

## CHAPTER 4: THEORETICAL GROUNDING OF THE UNDERPINNING COMPETENCIES OF THE CRITICAL CROSS-FIELD OUTCOMES

### 4.1 INTRODUCTION

This chapter addresses the research question on the theoretical grounding of the CCFOs. CCFOs, as discussed in chapter 3, are the qualities SAQA wishes all learners to have achieved at the end of any learning programme in all the fields of the NQF. CCFOs are also referred to as generic competencies and are cross-curricular critical thinking competencies that contribute to full personal development and are of transforming nature.

#### Action



This chapter forms part of the “action” step of the action research model as it analyses the CCFOs in terms of the demonstration verbs indicated in chapter 3.

This chapter unpacks and analyses the CCFOs in terms of their underpinning competencies according to the embedded actions required in the statements. The CCFOs incorporate cognitive as well as affective domain specific characteristics. The underpinning competencies of the CCFOs are explored according to the above-mentioned characteristics. The affective domain specific characteristics are ascertained in terms of Emotional/social intelligence and the cognitive specific characteristics are explored in terms of Sternberg’s triarchic theory of intelligence (Sternberg 2001), (Addendum D), Bloom’s taxonomy of educational objectives (Bloom 1979), (Addendum E), and Beyer’s cognitive and meta-cognitive operations (Beyer 1998), (Addendum F). It is important to note that the CCFOs can be differentiated, they are inseparable.

The CCFOs are complex statements. The first CCFO for example, incorporates the identification of problems, solving problems, using critical thinking and creative thinking. Table 9 and 10 as reflected at the end of chapter 3, are utilised to outline the underpinning competencies of the CCFOs in terms of the affective as well as the cognitive domain.

#### 4.2 AFFECTIVE DOMAIN SPECIFIC DESCRIPTION OF THE CCFOs

The affective domain specific underpinning competencies entail emotional intelligence and social intelligence. These are explored congruently, as the concepts are closely related. The ensuing text examines and explores the concept of emotional/social intelligence with the focus on the possible explanatory value it contributes to the concept of CCFOs.

The intention is not to explore emotional/social intelligence as concepts *per se*, but to explore the mentioned concepts in terms of CCFOs. Practical descriptions and examples from the mentioned concepts are utilised to support the purpose of this research.

The concept of emotional intelligence is not new. In fact, it is based on a long history of research and theory in Personality and Social as well as Industrial and Organisational Psychology. As early as 1940 Wechsler (1943:102) referred to *non-intellective* as well as *intellective* elements, by which he meant affective, personal and social factors. Wechsler furthermore proposed that the non-intellective abilities are essential for predicting one's ability to succeed in life. He wrote:

The main question is whether non-intellective, that is affective and cognitive abilities, are admissible as factors of general intelligence. My contention has been that such factors are not only admissible but also necessary. I have tried to show that in addition to intellective factors there are also definite non-intellective factors that determine intelligent behaviour. If the foregoing observations are correct, it follows that we cannot expect to measure total intelligence until our tests also include some measures of the non-intellective factors (Wechsler 1943:103).

Wechsler was not the only researcher who viewed non-cognitive aspects of intelligence to be important for adaptation and success. Thorndike (Thorndike 1937) also documented social intelligence in the late thirties. He described social intelligence as the ability to understand and manage people. Gardner (Gardner 1983) began to write about multiple-intelligence in 1983. Gardner proposed that intrapersonal and interpersonal

intelligences are as important as the type of intelligence typically measured by IQ and related tests (Gardner 1983: 3).

IQ in itself is not a very good predictor of job performance. IQ accounts for about 25 percent of the variance (Cherniss 2000:2). In some studies according to Cherniss (2000:2), IQ accounts for as little as four percent of the variance. The CCFOs relate to the emotional/social intelligence, for example working in teams as well as the statements that refer to the ability to contribute to the full personal development of each learner and the social and economic development of society at large, and are therefore valuable and very essential qualities for learners to acquire.

In studies that Cherniss (2000:5) conducted, it turned out that social and emotional abilities were four times more important than IQ in determining professional success and prestige. It would be absurd, according to the mentioned author, to suggest that cognitive ability is irrelevant to success. What matters, is how the candidate performs compared to his/her peers. This has less to do with IQ differences and more to do with social and emotional factors. It is for this reason the CCFOs are analysed in terms of emotional/social intelligence as well as the cognitive cluster. One should keep in mind that cognitive and non-cognitive abilities are very much related. In fact, there is research according to Cherniss (2000:3) suggests that emotional and social competencies actually help improve cognitive functioning. CCFOs are therefore an imperative component of Education, training and development interventions and ought to be integrated in all learning interventions at all levels of the NQF.

Social intelligence was initially defined as “the ability to understand and manage people” (Thorndike & Stein 1937:281). These social abilities are also directed inward and social intelligence expressed by extension, the ability to understand and manage oneself.

In essence, Salovey and Mayer (1990:198) define social intelligence as the ability to perceive one’s own and others’ internal states, motives and behaviours and to act toward them optimally on the basis of that information. Weinstein (1969:755) notes that social intelligence “boils down to the ability to manipulate the responses of others”.

In doing the research for his first book, Goleman (1996) became familiar with a wealth of research pointing to the importance of social and emotional abilities for personal success.

Salovey and Mayer (1990:198) define emotional intelligence as the sub-set of social intelligence that involves the ability to monitor one's own and others' feelings and emotion, to discriminate among them and to use this information to guide one's thinking and actions. Emotional intelligence is also part of Gardner's view of Social Intelligence, which he refers to as the *personal intelligence* (Gardner 1983:239). Like social intelligence, personal intelligence (divided into inter- and intra-personal intelligence) includes knowledge about the self and others. One aspect of personal intelligence relates to feelings and is quite close to what is called emotional intelligence:

The core capacity at work here is access to one's own feeling life - one's range of affects or emotions: the capacity instantly to effect discriminations among these feelings and, eventually to label them, to enmesh them in symbolic codes, to draw upon them as a means of understanding and guiding one's behaviour. In its most primitive form, the intra-personal intelligence amounts to little more than the capacity to distinguish a feeling of pleasure from one of pain.... At its most advanced level, intra-personal knowledge allows one to detect and to symbolize complex and highly differentiated sets of feelings... to attain a deep knowledge of.... feeling life (Gardner 1983:239).

Interpersonal intelligence involves, among other things, the ability to monitor others' moods and temperaments and to enlist such knowledge into the service of predicting their future behaviour. The awareness of one's own emotional state, according to Buck (1984:46), can be seen to be useful in the regulation and coordination of one's behaviour, just as the communication of emotional information is useful in the regulation and coordination of social behaviour. To function effectively on the affective cluster, one has to be aware of one's emotions. Correspondingly, the affective cluster needs to function appropriately as a prerequisite to the cognitive cluster.

Emotional intelligence does not include the general sense of self and the appraisal of others. It rather focuses on the processes described specifically above, that is, the recognition and use of one's own and others' emotional states to solve problems and regulate behaviour.

While working on this research I met JET (Joint Education Services 2003), a company that provide private education training and development services, who is currently in a working relationship with CAEL (Council for Adult and Experiential Learning). SAQA endorses the work that JET has done with regards to the CCFOs.

The mentioned parties are exploring the possibility of implementing the Behavioural Event Interview (BEI) as an assessment tool for the CCFOs. The Behavioural Event Interview provides employees with “knowledge about their capabilities and motivates them to become involved in job and career planning and education and training” (JET 2003: 9).

The Council for Adult and Experiential Learning (CAEL) did 18 years of research on 14 capabilities. These capabilities according to the Council are most important capabilities employers expect from employees.

The CAEL implement this assessment tool to:

- guide adults to appropriate education, training and development programmes
- select job applicants
- match employees with available jobs within a company
- guide the unemployed to appropriate jobs
- empower adults with information about their competencies and abilities
- motivate adults to seek further education, training and development

CAEL refers to the CCFOs as *capabilities*. Donna Younger (Younger 2002), the facilitator during a workshop held by JET views behaviour as an indicator of competence/capabilities. A person is interviewed to determine the capabilities and the fundamental philosophy of CAEL is that “the best predictor of how a person will behave in the future is how he or she has behaved in the past” (JET 2003:11). This interview indicates high “points” from the past. This past experience is likely to encourage or discourage the demonstration of these capabilities in the future. Donna Younger divided the CCFOs in 4 quadrants similar to that of Salovey and Mayer (2001:15) and Goleman (1996:268). The following table is a perceived division of emotional intelligence by the congregation of Salovey and Mayer (1990:15), Goleman (1996:268) and Younger (2002).

Table 12 below serves as a starting point to describe the underpinning competencies of the CCFOs in terms of Emotional/social intelligence. The table correlates the four branched model of emotional intelligence and sets the parameters for describing the CCFOs in terms of the affective characteristics thereof.

**Table 12     Division of Emotional intelligence**

Author	Division of Emotional intelligence Branches			
	Branch 1	Branch 2	Branch 3	Branch 4
Mayer et al. (2001:15)	Perceiving emotions	Using emotions to facilitate thought	Understanding emotions	Managing emotions in a way that enhances personal growth and social relations
Salovey & Mayer (1990:90)	Appraising and expressing emotions in the self and others	Regulating emotion in the self and others	None	Using emotions in adaptive ways
Goleman (1996:268)	Self - awareness	Empathy	Empathy	Managing emotions
Donna Younger (2004)	Self - awareness	Self -regulation	Social awareness	Relationship management

Goleman's (1996:15) and Donna Younger's (2002) first branch of the division of Emotional intelligence correlates with each other. Goleman (1996:268) refers to self-awareness in the sense of recognising feelings and building a vocabulary for them and recognises the links between thoughts, feelings and reactions. Self-awareness includes knowing if thoughts or feelings are ruling decisions, seeing the consequences of alternative choices and applying these insights to decisions. Self-awareness (Goleman 1996:268) also takes the form of recognising one's strengths and weaknesses and seeing oneself in a positive but realistic light. The processes underlying emotional intelligence, according to Salovey and Mayer (1990:191) are initiated when affect-laden information first enters the perceptual system. Mayer et al. (2001:15) refers to the ability

as the identification of emotions in faces, pictures, etcetera. Emotional intelligence allows for the accurate appraisal and expression of feelings (Salovey & Mayer 1990:191) and stable laws may govern them. These emotional appraisals, in turn, in part determine various expressions of emotions.

There is a distinction between the second branch (using emotions) and the other three (Mayer et al. 2001:15). Whereas branches 1, 3 and 4 involve reasoning about emotions, branch 2 uniquely involves using emotions to enhance reasoning.

People experience mood on both a direct and a reflective level, (Salovey & Mayer 1990:195). In their reflective experience, individuals have access to knowledge regarding their own and others' moods. This experience according to Salovey and Mayer (1990:195) in part, represents a willingness and ability to monitor, evaluate and regulate emotions. Mayer et al. (2001:15) describe this as the ability to comprehend emotional information about relationships, to make the transition from one emotion to another and to use linguistic information about emotions. Goleman (1996:268) describes this ability as empathy. This ability entails understanding of others' feelings and taking their perspective, and respecting differences in how people feel about things. Empathy also includes assertiveness rather than being passive or aggressive. Empathy is learning the art of cooperation, conflict resolution, negotiation and the ability to compromise (Goleman 1996:268). Empathy according to Salovey and Mayer (1990:194) may be a central characteristic of emotionally intelligent behaviour. When people relate positively to one another, they experience greater life satisfaction and lower stress levels. For example, the empathy of an advice giver is an important determinant of whether the advice is perceived as good or not.

People who behave in an emotionally intelligent fashion should have sufficient social competence to weave a warm fabric of interpersonal relations. Clearly, the greater the number of emotionally intelligent friends, relatives and co-workers, the more empathic and supportive a social structure will surround a person (Salovey & Mayer 1990:194).



Empathy researchers, according to Salovey and Mayer (1990:194), in turn, have noted its dependence on subsidiary abilities similar to appraisal and expressing emotions to enable a person to:

- understand another person's point of view
- identify accurately another's emotions
- experience the same or other appropriate emotions in response to them
- communicate and/or act on this internal experience

Developmental perspectives on empathy suggest that appraisal of one's own feelings and those of others are highly related and that, in fact, one may not exist without the other (Salovey & Mayer 1990: 194).

Most people regulate emotion in themselves and others. Emotionally intelligent individuals, however, should be especially adept at this process and do so to meet particular goals. On the positive side, they may enhance their own and others' moods and even manage emotions to motivate others charismatically toward achieving a worthwhile end. On the negative side, those whose competencies are channelled anti-socially may create manipulative scenes or lead others psychopathically to nefarious ends.

Managing emotions includes the ability to manage emotions and emotional relationships for personal and interpersonal growth (Mayer et al. 2001:15). Goleman (1996:268) refers to this ability as managing emotions. This entails the ability to realise what is behind a feeling and learning ways to handle emotions. Another emphasis is on taking responsibility for decisions and actions and following through on commitments.

Finally Mayer et al. (2001:15) view the four branches as forming a hierarchy, with *emotional perception* at the bottom and *management* at the top. This hierarchy of the emotional Intelligent branches is ranked in terms of personality, not specifically in terms of underlying affective and cognitive processes. The third level is viewed as the most cognitively saturated. The top management level is viewed as involving a balance among

many factors: motivational, emotional and cognitive. This four-branch model serves as a basis for current review of the field of emotional intelligence (Mayer et al. 2001). This perception on emotional intelligence compliments the notion that CCFOs relate to emotional/social intelligence.

Both Goleman (1996:268) and Mayer et al. (Mayer et al. 2001:15) argue that by itself emotional intelligence probably is not a strong predictor of job performance; it rather provides the bedrock for competencies that are (Cherniss 2000:4). The ability to recognise accurately what another person is feeling enables one to develop a specific competency, such as influence. Similarly, people who are better able to regulate their own emotions will find it easier to develop a competency such as initiative or achievement drive. Ultimately it is these social and emotional competencies that are needed to identify the underpinning competencies of the CCFOs that relate to the emotional/social intelligence cluster.

The above-mentioned four-branched explanation of emotional intelligence and the correlation JET makes between the CAEL capabilities and emotional intelligence are used to explore the underpinning competencies of the CCFOs. Following is a layout of the CCFOs on the matrix of emotional intelligence and CAEL capabilities:

**Figure 12 Correlation between CCFOs and Emotional intelligence and CAEL capabilities**

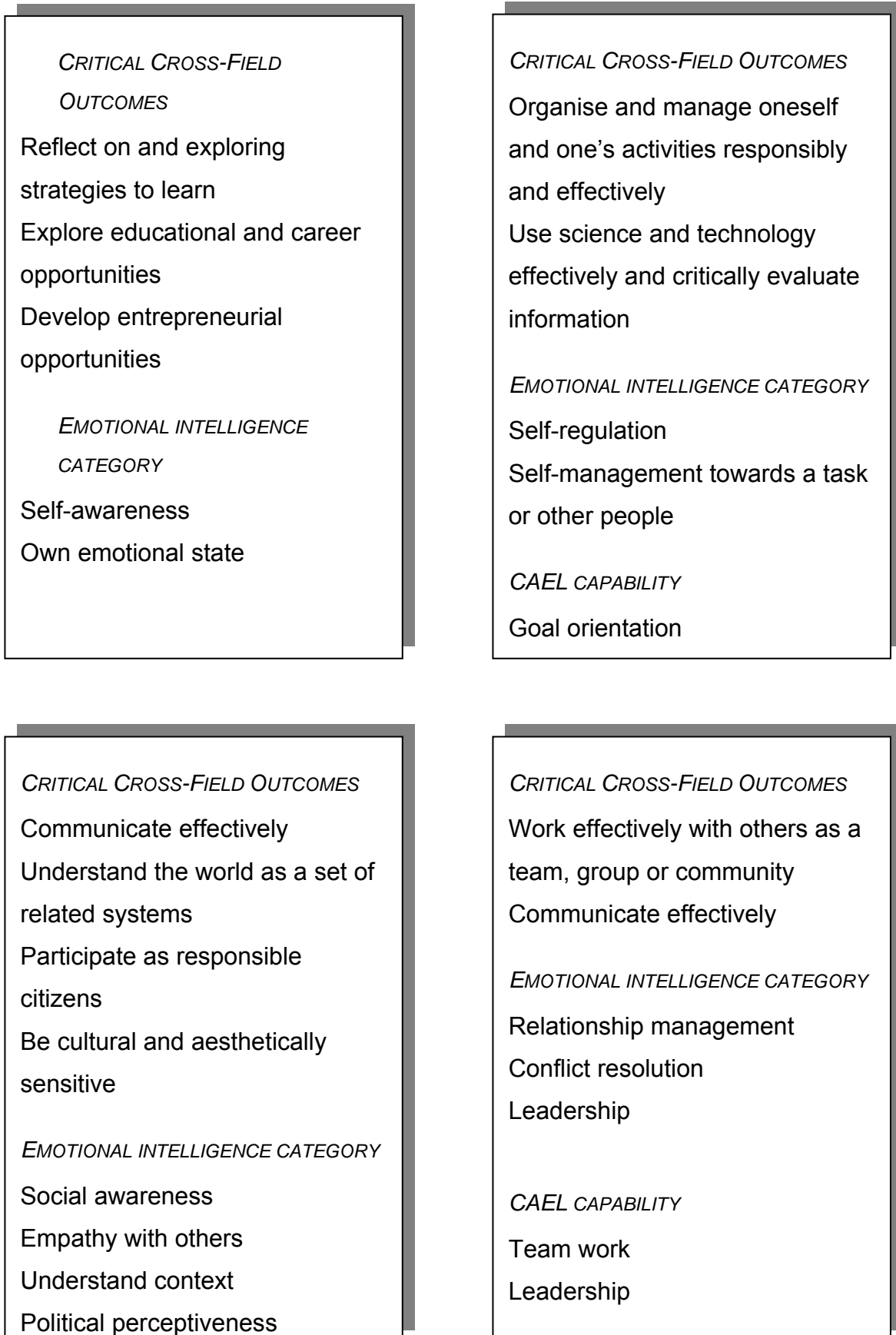


Figure 12 serves as a framework to link the emotional intelligence competencies, CAEL capabilities and the CCFOs. CCFOs are analysed within the congregation of emotional intelligence competencies mentioned in Addendum G. Addendum G is a competence framework that distils findings in terms of various authors on emotional intelligence. This provides an understanding of the concept of emotional intelligence competencies. These competencies together with the CAEL capabilities are utilised to define the CCFOs' underpinning competencies in terms of emotional intelligence.

The affective domain specific characteristics are grouped as follows and represented as:

**Self-regulative competencies:** Represents self-awareness, awareness of own emotional state, self control, self management, self-regulation, learning orientation and goal orientation.

**Social competencies:** Includes concern for others, interpersonal diagnosis, flexibility and influence, social awareness, empathy with others, understand context and political perceptiveness.

**Relationship managerial competencies:** Includes teamwork, leadership and conflict resolution.

Following is a description of the CCFO in terms of the cognitive domain specific characteristics.

### **4.3 COGNITIVE DOMAIN SPECIFIC DESCRIPTION OF THE CCFOs**

The future work force will require the learners of tomorrow to do more than read, write, speak, listen and perform mathematical computation. Learners, according to Teele (2000:52), will need to develop competencies that provide opportunities to think creatively, make decisions and judgements, solve problems independently, reason, envision new ideas and products and know how they learn and how others could assist them learning. The CCFOs directly relate to Teele's statement. The CCFOs also ensure access, portability and lifelong learning. They underpin all education, training and development initiatives.

The catalogue of what is taught as thinking competencies according to Beyer (1998:32) seems to be almost endless. This part of the chapter on the CCFOs intends to provide a comprehensive understanding of the concept with due understanding of the impossibility of listing every single competency that could describe it in terms of the cognitive domain specific characteristics.

It also takes into consideration that there is little widespread agreement on thinking. Following is an eclectic theoretical grounding of thinking competencies relating to the CCFOs.

### **4.4 THEORETICAL GROUNDING OF THE COGNITIVE DOMAIN SPECIFIC CHARACTERISTICS OF THE CCFOs**

Many a psychologist has defined intelligence. The main focus of the study is not to define intelligence *per se* but rather to identify the underpinning competencies of CCFOs.

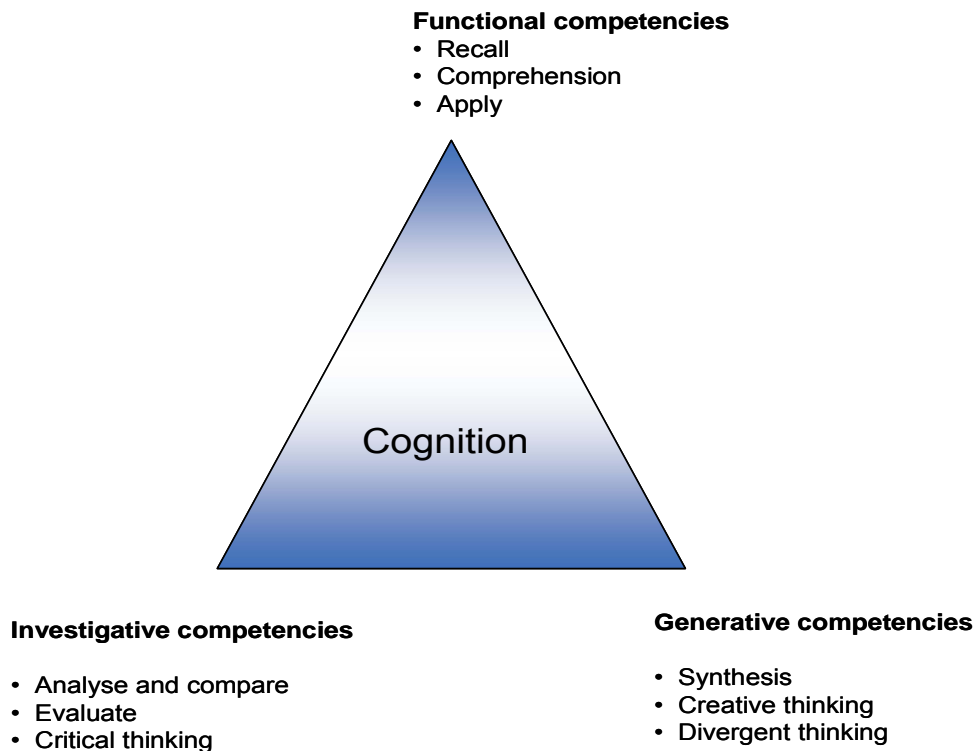
Sternberg's *Triarchic Theory of Intelligence* (Sternberg 2001:316), is one of the many theories that describe intelligence and implies that people may apply their intelligence to many kinds of problems. The triarchic theory of intelligence relates to the CCFOs statements in that the CCFOs are to be implemented on all levels and fields of the NQF. Sternberg (2001:316) distinguishes between practical, analytical and creative thinking.

In his triarchy of intelligence (Addendum B), Sternberg (Sternberg 2001:320) refers to analytical thinking as the ability to analyse, evaluate, critique or judge. *Analytical thinking* as defined by Sternberg (Sternberg 2001:318) correlates with the *evaluation* level of Bloom's taxonomy. Bloom (Bloom 1979:144) refers to these abilities as the assessment of values, ideas and things (Bloom 1979:144) as well as the judgements of given criteria. Creative abilities are used to create, invent, discover and imagine. Practical abilities according to Sternberg (2001:316) are used to apply, utilise and implement ideas. Practical abilities serve three functions: adapting to existing environments, shaping existing environments to create new environments and selecting new environments.

Thinking occurs in different forms, purposes, and arenas. Some authors describe thinking competencies as logical analysis, competencies such as reasoning, deductive logic, sequential synthesis, problem solving competencies, predicting, generalising and concluding, decision making or conceptualising competencies. Beyer (1998:54) refers to operations that imply that thinking consists of some type of mental activity. Activities can be described in terms of operations that the mind seems to perform when thinking. These types of operations are cognitive and meta-cognitive (Beyer 1998:32). Addendum D provides a representation of the mentioned operations. Yet another well-known descriptive model is explored for the purpose of defining the CCFOs, that being Bloom's taxonomy of educational objectives (Bloom 1979). The intention of identifying the mentioned perspectives is to synthesise a comprehensive model to serve the objective of this study. Bellis (2002:48&227), Addendum E, provides a detailed applied table of Bloom's taxonomy regarding the cognitive cluster.

These three mentioned explanatory theories and models presented are combined into one significant and self-descriptive model for the purpose of conceptualising the CCFOs in terms of the cognitive domain specific characteristics of the outcomes. Figure 13 explains the mentioned model and offers a brief description thereof.

**Figure 13 Cognitive domain specific characteristics of the CCFOs**



The presented model differentiates between functional, generative and investigative competencies. The respective competencies are discussed in the ensuing text.

#### **4.4.1 Cognition**

The cognitive competencies referred to in Figure 10 are functional competencies, generative competencies and investigative competencies. Cognition refers to those complex strategies and competencies to generate or find meaning in context. The strategies referred to by Beyer (1998:32) are the overall plan such as problem solving, decision-making and conceptualising. The competencies are mental operations such as recall or analysis or inductive reasoning used in conjunction with other similar operations such as critical thinking competencies and creative thinking competencies to execute a thinking strategy.

Addendum E, Bloom's applied taxonomy (Bellis 2002:48 & 227), provides underpinning competencies of the cognitive operations. Where insufficient descriptions occur, in depth details are provided to conceptualise the CCFOs.

#### **4.4.2 Functional competencies**

Functional competencies according to Figure 13 entail the following:

Recall

Do (Comprehension)

Apply (Problem solving)

Bellis (2002: 48&227) provides the following descriptions of Bloom's taxonomy regarding practical competencies:



**Table 13 Practical competencies**

Competency	Domain	Associated verbs or action		
Recall	Remember / recall terms, facts Recall information	Recall Reproduce Name Order State	Locate Arrange Define Recognise Repeat	List Label Memorise Relate
Comprehension	Knowing what a message means Interpret information in one's own words	Compare Define Classify Interpret Recognise	Explain Report Sort Restate Summarise	Generalise Identify Indicate Locate Review Select
Application Problem solving	Using what has been previously learned Apply knowledge or generalise it to a new situation	Operate Interpret Apply Choose Prepare Use	Modify Demonstrate Discover Schedule Survey	Solve Illustrate Revise Practise

#### 4.4.3 Recall

The first row in the above-mentioned table entails *recall*. Bellis (2002:48&227) refers to this competency as the ability to recall terms, facts or information. Bloom (1979:62) refers to the same competency as *knowledge*. Knowledge according to Bloom (1979:62) emphasises remembering either by recognition or recalling of ideas, material or phenomena.

#### 4.4.4 Comprehension

Comprehension according to Bloom (1979:89) is probably the largest general class of intellectual abilities emphasised. Comprehension is knowing what the message means, to interpret the message or information in one's own words. "In comprehension the emphasis is on the grasp of the meaning and intent of the material" (Bloom 1979:144). Comprehension in this case should not be associated with reading comprehension but put to use in a much broader sense.

Three types of comprehension are considered:

*Translation*: Translation means a learner can put the message into other terms.

*Interpretation*: Involves dealing with communication as a configuration of ideas of which the comprehension may require a reordering of the ideas into a new configuration in the mind of the learner. This includes thinking about the relative importance of the ideas, their interrelationships and their relevance to generalisations implied or described (Bloom 1979:90).

*Extrapolation*: Making estimates or predictions based on understanding of the trends, tendencies or conditions described in communication.

#### 4.4.5 Application/Problem solving

Problem solving according to Sternberg in Swanson (1992:2) is pervasive in everyday psychological theories of intelligence. The ability to solve problems successfully allows individuals to become independent learners. Because the human being is constantly bombarded with new knowledge and technology, any person needs to have effective problem solving competencies that will enable him/her to learn independently to be able to adapt to the ever changing environment. Problem solving is the cognitive activity that turns thoughts into action-changing an existing undesirable situation into one that is preferred (Ashman & Conway 1993:47).

Problems are tasks for which a subject wants or needs to find a solution; no readily available procedure exists and the person must make an attempt to find a solution (Charles & Lester 1982:5). A problem is defined as a situation, quantitative or otherwise, that confronts an individual or group of individuals and that requires a solution, and for which a path to the answer is not known or uncertain. The authors further suggest that a problem in contrast to a question or exercise is a situation that requires thought and use of knowledge to resolve it. A problem is a situation to which the problem solver has no immediate solution and for which he is willing to seek a solution using existing knowledge.

Problem solving is a competency that is learned through systematic and continuous exposure to problems (Sorenson et al. 1996:5). Szetela and Nicole (1992:42) define problem solving as the process of confronting a novel situation, formulating connections between the given facts, identifying the goal and exploring possible strategies for reaching the goal. Beyer (1991:184) complements this by defining problem solving as the process by which one devises and executes a plan to resolve a question, situations or condition that needs but does not yet have an answer or solution. A synthesis of these definitions is as follows: Problem solving is a process by which the problem solver, consciously or unconsciously moves systematically or randomly through a series of operations using thinking competencies to solve the problem, gathers more information than needed, makes choices and selects priorities to arrive at the solution(s).

In order to solve a problem, an impasse must by definition result in a new strategy being chosen; otherwise a complete failure to solve the problem will result (Roberts & Erdos 1993:4). Whenever a problem-solving task has more than one possible strategy for solution, according to Roberts and Erdos (1993:5), a person may be aware (metacognitive knowledge) that more than one solution strategy might be available. Whenever a problem solving task has more than one strategy available for solution, according to Roberts and Erdos (1993:11), the solver may be aware that this is the case and will therefore need to decide on the best strategy to use.

#### **4.4.6 Investigative competencies**

Investigative competencies according to Figure 13 include:

Analysis

Evaluation and Comparison

Critical thinking competencies

Bellis (2002:48&227) provides the following descriptive explanation of Bloom's taxonomy regarding analytical competencies:

**Table 14 Analytical competencies**

Competency	Domain	Associated verbs or action		
Analyse and compare	Disassembling a whole into parts Break down knowledge into parts and state relationship	Categorise	Contrast	Examine
		Deduce	Criticise	Experiment
		Infer	Discriminate	Question
		Differentiate	Classify	Test
		Compare	Distinguish	
Evaluate	Assessing the value of ideas and things Make judgements of given criteria	Predict	Select	Estimate
		Argue	Assess	Judge
		Appraise	Choose	Rate
		Compare	Support	Justify
		Score		
		Recommend		

**Analyse and compare**

Analysis emphasises the breakdown of the material into its constituent parts and detection of the relationships of the parts and of the way in which they are organised. Analysis shades into evaluation, especially when thinking of critical analysis (Bloom 1979:144). As a learner is analysing the relationships of elements of an argument, he/she may be judging how well the argument hangs together. Analysis is divided into three levels:

Level one: Breaking down material into its constituent parts, to identify or classify the elements

Level two: Making explicit the relationships among the elements to determine the connections and interactions

Level three: Recognition of the organisational principles, the arrangements and structures

Evaluation according to the above-mentioned table is evaluating/assessing the value of ideas and things, making judgements about given criteria.

#### **4.4.7 Generative competencies**

Critical thinking according to McKendree et al. (2002:580) is a valuable tool for facilitating learning and has been in circulation at least since the time of Socrates. Being able to think critically according to McKendree et al. (2002:580) is essential to respond appropriately to rapid and complex changes in modern society.

Critical thinking is essentially evaluative in nature (Beyer 1988:61). This statement supports the notion that critical thinking and evaluation resort under the same cluster as mentioned in Figure 10. Critical thinking is thinking for oneself according to McKendree et al. (2002:64). Lipman (1988:39) defines critical thinking as *skillful, responsible thinking that facilitates good judgement because*

- it relies upon criteria
- it is self-correcting, and
- it is sensitive to context

One function of criteria is to provide a basis for comparison. Ennis (1985:45) states that critical thinking is reflective and reasonable thinking that is focused on deciding what to believe or do. French and Rhoder (1992:190) suggest that a critical thinker must be able to organise and manipulate information. Critical thinking is not seen as part of a sequence but rather as a group of competencies and strategies chosen and used as needed by the particular thinking task (French & Rhoder 1992:187). The mentioned

authors suggest that how one thinks critically may be related to the specific material under consideration. This statement relates to the nature of CCFOs in that the CCFOs are applicable to all fields at all levels of the NQF. Critical thinkers need more than a large knowledge repertoire; they must have the ability to evoke particular knowledge when needed and integrate information where applicable.

Critical thinking competencies according to French and Rhoder (1992:187) involve interpreting, analysing or evaluating information, arguments or experiences but need a purpose and an outcome.

Critical thinking can be described as cognitive accountability. It entails providing reliable reasons for actions or thought. This statement is congruent to the CCFOs in that learners must seek answers and better their learning strategies.

Sorenson et al. (1996:26-27) provides the following critical thinking competencies:

Comparing and contrasting

Determining similarities and differences about objects, situations ideas, institutions and the like

Distinguishing between fact and opinion

Statements that can be verified (facts) are separated from those that cannot (opinion)

Distinguishing between relevant and irrelevant information

Deciding whether something is related (relevant) to the item or situation under discussion or not (irrelevant)

Distinguishing between reliable and unreliable sources

The reliability of a source is determined by whether it is believable or not. This is based on the accuracy of the information and the agreement of the information under discussion on that of other sources

Identifying cause and effect

This process involves both identifying the causes, reasons or motives for a condition or action and the effects, results or outcomes of the cause

Sequencing and prioritising

These are organisational competencies. Sequencing involves determining the logical order of tasks or events to produce a product or attain a goal. Prioritising involves ranking each item or step according to its importance in the situation at hand

#### Identifying bias and stereotype

Personal feelings are involved in these processes. Bias is recognised as a view slanted in favour or against something or someone, a view often formed unfairly. Stereotype is a form of bias where certain characteristics are considered common to a group without respect or consideration for individuals and their differences

#### Recognising point of view

This involves identifying the position or situation from which something is observed, presented or considered. Possible elements of bias may also be present

#### Recognising consistent and inconsistent reasoning

Deciding whether the line of reasoning is logical (consistent) or contradictory (inconsistent)

#### Recognising assumptions and generalisations

Both processes demand keen judgements. Assumptions involve identifying and exploring the validity of the beliefs or ideas taken for granted or tend to be accepted as true. Generalisations are statements, laws or principles drawn from specific verifiable situations or information

#### Analysing arguments

Identifying the elements of an argument and then determining the strengths or weaknesses of each element

#### Identifying induction and deduction



These are very general ways of thinking. Induction is often called *bottom-up* thinking because conclusions are drawn from specific instances. Deduction is often referred to as *top-down* thinking because the conclusion or result is known and leads to that particular conclusion.

#### **4.4.8 Creative thinking competencies**

“Creating effective solutions to a broad range of everyday, real-life problems require a higher level of creativity” (Fobes 1996:20). During creative thinking learners learn by exploring, trying out, manipulating, experimenting, questioning and modifying ideas (Sorenson et al. 1996:23). “The difficult part of creativity is arriving at ideas that are not only new, but that also have value” (Fobes 1996:20). The most common way of generating valuable ideas is to generate as many ideas as possible. Critical thinking will then reduce those ideas that have no or little value. Creative thinking and critical thinking are not identical. Creative thinking according to Beyer (1988:64) is divergent, critical thinking is convergent. Beyer (1988:65) states that a learner invents new combinations and critically evaluates them. The first Critical Cross-Field Outcome, which directly relates to critical and creative thinking, is supported by the above-mentioned statement: “Problems are identified and solved in which responses display that responsible decisions using critical and creative thinking have been made”.

Lipman (1993:10) provides the following correlation between critical and creative thinking:

**Table 15 Correlation between critical and creative thinking**

Critical thinking	Creative thinking
Sensitive to context (informal as well as formal logic)	Governed by context (holistic)
Self-correcting (fallibilistic)	Self-transcending (dialectical)
Guided by singular criteria in harmony (e.g. truth, consistency)	Guided by multiple criteria in opposition
Conducive to practical applications	Conducive to practical applications

If creative problem solving is understood as being any situation in which there is room for improvement, it indicates that most people recognise that there is room for improvement at any level and any environment of their lives (Fobes 1996:19).

Sternberg and Grigorenko (2003:612) and Guilford (1967:22) both refer to creativity as divergent thinking. Divergent thinking, according to Costa (1985:310), is the kind of thinking required to generate many different responses to the same question or problem. Divergent thinking also assists people to express creative, innovative and non-traditional ideas. Divergent thinking is congruent to creative thinking and directly relates to the first Critical Cross-Field Outcome: "Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made".

Divergent thinking can be encouraged by:

- Generating many ideas or options
- Accepting all ideas
- Reaching for limits
- Not jumping to conclusions
- Taking risk
- Letting one idea lead to another

In the following table divergent production competencies are represented by factors that are briefly explained.

**Table 16 Divergent production**

Factor	Description	Author	Year
Sensitivity to problems	The ability to recognise problems	Sternberg	2000:612
Fluency	Number of ideas	Sternberg	2000:612
	Ready flow of ideas	Guilford	1967:138
	The ability to think quickly and in quantity –to generate a large number of ideas or possibilities including relevant responses.	Sternberg and Grigorenko	2003:214
Flexibility	Shifts in approaches	Sternberg	2000:612
	Readiness to change direction or to modify information	Guilford	1967:138
	Involves thinking in different modes, ideally using different categories and mind-sets, it is seeing things from another point of view	Sternberg and Grigorenko	2003:214
Originality	Unusualness	Sternberg	2000:612
	The ability to think in new, unique, clever and unusual ways. Low frequency of occurrence	Sternberg and Grigorenko	2003:214
Elaboration	Elaborate on ideas, to fill out details	Guilford	1967:138
	The ability to think in detail – to embroider on and extend an idea	Sternberg and Grigorenko	2003:214

Convergent thinking is a way to narrow down ideas to the one or two that are best, correct or most useful to answer a question or solve a problem (Sorenson et al. 1996:23). To convert one needs criteria against which to make decisions. Guidelines for convergent thinking include:

- Focusing on the problem or goal
- Being clear
- Being concise and specific about evaluation criteria
- Being positive without overlooking difficult or troublesome areas
- Being deliberate and reflective

When learners become more competent in thinking, their self-confidence and self-esteem seem to be more positive. Both of the aforementioned are prerequisites for leading a self-fulfilling and contributing life.

McKendree et al. (2002:59) stress the fact of constructivism and the cognitive sciences seem to be in opposition to this in various ways. The authors try to crystallise the compatibility of the mentioned perspectives and among other reasons they state that the “best representation almost always lies beneath the surface of the given information and requires learners to engage in a deep way, often in collaboration with other, to impose their own framework on the problem”. This particular statement contributes to the conceptual understanding of CCFOs, as these outcomes are a mixture of social/emotional intelligence as well as cognitive competencies.

McKendree et al. (2002:58) suggest that representational systems, one of the approaches to critical thinking that have emerged from cognitive science research of which there is much proof, are often very local to a particular problem or problem type and must be reinterpreted each time in the current context; hence the constructivist perspective on critical thinking.

The core competencies of communication, reasoning and understanding information are the focus of cognitive science as well as goals of constructivist learning. Cognitive science according to McKendree et al. (2002:58), concentrates on building models of how people learn and how they transfer what they learn from one context to another.

#### **4.4.9 Knowledge and competencies**

Substantive knowledge, (Newman 1992:107-108), enables the person to utilise analytical knowledge and enables the learner to reason an argument, distinguish between empirical and normative issues and utilise criteria for judging the reliability of evidence. Knowledge is regarded as basic to all the other ends or purposes of education, training and development (Bloom 1979:33). “Problem solving cannot be carried out in a vacuum but must be based on knowledge of some of the realities” (Bloom 1979:33). Knowledge is of little value if it cannot be utilised in new situations or in a form very different from that in which it was originally encountered (Bloom 1979:29).

Although knowledge is a necessary condition, it is not a sufficient condition for becoming an expert as documented by Sternberg and Grigorenko (2003:158). “What is needed is some evidence that the learners can do something with their knowledge, that is that they can apply the information to new situations and problems” (Bloom 1979:38).

Competencies permit knowledge to be used or applied to the solution of new problems. The learner must be able to distinguish important from irrelevant information, to anticipate and to respond to arguments in opposition to his/her own view and to state an own view clearly and persuasively. These competencies put knowledge to work in solving problems. Bellis (2002:61) defines competencies as a generalised, performed ability in any domain of human learning and endeavour. He implies that competencies require a level of understanding in order to be repeatable across a variety of cases. The competency according to Bellis (2002:61) is not the task for an occupation; it is that which the learner gives evidence of. Ernst (2003:12) defines competencies as the descriptions of a number of complex steps usually performed subconsciously and completed in several seconds or minutes.

The definition of knowledge and competencies for this study is as follows:

Knowledge is the foundation of understanding and a learner wishes to expand existing knowledge. Competencies put knowledge to work. The learner utilises knowledge to implement other competencies.

Edward de Bono's (De Bono 1999) lateral thinking courses *The six thinking hats* and *Direct Attention thinking tools* (De Bono 1997) as well as the Herrmann Brain Dominance Instrument (HBDI) are practical examples of the underpinning competencies of the CCFOs and are incorporated in the competencies list. De Bono's courses as well as the HBDI instrument's competencies are correlated with the competencies list and added where appropriate. The mentioned practical tools are incorporated in the summary of the cognitive cluster specific CCFOs.

#### **4.5 CONCLUSION**

The tables supplied above summarise the practical underpinning competencies of the CCFOs as identified in the appropriate literature. The next chapter seeks to identify the underpinning competencies of the CCFO as perceived by the ETQA managers as part of the empirical study. The theoretically grounded competencies of the CCFO have been verified with the mentioned parties.

The following chapter discusses the empirical study.