	science
proposals for advanced certificate and diploma programmes	
hairdressing and beauty therapy	
information and communications technology	
clothing, design and textiles	
electrical and mechanical engineering	
multimedia	
tourism	
business	
hospitality operations	
building construction	
science	

Note: building construction programmes are highlighted with grey shaded areas

Appendix No. 2

Interview schedule: candidates

Section 1: General

1. What specific occupation/skill area in Construction are you interested in pursuing?
2. What skills/occupation areas are required by the construction Industry in the next 5 – 10 years?

The BTEP- building construction curriculum

2. What sections of the curriculum would rate as:
a) not useful? Name the section and state reasons
b) most useful? Name the section(s) and state reasons
3. How well does the learning outcomes match the current initiatives of the construction industry?
6. Are there content areas and or sections of the programme that could have been addressed more thoroughly in the training?
6. Comment on the balance of practical and theory sessions.
Probe
On a scale of 1 – 5 how would you rate the balance between practical and theory sessions?
8. How well has the training prepared you to work in the Construction Industry
Probe
Is the content of the programme appropriate for your career needs?
9. Do you have suggestions which may improve the programme?

Note: attached to this interview schedule is the curriculum outline of building and construction programmes in South Africa and programmes offered locally (table 4.1 and 4.2). This are used to guide discussion with respondents.

Appendix No. 3

Interview schedule: representatives of the building and construction industry

General

1. What skills are required by the industry in the next 5 years?

probe

How was this information obtained?

BTEP – building construction curriculum

2. To what extent is the building construction programme aligned with the training needs of the construction industry?

probe

To what extent does the skill requirements of the industry match the educational priorities (vocational units) of this programme?

3. What aspects of the curriculum are industry experts involved with?

probe

What aspects of the curriculum should industry experts be involved with?

4. Is the curriculum content adequate for the needs of the industry?

probe

Have you identified any gaps or limitations in the curriculum ? if yes, what are they

4. With regard to skill development, how does this programme compare with other training programmes (same level) locally and regionally ?

5. What is the most effective feature of the curriculum alignment plan?

6. How can support structures/systems for the curriculum be improved?

Note: attached to this interview schedule are(QAA validation process model, curriculum outline of building and construction programmes in South Africa and locally (table 4.1 and 4.2), as well as appendix 9. These are used to guide discussion with respondents.

Appendix No.4**Interview schedule: curriculum development group**

General

1. What skills are required by the industry in the next 5 years?
How was this information obtained?

BTEP- building construction curriculum

2. To what extent are industry experts involved in the development of the curriculum?
3. To what extent is the building construction programme aligned with the training needs of the construction industry?

probe

To what extent do the skill requirements of the industry match the educational priorities (vocational areas) of this programme?

4. Is the curriculum content adequate for the needs of the industry?

probe

Have you identified any gaps or limitations in the curriculum ?

5. With regard to skill development, how does this programme compare with other training programmes (same level) locally and regionally ?
6. What limitations have you encountered in your effort to implement the curriculum?
7. What processes were used to ensure alignment of the curriculum to the training needs of the industry?

probe

What is the most effective feature of the curriculum alignment plan?

8. What is the expertise of the members of curriculum development team?
9. How can support structures/systems for the curriculum be improved?

Note: attached to this interview schedule are(QAA validation process model, curriculum outline of building and construction programmes in South Africa and locally (table 4.1 and 4.2), as well as appendix 9. These are used to guide discussion with respondents.

Appendix No.5**Interview schedule : lecturers**

General

1. How were you involved in the selection of content for the programme ?
2. How did the department prepare you for developing and implementing this curriculum?
3. To what extent are industry experts involved in the development of the curriculum?
4. To what extent is the building construction programme aligned with the training needs of the construction industry?

probe

To what extent do the skill requirements of the industry match the educational priorities (vocational areas) of this programme?

5. What skills are required by the industry in the next 5 - 10 years?
6. Is the curriculum content adequate for the needs of the industry?

probe

Have you identified any gaps or limitations in the curriculum ?
What limitations have you encountered in your effort to implement the curriculum?

7. With regard to skill development, how does this programme compare with other training programmes (same level) locally and regionally ?
8. What processes were used to ensure alignment of the curriculum to the training needs of the industry?

probe

What is the most effective feature of the curriculum alignment plan?

9. What is the expertise of the members of curriculum development team?
10. How can support structures/systems for the curriculum be improved?

Note: attached to this interview schedule are(QAA validation process model, curriculum outline of building and construction programmes in South Africa, as well as appendix 9. These are used to guide discussion with respondents.

Plumbing 1**Identify a range of basic plumbing tools and state their uses**

- (a) Identify all the tools correctly
- (b) State the uses for the tools correctly

Identify a range of common plumbing components and materials and their uses

Identify correctly plumbing materials and components used in domestic housing

- (b) State the uses of a range of common components

Demonstrate basic practical exercises related to flashing

- (a) Interpret working drawing correctly
- (b) Assemble flashing to comply with the drawing and specification
- (c) Demonstrate working methods in correct sequence

Demonstrate basic practical exercises related to soldering

- (a) Interpret working drawing correctly
- (b) Apply solder to comply with the drawing and specification
- (c) Demonstrate working methods in correct sequence

Plumbing 2**Identify various types of pipe plumbing materials as used in domestic construction**

- (a) Identify correctly the differences between a range of plumbing materials
- (b) State the uses of plumbing materials correctly

Perform basic pipe jointing activities

- (a) Interpret working drawing correctly
- (b) Perform the steps in the activity in the correct sequence
- (c) Produce a jointed pipe that complies with a given specification
- (d) Apply good working practices to ensure waste of materials is minimal

Perform basic pipe bending activities

- (a) Interpret working drawing correctly
- (b) Perform the steps in the activity in the correct sequence
- (c) Fabricate pipe bends to comply with a given drawing and specification
- (d) Apply good working practices to ensure waste of materials is minimal

Plumbing 3**Identify types of sanitary appliances and fittings**

- (a) Identify correctly types of sanitary appliances
- (b) Identify correctly types of sanitary fittings
- (c) State the uses of various types of sanitary fittings correctly

Install sanitary appliances and fittings

- (a) Interpret a working drawing correctly
- (b) Demonstrate working methods in correct sequence
- (c) Install appliances to comply with the drawing and specification correctly
- (d) Install fittings to comply with the drawing and specification correctly

Lay drainage pipes

- (a) Interpret a working drawing correctly
- (b) Demonstrate working methods in correct sequence
- (c) Install and test the pipes to comply with the drawing and specification

Appendix No. 7 Alternative plumbing unit used to benchmark standards of the BTEP plumbing unit	
DUTY A. PERFORM COST ESTIMATES	
A1 evaluate job site conditions A2 calculate materials costs A3 calculate construction costs A4 calculate subcontractor costs A5 calculate equipment expenses	A6 calculate administrative costs A7 calculate insurance costs A8 certify permit costs A9 bid the job
DUTY B. PERFORM FIELD DIMENSIONING AND SKETCHING	
B1 size plumbing systems B2 calculate flow and pressure drops B3 refer to blueprints/specs B4 determine elevation and grade B5 coordinate with other trades B6 communicate with other mechanics	B7 locate buried lines B8 determine pipe location and elevations B9 determine pipe lengths B10 determine offsets B11 create field sketches
DUTY C. INSTALL PLUMBING SYSTEMS	
C1 obtain permit C2 coordinate with utilities C3 install sewers C4 install pipe in trenches C5 install pipe sleeves and penetrations C6 install grey water system C7 install acid waste system C8 install potable water distribution system C9 install fuel gas piping C10 install back flow preventers C11 install hot tap fittings C12 install compressed air piping systems	C13 install vents C14 install joints and connectors C15 install valves C16 install medical gas systems C17 install recirculation systems C18 install plumbing pumps C19 install traps and interceptors C20 install indirect waste systems C21 install lift stations C22 Check test and start plumbing systems C23 Clean and disinfect potable water systems
DUTY D. FABRICATE AND INSTALL PIPING	
D1 perform field take off D2 install piping supports and anchors D3 calculate common offsets D4 fabricate field run piping D5 lay out templates	D6 lay out welded joints D7 fabricate piping offsets D8 assemble offsets D9 cut and assemble miter joints D10 perform NDE testing
DUTY E. INSTALL MECHANICAL SYSTEMS	
E1 install chill water systems E2 install steam systems E3 install hydronic heating systems E4 install boilers E5 install heating and heating coils E6 install mechanical pumps E7 install heat exchangers	E8 install steam condensate pumps E9 enable thermal expansion stress relief E10 isolate noise and vibration sources E11 install control and balancing valves E12 install pressure and temperature relief valves E13 install makeup water systems E14 provide chemical treatment E15 check test and start mechanical systems

DUTY F. INSTALL FIXTURES	
F1 consult with customer F2 conform to ADA requirements F3 cut and assemble shower pans F4 install tubs and showers F5 install water closets F6 install faucets	F7 install sinks F8 install lavatories F9 install water heaters F10 install drinking fountains F11 install urinals F12 install water filters and softeners F13 install bidets F14 install emergency eye washers and showers
DUTY G. REPAIR/MAINTAIN PLUMBING SYSTEMS	
G1 troubleshoot piping systems G2 test gas pressure G3 service backflow preventers G4 perform valve maintenance G5 repair/replace valves G6 maintain water heaters G7 maintain medical gas systems G8 maintain recirculation systems G9 service interceptors	G10 maintain steam traps G11 maintain pumps G12 maintain water pressure booster systems G13 change out components G14 maintain drains G15 maintain thermal expansion stress relief G16 service traps G17 submit water samples for testing G18 complete records
DUTY H. FOLLOW SAFETY REQUIREMENTS	
H1 participate in safety training H2 follow occupational safety and health guidelines H3 follow hazardous materials communications act procedures H4 observe equipment safety guidelines H5 inspect job site H6 wear personal protective equipment H7 maintain tools and equipment H8 maintain clean work site H9 maintain safety equipment	H10 observe trench safety guidelines H11 observe confined space guidelines H12 observe flammable materials handling guidelines H13 observe ladder and scaffolding setup guidelines H14 calculate maximum weight for erection equipment H15 perform lockout/tagout H16 secure work area H17 assist in completing accident reports
DUTY I. MAINTAIN RECORDS	
I1 maintain professional certifications and licenses I2 maintain employee records I3 maintain payroll records I4 maintain material safety and data sheets I5 maintain hazardous materials communications act documentation I6 submit accident reports	I7 create as-built drawings I8 maintain warranties I9 maintain operation and maintenance manuals I10 obtain approval for change orders I11 maintain business records

Appendix No. 8 Summary of BTEP-building and construction curriculum	
Unit title	Expectations of candidates
building science-an introduction	On completion of this unit the candidate will be able to demonstrate an understanding of the effect of moisture and heat on building and building materials.
construction craft-an introduction	On completion of this unit the candidate will be able to identify and use materials and equipment commonly used in the construction industry.
construction industry-an introduction	On completion of this unit the candidate will understand the nature and basic features of the construction industry, the function of the members of the building team, and contract documents used for communication between them.
building drawing 1	On completion of this unit the candidate will be able to demonstrate drawing skills required to produce simple building drawings
building drawing 2	On completion of this unit the candidate will be able to draw plane, three-dimensional and orthographic projections.
construction health and safety	describe the necessary safety precautions on a building site and in the workshop, the causes of common injuries and their treatment, explain common causes of fire and measures to prevent them, and describe measures to secure construction site, workshop, equipment and machinery from unauthorised personnel
Summary of Elective Vocational Units	
bricklaying and plastering 1	On completion of this unit the candidate will be able to build short lengths of walling, return quoins and to plaster render coats, using basic tool skills.
carpentry and joinery 1	On completion of this unit the candidate will be able to manufacture products in wood, construct a range of woodworking joints and identify and use carpentry and joinery tools
carpentry and joinery 2	On completion of this unit the candidate will be able to describe the uses of a range of woods. He/she will also be able to manufacture a two-panel door and construct a roof truss.
painting and decorating 1	On completion of this unit the candidate will be able to identify a range of painting and decorating tools, and demonstrate methods of painting interiors and hanging wallpaper.

plumbing 1	On completion of this unit the candidate will be able to identify a range of basic plumbing tools, plumbing components and their uses. He/she will be able to demonstrate practical activities related to flashing and basic soldering and brazing activities
plumbing 2	On completion of this unit the candidate will be able to identify plumbing materials and to perform pipe-plumbing activities
building services: water supply and drainage	On completion of this unit, the candidate will be able to identify the main source of water supply and disposal systems for foul water in a domestic building.
finishes to domestic buildings	On completion of this unit, the candidate will be able to describe skills and techniques used in a range of finishes in domestic buildings.
site preparation and concrete work	On completion of this unit, the candidate will be able to understand basic site clearance techniques, and be able to set out and prepare lines for a building. He/she will describe basic trenching and be able to describe how to mix, transport and place concrete
major building elements 1	On completion of this unit, the candidate will be able to identify types of foundation, demonstrate brick bonds and describe various types of wall construction used in domestic building.
major building elements 2	On completion of this unit, the candidate will be able to distinguish and identify ground floor construction, formwork and roof construction
building drawing 3	On completion of this unit, the candidate will be able to identify and draw symbols and produce drawings for a single storey, two bed-roomed house that complies with Building Regulations
properties and uses of construction materials	On completion of this unit, the candidate will be able to identify and describe the properties and uses, and manufacturing methods of materials used in the construction industry.
power tools	On completion of this unit, the candidate will be able to identify and use power tools safely
secondary elements of a building	On completion of this unit, the candidate will be able to describe various types of doors, frames, windows and their methods of fixing.

Elective units	
bricklaying and plastering 3	On completion of this unit, the candidate will be able to prepare a materials list , build one brick thick walls, and apply plaster to internal corners and piers.
plumbing 3	On completion of this unit, the candidate will be able to install simple sanitary appliances and fittings, and connect drainage discharge systems
carpentry and joinery 3	On completion of this unit, the candidate will be able to use skills and knowledge to construct roofs, erect formwork and hang a door.
painting and decorating 3	On completion of this unit, the candidate will be able to prepare accurate lists of materials, stencil, apply textured paints and perform simple sign writing skills.
slabs and paving	On completion of this unit, the candidate will be able to interpret drawings , prepare bases, transport and position materials, and lay simple shaped paths and paved areas with concrete paving and brick sets.
electricity in domestic housing: an introduction	On completion of this unit, the candidate will be able to explain how electricity is generated and how it is serviced into a domestic building.

Appendix No. 9

Composition of curriculum development group and programme advisory committee

Curriculum development team

Curriculum development group members	Qualification (technical)	Place of employment
1	diploma in carpentry	DVET
2	higher national diploma building studies	DVET
3	certificate building studies	DVET
4	certificate painting and decorating	DVET
5	certificate painting and decorating	DVET
6	certificate in carpentry	DVET
7	certificate in plumbing	DVET
8	certificate bricklaying	DVET
9	certificate building studies	DVET

Programme Advisory committee

Programme advisory committee members	Composition of committee
1	government officer from department of building services
2	representative from Botswana confederation of industry, commerce and manpower
3	representative from furniture sales company
4	representative from architectural firm
5	staff from apprenticeship training unit
6	representative from water sanitary engineering firm
7	representative from the Botswana building association
8	lecturer from the university of Botswana – technical level programmes in building studies

Note: names withheld on the basis of confidentiality

Appendix No: 10

Skills analysis mail questionnaire for the new vocational programme in construction

Section 1 Information about your organisation

Name of company:location:

Address:

.....

Your position:.....telephone No.....

Qualification:.....

Total number of employees

Category of company:

Small
(1 – 49)

Medium
(50 – 499)

Large
(500 and above)

Section 2

Topics to be included in the foundation and certificate programmes. Please tick agrees or disagrees.

	FOUNDATION		CERTIFICATE	
	Agree	Disagree	Agree	Disagree
1. building science				
2. construction craft				
3. the construction industry				
4. building drawing				
5. construction health and safety				
6. bricklaying and plastering				
7. carpentry and joinery				
8. plumbing				
9. painting and decorating				
10. water supply and drainage				
11. finishes to domestic buildings				
12. site preparation and concrete work				
13. major building elements				
14. properties and uses of construction materials				
15. power tools				
16. secondary elements of buildings				
17. slabs and paving				
18. electricity in domestic housing				

Comments:

Appendix No.11 QAA VALIDATION PROCESS

