THE EFFECT OF USING A COMPUTER-BASED EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT LEARNING

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DECLARATION:

In accordance with Rule G4.6.3, I hereby declare that the above-mentioned thesis is my own work and that it has not previously been submitted for assessment to another University or for another qualification.

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ABSTRACT

Historically the process of career development was thought of as occurring in adolescence and adulthood; however, the renewed emphasis on lifelong career development has led to a greater focus on the career developmental stage of childhood. The present research focused on the development and trialling of a research-based computerised career exploration tool, *Growing-up: Children Building Careers*™ (GCBC™) that can be used for early intervention in children's career development. The integration of developmental considerations within a career developmental context is of paramount importance, considering that child and career developmental theories share certain basic foundational principles such as the dual recognition of identifiable life stages and the resolution or accomplishment of associated tasks.

The focus of the research is to provide access to a research-based tool that can assist learners with developing age appropriate career developmental skills. As the overview of education policy and existing programs will show, there are challenges in providing access to and improving the nature, level, and quality of career development services. Gaps in access to career development learning are particularly evident at the elementary education level. Furthermore it is clear that learners need to be at the centre of a radical rethink of careers services within a lifelong learning framework in order to ensure access to navigational tools throughout a lifetime of work and study transitions. Digital environments, such as the GCBC™, are tools that broaden and extend learning possibilities for children and appropriately designed digital environments can provide a vehicle that can take children further than they might travel unassisted.

The research is divided into five phases and includes eight to ten year old children as participants. Phase one focused on the program design and pilot study (ensuring content validity

and age-appropriate language use), while phases two to five focused on the fieldwork (i.e., pre – test, program exposure, post-test, and focus group discussions). The researcher made use of a mixed research design that combines both quantitative and qualitative research methods. The total sample consisted of 146 children between the ages of eight to ten years old. The control group had 72 children and the experimental group 74 children with a mean age of 8.74 years (SD = 0.63) for the total sample.

The quantitative data collection entailed a pre-and post-test design with learners' career development measured with the Childhood Career Development Scale (CCDS) and their career awareness with the Revised Career Awareness Survey (RCAS). Qualitative data was collected in the form of two focus group discussions, which included a small sample of children from the experimental group, as well as insights gained from educators following the GCBC™ fieldwork. The quantitative statistical analysis included descriptive and inferential statistics which allowed the researcher to not only describe the research findings, but to confirm the effectiveness of the GCBC™ as an intentional career development learning program. Furthermore, the responses of the children and educators who participated in or witnessed the facilitation of the GCBC™ provided support for the GCBC™ as a meaningful career learning experience which can be successfully implemented in educational settings.

Key words: career development learning, children's career development, intentional career experience, career education program, childhood development

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

The past two decades have been characterised by considerable expansion in research on career development in childhood which has led towards integrating early career behaviour into lifespan, systemic models of career (Skorikov & Patton, 2007). Despite this renewed emphasis on childhood career development (for example, Beale, 2003; Ferreira, Santos, Fonseca, & Haase, 2007; Hartung, Porfeli, & Vondracek, 2008; Howard & Walsh, 2011; McMahon & Watson, 2008; Porfeli & Lee, 2012), limited information is available on career programs that specifically target this developmental stage (see, for instance, Whiston, 2002). Although children are not expected to make premature decisions regarding an anticipated career path, there is a need to provide them with career exploration activities that will assist them in thinking about possible career interests and the interrelatedness of the world of work (Beale, 2000).

Rather than conceiving childhood as a passive, dormant period disconnected from the rest of lifespan career development (Hartung, Porfeli, & Vondracek, 2005), childhood should be viewed as a period of active precursory engagement in the world-of-work in order to develop initial concern about the future, control over one's life, conceptions about career decision making, and the confidence to make and implement future career choices (Savickas, 2002). According to Hartung et al., an orientation and openness to the future lived in the present and respectful of the past is a critical dimension of career development that ideally first emerges during this early life phase.

Early experiences related to the world of work provide a foundation for later career learning and ensure that children's knowledge frameworks are fully developed when they reach young adulthood (Harkins, 2001). The present research attempts to provide one such career

learning experience at an age in middle childhood, namely the eight to ten year old developmental phase, where it is believed that early steps towards building a future career are made (see, for instance, Schultheiss, Palma, & Manzi, 2005).

But exactly how important is childhood development in terms of future achievement in life and career satisfaction, and what is available to assist children during these formative years to prepare them for the challenges posed by career decision-making during adolescence? These questions were pivotal in conceptualising the aims of the present research and, as described throughout this study, assisted the researcher to position the study within a field of research calling for a practical application of theory, research, and policy (McMahon & Watson, 2008; Schultheiss, 2008; Watson & McMahon, 2008;).

This chapter introduces the rationale for the study and provides a brief overview of the major theoretical and research considerations. More specifically, the chapter begins by looking at career development in childhood as an important period which impacts on decision-making during subsequent career developmental stages such as adolescence. The theoretical grounding of the present research in childhood development, career development and learning is provided next and this leads into a discussion relating to the need for context relevant career education programs during the primary[1] school years. These theoretical fields, in addition to the use of technology in career education, provided the theoretical parameters for the development and design of *Growing-Up: Children Building Careers*™ (GCBC™), a computer-based career exploration program specifically targeting the childhood years. The present research describes the process followed to develop the GCBC™ and to test its relevance as a meaningful career learning

[1] While the South African education context uses the term 'primary school', the international term of 'elementary school' is preferred for the present research.

experience on a sample of South African children. The chapter concludes by providing an overview of the chapters of the thesis to follow.

Career Development in Childhood

At the heart of providing career learning experiences for children is the recognition of their need to develop more adaptive, resilient, and proactive approaches to their present situations and their possible future career selves (Hartung et al., 2005; Savickas, 1997; Turner & Lapan, 2005). The attainment of these early developmental tasks contributes to what is referred to as career readiness (Watson, 2008). Within more recent developments in the field of career psychology, 'career maturity' as a singular, point-in-time definition has been replaced by the concept of 'career readiness' which includes a more flexible, process-orientated definition (Watson). The latter definition also emphasises the developmental nature of an individual's career behaviour and the fact that "different types and levels of readiness are appropriate for different developmental ages and stages" (Watson, p. 511-512). Thus, more so than any other developmental stage, the career development phase of childhood requires the integration of developmental considerations (Magnuson & Starr, 2000) as a prerequisite for the development of age appropriate career interventions in order to compensate for such varying levels of career readiness.

The impact of childhood influences on career development is often overlooked because of the limited understanding of the processes underlying successful career development during these years (Watson & McMahon, 2005). When people think of dramatic developmental changes over time, they typically think about either the first two or three years of life (characterised by rapid biological changes and growth) or the adolescent years (where there is yet again a period of accelerated physical and emotional growth) (Kail & Cavanaugh, 2010). Although these years are

marked by striking changes, the developmental and social changes that occur in middle childhood in terms of lifelong development can be even more striking (Eccles, 1999; National Association for the Education of Young Children [NAEYC], 2005).

'Middle childhood' as a descriptive term is frequently used in the literature (e.g., Eccles 1999; Schultheiss et al., 2005) to define a developmental period which begins when children enter school (i.e., from ages six and seven years) (Ghettia & Bunge, 2012) and ends with the onset of puberty (which can range from twelve to fourteen years). However, an overview of research reveals that the specific age ranges used by authors to demarcate this period of development vary. For example, Eccles views middle childhood as the period ranging from six to ten years old, Ghettia and Bunge from ages six to eleven, and Schultheiss et al. include the ages of nine to twelve years in their description of middle childhood. For the purposes of the present research, the age ranges proposed by these different authors are incorporated into a single description and thus middle childhood will refer to the six to twelve year old period.

Middle childhood is recognised by developmental psychologists as a distinct developmental stage between early childhood and adolescence, defined by increasing cognitive development, emotional regulation, and relative social independence (Campbell, 2011). It is during this period when children experience several 'firsts' in their lives. For example, children start school and for the first time they engage in formal learning, they begin to participate in team and individual sports, they sample a variety of extra-curricular activities (liking some and disliking others), and increasingly they become aware of marked differences between themselves and those around them. Indeed middle childhood is an important period of development which not only includes biological changes, but also critical social changes as well which can contribute significantly to children's perceptions of themselves (Erikson, 1985; Meadows, 2006).

Consequently there is a need to emphasise this period as a key phase in human and, in particular, career development when "middle childhood is about coming out of the shadows of community life and assuming a distinct, lifetime character" (Lancy & Grove, 2011, p. 281).

Eccles (1999) supports this view and suggests that the middle childhood years are a key period for the establishment of an individual's career identity. Children come to expect that they will succeed or fail at different tasks and, particularly relevant to the current research, they may develop an orientation toward achievement that will colour their response to school and other challenges (including later career decision-making) in subsequent years. The significance of children's experiences in school and other activities during this period cannot be overlooked as these experiences will help shape future development, including career development (Magnuson & Starr, 2000; Porfeli & Lee, 2012). In the light of the information discussed in this subsection it is clear that a concerted effort is needed to optimise children's access to a variety of experiences during the middle childhood period if optimal career learning is to take place. This prompted the researcher to investigate the theoretical contexts which have either directly (as in the case of career development theory) or indirectly (as in the case of child development theory) shaped the field of children's career development.

Theoretical Grounding of Present Research

Three related bodies of theory, specifically child development theory, career development theory and learning theory, were considered in the development and design of the GCBC™. Predominant theories of child development (i.e., Erikson, 1985; Piaget, 1970, 1977), career development (i.e., Gottfredson, 1981, 2002, 2005; Super, 1957, 1980, 1990; Savickas, 2005), and learning theories (i.e., Kolb, 1984; Vygotsky, 1978) were overviewed. In addition, the career exploration program developed, i.e., the GCBC™, is a computer-based application and

consequently Mayer's (2001) theory of multimedia learning was also consulted as it provides guidelines to program developers for effectively combining learning content in a digital format. Although the different theories selected provide specialised insight into divergent research fields of childhood, they converge on a common theme in the present research, which is to assist in the development of an age appropriate intentional career learning activity for children. Each of these contributing theoretical fields is described in subsequent chapters of the present thesis.

Career Development Learning in Childhood

Despite the acknowledged need to assist children by intentionally providing age appropriate career programs or interventions (Beale, 2000, 2003; Schultheiss, 2008), the present researcher's review of the literature indicates that limited examples of such programs are available, generally, and even fewer which could be described as evidence based. This is a concern considering that learning experiences during childhood are perceived as providing a foundation for successfully making decisions in adolescence (Watson & McMahon, 2005). This view is supported by Bandura, Barbaranelli, Caprara, and Pastorelli (2001) who suggest that the development of age appropriate career skills during childhood is needed as a prerequisite for successful career development during later developmental stages such as adolescence.

It therefore appears that the period of middle childhood is not only tasked with the development of skills relating to academic learning, but important career development learning is also presumed to take place during this formative period. Career development learning, as it applies to childhood, embraces not only formal or intentional education and learning, but also informal or unintentional learning (Patton & McMahon, 2006) which can occur in a variety of settings. Programs that intentionally introduce elementary school children to the world of work and that help them to understand the connection between what they learn in school and what is

expected in the world of work are integral to facilitating the development of career and self-management skills which are needed to successfully negotiate life's challenges (Schultheiss, 2008). Such learning experiences are limited at present and this provided the motivation for the development and design of the GCBC™. However, while the GCBC™ may be regarded as a step in the right direction in terms of providing an example of such a career learning experience, the context in which the program needed to be presented required careful consideration. More so than in any other domain, it is in the practical application of career interventions where career theory and research have to consider the realities of career education policy and practice.

The Need for Context Relevant Career Education Programs

Schools are strategically positioned to provide intentional career learning experiences to young people (McMahon & Carroll, 2001). In a rapidly changing sociopolitical environment, schools remain a constant where a foundation in career learning can be provided through systematic programs of career education. Indeed, many countries acknowledge the importance of early intervention with regards to the need for career services (Organisation for Economic Co-operation and Development [OECD], 2004a). Internationally, career services are now higher on the public policy agenda than ever before and in most countries policy makers clearly regard career services as being of value not only to the participating individuals but to society as a whole (Watts, 2005). In the South African context where the present research was conducted Akhurst and Mhkize (2006, p. 139) support this view but suggest that it is of "vital importance for career education to be conceptualised differently in South Africa, since it has the potential to make a positive contribution to the development of people, and thus to the economic development of the country".

Educational reform has been a priority in South Africa since the establishment of the Government of National Unity in 1994 but many challenges remain, in particular when it comes to aligning curriculum activities with labour market relevance (Flederman, 2008; OECD, 2008). A major step towards redressing the current deficit has recently been undertaken with career development (i.e., exposing children to the world of work learning) being included in the general curriculum (Department of Education, 2002), thereby emphasising a shift towards better career management at earlier developmental phases of the lifespan.

As noted earlier, career education programs that specifically target the elementary school years are significantly limited internationally and lacking in South Africa. Consequently the present research aimed to: develop and design a computer-based career exploration program (the GCBC™) for eight to ten year old South African children; quantitatively evaluate the effectiveness of the GCBC™ in enhancing children's career development; and qualitatively evaluate children's experience of using the GCBC™ as an intentional career development learning process. In addition, recent technological advances within education systems throughout the world (Grabe & Grabe, 2007) necessitated the need to consider a variety of viable presentation formats for the GCBC™, including those provided by computers and interactive whiteboards.

Technology and Career Education

The integration of educational technology into classroom instruction to enhance student learning is of increasing interest to stakeholders such as policymakers, administrators, educators, students, and parents (Keengwe, 2007). Recent technological advances have opened the door to the development of new and exciting career interventions (Grabe & Grabe, 2007; Harris-Bowlsbey & Sampson, 2005) which can be beneficial to children's learning if used appropriately

(Keengwe & Onchwari, 2009). Smeets (2005) supports this viewpoint and draws attention to the need for technology-supported learning environments during the elementary school years. These developments have resulted in calls for career programs to be delivered using technology (Harris-Bowlsbey & Sampson) and there has been recognition that technology can be effectively used to facilitate children's career development learning through experiential activity (Wang & Hoot, 2006). It is against this contextual background that the current research focused on the development of a computer-based career development learning program that can be used for early intervention in children's career development.

Growing-Up: Children Building Careers™ (GCBC™) Program Development

The GCBC™ is a computer-based career development learning program that aims to assist children to develop the age appropriate skills, knowledge and attitudes needed to make appropriate and relevant career choices in the future. The rationale behind the GCBC's™ development was to provide educators and career practitioners with a ready-to-use resource which remained sensitive to the developmental parameters of middle childhood proposed in career theory, research, and practice.

In order for the GCBC™ to represent an evidence-based career learning experience it was necessary to test its effectiveness in the field. A mixed method design was used in the present research. A major strength of this type of approach is that researchers can situate numbers in the contexts and words of participants, and they can frame the words of participants with numbers, trends, and statistical results (Creswell, 2009). The development and validation of the GCBC™ is discussed in subsequent chapters of this thesis.

Chapter Overview

This chapter has provided an introduction to the present research. The following three chapters describe the theoretical underpinnings on which the present research is established, including Child and Career Development Theory (Chapter 2), Learning Theory (Chapter 3), and Education Policy and Career Education Programs (Chapter 4). Chapter 5 builds on these initial chapters by exploring the extant research within the field of childhood career development both internationally and nationally. Chapter 6 focuses on the GCBC's™ development and design and a detailed description is provided highlighting the various steps involved in finalising the program. Chapter 7 describes the problem formulation, the aims of the research and the methodology. The results of the study are presented in Chapters 8 (quantitative research) and 9 (qualitative research), and the discussion concludes the thesis in Chapter 10. This final chapter also provides a brief overview of the limitations faced by the researcher in conducting the present research as well as recommendations which can assist future researchers in conducting similar career development research.

Summary

Career choice and development are matters not exclusively associated with adolescence or adulthood; childhood is also an important precursor of future career behaviour (Ferreira et al., 2007). This introductory chapter suggests that career education needs to be taken more seriously in schools (Stead & Nqweni, 2006). The formative years of childhood provide the developmental context in which the provision of age appropriate career learning experiences can significantly assist and facilitate the development of critical career skills (Magnuson & Starr, 2000; Patton & Porfeli, 2007; Sodano & Tracey, 2007; Watson & McMahon, 2007a).

During the eight to ten year old period, children need to establish competence in various activities which contribute to their personal identity, self-concept, and an orientation toward achievement (Perry & Wallace, 2012; Porfeli & Lee, 2012; Schultheiss, 2008) that, according to Eccles (1999), will play a significant role in shaping their success in school, work, and life. In a time where children are expected to exercise their growing autonomy in school and organised programs, children need to be provided with opportunities to learn about the world outside the family, match themselves against the expectations of others, compare their performance with that of their peers, and develop customary ways of responding to challenges and learning opportunities. As introduced in the present chapter, appropriate career development learning experiences can provide much needed opportunities for children to facilitate the development of these skills (Patton & McMahon, 1999, 2006). However, the successful provision of intentional career learning programs during the elementary school years can only be accomplished by considering (and learning from) key constructs found within theory, research and practice. Consequently, each of these fields as it applies to childhood career development was considered in the present research. The following chapter introduces the theoretical fields of child development theory and career development theory pertaining to childhood.

CHAPTER 2

CHILD AND CAREER DEVELOPMENT THEORY

Introduction

It is essential to conceptualise the present study within the theoretical parameters proposed by child and career development theorists. While theories of child development have traditionally provided a foundation for educational instruction and intervention in early childhood (Aldridge, Sexton, Goldman, Booker, & Werner, 1997), in general they have struggled to move from theory into practice, especially when addressing the career developmental needs of children. The present chapter aims to provide insight into understanding historical trends in child and career development theory. The chapter also explains the renewed emphasis on lifelong career development and, consequently, on the career developmental stage of childhood (Sharf, 2012).

Childhood signifies the threshold of human development and it includes an active period of preliminary self-engagement in relation to the future world of work (Hartung et al., 2005). However, although it is generally acknowledged that crucial career-related concepts and attitudes are first formed in childhood (Hartung et al., 2008; Herr & Cramer, 1997), the neglected status of childhood career development theory and research compounds efforts to establish a foundation for lifelong career development during this developmental stage (McMahon & Watson, 2008; Watson & McMahon, 2008). Today, despite what is known about early stages of career development, the question remains: at what stage is it deemed appropriate to introduce career concepts to young learners (Magnuson & Starr, 2000)?

Research has indicated that childhood is a key period of development (Meadows, 2006) and it is therefore important to consider child development theory as the proverbial mirror

against which career development can be described. Schultheiss (2008) supports this perspective and states that "the time has come to move toward the study of the developmental processes of children's work behavior rooted within life context" (p. 20). This is especially so considering the fact that child and career development theories share certain theoretical constructs. Central to both types of developmental theories is the recognition of identifiable life stages in the developmental process and the importance of successfully dealing with specific developmental tasks associated with such stages (Erikson, 1985; Super, 1980). The concept of life stages constitutes the link between human and career developmental theories and it is for this reason that it is essential to explore the influence of the one set of theories on the other. The interrelationship of early childhood development and childhood career development has been explored previously. This is evidenced by the fact that several authors (i.e., Drummond & Ryan, 1995; Herring, 1998) have used lifespan development as an organizational framework for their career development concepts.

For the purpose of this study two major theories of child development, those of Piaget (1970, 1977) and Erikson (1963, 1985), are used as a basis for understanding children's development from a cognitive and a psychosocial perspective respectively. The rationale for specifically selecting these two theories lies in the fact that much research has attempted to apply these two theories to practice. In addition, a number of career theories are discussed in order to contextualise career development as a lifelong process and to gain specific insight into the career development of children. Specifically, the theories of Super (Super, 1957, 1990; Super, Savickas, & Super, 1996), Savickas (2005), Gottfredson (2002; 2005), and the Systems Theory Framework of career development (Patton & McMahon, 1999, 2006) are discussed.

It is important at this stage to justify the use of theories that span across disciplines, including child development, career development and, later in the thesis, education and learning. The rationale for selecting this diversity of theories lies in the fact that no single theory has been able to explain all aspects of human or career development. However, each of the theories cited above has contributed to broadening our understanding of developmental processes as they apply to childhood. These theories have helped to advance our knowledge of childhood development and childhood career development as researchers continually attempt to support, challenge, and integrate these different points of view (Burk, 2007). In the present chapter, child development theory will be discussed first followed by career development theory.

Child Development Theory

To better understand age specific developmental tasks, the theories of Piaget (1970, 1977) and Erikson (1963, 1985) are explored as they have particular relevance to the present study. Piaget and Erikson's theories offer different but complementary perspectives of childhood development and they are similar in their emphasis on distinct developmental stages (Meadows, 2006). Both theories contribute to an understanding of how children process experiences and information presented to them. According to these two theories, the research participants (i.e., eight to ten year old children) of the present study are in Piaget's concrete operational stage of cognitive development and Erikson's Industry versus Inferiority stage of psychosocial development.

Jean Piaget's Theory of Cognitive Development

Few theorists are viewed in the same high regard as Jean Piaget, who forged the single most comprehensive theory of intellectual development (Crain, 2000) that has shaped the field of developmental psychology in quite remarkable ways (Meadows, 2006). Piaget's (1971, 1977)

analysis of the stages of human intellectual development emerged from an overarching endeavour to understand the nature, structure and evolution of knowledge (Wood, 1998). Piaget theorised that the difference between children and adults was not confined to how much they knew but also included the way in which they acquired knowledge (Craig, 1994). One of Piaget's greatest contributions to the field of developmental psychology was his reference to developmental stages that reflected and emphasised the structural transitions that take place during different developmental life phases rather than simply providing a description of different behaviours at different times (Meadows).

Piaget (1970, 1977) described four stages of cognitive development, namely the *sensorimotor stage* (lasting from birth through to age two), the *preoperational stage* (lasting from age two to age seven), the *concrete operational stage* (lasting from age seven to age twelve) and the *formal operational stage* (lasting from age twelve through to adulthood). Each of these stages contains an aspect of achievement with regard to the preceding stage and an aspect of preparation with respect to subsequent stages (Meadows, 2006; Miazga, 2000). Progress through the four stages can occur at different rates with each stage characterised by the development of new cognitive structures or schemas (Piaget, 1977). The more advanced stages of cognitive development are associated with more complex and sophisticated schemas, and hence more advanced and flexible thinking and behaviour (Meadows). Piaget's *concrete operational stage* is the most relevant for the present study and it is discussed below in greater detail; however, a brief overview of Piaget's *sensorimotor*, *preoperational* and *formal operational stages* is also described in order to provide a broader theoretical context.

Sensory-motor stage (birth to two years)

Piaget (1970, 1977) viewed the *sensorimotor stage* as the start of development. During this stage children, through physical interaction with their environment, build a set of concepts about reality, and how they differentiate themselves from objects. This is the stage where children need to move towards developing object permanence. They learn that they exist separately from the objects and people around them, that they can cause things to happen, and that things continue to exist even when they cannot see them.

Preoperational stage (two to seven years)

In the *preoperational stage,* children are not yet able to conceptualise abstractly and they need concrete physical situations. They are able to understand concepts like counting, classifying according to similarity, and concepts of time but generally they remain focused primarily on the present and on the concrete rather than the abstract. Once children acquire language they are able to use symbols (such as words or pictures) to represent objects. Their thinking, however, is still egocentric and they have difficulty accepting the viewpoint of others (Miazga, 2000).

The success of lifelong learning lies in the ability to provide age-appropriate learning activities across developmental stages, even more so when lifelong learning is associated with career development. The preoperational stage represents a period of rapid physical and cognitive growth. Consequently, work with children during this early developmental stage should rather encourage and facilitate their general capacity to manage increasingly complex information rather than focusing attention on implementing specific career learning programs.

Concrete operational stage (seven to eleven years)

As mentioned earlier, the concrete operational stage is of particular relevance to the present study. It represents a transition between the preoperational and formal operational stages

(Crain, 2000; Meadows, 2006). During this stage, children begin to use logic in their thinking (Craig, 1994), thus marking a dramatic transition from illogically to logically based thought (Magnuson & Starr, 2000; Pressley & McCormick, 2007). The question that needs to be answered, however, is how this new capacity to work with increasingly complex information translates into career development terms, i.e., what type of career information or interventions can now successfully be managed by children in this stage?

The answer to this question lies in the fact that the cognitive development of this stage is dependent on the experiences the child has had at earlier developmental levels. For example, if curiosity as an early developmental construct has been nurtured children will be more willing to explore new and unfamiliar surroundings during subsequent developmental stages. This has significant implications for career development learning programs when one considers that novel learning activities (such as a careers activity presented to learners for the first time) in itself can be regarded as new and unfamiliar terrain to explore. If curiosity has been stifled, children may be hesitant to explore and, according to Magnuson and Starr (2000), may not know how to assimilate or accommodate new experiences. Making children aware of the world of work conforms to the idea of a new experience, and consequently requires children to be willing to take initiative and explore within the parameters provided within the career intervention. According to the present researcher, these parameters should be clear in terms of instructions and expectations yet they should also allow spontaneous exploration to occur. This was an important precursor to consider when Growing-Up: Children Building Careers™ (GCBC™) was designed and this is discussed in Chapter 6 in greater detail.

The concrete operational child, according to Papert (1999), can conserve (the idea that a quantity remains the same despite changes in appearance), perform certain operations, and master

a variety of cognitive tasks the preoperational child cannot. For example, it is easier for children in this stage to learn what a dentist does (e.g., how he or she uses equipment, examines teeth, and so forth) than it is for them to understand how long eight years of post-high school training really is or what a particular income means (Sharf, 2012). This was another important element that could not be overlooked when designing the GCBC™. Awareness of this developmental indicator significantly informed the design of the GCBC™ career intervention, particularly in terms of program content[2] (i.e., what kind of activity or intervention best suits this type of learning during these early developmental stages).

Formal operational stage (from age eleven onwards)

The *formal operational stage* is the final stage of cognitive development in Piaget's (1971, 1977) theory. At this point, children can explore all logical solutions to a problem, imagine things contrary to fact, think realistically about the future, form ideals, and grasp metaphors that younger children cannot comprehend. Children have now developed a mature system of thought which allows for the mastery of complex systems of literature, mathematics and science and, more importantly, makes it possible to plan future goals and integrate their past and present into a realistic self-identity (Craig, 1994; Crain, 2000).

It is in the formal operational stage where career interventions traditionally reside as such interventions target key decision-making periods associated with this developmental stage (for example, subject choices at the age of fourteen) (Mekinda, 2012; Perry & Wallace, 2012). Clearly, children now have developed the capacity to manage increasingly complex tasks, including career decision-making; however, it can be argued that without creating the necessary cognitive framework for organizing careers information and skills much of this capacity is not

[2] Chapter 6 provides a detailed description of the GCBC™ including its development and design, research considerations, graphic design, computer programming, and technical detail associated with the program.

effectively utilised in the decision-making process. For example, a few learners impulsively decide to drop mathematics as a subject because they do not like the teacher and unknowingly eliminate engineering as a potential study field. If the learners were exposed to age appropriate career information throughout their schooling they would realise that mathematics is a core subject and they would therefore have to alter their perception of the situation.

A Summary of Jean Piaget's Theory

Piaget's theory encouraged the development of educational philosophies and programs that emphasise discovery learning and direct contact with the environment (Burk, 2007), and his theory continues to have a substantial influence on developmental psychology and education. However, most developmental psychologists recognise the limitations of the original four-stage conception of development offered by Piaget (Pressley & McCormick, 2007). For instance, children acquire some capacities much earlier than Piaget proposed and other acquisitions much later. Further, recent work has demonstrated that development is not a smooth progression between qualitatively distinct stages but involves gradual and inconsistent movement between different cognitive processes (Siegler, 2005). There may be alternative paths to the same outcome, and such individual differences need to be theoretically accounted for (Meadows, 2006).

Despite facets of Piaget's theory undergoing revision in recent times, Papert (1999) believes that Piaget remains an influential theorist in the postmodern era, especially as computers and the Internet provide children with greater autonomy in exploring even larger digital worlds than before. This greater technological exploration makes the concepts that Piaget pioneered potentially more relevant today, and thus applicable to the current research. Although Piaget's theory does not specifically refer to career development, it does maintain that intellectual

development is necessary in order to make successful career decisions (Dean, 2001; Vondracek, 1985). While Piaget emphasised the stages associated with cognitive development, Erikson's theory (1963, 1968, 1985) which is described next focused on the stages of psychosocial development.

Erik Erikson's Theory of Psychosocial Development

Among the advances in the psychoanalytic theory of development, none has been more substantial than that made by Erik Erikson (Crain, 2000). Similar to Piaget's theory, Erikson (1985) recognises human development as a process divided into stages, several of which correspond to Freud's psychosexual stages (Craig, 1994). Erikson postulates the existence of eight stages of development governed by underlying maturational forces and the presence of a conflict within each of these stages (Crain). These eight psychosocial stages begin during infancy and progress through to old age with unique developmental tasks presenting themselves within each stage in terms of two opposing poles to which individuals must adjust (Pressley & McCormick, 2007). These stages are briefly described below.

Erikson's eight psychosocial stages

The first of Erikson's psychosocial stages involves the conflict of *Trust versus Mistrust*, which spans the first year of a child's life. During this stage, children are expected to develop a sense of trust when caregivers provide care and affection. If a child's basic needs are not properly met at this age, they might grow up with a general mistrust of the world. The second psychosocial stage poses the conflict of *Autonomy versus Shame* and includes the ages from one to three. As toddlers, children begin to develop independence and start to learn that they can do some things on their own. Success leads to feelings of autonomy, whereas failure results in feelings of shame and doubt. *Initiative versus Guilt* (three to six years) is the conflict experienced

in Erikson's third psychosocial stage and it is here where children continue to develop greater independence and start to undertake activities of their own initiative. Success in this stage leads to a sense of purpose. On the other hand, research indicates that children who try to exert too much power during this stage experience disapproval, resulting in a sense of guilt. Of particular interest for the present study is the *Industry versus Inferiority* (six to eleven years) developmental stage. During this stage, children continue to develop self-confidence through learning new things. Success leads to a sense of competence, while failure results in feelings of inferiority (Marcia, 2009). This stage is described in greater detail below

The remaining stages of Erikson's theory present the psychosocial conflicts of *Identity versus Role Confusion* (adolescence), *Intimacy versus Isolation* (early adulthood), *Generativity versus Stagnation* (middle adulthood), and *Integrity versus Despair* (late adulthood). Although not described in detail here, it is important to note that, as with previous stages, the successful resolution of each psychosocial conflict contributes to the achievement of age appropriate developmental tasks. The core function of each of these stages is for: adolescents to form their own identity by experimenting with who they are; young adults to form intimate, loving relationships with other people; adults to create or nurture things that will outlast them, often by having children or creating a positive change that benefits other people; and senior citizens' to reflect on a life that has added meaning to their existence.

Erikson presents human growth as the resolution of conflicts which the individual weathers, re-emerging from each crisis with an increased sense of inner unity (Meadows, 2006). For Erikson, a crisis does not imply an emergency. The term is used rather in a developmental sense in order to connote not a threat or a catastrophe but a turning point, a crucial period of increased vulnerability and heightened potential (Erikson, 1968). This lifespan model of human

development presumes that children are socialised to the concept of work during middle and late childhood, and that these early experiences have an impact on psychosocial adjustment throughout career identity development. We now return to a more comprehensive description of the psychosocial stage most relevant for the present study, i.e., Industry versus Inferiority.

Industry versus Inferiority

As has already been noted, Erikson's Industry versus Inferiority stage is most relevant to the eight to ten-year old participants of the current research. At approximately six years of age, children enter Erikson's fourth psychosocial crisis (industry versus inferiority) which continues until puberty. According to Erikson (1985), this stage marks an important career developmental phase as the individual child, busy in extending his or her mastery, must learn how to become a potential worker and provider. Children's levels of initiative and their sense of capability will influence their willingness to try new experiences.

During the Industry versus Inferiority stage children are absorbed in the task of developing competence in the fundamental technologies of their culture. From a career information perspective, if young learners have an opportunity to learn through experience (for example, make signs or drawings for a career or use tools such as an electrician's pliers), they may be able to experience a sense of success (Sharf, 2012). Unfortunately, if these types of activities are not provided within a structured school environment, learners may not have the opportunity to learn from such age appropriate career activities. This highlights the importance of the education system as a primary shaping influence tasked with providing the first formal career learning opportunities to young learners.

By the time children enter school, they unknowingly will have made decisions in two critical aspects of living: the level of trust they can place in adults and their degree of self-

sufficiency (Magnuson & Starr, 2000). Typically, developing children will enter school believing that adults will provide care for them, that they have the ability to master life tasks and, according to the latter authors, children are excited about exploring detail and learning new things. However, there is a concern here that not all children have successfully completed earlier developmental tasks as proposed in development theory. The implication of this concern is highlighted in an article entitled, *How early is too early to begin life career planning* (Magnuson & Starr). As children experience challenge and success or failure in their explorations, they constantly make decisions about their abilities. Some children may enter the first years of formal schooling exhibiting signs of mistrust and a doubting of their own abilities. If children are discouraged in their exploration or their efforts are deemed 'not good enough,' they are at risk of developing an internalised sense of inferiority according to these authors. The result is that discouraged children will be more likely to limit the range of careers in which they can imagine themselves. The basic decisions children make about who they are in relation to the world around them will influence their continuing development, including their ideas about work, workers and themselves (Gottfredson, 2002; Hartung et al., 2005; Howard & Walsh, 2010).

Evident from the above example is that self-confidence and the learning of new skills and tools have developmental importance during these developmental years, with significant implications for the child's maturation into a productive and self-assured adult worker (Seligman, Weinstock & Heflin, 1991). McMahon and Watson (2008) support this viewpoint and they reinforce the idea that the foundational and precursory parameters that have an impact on later adolescent and career development are shaped during the childhood years. Surprising then is the lack of age appropriate career interventions available during these early stages of development (Feller, Russel, & Whichard, 2005; Flederman, 2008; Sultana, 2004).

A Summary of Erikson's Theory

The years between six and eleven years of age represent a rapid period of developmental advances that establishes children's belief in themselves and their subsequent self-concept development. During these years, children make strides toward adulthood by becoming competent, independent, self-aware, and involved in the world beyond their families (Eccles, 1999). Erikson (1985) believed that biological and cognitive changes transform children's bodies and minds and start to prepare them for adult roles. Social relationships and roles change dramatically as children enter school and become involved with peers and adults outside their families. During middle childhood, children develop a sense of self-esteem and individuality, which has importance not only at a self-concept level but also in terms of the career aspirations they hold. It is here where age appropriate career interventions are most needed. If one accepts the idea that children make decisions about themselves and the world at a young age, it follows that development of the skills required for effective life career planning must begin early (Magnuson & Starr, 2000). However, as already mentioned, career interventions, and in particular career learning programs, require policy and curriculum support within education if the deficits already noted about such programs are to be addressed.

A Summation of Developmental Theory

Early childhood education and subsequent interventions aimed at facilitating important foundational skills (for example, the early development of literacy and numeracy skills) have relied heavily on child development theories for instruction (Aldridge et al., 1997). During the past 100 years, numerous paradigms and theories have been applied to education. However, as some theories begin to inform practice, other theories tend to lose their influence. According to Aldridge et al., the result has been a bandwagon approach in the application of child development

theories. This can be evidenced by reviewing educational reforms throughout the last century and in particular curriculum reform in South Africa during the last decade. The most demanding and complex of these reforms has been a South African variant of outcomes-based education (OBE) which required, among other prerequisites, a marked shift in assessment practices (Vandeyar, 2004). Much of what is seen in South African schools in terms of curriculum changes and assessment procedures are underpinned by a variety of developmental and learning theories supported by key stakeholders in the field.

According to De Waal (2004), curriculum has always been seen as a contested terrain due to the fact that definitions attributed to it reflected in many ways the conflicting perceptions of scholars influenced by their own beliefs and views of social interactions and what should be achieved by it. Education policy and curriculum in South Africa is discussed in greater detail in Chapter 4; however, it is necessary to acknowledge that theory does have an important role to play in accounting for career behaviour. Understanding the broader human developmental antecedents of various career behaviour variables would certainly lead to better predictions of career choice and more effective career interventions (Vondracek, 1985). One area identified for future research is to investigate whether career exploration activities designed to help individuals gather information about self and the world of work may facilitate development of more complex perspective-taking ability (Howard & Walsh, 2010).

Two theories of child development, Piaget (1970, 1977) and Erikson (1968, 1985), have been described to highlight important developmental considerations that can contribute to the development and design of age appropriate career interventions. The integration of these developmental considerations within a career developmental context is of paramount importance, considering that child and career developmental theories share certain basic foundational

principles such as the dual recognition of identifiable life stages and the resolution or accomplishment of associated developmental tasks. It is therefore of central importance to understand the influence of the one form of development on the other. In order to acquire a more specific understanding of children's career development, a number of influential career theories are discussed in the next subsection of this chapter.

Career Development Theory

Any discussion of career development theory should start with a clear definition of the word 'career' as there are variants of this term used within the literature (Stead & Watson, 2006). From an academic perspective, the word 'career' remains an elusive concept and, like the changing nature of the work environment, it has undergone changes in meaning over time (Stead & Watson). The word 'career' has been defined as "a sequence of occupations, jobs, and positions throughout a person's working life" (Super, 1957, p. 131), the "combination and sequences of roles played by a person during the course of a lifetime" (Super, 1980, p. 282), a "series of lifelong work-related experiences and personal learnings" (Hall, 1996, p. 1), and "the patterning of work experience into a cohesive whole that produces a meaningful story" (Savickas, 2005, p. 43). When these definitions are viewed in chronological year order, each definition clearly represents a shift in thinking over time that reflects the sociocultural perceptions of the meaning of the word 'career' during the periods it was defined in. For example, Super's (1957) first definition demarcates the age boundaries of 'careers' to adult populations by referencing, and in essence limiting, 'career' to those experiences deemed as part of 'working life'. Super's (1980) later definition marked a significant shift from his previous limited description of 'career' to recognise and acknowledge the contribution other life roles may make to an individual's experience of career.

These early definitions of ‘career’ (Super, 1957; Super, 1980) ultimately paved the way for the description of ‘career’ as all work-related experiences and personal learnings occurring throughout an individual’s lifetime (Hall, 1996). This latter view emphasised the developmental nature of careers and positioned work-related experiences alongside personal learnings as having similar, and even complimentary, value on individuals’ experience of their career. Savickas’s (2005) definition provides researchers with insight into the current perspective of career and it introduces the concept of ‘meaning’ into his description of career. For Savickas, the meaning of the word ‘career’ cannot be contained within the historical definitions highlighted above. Consequently, Savickas recognises that the meaning of career for each individual is unique and that subjective experiences contribute to a sense of self or life narrative. The latter definitions of career (Hall, Savickas) imply that change is inevitable and that change maintains a central function in shaping career behaviour. For the purpose of this study, the meaning of the word career will encompass previous definitions and be viewed as a combination and sequence of roles that are guided by lifelong work-related experiences and personal learning which have subjective relevance and importance. This definition represents the core aspects of each of the previous definitions and consequently mirrors the present research’s emphasis on lifelong developmental learning as a key aspect of career development.

Before discussing the career development theories used in this study, a broader understanding of career theories is needed. According to Watson and Stead (2006), there are many theories that attempt to explain career behaviour and choice, with each theory reflecting the perspectives and philosophical assumptions on which it chooses to focus. These theories provide parameters within which we can understand and hypothesise about career behaviour and choice (Sharf, 2012). Of particular interest to the current research are career theories that recognise

career development occurring over the lifespan. Although children as early as age four begin making judgments about the suitability of various types of careers (Trice & Rush, 1995), there has been little research investigating the developmental nature of children's reasoning about careers (McMahon & Watson, 2008). Thus, despite the widespread acceptance of the notion of life span theory, the span of life relating to the career development of children (i.e., those under 14 years of age[3]) has received little theoretical attention (Tracey, 2001; Wahl & Blackhurst, 2000; Whiston & Brecheisen, 2002). This view is supported by Vondracek (2001) who states that, while much attention has focused on studying and synthesizing knowledge about child development, the career development of children has been inadequately addressed.

In an attempt to clarify the current status in the field of childhood career development, Schultheiss (2008, p. 7) rightfully asks, "what is the current state of knowledge in childhood career development, where is it going, and how will we get there?" This question clearly highlights the uncertainty that continues to pervade much of the discussion around the application of career development theory to children in postmodern times. Although theorists addressing lifespan career development have historically recognised childhood as an important formative period (i.e., Gottfredson, 1981; Super, 1957), this focus is still limited in its theoretical and research foundations as well as in its practical application (Watson & McMahon, 2007a). For the purpose of the present research, some influential career development theories that do explore children's career development are discussed. These include Super's life span, life space theory (Super, 1957, 1990; Super et al., 1996), career construction theory (Savickas, 2005), and Gottfredson's (2002; 2005) theory of circumscription and compromise. Hereafter the discussion

[3] For the purpose of this study 'children' are seen as those individuals under the age of 14 as proposed in Super's (1957) theory of career development. The growth stage, explained later in this chapter, involves an individual's first introduction to the world of careers (Super, 1990).

moves towards broadly describing career theories that specifically focus on the important role of learning in the career development process. In particular, the Systems Theory Framework of career development (Patton & McMahon, 1999. 2006), Krumboltz's (1979) social cognitive learning theory, and Howard and Walsh's (2010, 2011) theory of career choice and attainment are considered as a conceptual link between developmental theories discussed in this chapter and the theories of learning discussed in Chapter 3.

Super's Life span, Life space Theory

Super's explication and operationalization of career development and its central processes have strongly influenced how counsellors throughout the world comprehend and guide their clients' career behaviour (Savickas, 1994). Super's life span, life space theory represents the cumulative result of empirical research, conceptual reflection and practice over a sixty-year period (Watson & Stead, 2006). During this period Super helped to transform career psychology from an expert driven profession towards viewing career development within a social and cultural context (Savickas). Furthermore, Super's constructs of career development, career maturity, self-concept development, and career adaptability, helped to shift the focus from career choice to career development as a lifelong process (Sharf, 2012; Watson & Stead).

Self-concept

Central to Super's understanding of the process of career development is the development of the self-concept. Super viewed the self-concept as a major construct which is evidenced by the fact that he described career development as the process of developing and implementing a self-concept (Magnuson & Starr, 2000; Sharf, 2012). Super's emphasis on self-concept development has been at the centre of his developmental theory and it has been described as the centrepiece of Super's approach to career behaviour (Zunker, 2006). Super (1957) viewed self-concept as a

combination of biological characteristics, the social roles individuals play, and the evaluations of the reactions of others to the individual. In brief, self-concept refers to how people view themselves and their situation and, according to Sharf, this sense of self begins to emerge in late childhood or early adolescence.

Super (1981, 1990) described the Growth Stage (birth to fourteen years) as a time when the self-concept develops through identification with key figures in the family and school (Schultheiss et al., 2005). The development of a self-concept appears to be critical in childhood, with the child drawing on a disjointed repertoire of attributes and fragmented selves as needed in different situations (Savickas, 2002). This rapid adjustment to the self-concept in different social contexts could provide an explanation for children's changing interests and ambitions. Super (1990) explained that these changes occur over time both because of development and changing circumstances.

Super's (1990) theoretical model of childhood career development consists of nine concepts that were thought to contribute to career awareness and decision-making. These concepts have recently been used in the development and design of the Childhood Career Development Scale (CCDS; Stead & Schultheiss, 2003), one of the first instruments to measure career development in children (and which is used in the present study). This measure asks children to answer questions that relate to self-concept development as described in theory and the measure focuses on eight of the nine concepts identified by Super. Each of these concepts is briefly described next as summarised by Schultheiss et al. (2005):

1. *Curiosity*: a strong desire to know or learn something
2. *Exploration*: actions directed towards understanding, discovery, or examining information about oneself or one's environment in an attempt to meet curiosity needs

3. *Information*: awareness of the importance or use of career information and how one learns or acquires this information
4. *Key figures:* role models or interesting or helpful people whose actions and opinions strongly influence the course of events in individuals' lives
5. *Interests:* an awareness of one's preference towards certain types of activities
6. *Locus of control*: the degree to which one feels in control over one's present and future relative to the self (internal) or other-controlled (external)
7. *Time perspective:* an awareness and acknowledgement of how the past, present, and future can be used to influence future events
8. *Self-concept:* dimensions of the self, including needs, values, interests, abilities, and personality in combination with information gained through interaction with others, and
9. *Planfulness:* an awareness of the importance of planning.

As can be seen, Super identified a broad spectrum of age related capacities needed by children in order to successfully negotiate the early stages of career development. These concepts have also played an influential role in the development and design of GCBC™, which is discussed later in this thesis.

Stages of development

Super (1957) and other theorists of career development recognise that maturational changes occur in individuals as they progress through their career development. Super's particular contribution was his formalisation of developmental stages and developmental tasks over the lifespan. These life stages as well as their corresponding substages are summarised in Figure 1.

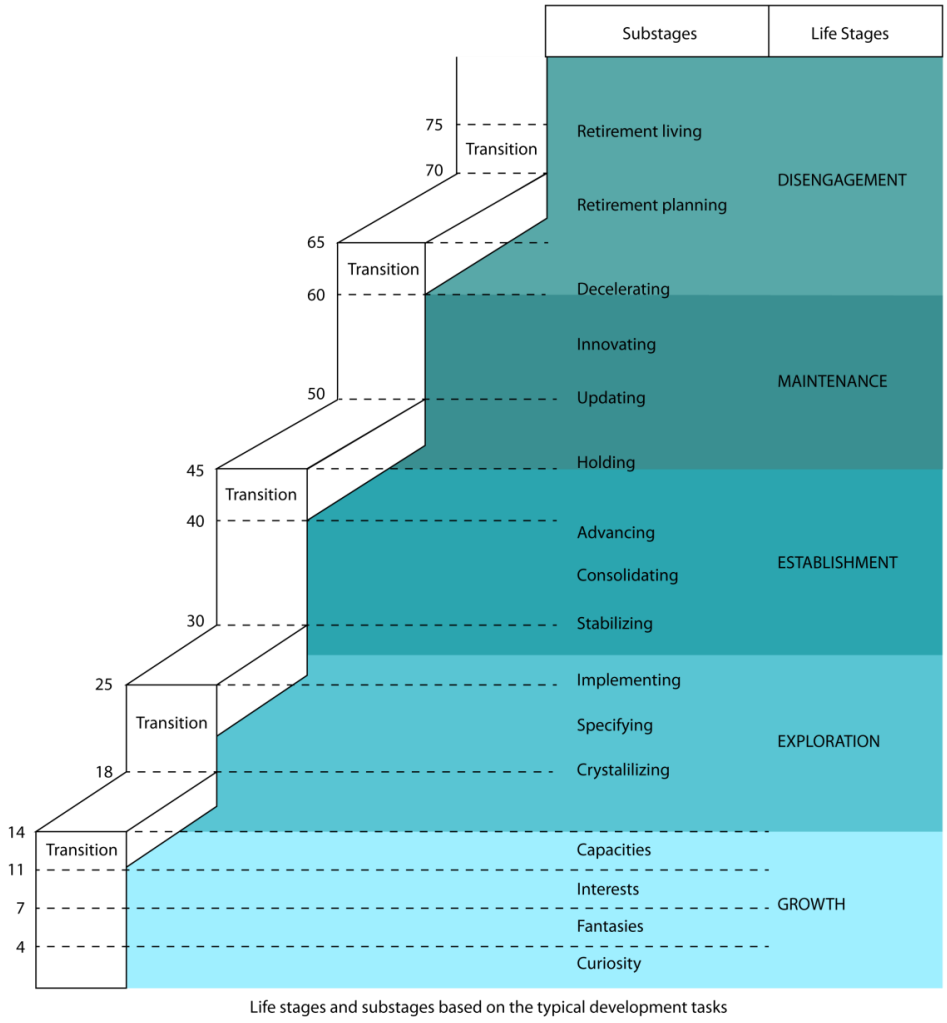

Figure 1. Super's Stages and Tasks of Development

Adapted from *Career Choice and Development*, by D. Brown , L. Brooks, and Associates. Copyright © 1984 by Josey-Bass, Inc.

Super viewed career development as a process that occurs according to a linear, predictable progression in a normal, but not invariable, sequence and within approximate stages and ages (Watson & Stead, 2006). These stages are: *Growth* (birth to age 14); *Exploration* (ages 15 to 24 years); *Establishment* (ages 25 to 44 years); *Maintenance* (ages 45 to 64 years); and *Disengagement* (ages 65 years onwards) (Super, 1990). Super (1957) positioned childhood at the onset of this process and denoted it as the *Growth* stage, with its concomitant developmental

tasks of fantasy, interest, and capacity. According to Hartung et al. (2008), these developmental tasks encompass childhood and the years of birth to age fourteen and they essentially mirror the stages of child career development originally delineated by Ginzberg, Ginsburg, Axelrad, and Herma (1951).

Each of these developmental stages is characterised by a series of career tasks and behaviours that society expects an individual to accomplish. For the purpose of this study, the *Growth* stage, covering the ages from birth to approximately 14 years of age, is of particular interest because it includes the eight to ten year old sample which comprises the present research.

Growth

The career developmental life stage of *Growth* includes four major developmental tasks: becoming concerned about the future; increasing personal control over one's own life; convincing oneself to achieve in school and at work; and acquiring competent work habits and attitudes (Super, 1990; Super et al., 1996).

The *Growth* stage also refers to the physical and psychological growth of an individual and is further divided into substages that are associated with various ages (Sharf, 2012). These substages are: *curiosity* (birth to four years); *fantasy* (four to seven years); *interests* (seven to eleven years); and *capacities* (eleven to fourteen years). When categorised according to Super's career development theory, the participants of the current research would be in the *interest* substage of the *Growth* stage and any career intervention developed for this age group should assist in facilitating the achievement of the developmental tasks associated with this substage.

During the Growth stage and, in particular, the interest substage of Growth, the primary focus for children is on the development of interests. According to Sharf (2012), the development of interests is clearly a product of exploration and the importance of exploration during childhood

is pivotal to the career development process. Schultheiss et al. (2005) support this view by stating that exploratory behaviour leads to the acquisition of career information and further exploration. For example, as the child tries out new behaviours (i.e., participating in various school activities), some behaviour becomes attractive and some does not (for example, a child might choose to limit participation in sport and rather focus on activities of a more expressive nature including the arts or music). Continued participation and exploration can lead the child to explore beyond the boundaries of the activity itself (for example, merely completing an art activity) and vicariously experience the world of work (for example, seeing an art teacher working with a class). During self-concept development, a child starts to attach meaning to personal experiences and such meaning starts shaping ideas around career selves. For example, a child exploring and participating in a range of activities receives positive feedback from an art teacher. The art teacher, being an important role model for the child, contributes to the child's perception of himself/herself as a 'skilled artist' and subsequently influences the child's occupational perceptions and aspirations towards this direction. Even though this stage of development is characterised by rapid change in terms of interests, research indicates that childhood aspirations significantly influence adult career choice (Trice & McClellan, 1994).

In what Savickas (2002, p.162) views as a "very important career choice", children choose role models who portray solutions to their problems in growing up. Role models play a critical role in children's career development during the Growth stage as children seek role models who can help them achieve their goals (Helwig, 2004; Lockwood & Kunda, 1997). Savickas states further that "as children imitate desirable qualities of their models for self-construction, they rehearse relevant coping attitudes and actions, form values about and interests in certain activities, and exercise abilities and skills as they engage in these activities" (p. 162).

However, the role of adults is not only to act as prominent models in children's lives through modelling behaviour, but also to play a critical role in the facilitation of the child's developing self-concept. Magnuson and Starr (2000) state that the responsibility of adults in the lives of children is to provide many and varied developmentally appropriate opportunities for career awareness, career exploration and the development of life career planning skills. To be personally meaningful to children, these experiences must be accompanied by opportunities to express individual thoughts and beliefs as they develop (Magnuson & Starr). Super's remaining four developmental stages focus on adolescents and adults and are briefly described next.

Exploration, establishment, maintenance and disengagement

Exploration is the stage in which adolescents and young adults are expected to crystallise, specify and implement a career choice. The development of a meaningful and rewarding career often begins in adolescence as part of this process of self-exploration and crystallization of identity (Felsman & Blustein, 1999; Sharf, 2012; Super, 1980). What is required of an individual during this stage is to acquire information about the self and about careers in order to make the matching choices that construct a career (Savickas, 2002). The years of the *Establishment* stage (ages 25 to 45 years) involve the implementation of a self-concept in a career and include the tasks of stabilizing, consolidating, and advancing (Sharf). This period marks the start of working life. This is followed by the *Maintenance* stage (ages 45 to 65 years) in which individuals do not necessarily advance but rather maintain their status in work. Major developmental tasks that constitute this stage are: holding on, updating, and innovating (Sharf; Zunker, 2006). Individuals in this stage often reevaluate work experiences and revise their career self-concept accordingly (Savickas). One of the main objectives of this stage is to sustain oneself in a career and to preserve one's self-concept. Finally, the career stage of *Disengagement* (ages 65 years and older)

involves the developmental tasks of decelerating, retirement planning, and retirement living (Zunker).

A summary of Super's theory

An overview of Super's life stage life space theory highlights the importance of the Growth stage in career development. This is a time during which the developing self-concept is greatly influenced by a range of shaping influences. It has been suggested that age appropriate career interventions can significantly assist the achievement of the developmental tasks of the Growth stage (i.e., becoming concerned about the future, increasing personal control over one's own life, convincing oneself to achieve in school and at work, and acquiring competent work habits and attitudes).

Super's life stage life span theory has been an influential career theory for several decades and it is used in the present study because it specifically describes the career development of children. Recently, Super's theory has been reinterpreted as *Career Construction Theory* (Savickas, 2002, 2005) which attempts to explain the interpretive and interpersonal processes through which individuals impose meaning and direction on their career behaviour (Savickas, 2005). Savickas states that career construction theory incorporates Super's (1957) innovative ideas into a contemporary vision of careers by using social constructionism as a metatheory within which to reconceptualise central concepts of Super's career development theory. Career construction theory is described next.

Savickas's Career Construction Theory

Using Super's theory of career development as a foundational framework, Savickas (2005) expanded and extended Super's theory by reframing it within the philosophical approach of constructivism, which suggests that individuals construct their own reality or truth. Whereas

the objective definition of the word career denotes the sequence of positions occupied by an individual from school to retirement, the subjective definition of career used in career construction theory is not the sum of work experiences but rather the patterning of these experiences into a cohesive whole that produces a meaningful story (Savickas). Constructivists not only examine how individuals fit into the world of work, but how the world of work fits into individuals' lives (Savickas, 1993). This theory and practice considers what traits an individual possesses, how an individual adapts over the life course to transitions and changes prompted by personal and environmental conditions, and why an individual behaves and moves in a particular life direction (Hartung & Taber, 2008; Savickas, 2005). Furthermore, this theory views careers from a contextual perspective, one that sees development as driven by adaptation to an environment rather than by maturation of inner structures. Similar to the work of Super, Savickas (2005) also emphasises the importance of self-concept development and he describes the formation of self-concept in early childhood as a collection of perceptions that is neither integrated nor particularly coherent.

Career construction theory further endorses Super's (1990) basic principle of developmental tasks which suggests that successful passage from one developmental stage to another is necessary as one progresses over the life span. The first of these developmental stages in career construction theory focuses on childhood where children face four major developmental tasks. The first two tasks correspond with those identified by Super: becoming concerned about the future, and increasing personal control over career activities. The remaining two tasks have been revised and adapted to reflect a constructivist approach in which children are tasked to form conceptions about how to make educational and career choices, and how to acquire the confidence to make and implement such choices (Savickas, 2005). The description and

clarification of these four development tasks provide program developers with valuable insight into what is needed for designing age appropriate career interventions for children. These four tasks have contributed to the development and design of the program that is the focus of the present research, i.e. Growing-Up: Children Building Careers™ (GCBC™). However, before specific attention is given to the development of the program it is important to consider the three main components of career construction theory, i.e., *Vocational*[4] *Personality*, *Life Themes*, and *Career Adaptability*.

Components of career construction theory

Vocational personality

Vocational personality refers to an individual's career-related abilities, needs, values, and interests. By attending to individual differences in career traits, career construction theory seeks to improve practice in augmenting, but not replacing, person-environment fit theories that match people to careers (Savickas, 2005). Savickas views Holland's (1985) RIASEC (i.e., Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) type model, composed of trait complexes organised into types, as a useful approach for appraising individual differences and for describing career groups. RIASEC types can be used to summarise an individual's skills, interests, values, and abilities for enacting work roles. According to Savickas, these personal ideas and feelings about self, work, and life reveal purpose, and purpose rather than traits composes the life themes that control behaviour, explain behavioural continuity, sustain identity coherence, and foresee future action.

Vocational personality, and by virtue RIASEC types, became an important influence during the program development stage of the present research. The primary reason for including

[4]The word 'vocation' rather than 'career' is the preferred term to describe work behaviour in career construction theory. The motivation provided for this is that 'vocation', defined as a 'calling', is regarded as having particular meaning in a person's life which goes beyond the traditional definitions of 'career'.

Holland's RIASEC types as a method of organizing program content was that, in career construction theory, these interest types are simply resemblances to socially constructed clusters of attitudes and skills (Savickas, 2005), and they have been previously used (Tracey, 2001; Tracey & Ward, 1998) to characterise the social organization of careers. RIASEC types in career construction theory are used to generate hypotheses about self and the world of work that are viewed as possibilities, not predictions. Generating ideas about self in future careers is a manifest goal of the current research and thus makes it a valuable addition to the GCBC™ which aims to facilitate the process of discovery and exploration during childhood.

During the *Growth* stage of career development, the primary focus is on the origin and growth of the individual's vocational personality. Children must learn to imagine, explore, and problem solve in order to construct a viable work future consistent with cultural imperatives reflected in family and community contexts (Hartung et al., 2008). It is here where the concept of life theme, as proposed by career construction theory, has much value in terms of helping individuals understand how their life project matters to themselves and to other people. In career construction theory, the theme is what matters in the life story of an individual (Savickas, 2005).

Life theme

Another component of career construction theory is that of Life Themes. The life theme component of career construction theory addresses the subject matter of work life and focuses on the 'why' of career behaviour (Savickas, 2002). The essential meaning of a career, and the dynamics of its construction, are revealed in self-defining stories about the career development tasks, career transitions, and work experiences that an individual has faced (Savickas, 2005).

The value of career construction theory lies in the fact that these self-defining stories about career development tasks, career transitions, triumphs, and traumas indicate life themes that

play out between the self and society and that give shape to the significance and role of work in the individual's life. Clearly, the importance of work in a child's life has not manifested itself yet; however, influences during childhood shape career narratives and these in turn can have an enduring influence throughout subsequent stages of career development.

The last component of career construction theory, career adaptability, offers career practitioners clear guidelines as to what is needed to optimally assist early childhood development.

Career adaptability

Career adaptability is a psychosocial construct that denotes an individual's readiness and resources for coping with current and imminent vocational development tasks, career transitions, and personal traumas (Savickas, 2005). While vocational personality types emphasise the occupational content of career, adaptability emphasises the coping processes through which individuals connect to their communities and construct their careers. Succinctly stated, career adaptability deals with *how* an individual constructs a career whereas vocational personality deals with *what* career they construct (Savickas).

Children must accrue an array of experiences that promote foundational attitudes, beliefs, and competencies for envisioning a future, making career decisions, exploring self and occupations, and shaping their life careers (Hartung et al., 2008). These attitudes, beliefs, and competencies represent core dimensions of career adaptability, which has evolved as an important construct in the theory and practice of career construction (Savickas, 2002). Recognizing childhood as the dawn of vocational development and the centrality of career adaptability across the life span, Hartung et al. assert that the antecedents of career adaptability are established during childhood.

The four developmental dimensions of career adaptability (i.e., concern, control, curiosity, and confidence) extend through the traditional developmental career stages of *Growth*, *Exploration*, *Establishment*, *Maintenance* and *Disengagement* and the tasks associated with these stages (Hartung et al., 2008). The Career Adaptability Model described by Hartung et al. offers career practitioners a blueprint for investigating, comprehending, and intervening in order to promote career adaptability beginning in childhood and throughout the life course. These four career adaptability constructs are described below.

Career concern

Career concern deals with issues of orienting to the future and feeling optimistic about the future (Hartung et al., 2008). Career concern represents essentially a future orientation, a sense that it is important to prepare for tomorrow (Savickas, 2005). What is evident from this aspect of career adaptability is that appropriately designed experiences, opportunities, and activities that focus on assisting children to develop awareness of the future can afford children a growing sense of hopefulness and a planful attitude. The difficulty here lies in designing activities that are deemed age appropriate for young learners.

Career control

Career control involves increasing self-regulation through career decision making and through taking responsibility for the future (Hartung et al., 2008). Savickas (2005) states that career control implies that individuals feel and believe that they are responsible for constructing their careers. During the developmental stage of childhood, it is important to acknowledge that not all children will inherently feel and believe that they are responsible for constructing their careers, especially when one considers that the concept of career is an unknown for many children. Facilitating the achievement of career control within childhood requires that supportive

scaffolding be put in place (i.e., age appropriate career development skills) that can support the attainment of subsequent developmental tasks. It is during these early years that adults are strategically positioned as role models to assist in the process of establishing these supportive structures through facilitating age appropriate career interventions.

The security of a child's relationship with responsible adults permits a growing sense of self-direction and personal ownership of the future along with a decisive attitude and an ability to make decisions about educational and career pursuits (Hartung et al., 2008). Clearly, the idea here is to provide a balance between adult or educator facilitated activities and activities that challenge and extend children's ability to make decisions based on their own beliefs.

Career curiosity

With a sense of control comes the initiative for learning about the types of work that the individual might want to do and the career opportunities available to do it (Savickas, 2005). Career curiosity reflects an inquisitive attitude that leads to productive career exploration that permits an individual to realistically explore educational and career options and approach the future realistically (Patton & Porfeli, 2007). Career counsellors often use information-based interventions to stimulate and reinforce exploration, ultimately increasing knowledge about the world of work, and fostering exploratory behaviour (Hartung et al., 2008). The difficulty faced in the present research was to translate existing information-based interventions traditionally used with adolescents and adapt them to more appropriately meet the career development needs of children.

Career confidence

Career confidence concerns the acquisition of problem-solving abilities and self-efficacy beliefs (Hartung et al., 2008). It is no secret that career choice requires solving complex problems

and it takes confidence to do what is required to master these problems (Savickas, 2005). According to Hartung et al., children are tasked to develop an efficacious attitude and an ability to solve problems and effectively navigate obstacles to constructing the future. During early developmental stages, much of this confidence is gained from solving problems encountered in daily activities such as household chores, schoolwork and hobbies.

What can be deduced from this brief overview is that age-appropriate career interventions require tasks and activities that firstly challenge learners, and secondly allow learners to experience positive feedback for participating in the activity. Structuring such activities according to varying levels of difficulty, based on the diversity of children's skills and abilities, provides all children with an opportunity to instil self-confidence. These considerations significantly influenced the development and design of GCBC™ and this is discussed in greater detail in Chapter 6.

A summary of career construction theory

In summary, similar to other developmental theories, career construction theory maintains that completing all tasks identified as crucial to overall development builds a foundation for success and future adaptability and reduces the likelihood of difficulties in later stages (Hartung & Taber, 2008). What needs to be noted here is that distorted career perceptions during this early stage of career development can hamper future career choices (Zunker, 2006), thus highlighting the need for career interventions that can nurture and develop personal and career related growth. A major contribution of career construction theory thus is its emphasis on the influence that life stories and career narratives have on future decisions. These career narratives are shaped by the three components of career construction theory, namely vocational personality, life themes, and career adaptability and they have particular relevance during childhood.

An added benefit of career construction theory is that it provides program developers with a means of effectively integrating Holland's RIASEC model in a manner that is not prescriptive (i.e., does not force individuals to only consider a limited range of careers) and that can be adapted to suit the information needs of children of various ages (for example, the younger the child, the simpler the information). This allows for the application of career construction theory within educational contexts because the various components of career construction theory can easily be translated into age specific learning program content. Considering that one of the goals of the present research is to broaden children's awareness of careers, the RIASEC model was utilised to open avenues for exploring career fields, and this made career construction theory a valuable addition to the present study. The next theory to be described is Gottfredson's theory of circumscription and compromise.

Gottfredson's Theory of Circumscription and Compromise

One theory that pays particular attention to the influence of limitations during early career development is that of Linda Gottfredson (1981, 2002, 2005). Gottfredson's theory differs from other career developmental theories in the emphasis it places on the barriers that may inhibit an individual's occupational aspirations and opportunities (Sharf, 2012). Gottfredson's theory describes how individuals' occupational aspirations develop over time and, in addition to this, her theory seeks to explain the cognitive career decision-making process within the context of development (Blanchard & Lichtenberg, 2003).

Circumscription and compromise

Circumscription and *compromise* are two processes by means of which individuals narrow life choices and begin to follow certain career paths in life (Gottfredson, 2002). Circumscription is the process of eliminating unacceptable careers from a range of possibilities,

thereby creating a zone of acceptable alternatives. According to Gottfredson (2005), most children learn that there are major varieties of work that occupy different positions in the general social order. When an individual finally makes a career decision, it is because the option chosen has been deemed the most acceptable when considered against all other options (Blanchard & Lichtenberg, 2003; Gottfredson, 1981, 2002, 2005). Thus, it is the social aspects of careers that concern children most and that children first consider. Whereas circumscription is the process by which individuals reject alternatives they deem unacceptable, compromise is the process by which children abandon their most-preferred alternatives for more achievable alternatives (Blanchard & Lichtenberg; Gottfredson, 2005). For example, when considering a preferred career choice, individuals may encounter barriers that would inhibit them from achieving that goal successfully.

Stages of development

Essential to Gottfredson's theory are four stages of development that provide a way to perceive oneself in the world (Helwig, 2004; Sharf, 2012). These stages are progressive in that each successive stage introduces a new dimension that must be incorporated into the development of the self-concept. Furthermore, each new dimension further limits or circumscribes an individual's range of acceptable career options (Watson & Stead, 2006). As indicated by circumscription, the range of acceptable career alternatives narrows with each stage of development (Blanchard & Lichtenberg, 2003). The four stages that Gottfredson (1981) originally identified are described below.

Orientation to size and power

In Gottfredson's (1981, 2002, 2005) first stage (occurring between the ages of three and five years), children's elementary orientation is to size and power. Although earlier stages of

Gottfredson's theory relate to general childhood development theory, this connection will only be made for stages relevant to the present research. In this stage, children's thought processes are concrete. They begin learning about careers and they begin to grasp the idea of becoming an adult by orientating themselves to the size difference between themselves and adults. Gottfredson indicates that a career achievement during this stage is to have recognised that there is an adult world, that working at a job is part of it, and that they, too, will eventually become a working adult.

Orientation to sex roles

In the second stage from ages six to eight years, Gottfredson's (2002) theory suggests that children choose careers based on gender role differences and their perceptions of the world of work. Children become aware that men and women perform different roles and work and, according to Helwig (2004), children choose careers consistent with their gender. Occupational aspirations are focused on what children regard as appropriate for their own sex, ruling out other careers that do not meet this criterion. Although children's perceptions of people and jobs will become subtler and more complex, their naïve early understandings have already turned them toward some possible futures and away from others (Gottfredson, 2005).

Gottfredson's second stage of development is relevant to the current research as the upper range of this stage in terms of age (i.e., eight years old) represents the youngest learners included in the present study (i.e., the sample includes eight to ten year old learners). Consequently, reference to the influence of sex roles during circumscription and compromise is needed and will need to be considered in the development and design of the GCBC™. For example, the researcher had to ensure adequate representation of male and female characters in the final version of the program. This is further discussed in Chapter 6.

Orientation to social valuation

In the third stage, approximately nine to thirteen years, children become aware of the social value and status differences of careers that exist around them. It is during this stage that prestige becomes an important factor in career choice. Consideration is given to how well an occupational aspiration fits with one's abilities and social status. As children incorporate considerations of social class and ability into their self-concepts, they reject occupational alternatives that seem inconsistent with those newly recognised elements of self (Gottfredson, 2002). In addition, individuals also ignore options that seem too difficult to obtain with reasonable effort or that pose too high a risk of failure. These perceptions then lead children to set a "tolerable-effort boundary" (Gottfredson, p. 98) which is shaped by their self-conceptions of ability and competitiveness. Gottfredson (1981, 2002, 2005) suggests that by the end of this stage children's career options have narrowed significantly because children delete or rule out large sections of their occupational map as being irrelevant to their sex type, or as of unacceptably low social level, or as being unacceptably difficult. This stage is the most relevant to the current research as the majority of the participants fall within the third stage of Gottfredson's theory.

Orientation to internal unique self

During the fourth stage (fourteen years and older), adolescents become more introspective and develop greater self-awareness and perceptiveness towards others (Gottfredson, 2002; Sharf, 2012). Individuals choose careers consistent with their internal, unique selves (Gottfredson; Helwig, 2004). In addition to sex roles, abilities, and social status, personal interests and values become important variables in this fourth stage of the circumscription process (Blanchard & Lichtenberg, 2003; Gottfredson). According to Blanchard and Lichtenberg, it is also during this

stage that compromise is initiated, whereby preferences for particular careers are determined additionally according to the obstacles and opportunities surrounding the individual.

A summary of Gottfredson's theory

The theory of Gottfredson (1981, 2002, 2005) differs from other career theories as it highlights special challenges in the career development of children. One of these challenges is the lack of evidence about the kinds of career interventions that are most effective. In an attempt to resolve this issue, Gottfredson (2005) identified pertinent features that should ideally be integrated into age appropriate career interventions. These are briefly described below.

Effective learning and adequate experience for Gottfredson (2005) are important to all ages because these create the foundation for self-insight. However, as has already been highlighted, the information and instruction of learning programs must be kept commensurate with the intended target audience's cognitive abilities. Activities must be short, elemental, discrete, and concrete. Therefore, a careful analysis of the complexity and comprehensibility of intended career material and interventions is needed to ensure that they are not too complicated, too abstract, or their vocabulary too difficult (Gottfredson). The participants for the current research are between the ages of eight to ten years old and consequently the content was designed, trialled and tested, for this specific age group. In addition, foundation phase educators (foundation phase includes grades one to three) were approached to review the program content. This greatly reduced the risk of a mismatch between skills needed by participants and the content presented.

Gottfredson (2005) also suggested that career practitioners and educators could provide a broad menu of possible experiences and encourage individuals to sample experiences new to them. Children tend to be exposed to somewhat different careers depending on their background,

so systematically exposing all learners, from kindergarten on, to all sectors of the common cognitive map of careers helps to broaden their horizons and can help to break down self-limiting stereotypes about race, gender, and class (Gottfredson, 2005). These cognitive maps constitute the way in which individuals distinguish careers into major dimensions, specifically, masculinity/femininity, career prestige level, and field of work (Zunker, 2006). As described in Chapter 6, the challenge in the development of the GCBC™ and the design phase of the current research was to adhere to Gottfredson's recommendation and expose children to all sectors of the common cognitive map of careers so that optimal career learning can take place. Theories pertaining to learning are described in greater detail in Chapter 3 and they represent an important addition to the current study; however, it is also necessary to position the role of learning within career theories. The three theories looked at in this regard include the Systems Theory Framework of career development (Patton & McMahon, 1999, 2006), Krumboltz's (1979) social cognitive learning theory, and Howard and Walsh's (2010, 2011) theory of career choice and attainment. These theories share an emphasis similar to other career development theories on the important role of learning in the career development process (Patton & McMahon); however, because of their dedicated focus on career learning they provide a conceptual link between developmental theories discussed in this chapter and the theories of learning discussed in Chapter 3.

The Role of Learning in Career Theories

Although a number of career theories exist, only a few (i.e., Ginzberg et al., 1951; Gottfredson, 1981, 2002; Roe, 1957; Roe & Siegelman, 1964; Super, 1957, 1990; Tiedeman & O'Hara, 1963) actually address the career development of children. These theories describe varying ways for understanding how children develop career preferences and identities. While

assisting us in anticipating the changes in the career aspirations of children as they mature and in identifying the activities that allow children to develop the career skills essential to successful career development, these theories do not, however, provide a description of the understanding that children of various ages have of work-related processes (Howard & Walsh, 2011). Howard and Walsh suggest that by articulating the evolution of children's understanding of career development processes, programs designed to enhance career development could be made sensitive to and relevant to the level of children's development.

Career development, as the word suggests, is a developmental learning process that evolves throughout individuals' lives (Turner, & Lapan, 2005). The term also pertains to the interventions used by practitioners to facilitate age- and situation appropriate career behaviours across an individual's lifetime (Herr, 2001). These two subjects are the topics of Chapters 3 (Learning Theories) and 4 (Career Programs and Interventions); however, before these topics are discussed it is important to consider the role of learning within existing career theory. Indeed learning is not a new concept in career (Watson & McMahon, 2005). Since the days of Parsons (1909), learning has been implicit in career theory (Patton & McMahon, 1999, 2006) as exploring self and the world of work underpinned Parsons' conceptualization of career decision making. However, the diversity of conceptual and definitional issues (Hartung et al., 2005) continues to limit our understanding of children's career development learning. Recently there have been notable advances in the field (see, for instance, Patton and McMahon's [1999, 2006] Systems Theory Framework and Howard and Walsh's [2010, 2011] Theory of Career Choice and Attainment) that have moved us closer to consider the important role of children's perceptions of career information (McMahon & Watson, 2005).

The STF is an approach that allows for a more holistic understanding of career behaviour, including an emphasis on the contextual factors that play a significant role in shaping children's career behaviour (Patton & McMahon, 1999, 2006). This is particularly relevant in view of the fact that children's reasoning about careers is shaped by a dynamic interaction of both developmental and contextual determinants (Howard & Walsh, 2011). The STF therefore provides an important step towards creating a conceptual understanding of career development which includes content and process influences. Watson and McMahon (2005) illustrated how little research has focused on the process of career development learning and they emphasised the need for dual focus research that examines not only the *what* (content*)* but also the *how* (process) of children's career development learning.

Content

According to McMahon and Watson (2009), *content influences* include personal qualities and characteristics intrinsic to individuals (i.e., personality, gender, abilities, personal values and age), as well as influences from the context in which they live including the people and organizations with whom they interact, society and the environment. Despite several career theories drawing attention to content influences in career development learning, few relate these influences specifically to the career development of children (Watson & McMahon, 2007).

As has already been emphasised it is clear that many important career shaping experiences occur during the developmental stage of childhood. Krumboltz (1996) found that individuals' skills, interests, beliefs, values, and personalities are constantly changing as a result of exposure to new learning experiences. These learning experiences either can be direct activities (e.g., playing cricket and having a positive experience such as being applauded) or indirect, associative activities (e.g., watching a cricket game and observing the crowd cheering for the players) (Shurts

& Shoffner, 2004). The types of learning experiences children experience are limited by a number of social, cultural, and economic factors and every learning experience can be interpreted in various ways. The STF remains context sensitive in this regard and encourages individuals to consider career development within their systems of influence. The career learning that takes place therefore depends whether or not children were exposed to learning experiences, irrespective of the fact as to whether these learning experiences formed part of a structured career education program or general school and extracurricular activities. What is widely accepted is that these learning experiences can lead children to make unique generalizations about themselves (for example, I am good at playing cricket) and how they fit into the world around them (for example, I could play cricket professionally). However, the consequences experienced after these opportunities as well as the reactions of others (for example, parents, teachers, and significant others) also can shape, restrict or enhance children's learning (Shurts & Shoffner).

These experiences, positive (for example, praise given after completing a difficult art project) or negative (for example, being told that boys cannot draw or paint well), begin to shape children's perceptions of themselves. Children might not sufficiently comprehend the significance of these influences at this early stage, but it is during these early stages of development where some of the first steps are taken towards a future self. Consequently, the importance of content influences on children's developing self-concepts cannot be overlooked as illustrated in the preceding example.

Process

Indeed, development cannot be fully understood without an understanding of the environment in which it occurs (Howard & Walsh, 2011). Developmental contextualism also posits reciprocal relationships between and among levels of and domains of development. Thus,

a change in one domain of development (for example, cognitive development) has the potential to influence changes in another domain (for example, career development) (Lerner, 2002).

Within the concept of process, the STF identifies the existence of recursive interaction processes *within* the individual and *within* the context, and *between* the individuals and their context, thereby contributing to a microprocess of decision-making and a macroprocess of change over time (Patton & McMahon, 2006). Past, present and future are in a constant dynamic interaction where the meaning and shape of career related experiences in all three dimensions (i.e., *within* the individual, *within* the context, as well as *between* the individual and the context) of time are constantly changed by feedback and feed forward mechanisms (Patton & McMahon, 1999, 2006).

Research conducted by Howard and Walsh (2010) indicate that as children mature cognitively, they are better able to explain the processes of career choice and attainment. These authors found that as children are better able to understand cause and effect relationships, they will be increasingly able to identify specific educational and training experiences required for various careers. With ongoing cognitive development and interactions with their environments, children begin to use better organised reasoning, in that their thought processes are more logical, flexible, and organised than they were during early childhood (Howard & Walsh). This has important implications for conceptualizing career development according to processes associated with traditional developmental psychology. It therefore seems that the ability of children to comprehend the more complex career processes that form part of later career decision-making (i.e., decision-making that considers the implementation of a self-concept within a meaningful career choice) depends on the foundation established during early stages of career development.

A Summary of the Role of Learning within Career Theory

While several career theories provide the depth needed to account for specific concepts in the career development of children, the STF provides a broad framework that can unite these career theories (Watson & McMahon, 2007). However, it would be a major oversight to limit the discussion of the theoretical basis for the current study to developmental and career development theories only. McMahon and Watson's (2005) research indicated that it is not only important to explore what children know and how they acquire occupational information. It is also important to explore what children want to know. Such exploration demonstrates that children appear to have specific needs for career information. The importance of occupational information to children's career development has been established by research that demonstrates a significant relationship between the amount of career knowledge and later career adjustment (Borgen & Young, 1982).

Two questions that seem relevant to the present research and that need to be answered are: how do children acquire career information and, more importantly, what career information is it that children seek (McMahon & Watson, 2005)? The STF provides some answers to these questions as it identifies systems of influence that are constantly shaping career learning, either directly or indirectly. In addition, Krumboltz's (1979, 1996) Social Cognitive Learning Theory highlights the importance of early career learning experiences on children's self-concept which constantly changes as a result of exposure to new learning experiences. Learning is perceived in established career theories as an ongoing process, thus suggesting that "it is the learning process itself rather than any particular career theory that seems relevant to the career development of children" (Watson & McMahon, 2007, p. 31). It is no wonder then that researchers recommend strengthening the provision of intentional, career development learning experiences for children.

Chapter Summation

Clearly when using multiple theories to explain career development, as is the case with the current research, there exists a need for integration and synthesis between theories. Although attempts at weaving together certain distinct theoretical and practice-based contributions from the career field do exist (for example, see Lent, Brown, & Hackett, 1994), the discipline of career psychology has continued to search for an all-encompassing answer to the challenges posed by its own multiplicity (Kuit, 2006). Any description of the career development of children needs to acknowledge the interwoven theoretical foundations of child development and career development theories (Schultheiss, 2008; Watson & McMahon, 2007). Integration between the various theoretical approaches is critical if we are to move towards a better understanding of childhood career development. As mentioned earlier, the current research attempts to draw guidelines and recommendations from a variety of disciplines and theories as these pertain to the developmental stage of childhood that can be used to develop and design an age appropriate career learning resource. Two sets of theories, namely human development and career development theories, were used as the basis for exploration of the developmental stage of childhood. According to Magnuson and Starr (2000), weaving the writings of child development theorists with career development theorists provides direction when planning age-appropriate career awareness, career exploration and career planning skill-building strategies.

All the theories overviewed in this chapter recognise the need for early intervention as part of establishing a sound foundation for future development to occur. ‘Growth’ and ‘development,’ as viewed from a career development theoretical perspective, share similar theoretical trends to those noted by Piaget (1970, 1977) and Erikson (1963, 1985) in terms of successfully negotiating developmental stages or phases. These theorists (see Piaget, [1970,

1977] and Erikson, [1963, 1985]) laid the foundation for the development of educational philosophies and programs that emphasise discovery learning and direct contact with the environment. In postmodern times, discovery learning and direct contact with the environment is mediated by technology, especially as computers and the Internet provide children with greater autonomy in exploring even larger digital worlds than before. It is during the middle childhood years that children develop a sense of self-esteem and individuality, which has importance not only at a self-concept level, but also in terms of the career aspirations they hold. Both Super (1957, 1980, 1990) and Savickas (2002) agree that childhood is a time during which the developing self-concept is greatly influenced by a range of shaping influences, thus highlighting the need for career interventions that can nurture and develop personal and career related growth.

Gottfredson's (1981, 2002, 2005) theoretical assumptions also follow the developmental stages proposed by Piaget and Erikson. Gottfredson, Piaget, and Erikson share the view that children's capacity for learning and reasoning increases with chronological age, progressing from thinking intuitively in the preschool years, to concretely in the elementary years, to abstractly in adolescence and from being able to make simple distinctions to making multidimensional distinctions (Gottfredson, 2005). Consequently, the success of any age appropriate career intervention then lies in its ability to translate theory into practice. This can be accomplished through adapting and managing the career content to match the cognitive capacities present at any given stage.

One method to accomplish this task in childhood is to reduce the amount of career content into manageable segments and to present the content in a concrete manner (i.e. where children can physically see and experience careers). However, Gottfredson (2005) cautions researchers to be aware of the many differences between children in terms of general learning and

reasoning ability. At any given chronological age, some children may be far above or below their peers in mental age. For example, brighter children may understand and extract more information from the environment and from direct instruction and consequently learning programs must be flexible enough to accommodate this range of learners.

When one considers the various theories overviewed in this chapter it is clear that an understanding of the types of reasoning about career development processes commonly used could, and should, inform career education and exploration efforts with children (Howard & Walsh, 2011). For example, educators could use Super's theory to identify the age-appropriate tasks to facilitate exploration in programs of career education, the theory of career construction to strengthen children's developing career narrative through which careers are positioned as a meaningful life event, the theory of Gottfredson to identity sources that could potentially limit children's perceptions of desirable future careers, and the STF (Patton & McMahon, 1999, 2006), Social Cognitive Learning Theory (Krumboltz 1979, 1996), and Howard and Walsh (2010, 2011) theory of career choice and attainment to tailor the method of providing pertinent career information. These types of tasks can be unpacked within structured guidance programs and provide invaluable career learning experiences in the home, school, and community contexts that could support developmental movement from one level of reasoning to another (Howard & Walsh).

Conclusion

In this chapter, the focus has been on developmental and career development theories. However, it is critical to acknowledge the importance of yet another set of theories that greatly contribute to the developmental stage of childhood, namely learning theories. Although there is little urgency for children to make immediate career choices, there are benefits to developing a

meaningful understanding of the relevance of school-based learning to their future careers (Johnson, 2000). Regarded as a holistic process, learning involves thinking, feeling, perceiving, and behaving and results in the creation of knowledge (Patton & McMahon, 2006). This is discussed in more detail in the next chapter.

CHAPTER 3

LEARNING AND CAREER DEVELOPMENT

Introduction

Work plays a significant role in the lives of many and, according to Krumboltz and Worthington (1999), preparation for work pervades "every activity" (p. 318). Although some might argue with this statement, Krumboltz and Worthington illustrate the pervasive influence of preparation for work by referring to such everyday activities as "learning math skills, reading, drawing pictures, dancing, playing games, and conversing with friends" (p. 318). These activities all form part of the process of acquiring the skills and personal qualities that will shape a career path. Of interest here is the fact that none of these activities is specifically mentioned in combination with a career learning activity, yet all these activities are recognised as experiences that can influence career behaviour. The implication that can be drawn is that learning is central to the process of self-discovery and that self-discovery can consequently shape career behaviour. And it is during childhood where children need to learn a set of skills that will assist them in their efforts to establish satisfying life structures across their life spans (Super et al., 1996).

At the heart of providing career development services to children is the recognition of their need to develop more adaptive, resilient, and proactive approaches to their present situations and possible future career selves (Savickas, 1997; Turner & Lapan, 2005). The achievement of these early developmental tasks contributes to what researchers regard as career readiness. Career readiness requires children and adolescents to develop adequate self-knowledge in relation to careers and to acquire sufficient information on which to base later career and education decisions (Super et al., 1996). In other words, engaging in career exploration is a necessary prelude to career readiness (Ochs & Roessler, 2004). Already noted in the previous chapter,

career development is seen as a developmental learning process throughout life (McDaniels & Gysbers, 1992), and it is shaped by various intentional and unintentional learning experiences (Patton & McMahon, 1996, 2006). According to Watson and McMahon (2007), it is through children's participation in these career learning activities that individual experiences take place with learning shaping the meaning that individuals can attribute to these experiences. Thus it is through learning that individuals gain new insights and strategies that help them to make sense of their career development. Until recently, career learning interventions targeted particular points of decision-making (for example, school-to-work transition) (Turner & Conkel, 2010), yet learning as an important career development skill is relevant throughout the lifespan, including the developmental stage of childhood.

Intuitively, one might think that learning career readiness skills is a natural function of children's socialization; however, in today's complex world with understaffed schools, increasing family and educational transitions, increased residential mobility, and increasing demographic and cultural diversity this is easier said than done (Turner & Lapan, 2005). Educators and career practitioners concerned with the career development of children may need to take a deliberate and proactive stance in the development of career-related competencies. Therefore, career development learning, as it applies to childhood, embraces not only formal or intentional education and training, but also informal or unintentional learning (Patton & McMahon, 1996, 2006) which can occur in a variety of settings (South African Qualifications Authority [SAQA], 2009). Regardless of whether career development learning is intentional or unintentional, it helps shape career identity from an early age and a greater understanding of, and attention to, children's career development learning could provide a firm foundation for lifespan career management (Watson & McMahon, 2007). It is with this in mind that learning, and in particular career

development learning, can be regarded as a key construct with significant bearing on lifespan career developmental processes.

The concept of career development as a dynamic interactive learning process is supported by career theory (for example, Gottfredson, 2002; Super, 1990), with learning being regarded as a construct that can bridge the fragmented conceptualization of children's career development (Patton & McMahon, 2006). Here it should be noted that Super himself suggested that learning theory is the cement that binds the segments of his archway of career determinants, thus acknowledging the need to understand the processes that facilitate learning in career development. A focus on the learning process in career development may also help narrow the acknowledged gap between career theory and practice (Patton & McMahon).

This chapter begins by considering how learning has been positioned in career development theory and then pays specific attention to theorists who have contributed significantly to understanding the learning processes involved in the acquisition of knowledge. These include the theories of Kolb (1984) and Vygotsky (1978). In addition, as the purpose of the current research is to design and evaluate a computer-based career exploration intervention for children, it is important to examine the integration of Information Technology and Communication (ITC) within the classroom. Mayer's (2001) Cognitive Theory of Multimedia Learning is included here as it specifically refers to learning through the use of technology. This chapter concludes with a summary of the theories overviewed and links such theories with those described in Chapter 2.

Career Development Learning in Context

Learning, according to Patton and McMahon (1999, 2006), is a holistic process involving thinking, feeling, perceiving and behaving as individuals relate with past experience and ongoing

interaction with the world throughout their lives. As learning is universally perceived by career theorists (for example, Gottfredson, 2002; Patton & McMahon, 2006; Savickas, 2005; Super, 1990) as an ongoing process throughout the lifespan of an individual, it is the learning process itself rather than a specific learning theory that seems relevant across the career development lifespan (Watson & McMahon, 2005). Learning processes are seen as vital in successfully negotiating career developmental tasks. However, while there is general recognition that a learning process occurs in the career development of children, the interactional nature of this process is more hypothesised about than researched (Watson & McMahon). It is perhaps then not surprising that, given the lack of attention to the career development learning of children in the literature, there is a corresponding lack of attention to it in practice (Watson & McMahon, 2007).

Over the last decade the field of children's career development learning has been dominated by researchers calling for a means to bridge the gap between theory and practice (for example, Hartung, et al., 2005; Watson & McMahon, 2008). Unfortunately, this call remains largely unaddressed, consequently maintaining the status quo of our knowledge in this field and leaving practitioners to utilise the limited resources available. However, as has been noted by Watson and McMahon (2007), career development learning is not confined to structured and planned activities, and many informal opportunities for encouraging career development learning are available. Thus two distinct career development learning categories exist, namely intentional (i.e., based on career intervention) and unintentional (i.e., based on what children see and hear) (Patton & McMahon, 1999, 2006).

During earlier developmental stages learning primarily takes place through children's participation in activities, and it is the experience itself that can provide the catalyst to facilitate

learning. For example, a child's unintentional career development learning gained through helping a parent prepare supper, may spark an interest in exploring careers in the food industry. This in turn can serve as a stimulus for providing intentional career development learning where the work of a chef is discussed in relation to their personal qualities, the tasks chefs do, and school learning that may be helpful to chefs. As shown in this simple example, unintentional career development learning that occurs in a range of formal and informal settings may provide a rich source of material that can be utilised in intentional experiential career development learning programs. This is important to consider in the current chapter as learning theory recognises children's experiences as central to the process of learning. What is critical here is the fact that intentional and unintentional career development learning do not exist in isolation from each other, and that a recursive relationship exists between these two types of career development learning. Specifically, unintentional career development learning experiences may be used as stimulus material in career development learning programs, and intentional career development learning may in turn influence the nature of a child's unintentional career development learning experience (Watson & McMahon, 2007).

Considering the important role that childhood experiences play in the learning process, it is necessary to include in this chapter a section on the theory behind learning. When learning is viewed from a career perspective, two distinct areas, namely what children know and how they understand, need to be better understood to support positive career development in children (Watson & McMahon, 2005). Two complementary theories are described in the present chapter, namely Vygotsky's (1978) theory of learning and cognitive development, and Kolb's (1984) experiential learning theory. The rationale for including yet another set of theories is that learning theory can be used as a theoretical framework for exploring the variables that contribute to

effective learning. As will be seen in Chapter 6, learning stands at the heart of the GCBC™ which was designed as a career development learning resource.

Vygotsky's theory of learning and cognitive development

Vygotsky's theory of learning and cognitive development is well known to educators for his concept of the *zone of proximal development* (ZPD) and his emphasis on social interaction in learning (Crain, 2000). In Vygotsky's model, education does not coincide with development but is constructed in such a way as to develop psychological functions that will be needed for the next educational step (Kozulin, 2004). Vygotsky's theory asserts three major themes, including: *the importance of social interaction in the process of learning*, the *More Knowledgeable Other* (MKO), and the *Zone of Proximal Development* (ZPD) (Vygotsky, 1978). These three themes are discussed below.

The first of Vygotsky's themes focuses on identifying social interaction as a major contributing factor to understanding development. Vygotsky viewed social interaction within the process of cognitive development as central to his theory. However, in contrast to Piaget's understanding of child development (in which development precedes learning), Vygotsky believed social learning precedes development (Daniels, 1996).

The second theme in Vygotsky's (1978) theory, the MKO, refers to anyone who has a better understanding or a higher ability level than the learner with respect to a particular task, process or concept. Vygotsky viewed children as apprentices in learning to think (Magnuson & Starr, 2000), yet in this process Vygotsky acknowledges differences in terms of children's ability to master tasks. This means that children, depending on their current ability to make sense of incoming information, could fulfil the role of apprentice (i.e., learning through guidance and/or assistance) or the MKO (i.e., someone who has already successfully processed the learning task

and who can assist others in doing so). The MKO is normally thought of as a teacher, coach, or older adult, but the MKO could also include peers or, in today's rapidly advancing technological age, a well-designed computer character that guides the learner through the different tasks of the program. Those participants who are more knowledgeable serve as mentors to others in a process of guided participation.

The last of Vygotsky's themes is the ZPD. The ZPD represents a metatheory of greater freedom for learner-centred interaction within education (Crain, 2000). The ZPD is the distance between a learner's ability to perform a task under adult guidance and/or with peer collaboration and the learner's ability to solve a problem independently. Put differently, the ZPD provides insight into the learning that potentially exists between actual developmental level as determined by independent problem solving and the level of development as determined through problem solving under adult guidance or in collaboration with more capable peers. According to Vygotsky, the ZPD influences cognitive development or learning and is somewhat like the concept of 'readiness' where new learning is within the reach of the child but that he or she needs a bridge to this learning (Daniels, 1996). If we want to know what a child is ready to learn, we cannot look at what the child can learn when working alone; we must see how far ahead he/she can go when offered some assistance, (Crain, 2000). Vygotsky (1978) argued that this dialectical approach to development invites the educator to be continually projecting learning beyond the child's current capacities, but in ways which connect with children's growing sense of themselves within their communities (Fleer & Hedegaard, 2010). In this way, instruction stimulates capacities that are still in an embryonic state and pushes development forward (Crain). Educators are seen thus as active agents who, together with children, coconstruct a ZPD in which

the children and educator together develop a solution to a problem that neither the educator nor learner had been able to think of on their own.

Children are especially vulnerable to dependence on others for their learning opportunities, making childhood a critical time in which supportive adults provide interaction-rich, yet age appropriate, experiences (Magnuson & Starr, 2000). Career development learning presented in a structured and age appropriate manner is an example of such an interaction-rich experience. Further, an appropriately designed career development learning activity has the potential to: allow children to learn through social interaction (i.e., through group participation and feedback); allow children the freedom to participate through learning with assistance from peers or educators or to assist struggling learners themselves (MKO); and optimally allow children to learn new skills or information through activities in their ZPD. This process is demonstrated in Figure 2 (which has been developed and designed for the GCBC™) and described in the following example.

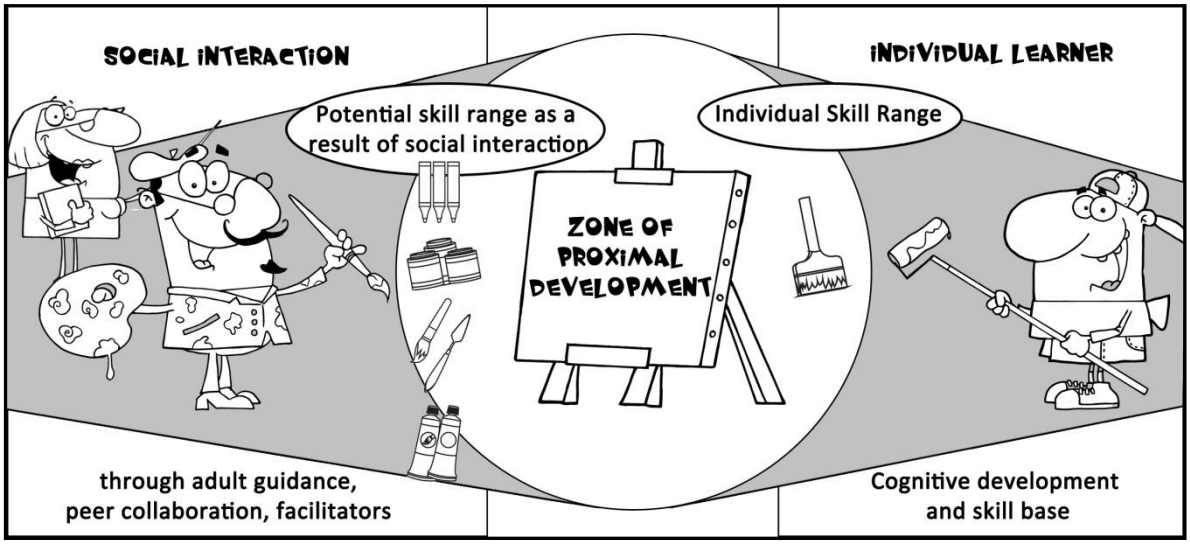

Figure 2. Vygotsky's Zone of Proximal Development

Grade 3 learners at a particular school have to regularly submit projects that require a certain amount of artistic ability. Each learner has an inherent skill or ability that they can call on in order to complete the task. Some might struggle with the task while others excel. The struggling learners can be described as those learners with a limited individual skill set (for example, confidence in using a paintbrush) and they will require assistance either from a peer or an adult (MKO). These peers or adults, through a process of social interaction, present a new set of skills (for example, the knowledge of and skill in the use of art tools and techniques) that can be accessed by the individual learner through collaboration and teaching. This process occurs in the ZPD which can be seen as a canvas where optimal learning can take place.

Vygotsky's (1978) theory has a rich history within education systems. Education systems have traditionally relied on educators to transmit or convey information to learners; however, in recent years there has been a concerted effort to change learning from an educator driven activity to a coconstructing of meaning or learning in the classroom (Department of Education, 2002). Systematic classroom learning and everyday experiences as sources of learning are key aspects of Vygotsky's theory of learning. Vygotsky's theory therefore promotes learning contexts in which learners play an active role in learning, thus redefining the traditional roles of educators and learners. Learning therefore becomes a recursive experience for learners and educators.

As can be seen from this example, good teachers are essential during this time in encouraging individuals to move beyond any psychological barriers that might be preventing them from engaging in career learning activities (Crain, 2000). Children need to broaden and deepen the knowledge they already have, and they need the opportunity to relate this new information to something in their experience that they already understand (NAEYC, 2005). Children need both the challenge of new experience and the opportunity to practice skills they

already possess (Cooper, 2005). This is a simple illustration of the application of Vygotsky's theory to career development learning, yet it provides insight into how daily activities can be utilised within educational contexts.

Learning through experiences also forms part of another influential learning theory, namely that of Kolb's (1984) Experiential Learning Theory (ELT) which is described in the next subsection. In career development learning, children's participation in career learning experiences provide a context for career development learning and offer the potential for the preparation for real-world tasks that will be faced in adulthood (Schultheiss, 2008). As noted by Schultheiss, direct, simulated, and vicarious experiences can help children to connect school-based learning to the tasks they will undertake as adults. Further, it is during the early grades of school that children need to develop work readiness skills through the integration of knowledge acquisition and its practical application (Harkins, 2000).

Experiential learning theory

> "No, no, that's not what I want"; "Wait! This is closer to what I am interested in, what I need"; "Ah, here it is! Now I'm grasping and comprehending what I need and what I want to know!"
>
> Carl Rogers (1983, p. 19)

Experiential learning theory has formulated its concept of learning by focusing on the process whereby knowledge is created through the transformation of experience. Carl Rogers, an influential psychologist, draws attention to the steps involved in this process and positions the learner at the centre of the learning process (i.e., "now I'm grasping and comprehending what I need and what I want to know") (Rogers, 1983, p.19). Considering that learning is regarded as a change in an individual's behaviour that occurs as a result of prior experience (Pierce & Cheney,

2004), and that knowledge results from the combination of grasping and transforming experience (Kolb, 1984), it is clear that the learning context plays an important role in facilitating both the process of learning and the attainment of knowledge.

Change can and does obviously occur in the formal classroom as the result of traditional educational approaches such as academic lessons, discussions, recitations, and testing. However, it is equally obvious that change in the individual or in behaviour can and does occur in the non-school environment, and that learning is not something confined to schools, classrooms, or textbooks (Kraft, 1999). According to Kraft, vicarious and symbolic forms of learning dominate our schools and classrooms, and these experiences represent one of the major forms of learning advocated by Rogers (1983), Kolb (1984), and education departments around the world, namely, learning from experience. The concept of learning from experience is the cornerstone of ELT (Kolb which emphasises the central role that experience plays in the learning process. This emphasis on experiences as the precursor for learning distinguishes ELT from other learning theories (Kolb, Boyatzis, & Mainemelis, 2000).

Beginning with the assumption that learning is the central task of career exploration, Atkinson and Murrell (1988) propose that Kolb's experiential learning theory provides an appropriate meta-model within which many diverse techniques, interventions, and strategies may be assembled. Learning, according to Kolb, is a continuous process that is grounded in experience and that has important educational implications that are discussed in greater detail later in this chapter. Kolb (1984) described learning as a four-step cycle based on the relationship of the two dimensions of cognitive growth and learning: the concrete-abstract dimension and the reflective-active dimension (Atkinson, 1991). Typically, an individual begins the learning cycle by first having an immediate experience (*concrete experience*) which becomes the basis of

observations and reflections (*reflective observation*). The individual then assimilates these observations and reflections into testable hypotheses (*abstract conceptualisation*). By testing these hypotheses (*active experimentation*), the learner creates a new concrete experience and starts the cycle anew (Atkinson).

Kolb's experiential learning cycle has been used extensively in education and it is clear why. It presents a logical and simple representation of the learning cycle and it can be used as a framework for designing learning programs (Atkinson, 1991). Each phase of the learning cycle represents a separate entity that can be sequentially unpacked in a structured learning activity (see Figure 3).

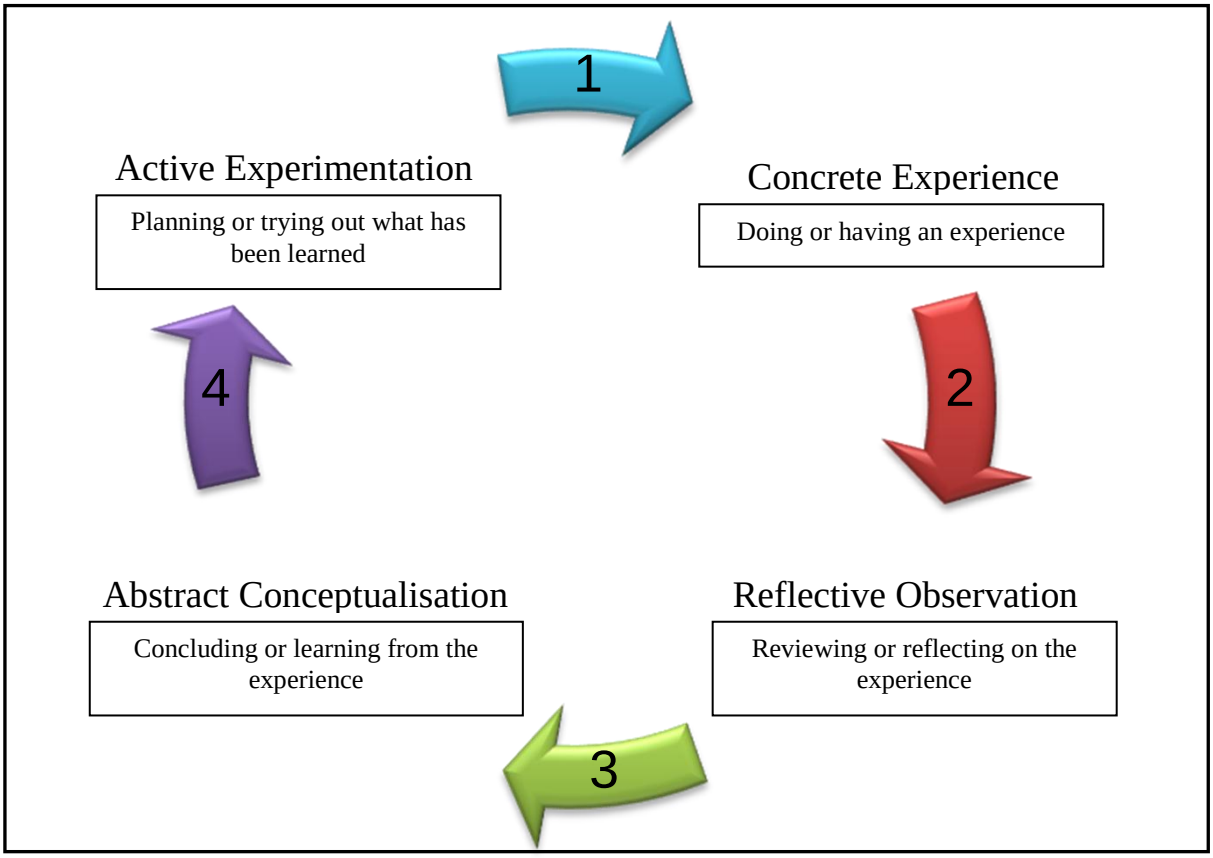

Figure 3. Kolb's Experiential Learning Cycle

Adapted from *Experiential learning: Experience as the source of learning and development* by Kolb (1984), New Jersey: Prentice-Hall.

For example, a career developmental learning activity can have children participate in an introductory exercise focusing on abilities (i.e., a concrete experience). Hereafter a facilitator can ask children to reflect on their experience and encourage learners to acknowledge individual differences between people (i.e., reflective observation). This activity can then lead children to consider that people are unique and that differences in terms of abilities can lead to different career paths (i.e., abstract conceptualisation). The learning outcome of this activity would be for participants to become excited about the potential that resides within everyone, irrespective of their current abilities.

Experiential learning theory also provides much insight into the finer details required when designing successful program content and activities. Appropriately designed career development learning activities would provide, as a manifest function, a concrete experience where children can move towards developing age appropriate career skills. As a latent function, such career development learning activities would encourage children's developing self-concept. In childhood career development children are tasked with becoming concerned about the future, increasing personal control over career activities, forming conceptions about how to make educational and career choices, and acquiring the confidence to make and implement these career choices (Super, 1990; Super et al., 1996).

Consequently, experiential learning activities that aim to assist children's career development should encourage attainment of the aforementioned goals. Unfortunately, given the lack of attention to the career development learning of children in the literature, there is a corresponding lack of attention to career development learning in practice (Watson & McMahon, 2007). According to Watson and McMahon, valuable career development learning opportunities are missed that could influence the shaping of vocational identity in young children. Such

shaping is increasingly necessary as it has been suggested that, to effectively prepare young people for their future careers, education must connect the world of childhood play with the adult workplace within the context of experiential learning (Harkins, 2000).

One such learning opportunity that is currently high on the agenda is the use of technology in the classroom (Agar, 2003; Dwyer, 2007; Forcier & Descy, 2002; Goodison, 2002; Haugland, 1992; Hyun & Davis, 2005; Keengwe, 2007; Mioduser, Tur-Kaspa, & Leitner, 2000; Smeets, 2005). From the information already reviewed in Chapters 2 and 3, it is apparent that we need to clearly understand the 'what' and the 'how' of children's career development learning in order to successfully develop, design and implement age appropriate career interventions for use in educational contexts. However, it remains a limited perspective to assume that learning only takes place within the confines of an educator/learner relationship and it is important to acknowledge technology as another mediator of learning in postmodern times.

Information and Communication Technologies (ICT) in Schools

The integration of educational technology into classroom instruction to enhance student learning is of increasing interest to stakeholders such as policymakers, administrators, educators, students, and parents (Keengwe 2007). Today's generation of children develop in the omnipresence of technology, with children exposed to digital technology even before they are exposed to books (Cooper, 2005). Whereas the children of previous generations may have needed an introduction to computers and digital information on beginning formal schooling, these things, according to Cooper, have very likely been a part of life for today's children from a young age. Rapid changes have been noted in the status of ICT in elementary schools over the past ten years (Agar, 2003). Further, there is a renewed emphasis on using ICT to enhance the quality of

children's teaching and learning experiences in schools, building on children's ability to use ICT tools effectively (Keengwe & Onchwari, 2009).

However, ICT in schools has not always been welcomed (Appel & O'Gara, 2001; Smeets, 2005). The lack of training available to educators to use ICT learning strategies in the classroom, the limited funding to purchase hardware and age appropriate software, and time restrictions are some of the main reasons why the use and impact of ICT in schools have had a fragmented influence on education (Grabe & Grabe, 2007). Digital technology is a tool for learning in much the same way as a pencil and paper are; therefore, irrespective of the obstacles faced in practice, children need to gain ability in the use of ICT (Haugland, 1992). While the benefits of ICT learning greatly outweigh the drawbacks, the premise remains that "there is no point in using ICT if children do not receive an enhanced learning experience" (Agar, 2003, p.16). According to Cooper (2005), digital technology has the potential to provide this enhanced learning experience through the integration of colour, movement, sound, and interaction. In order to better understand the use of ICT within educational settings, Mayer's (2001) cognitive theory of multimedia[5] learning is briefly examined next.

Cognitive theory of multimedia learning

Multimedia is increasingly used in computer-based learning, and the general indication is that this trend will persist (Agar, 2003; Goodison, 2002; Keengwe, 2007). One rationale for this trend is the assumption that multimedia has properties that can aid learning, particularly the learning of abstract subject matter and in the field of children's learning (Macaulay, 2003).

[5] Multimedia is the integration of multiple forms of media. This includes text, graphics, audio, and video. For example, a presentation involving audio and video clips would be considered a multimedia presentation. Educational software that involves animation, sound, and text is referred to as multimedia software.

The growing use of multimedia programs in schools has provided considerable support to individual learning in the sense that it allows the learner to access different kinds of information at the same time (i.e., words, pictures, audio) and at their own pace (Acha, 2009). However, although some advances have been made in developing new instructional technologies and in understanding how learners interact with media, a holistic view of educational technology research remains elusive (Muller, Eklund, & Sharma, 2006). One theorist who has made a significant attempt at addressing the current deficit in the field is Mayer (2001). Mayer introduced a generative theory of multimedia learning that supplements cognitive learning theory[6] in its description of the complex processes involved in multimedia learning.

Known as the 'multimedia principle', Mayer states that "people learn more deeply from words and pictures than from words alone" (Mayer, 2001, p. 47). However, simply adding words to pictures is not an effective way to achieve multimedia learning. The cognitive theory of multimedia learning explains how people learn from words (such as printed text or spoken text) and pictures (such as illustrations, photos, charts, animation, or video) and it is based on three assumptions derived from research in cognitive science (Mayer & Moreno, 2003). The first assumption relates to *dual channels* that suggests that people have separate channels for processing visual and verbal material. The implication of this on the development of a career learning program is that the information presented can be better understood if content is presented in words and pictures than when it is presented in words alone. By building a connection between words and pictures, learners are able to create a deeper understanding than from words or pictures alone. However, learners can only process a finite amount of information

[6] Cognitive learning theory implies that learning can be predicted and understood in terms of what the learners bring to the learning situation, how they relate the stimuli to their memories, and what they generate from their previous experiences (Wittrock, 2010).

in a channel at a time, and they make sense of incoming information by actively creating mental representations.

The second assumption, *limited capacity*, states that learners are able to process only a few elements in each channel at any one time. According to Mayer and Moreno (2003), meaningful learning requires that the learner engage in substantial cognitive processing during learning, but the learner's capacity for cognitive processing is severely limited. A central challenge facing designers of multimedia instruction is the potential for cognitive overload in which the learner's intended cognitive processing exceeds the learner's available cognitive capacity. One way to manage this within a structured career learning program is to use concise narrated animation to foster meaningful learning without creating cognitive overload. An important example of multimedia instruction is a computer-based narrated animation that explains how a causal system works (for example, how the machinery on a farm works, how a photographer's camera works, or even how various elements of your self-concept can influence the career decisions that we will one day make).

The third assumption, *generative processing*, acknowledges that meaningful learning occurs when learners engage in appropriate cognitive processing during learning, such as paying attention to the presented material , mentally organizing the selected information into coherent pictorial and verbal models, and integrating them with each other and with prior knowledge (Veronikas & Shaughnessy, 2005). This process of active learning results in a meaningful learning outcome that can support problem-solving transfer (Mayer, 2003).

What we can learn from this third assumption is that, according to Mayer (2003), the design of multimedia instructional messages should be based on an understanding of the nature of human learning. Using different technologies does not change the fundamental nature of how the

human mind works; however, to the extent that instructional technologies are intelligently designed, they can serve as powerful aids to human cognition and the development and design of optimal learning experiences. These three assumptions are key to understanding how learning through technology can take place.

Multimedia learning, as an intentional learning activity for young learners, can be seen on all major television networks and it focuses on a variety of topics, including literacy, numeracy, and general life skills. It is no secret then that teaching materials that implement multimedia resources increasingly provide richer instruction (Yen-Shou, Hung-Hsu, & Pao-Ta, 2011). What is important to remember is that learning is at the heart of education and, despite all the technological advances available, Veronikas and Shaughnessy (2005) emphasise that instruction should be learner centred rather than technology centred. The goal of education should always be to promote learning, and in today's technologically advanced environment the key to promoting learning is to find the balance between a learner centred approach and one that implements technology as an aid to the learning experience. According to this view, technology is a learning tool that should be adjusted to fit the needs of learners (Cooper, 2005). The challenge remains, however, as to how to promote effective learning using the complexities of multimedia instruction and design in order to foster meaningful learning (Mayer & Moreno, 2003). Some of these answers can be found in Mayer's (2001) theory of multimedia learning.

Mayer's (2001) theory is particularly relevant to the present study because it acknowledges how various individual elements (for example, sound, video, and images) can be combined in a digital format and presented as a cohesive learning experience. The main challenge of instructional design (i.e., the systematic process of translating general principles of learning and instruction into plans for instructional materials and learning) is to present material in a way

that promotes generative processing without overloading the capacity of the learner's information processing system (Veronikas & Shaughnessy, 2005). Clearly, this is an important consideration when designing age appropriate career development learning programs.

This was one of the major challenges in the development and design of the GCBC™ and it is discussed in greater detail in Chapter 6. However, briefly the GCBC™ aims to bridge the gap between theory and research by providing a computer-based career exploration tool specifically designed for young learners. The GCBC™ aims to do this by combining verbal and nonverbal career development learning material in an attempt to present an age appropriate career intervention for young learners. Considering that one of the aims of the research is centred on the development and design of a computer-based learning resource, the cognitive theory of multimedia learning provides much insight into the variation in learning found when dealing with digital environments.

Mayer provides a brief overview of the five cognitive elements involved in multimedia learning, specifically: selecting words, selecting images, organizing words, organizing images, and integrating (Veronikas & Shaughnessy, 2005). Selecting words occurs when the learner pays attention to verbal material entering through the ears (i.e., spoken text) for further processing in the verbal channel of working memory. Selecting images occurs when the learner pays attention to visual material entering through the eyes (i.e., pictures or printed words) for further processing in the visual channel of working memory. In working memory, the visual representation of the printed words can be converted into the sounds of the words in the verbal channel and verbal representations can be converted into pictorial ones. Organizing words involves building a verbal model, which is a coherent structure containing some of the selected verbal material in the verbal channel. Organizing images involves building a pictorial model, which is a coherent structure

containing some of the selected pictorial material in the visual channel. Finally, integrating involves building connections between the verbal and pictorial models, as well as with prior knowledge from long-term memory. Each of these cognitive elements was critically examined during the development and design phase of the GCBC™ and they informed much of the program content and layout. These elements are discussed in more detail in Chapter 6.

Summary of Learning Theory

Three theories, each with a specific focus on learning, were overviewed in this chapter. Vygotsky's theory of learning and cognitive development has a long history in education and was included here because of its emphasis on the learning contexts in which learning takes place. For optimal career learning to take place, learners must be able to learn through social interaction; participate through learning with assistance from peers or educators or through assisting struggling learners themselves (MKO), and optimally learn new skills or information through activities in their ZPD. Regardless of age or educational level, career education programs have been shown to be effective in assisting individuals develop early career development skills (Turner & Lapan, 2005). These programs, or rather career learning experiences, provide much needed opportunities for children to learn more about the world of work.

Kolb's (1984) ELT was included here because of its premise that knowledge is created through the transformation of experience. Experiential learning theory suggests that learning through experiential activity can provide the context for career development learning to take place. In particular, it offers potential for the preparation for real-world tasks that will be faced in adulthood (Schultheiss, 2008). More importantly here is the suggestion that direct, simulated, and vicarious experiences can help children to connect school-based learning to the tasks they will undertake as adults (Schultheiss). Connecting school-based learning to career information is

critical if we wish to establish the foundation for lifelong career development during these early developmental years. It would seem that providing children with meaningful career learning experiences is one way to assist them achieve childhood career developmental tasks (Super, 1990; Super et al. 1996) described in chapter 2. The challenge for the current research was to combine these learning prerequisites that Vygotsky (1978) and Kolb (1984) identified within a computer-based intervention that also conforms to multimedia learning principles.

From the information reviewed, it is clear that technology is beneficial to children's learning if used appropriately (Keengwe & Onchwari, 2009). Smeets (2005) supports this view and draws attention to the need for technology-supported learning environments in early childhood and elementary education. According to Mioduser et al. (2000), children seem to benefit from computer-based work not only at the specific skills level, but also as a result of their improvement in academic achievement in terms of motivational and self-confidence levels. The major challenge facing teachers today is how to effectively integrate technology to help students learn and become actively involved in the teaching and learning process (Bauer & Kenton, 2005). A critical issue related to technology use is that technology should not drive instruction. Technology remains a tool that supports learning (Keengwe & Onchwari). Tools are extensions of our human capability (Forcier & Descy, 2002); tools alone do not function until they are used properly. Therefore, it is important to understand that, although technologies allow students to work more productively than in the past, the teacher's role in modern technology-rich classrooms is more demanding than ever (Keengwe & Onchwari). Chapter 6 provides a detailed description of how these learning theories informed the development and design of the GCBC™.

Common to all of the theories reviewed (i.e., child development theory, career development theory, and learning theory) are the processes of encouragement of effort, self-

evaluation, and planning for children's growth through providing increasingly more complex tasks. What is evident here is that career learning tasks need to be varied, require a range of skills, and they need to allow for successful problem solving (Magnuson & Starr, 2000). Considering all the contributions summarised above, it is clear that in order to create more engaging and effective learning experiences for all types of learners, program developers must deepen their understanding of the ways that factors such as learning style, developmental stage, and contextual factors influence user preferences for particular types of interactive digital learning activities.

Conclusion

Programs that introduce elementary school children to the world of work and that help them to understand the connection between what they are learning in school and what is expected in the work world are integral to promoting lifelong learning, a productive educational environment, and future successful transitions from school to work life (Schultheiss, 2008). According to this view, it is imperative to provide learners with a variety of developmentally appropriate opportunities for career awareness, career exploration and the development of life career planning skills (Magnuson & Starr, 2000). In today's ever changing school environment, technology provides an exciting addition to a teacher's repertoire. However, successfully integrating technology into the classroom requires teachers to draw on their own experiences in learning with technology (Grabe & Grabe, 2007).

One of the most significant obstacles for designing intentional career development learning interventions lies in the fact that children's development is often unpredictable and it does not always conform to the parameters proposed in theory, especially in relation to how this learning is supposed to transpire. Despite this uncertainty, it remains paramount to begin the process of developing and designing age appropriate career interventions for children with

reference to the principles of learning found in theory. A common suggestion here is that learning activities must be able to accommodate a variety of learners at different stages of their development. However, as will be discussed further, career services that specifically target the developmental stage of childhood are limited at present and they lack policy support. This topic is the focus of the next chapter.

CHAPTER 4

CAREER EDUCATION: POLICY AND PRACTICE

We worry about what a child will become tomorrow,

yet we forget that he is someone today

(Attributed to Stacia Tauscher, 17th Century)

I decided to start this chapter with the above quote for two reasons. Firstly, the quote acknowledges the enduring societal concerns often expressed over the future of children, while it also implicitly recognises that despite such concerns this developmental stage is often overlooked in terms of age appropriate career education to facilitate development. The words clearly emphasise the relationship between today and tomorrow and that support, which may be lacking during these early years, could help children better prepare for their futures. Secondly, this quote could be directed towards all who have researched the career development of children. The quote indirectly reinforces a common theme in the career literature, namely that researchers frequently fail to translate career theory into practice (Porfeli et al., 2008; Watson & McMahon, 2008) and that most career development research has focused on adolescents as the adults of tomorrow rather than on the child of today. Yet facilitating career development during childhood is a critical aspect of lifelong career development (see Chapters 2 and 3 in this regard).

Research suggests that children begin constructing ideas about the future and making judgments about the suitability of various types of careers for themselves as early as four years of age (Trice & Rush, 1995). As childhood conceptions about work and careers are the precursors to adolescent career development and later exploration of the world of work, it is critical to expand our understanding of career development during the elementary and middle school years (Howard & Walsh, 2011). Further, the provision of career services (i.e., used here

as an umbrella term for a variety of career focused interventions including career development learning programs) within the school curriculum, the nature and availability of career development learning programs, and the nature and influence of public policy in supporting career development learning in schools also warrant consideration within the context of this study. Three main topics are thus discussed in the present chapter. Firstly the chapter considers the context of career programs for children. Secondly the chapter provides a description of career services within education policy. Lastly, the chapter provides an overview of available career education programs, making a distinction between classroom-based and computer-based programs.

The Context of Career Programs for Children

There is an increasing need for relevant, timely, and more comprehensive career development and education programs throughout all stages of development (Feller et al., 2005). Feller et al. contend that, despite differences in cultures, religions, economies, political systems, and education structures, "many countries face similar challenges when designing and implementing career development programs" (p. 36). The need for career programs emphasises the related and urgent need for research that can inform the development and design of early career programs which can help children develop a meaningful understanding of the relevance of school-based learning to their future careers (Johnson, 2000). Hartung et al. (2008), in an article which focused on career adaptability in childhood, suggested that "children must accrue an array of experiences that promote foundational attitudes, beliefs, and competencies for envisioning a future, making career decisions, exploring self and occupations, and shaping their life careers" (p. 63). These experiences are critical in facilitating children's career development and, as such, they could provide a potential link in bridging the gap between career theory and practice.

It is clear that there has been an increasing focus on career development throughout most levels of formal education (Brolin & Loyd, 2004; Gillies, McMahon, & Carroll, 1998; Lapan, 2004). However, there is considerable discrepancy within education systems in which policy makers and curriculum developers struggle to develop, design and implement career education programs. A lack of interdisciplinary collaboration further compounds the situation and has contributed to a lacklustre approach in the design of career education programs (OECD, 2004a,b). Traditionally there has been some separation between the roles of career researchers, program developers and educators. Career researchers have focused on the theory that describes career behaviour, program developers on the development and design of program content that conforms to predetermined learning parameters, and educators on delivering curriculum content through direct interaction with learners. These three groups of practitioners have largely existed in isolation from each other. Considering the growing need for a comprehensive, cohesive approach to career theory, practice, and research (Watson & McMahon, 2008), it seems timely to move beyond divisive and fragmented boundaries and to attempt to develop a collaborative approach that calls on the skills and expertise of each of these three subdisciplines. This would move us closer to answering the call for action rather than reaction in the career literature (Watson & McMahon).

Times have changed in terms of the demands placed on children, particularly given the technological advances and changes within education systems (Grabe & Grabe, 2007). The profile of career education[7] has in recent years been raised significantly in political discourse as playing an important role in improving economic competitiveness (Harris, 1999). However, according to the latter author, career education has not been a focus of much educational analysis

[7] Career education refers to a planned program in the curriculum that provides learners with the knowledge and skills for planning and managing their careers.

despite the fact that changes in the world of work have increased the importance of careers education and career guidance[8] services (Patton & McMahon, 2001). Thus the necessity to research and intervene in children's career development is currently acute (Hartung et al., 2008), with a major focus recently directed towards career development learning within the context of lifelong learning (see Chapters 2 and 3 in this regard). Such career development learning refers to a range of activities that enable individuals of any age and at any stage in their lives to identify their capacities, competences and interests in order to make educational, training and career decisions. Career development learning also facilitates the development of competencies that assist individuals to manage their life paths in learning, work and other settings (Council of the European Union, 2004).

Countries in the Organisation for Economic Co-operation and Development (OECD) and the European Union currently implement lifelong learning strategies, as well as develop policies that encourage the development of their citizens' employability (OECD, 2004b). There are, however, challenges in providing access to and improving the nature, level, and quality of career development services. Gaps in access to career development learning are particularly evident at the elementary education level (OECD). In addition, career services are largely available to a limited number of specific socioeconomic or population groups, at fixed points in the lifespan, and are focused on immediate decisions (Harris, 1999; Turner & Lapan. 2005).

The OECD and the European Commission have conducted major reviews of national career guidance policies linked to the provision of career development learning services throughout the world (OECD, 2002b). A number of common themes have emerged from these reviews concerning deficiencies in national career guidance services. The theme most relevant to

[8] Career guidance, on the other hand, refers more broadly to personalised help from specialist advisers to identify long-term goals and plan steps to attain these goals.

the present research is the risk of career education and guidance in schools being subsumed and marginalised, firstly within secondary schools and adolescent samples, and secondly within broader educational concepts (OECD), mainly because career development learning objectives are weakly reflected in policies for education, training and employment in most countries (OECD, 2004b).

To strengthen the impact of career education within educational policies, Collin and Watts (1996) emphasised the need for career guidance services to be integrated within a learning framework. They advocated that the role of career education within educational systems needs to be strengthened and recast as the foundation for lifelong career development. Furthermore, within career programs more attention needs to be paid to constructivist approaches (i.e., helping individuals to develop their subjective career narratives). Given the diverse stakeholders that have a vested interest in education and in children's development, a collaborative approach between career researchers, program developers, and educators is needed to appropriately inform career learning program design and to ensure effective application of theoretical models within structured career learning programs. It has also been suggested that career practitioners and policymakers need to form strategic alliances so that policy commitments relating to the provision of quality career services are enhanced (OECD, 2003). The question that needs to be answered is: what is the current state of education policies relating to the provision of career services?

Career Services within Education Policy

One of the main settings for delivering career education and guidance services has been the school and, indeed, that is where children are most likely to first experience formal career guidance (Sultana, 2004). Policies for career guidance and career information have attracted

considerable international attention and have been investigated by the OECD, the European Union and the World Bank in 37 countries (Watts & Sultana, 2004). Despite this attention, policies relating to the delivery of career services[9], both nationally and abroad, have seldom been researched and studies that have focused on the implementation of such policies are particularly lacking (OECD, 2003).

In order to better understand the nature of career services offered within educational systems worldwide, an overview of existing policy on career services within education is needed. For the purpose of the present research, trends in policies related to career education and guidance are reviewed because they are often seen as complementary services. Within this overview of policies attention is drawn to the positioning of career development learning programs within broader international and national education policies. This discussion will firstly examine international policies and then narrow its focus to an overview of national career education policy as it pertains to the South African context.

International career education and guidance policy

Career education and guidance are not new or fixed concepts but rather concepts that have been redefined, reconceptualised and re-presented in educational debates in times of changing social, political, economic and cultural contexts (Harris, 1999). These contextual changes, both in scale and depth, have been a constant feature of the education world but the 1980s and early 1990s saw a particularly radical and sustained period of change which affected all sectors of education. According to Harris, during the 1990s governments world-wide viewed career guidance as a means of reducing student 'drop out' rates, with career education seen as improving the performance of both students and schools. Despite this positive perspective, career

[9] 'Career services' will be the preferred term used from this point on in the chapter to describe both career guidance and career education programs.

services continued to be marginalised to a large extent and it was only during the latter part of the 1990s that career services were seen as part of required schooling in many countries.

At present, few governments have the data available that would provide a holistic picture of career development learning services or of its effectiveness in meeting public policy objectives. A possible explanation for this, according to Watts (2005), could be that most developed countries are in the midst of a paradigm shift in the nature of work and career. The pace of technology and globalisation means that organisations are constantly exposed to change (Watts & Sultana, 2004). This situation calls for a reform of policies linked to the provision of career development learning and a reconceptualisation of such practice (European Centre for the Development of Vocational Training [Cedefop], 2008). Throughout OECD countries, for instance, a number of important policy directions are placing increasing demands on career information and guidance services. Amongst the most important of these demands is a growing emphasis on lifelong learning for all as well as active employment and welfare policies (Sweet, 2001). Given the onset of the concern for lifelong career management skills, the provision of career education and guidance is seen by governments as a key element within a raft of policy measures designed to promote a learning society (Hooley & Watts, 2011; Sultana, 2004).

Internationally, career services are now higher on the public policy agenda than ever before and in most countries policy makers regard career services as being of value not only to the individuals who engage with them but to society as a whole (Watts, 2005). However, the provision of career services is susceptible to policy changes and budgetary limitations. For example, England has recently reduced funding directed towards certain career services (i.e., Connexions Services) (see Watts, 2011) and Australia is reconsidering its plans for a national career development strategy (National Career Development Strategy Green Paper, 2012). These

developments can have major implications (both positive and negative) for the manner in which career services are provided throughout various institutions, and for the impact of such career services in addressing public policy goals.

From these recent developments it appears that, although policy makers see the value of career development services as Watts (2011) claims, the provision of these services is largely dependent on the availability of political support and subsequent funding directed towards this initiative. The recent recession has also complicated the provision of career services worldwide because countries are primarily focusing on finding the best way to revive growth and to find ways to stimulate the flow of money again (Rajan, 2012). Unfortunately, this tendency has made us think narrowly precisely when we need to be planning for the longer term (Simpson, 2009). For example, American states are now looking to public higher education as a place to find budget savings rather than as a necessary investment for future economic well-being (Simpson). One could argue that ongoing investment in education is exactly what is needed to optimally develop students and prepare them for these types of challenges faced in later life. Even more important would be to introduce career services within early education to facilitate the development of age appropriate career skills to better prepare learners for the often unfamiliar world of careers.

Despite countries attempting to formalise career development services within policy statements, it is difficult to demonstrate the direct impact of careers education, information, advice and guidance (CEIAG) support activities given that the behaviour of individuals is complex and subject to a variety of interacting factors (Hughes, 2011). Research evidence demonstrates clearly that career services and career support activities can and do make a significant difference in terms of learning outcomes such as increased self-confidence, self-

esteem, motivation, and enhanced decision making. There is also strong evidence that CEIAG supports significant participation in learning and educational attainment (Hughes). In earlier years, this was indeed a major consideration in the provision of career services (Australian Education Council, 1992). However, in recent years career services increasingly moved from focusing on traditional individual goals, to considering the broader societal context. In addition, career services have been seen to contribute to public policy objectives, which include making education systems more efficient, contributing to the improved efficiency of the labour market, and helping to improve social equity (OECD, 2004b). These public policy objectives are described below.

Policy makers expect career services to facilitate the achievement of three distinct public policy goals (Watts, 2005). According to Watts, these are: *learning goals*, including improving the efficiency of the education and training system and managing its interface with the labour market; *labour market goals*, including improving the match between supply and demand and managing adjustments to change; and *social equity goals*, including supporting equal opportunities and promoting social inclusion. These three goals have been used as a framework to monitor career services throughout the world. Subsequently, it has been noted that the precise nature of these three sets of goals, and the balance between and within these goals, varies across countries (OECD, 2008). As a consequence, these goals are currently being radically reframed in the light of policies relating to lifelong learning, and they are becoming linked to emerging labour market policies and the concept of sustained employability (Watts, 2005; Watts & Sultana, 2004). For example, the *Right to Vocational Guidance* forms part of the European Social Charter published in 1996. Particularly relevant to the present study is the call for career

services to be made available to school children. Below is an extract from this charter that emphasises this point:

> With a view to ensuring the effective exercise of the right to vocational guidance, the Parties[10] undertake to provide or promote, as necessary, a service which will assist all persons, including the handicapped, to solve problems related to occupational choice and progress, with due regard to the individual's characteristics and their relation to occupational opportunity: this assistance should be available free of charge, both to young persons, including school children, and to adults (Council of Europe, 1996, p. 9).

The international focus on lifelong learning is evident from the inclusion of 'school children' in this statement and positions the provision of career services at the very start of lifelong learning. Although not specifically mentioned in the initial charter, the age range that constitutes the 'school children' period is lacking. However, a subsequent report compiled by the Cedefop (2005, p. 13) clarifies the statement by emphasising the fact that all citizens have a right to access career services "at any point in their lives". Effective career services are thus seen as the key to making lifelong learning a reality for all. According to the OECD (2008), such services can help to make the best use of human resources in the labour market as well as in education by allowing better matches between individuals' skills and interests and available opportunities for work and learning. For the purpose of the present research only learning goals (i.e., thereby excluding previously mentioned labour market and social equity goals) are specifically examined because these goals address policies relating to education and are fundamental to achieving labour market and social equity goals.

[10] The Council of Europe includes 47 countries including the United Kingdom, France, and Germany.

An overview of education policy relating to career services reveals that most Western countries are still in the process of establishing well-defined parameters for including career services within existing school curricula (OECD, 2004a). Attention devoted to career services within the school curriculum has been growing but it varies considerably from country to country (OECD) and at times these services seem designed to suit the organisational needs of the school rather than the career development needs of the student (OECD, 2004b). Three broad patterns of career services within education can be distinguished by reviewing current policies. These are: career programs that are run as a separate course; career programs that are included, for example, as one strand of a course in personal, social and health education, or in social studies; and career programs that are sited within most or all subjects across the curriculum (OECD, 2004a).

At present, career services are largely available to limited population groups, at fixed points in the lifespan, and are focused on immediate decisions (i.e., such as school subject choices) (OECD, 2002b). This represents a restricted focus for career services and stands in conflict with the need to expand these services to benefit a wider community (see, for example, Flederman, 2008). The future challenges for effective implementation of career services are to make a shift so that such services focus on developing age appropriate career development skills and to make career services universally accessible throughout the lifespan through intentional and unintentional learning experiences, in locations and at times that reflect more diverse client needs (OECD). In attempting to address the difficulty of bridging the gap between policy and practice, the United States of America (see National Career Development Guidelines [NCDG]: National Occupational Information Coordinating Committee [NOICC], 1989), Canada (see Canadian Blueprint for Life/Work Designs: Haché, Redekopp & Jarvis, 2000; Jarvis & Richardt, 2000) and Australia (see The Australian Blueprint for Career Development [ABCD]: Ministerial

Council on Education, Employment, Training and Youth Affairs [MCEETYA], 2009) have invested considerable effort in the development of guidelines that can be used in designing country specific career education and guidance services.

The documents highlighted above constitute three distinct frameworks for career management skills and represent the output of a series of interlinked policy initiatives in the USA, Canada and Australia (Hooley, Watts, Sultana, & Neary, 2012). These initiatives sought to create a competency framework that articulates the concept of career management skills for a range of audiences (careers workers, policy-makers, teachers and end users). These documents, the *NCDG (*NOICC, 1989) the *Canadian Blueprint for Life/Work Designs* (Haché et al., 2000; Jarvis & Keeley, 2003; Jarvis & Richardt, 2000) and the *ABCD* (MCEETYA, 2009), are briefly described below.

The Blueprint framework has its origins in the USA, as the National Career Development Guidelines (NCDG) (NOICC, 1989). The NCDG is a framework for building a comprehensive career development program and for incorporating career development concepts into the classroom. Using the NCDG framework, career development professionals, school administrators or community leaders can create high-quality career development programs that, according to its developers: help students acquire skills they will need to move successfully to college or a job after high school graduation; help students achieve more by linking classroom study to future choices; and help adults acquire new skills and move through career transitions (America's Career Resource Network, 2012).

Based on this framework, the Canadian Blueprint for Life/Work Designs has been refined and modified for use in the Canadian setting. The Canadian Blueprint for Life/Work Designs (similar to that found in the United States) is a common framework of career development

competencies that students and adults in Canada need to master in order to be successful and self-reliant in planning and managing their careers in a rapidly changing, knowledge-age labour market (Jarvis & Richardt, 2000). A practical resource designed for career professionals, the Blueprint emerged from a partnership project of Canada's National Life/Work Centre, Human Resources Development Canada, and the Canada Career Information Partnership. The Blueprint outlines the skills, knowledge and attitudes that play integral roles in the unfolding of life/work designs, and it traces their growth and development from childhood through to adulthood (Jarvis & Keeley, 2003).

The ABCD is modelled on the Canadian Blueprint for Life/Work Designs and was modified to suit the Australian context. The core of the Australian Blueprint draws heavily on the Canadian iteration and is essentially a restatement of it, with some rewording (Hooley et al., 2012). It also acknowledges the American NOICC. The primary aim of the ABCD is to enable teachers, parents, career development practitioners, employment service providers, employers or others who are in a position to support people's careers and transitions, to work with a nationally consistent set of career management competencies which will help all Australians to better manage their lives, learning and work (MCEETYA, 2009). The ABCD is also a framework that can be used to design, implement and evaluate career development programs. At its core, the ABCD identifies the skills, attitudes and knowledge that individuals need to make sound choices and to effectively manage their careers (MCEETYA). A major contribution of the ABCD is its emphasis on age appropriate career competencies which provide parameters for the design and implementation of career programs at different educational levels.

From the information provided it is clear that the distinctions between the three policy documents are subtle, although a different philosophy appears to underpin the American version.

This version focuses more on the acquisition of employability skills which address the transition to and maintenance of employment, whereas the Canadian and Australian frameworks focus more broadly on the development of individuals in their life and work (Hooley et al., 2012).

Both the Blueprint for Life/Work Designs and the ABCD offer a set of competencies and skills required for effective career management and present these within an understanding of the developmental tasks required to successfully progress through career development stages. These competencies and developmental indicators provide program developers with much needed insight into what is needed in career learning programs and they proved critical in the development and design of the Growing Up: Children Building Careers™ (GCBC™) as discussed in Chapter 6. Despite having these sets of guidelines and parameters regarding age appropriate career competencies, the development and design of age appropriate career development learning resources (within the context of policy and curriculum statements) remains a challenging task.

At present there are few countries, according to the researcher, that have been able to successfully translate policy statements relating to career services into effective and manageable curriculum statements. The major reason for this is that policy relating to career services covers such a broad field that it often overlooks the developmental stage of childhood. What is particularly evident in the information presented in this chapter is the lack of information available about career services for elementary school children. Although many governments have explicitly identified career services as an essential component of mainstream schooling, indications suggest that the career development needs of elementary school children remain largely unmet (Whiston, 2002). Citing large student-to-counsellor ratios in elementary schools that employ school counsellors and the total absence of career education and guidance in other

elementary schools, several authors have questioned whether school programs are actually meeting the needs of all students comprehensively (Green & Keys, 2001; Schultheiss, 2008). Internationally this is a significant concern that requires action if the impact of early career development learning experiences on children's career development is to be acknowledged. Closer to home, there has been considerable movement regarding the provision of career services within a lifelong learning context. This is evidenced by the fact that the Department of Education in South Africa (DoE, 2002) has recently included the early orientation of all learners to the world of work as a means of redressing the historic inequalities of the legacy of apartheid.

South African career education and guidance policy

Education reform has been a priority in South Africa since the establishment of the Government of National Unity in 1994 and it has played a key role in redressing the injustices of apartheid (OECD, 2008). According to an OECD (2008) review, through the National Education Policy Act of 1996, the Minister of Education sets the political agenda and determines the national norms and standards for education planning, provision, governance, monitoring and evaluation. The nine provincial departments of education in South Africa are responsible for implementing education policy and programs aligned with national goals. These provincial authorities make funding decisions and exercise executive responsibility for all general education and training (GET) from grade R (or grade 0, the reception year), through grades 1 to 3 (the Foundation Phase), grades 4 to 6 (the Intermediate Phase), and grades 7 to 9 (the Senior Phase), as well as for further education and training (FET) from grades 10 to 12 and for formal adult education and training (AET).

Impressive progress has been made in education legislation, policy development, curriculum reform and the implementation of new ways of delivering education, but many

challenges remain, such as student outcomes and labour market relevance (OECD, 2008). Since 1994, the government has worked to transform all facets of the education system (DoE, 2002). The fragmented and racially duplicated institutions of the apartheid era have been replaced by a single national system including nine provincial subsystems (OECD, 2008). Consistent and persistent efforts have been made to make education structurally accessible to all who were previously denied or who had limited access to compulsory schooling.

The *Lifelong Learning through a National Curriculum Framework* (1996) document was the first major curriculum statement of a democratic South Africa (DoE, 2002). It was informed by principles derived from the White Paper on Education and Training (1995), the South African Qualifications Act (No 58 of 1995) and the National Education Policy Act (No 27 of 1996). The White Paper emphasised the need for major change in education and training in South Africa in order to normalise and transform teaching and learning (DoE). Key statements of the White Paper on Education and Training (1995) on career education and guidance have been highlighted below.

The first of these curriculum statements that has a particular bearing on career development refers to *Values and Principles of Education and Training Policy* and the need to diversify the national curriculum in order to better prepare learners for the future. In particular, Point 18 states that*: "Curriculum choice must be diversified in order to prepare increasing numbers of young people and adults with the education and skills required by the economy and for further learning and career development"* (DoE, 1995, p. 18).

The second curriculum statement that focuses on career development has been grouped under the heading of *Developmental Initiatives* and refers to the need to link education and the world of work. What is particularly important here is the fact that early childhood is explicitly

recognised in this statement as a demarcated developmental stage where career services are necessary (i.e., as summarised in the following extract):

> *... the need to deliver education services to neglected adult, youth and early childhood constituencies, to rewrite curricula and textbooks, link schooling and the world of work, restructure governance systems, upgrade the professional competence of teachers, gear learning outcomes to the country's reconstruction and development agenda, and much more* (DoE, 1995, p. 19).

Unfortunately, as with many policy statements, these two statements are broad and offer few guidelines on how to accomplish their stated goals. This is generally true for career education as a whole in the South African context (Akhurst & Mkhize, 2006). Still, significant progress has been made and career development learning has for the first time been recognised on a national level (DoE, 2002). In South Africa, the education curriculum aims to develop the full potential of each learner as a citizen of a democratic South Africa by focusing on experiential learning, one of the major learning theories discussed in Chapter 3, through outcomes-based education (DoE). These outcomes encourage a learner-centred and activity-based approach to education. Career development has recently been included in the general curriculum, thereby emphasising a shift towards better career management across the lifespan. The Revised National Curriculum Statements for Grades R to Nine (DoE, 2002), which also covers the grades at an elementary school level, has for the first time translated the policy statements of the White Paper on Education and Training (1995) to include a career development focus.

According to the Department of Education (2002), the orientation of children to the world of work is included in the curriculum from a young age as all learners in the General Education

and Training (GET) band require a general orientation to work and further study, whether they intend to enter employment or study further. The premise for the early exposure of learners to the world of work lies in the fact that all learners at the end of the GET band must make career and study choices that will affect their future. In order to make such choices, learners need career information from a range of learning areas (DoE, 2002) which will encourage the development of career information and planning skills, self-knowledge, general work and further study, and work ethics. Some authors have argued that there could be information overload without the accompanying support to help learners select and interpret what they need (Flederman, 2008). Support, in the form of structured career services or experiential career learning activities, is needed in helping learners to access, make sense of and integrate a range of career learning experiences and information into realistic career plans. Currently little support is available and the range of support needed by most learners to help bridge from school to further study or work is often complex, time- and resource consuming and extends beyond the bounds of traditional models of career education and guidance (Flederman).

Clearly the important role that schools and educators fulfil in redressing historic inequalities cannot be overlooked. It is important to ensure that schools are not considered by children as places without hope, but rather as the route to a meaningful career and, consequently, a rewarding place in society (OECD, 2008). Therefore, better links and partnerships between education and the world of work should be ensured. One of the methods that can be used to establish this link is through appropriately designed career learning programs informed by career theory and utilizing best practice principles found in both education and program development. Such a program is discussed in greater detail in Chapter 6 of the present research.

A summary of career services within education policy

The reason for the current limited focus on career services could be that, despite national and international pressure for wider community access to career services, recent OECD surveys and subsequent reports (i.e., OECD, 2002a,b, 2003, 2004a,b, 2008) reveal weaknesses in the organisation and delivery of career information, guidance and counselling (Flederman, 2008; Sweet, 2001). A key challenge facing present governments is to significantly widen access to these career services in an affordable way while maintaining the quality of such services. In middle income countries (but also elsewhere) there is much evidence of "policy borrowing", in terms of strategies, tools, resources and training (Watts & Sultana, 2004, p. 105), mainly because of the lack of resources (both physical resources and skilled officials) that can be dedicated to the development of new policies and programs. What becomes particularly challenging is the translation of these 'borrowed' policy statements into curriculum statements which can be used to position career services as a prerequisite for the holistic development of children.

As discussed earlier, schools are strategically positioned to provide the foundation for career learning experiences to all young people (McMahon & Carroll, 2001). In a rapidly changing sociopolitical environment, schools remain a constant where a foundation in career guidance can be provided through systematic programs of career education. What is evident from the above overview of education policy is that most countries acknowledge the importance of early intervention with regards to career services. However, despite this widespread acknowledgement, career practitioners remain confused by the way career services are perceived by their governments (Law, 2006b). According to Law, policy developers seem unimpressed by the claim that well-positioned career guidance supports economic well-being, thus ignoring a broad, global consensus on how careers education and guidance is best conducted (Watts &

Sultana, 2004). Furthermore, by not introducing career programs before adolescence, valuable opportunities for teachers and schools to influence the process of career development are missed (McMahon & Carroll).

Recent reviews, including those of Cedefop (2008), the Organisation for Economic Co-operation and Development (2004a), and a review conducted by Watts and Fretwell (2004), have examined the current provision of career services. These reviews demonstrate that no country has yet developed an adequate lifelong guidance system (Watts & Sultana, 2004). However, all countries reviewed did have examples of good practice. Across a diversity of countries these examples indicate what a career education and guidance system might look like, while recognising that there would be different forms of content in different countries.

The goal is for career services to become part of mainstream schooling, embedded within education policy, and supported by researchers and program developers to ensure effective delivery of age appropriate career education programs. In fact, it has been suggested that an effective educational curriculum is one that infuses career-building competencies throughout the school program to encourage integration from all subject learning areas (Schultheiss, 2008). Table 1 contains an example of these competencies as outlined in the ABCD (MCEETYA, 2009). Only competencies that pertain to elementary school children (Phase 1) have been listed in the table.

Despite the varying degrees of career service provision mentioned above, there are a number of career education programs available that aim to close the gap between policy and practice. It is essential to introduce the next subsection of this chapter with a clear definition of what constitutes a career development program.

Table 1

Career Competencies for Children (Phase 1) as listed in the ABCD

AREA A: PERSONAL MANAGEMENT	**COMPETENCY 1**	**Build and maintain a positive self-concept**
	PHASE I	Build a positive self-concept while discovering its influence on yourself and others
	COMPETENCY 2	**Interact positively and effectively with others**
	PHASE I	Develop abilities for building positive relationships in life
	COMPETENCY 3	**Change and grow throughout life**
	PHASE I	Discover that change and growth are part of life
AREA B: LEARNING AND WORK EXPLORATION	**COMPETENCY 4**	**Participate in lifelong learning supportive of career goals**
	PHASE I	Discover lifelong learning and its contribution to life and work
	COMPETENCY 5	**Locate and effectively use career information**
	PHASE I	Understand the nature of career information
	COMPETENCY 6	**Understand the relationship between work, society and the economy**
	PHASE I	Discover how work contributes to individuals' lives
AREA C: CAREER BUILDING	**COMPETENCY 7**	**Secure/create and maintain work**
	PHASE I	Explore effective ways of working
	COMPETENCY 8	**Make career enhancing decisions**
	PHASE I	Explore and improve decision-making
	COMPETENCY 9	**Maintain balanced life and work roles**
	PHASE I	Explore and understand the interrelationship of life roles
	COMPETENCY 10	**Understand the changing nature of life and work roles**
	PHASE I	Discover the nature of gendered life and work roles
	COMPETENCY 11	**Understand, engage in and manage the career building process**
	PHASE I	Explore the underlying concepts of the career building process

According to the Australian Blueprint for Career Development (ABCD) (MCEETYA, 2009), a career development program encompasses the development of knowledge, skills and attitudes through a planned program of learning experiences in education and training settings. Such a program should assist learners to make informed decisions about learning, work, and life options, as well as support them to participate effectively in life, work, and learning throughout their lifespan (MCEETYA). Examples of such programs will now be described.

Career Education Programs

School-based efforts to prepare students for career-related developmental tasks, including career choices, have been part of mainstream schooling since the 1970s (Akos, Charles, & Orthner, 2011). More recently, career education within the elementary school years has received increasing support and it is regarded as an important step towards preparing children for the transition from school to work (Ediger, 2000). In the present times more elementary schools are striving for career education outcomes, as curriculum planners link school-to-work concepts with authentic classroom learning experiences and it is increasingly understood that associating classroom learning with the environment helps children connect their textbook lessons with the real world around them (Gallavan, 2003). This supports the view of Magnuson and Starr (2000) that the elementary school years are not too early to begin to achieve a vision of what one desires to do in life. However, without career education many children may hold unrealistic perceptions of careers due to a lack of knowledge and poor career development skills.

Career education does not encompass a finite list of easily assessable outcomes that teachers can include conveniently into one lesson plan or unit (Gallavan, 2003). According to Gallavan, everything that teachers do in their classrooms every day contributes to young learners' knowledge and skills for understanding themselves, one another, and the interconnectivity of the world around them. Because school is the time and place to prepare children for their futures as happy and successful citizens who work, play, learn, and live in the worlds of tomorrow, teachers need to find meaningful and authentic teaching strategies to support and model effective decision making in the ever changing world of today (Charney, 1992; Todd & Mason, 2005). Well-designed career education programs can provide the platform

for presenting these intentional career learning experiences within a structured learning environment.

Starr (1996) suggests that children must be provided with a systematic process that will enable them to develop sound educational and career plans. This process must ideally include four key considerations. Firstly, extensive career awareness activities should begin at the elementary school level centred around concepts such as exploring careers, self-knowledge, decision making, understanding and getting along with others, learning about family responsibilities, learning about school, and good work habits. Secondly, further career exploration and planning activities need to be assimilated into the curriculum that will provide the basis for making sound career choices, such as learning more about career paths and job clusters, learning more about individual interests and aptitudes, steps in making decisions, and planning for further education and training. Thirdly, the intervention must include activities that will assist children to increase their knowledge of self and others and that will help children to know what is important to them, to respect the opinions of others, and to effectively communicate feelings. Lastly, age appropriate career programs must broaden knowledge of the changing world and how this will impact on educational and career planning, effective decision-making skills, and the enhancement of life-coping skills (Starr). Thus the school system is expected to play a central role in the delivery of career services, especially in terms of connecting school-based learning with information about the world of work.

Although children are not expected to make premature decisions regarding an anticipated career path, there is a need to provide them with career exploration activities that will assist them in thinking about possible career interests and the interrelatedness of the world of work (Beale 2000). School curricula that offer opportunities for children to make connections between

classroom activities and future work roles are essential building blocks for facilitating the acquisition of age appropriate career skills (Zunker, 2006). However, as will be discussed later, career programs that specifically target the developmental stage of childhood are limited.

Of those programs available, a distinction can be made between structured, facilitator driven career interventions, for example, the *Missouri Comprehensive Guidance Program* (MCGP) (Gysbers, Stanley, Kosteck-Bunch, Magnuson, & Starr, 2008) and *The Real Game Series* (Barry, 2001), and computer-based career programs which are less reliant on a facilitator, for example, *Paws in Jobland* (CASCAiD, 2011). Both the MCGP and The Real Game Series have been included in this review because of their relative long standing in the provision of career services to school-going learners. Paws in Jobland, on the other hand, has been included because it was developed as a computer-based career information resource from the outset and it reflects recent advances in the use of computer technology to support career guidance. These three programs, representing the two categories of career programs identified, are described below.

Career programs

Missouri Comprehensive Guidance Program (MCGP)

Career programs often focus on assisting children to acquire a better understanding of themselves in relation to the world of work and to develop a greater understanding of the diversity of life roles in which individuals engage on a daily basis (Gillies et al., 1998). An example of a school-based program designed to help learners in making decisions about their educational and personal lives is the *Missouri Comprehensive Guidance Program* (MCGP) (Ellis, 1990; Starr & Gysbers, 1988). Understanding the important contributions school counsellors make in responding to a wide array of psychosocial challenges in schools in

Missouri, the Missouri Department of Elementary and Secondary Education undertook the development of the MCGP in 1984 (Gysbers, Lapan, & Blair, 1999). The goal of the MCGP was to refocus and redirect guidance activities and to develop guidance and school counsellors' work within a program framework.

The MCGP is designed to assist school districts to meet the challenges of providing students with: extensive career awareness, career exploration and career planning activities; increased knowledge of self and others; broadened knowledge of the changing world; decision-making skills; enhancement of life-coping skills; and systematic educational and career planning (Starr, 1996). According to Starr, the MCGP is a competency-based program that provides a balance of direct and indirect services and activities. The MCGP provides school districts, and the administrators and counsellors responsible for guidance (K-12), with a vehicle that makes guidance accountable and in turn provides maximum benefits to students, parents or guardians, and the community (Gysbers et al., 2008).

The MCGP has three program elements (Gysbers, Hughey, Starr, & Lapan, 1992). The first element is the content of the program which contains the student competencies that need to be achieved and it is organised around three areas, i.e. knowledge of self and others, career planning and exploration, and educational and career development. The second element describes the overall organisational structure of the program. It consists of six structural components, four program components, and suggested allocations of counsellor time for each of the program components. Finally, the last element includes the resources required to implement and manage the program (Gysbers et al.). For the purposes of the present research, only the program content and its methods of delivery, particularly for the elementary school years, are described. Nevertheless, a brief overview of the later stages of the MCGP has been included as a

means of understanding the developmental focus of the program. Specific attention is paid to sections of the MCGP where career guidance is referenced.

The guidance curriculum includes the competencies to be developed by all students throughout the K-12 years of schooling and the activities to assist them to achieve these competencies. It is developmental by design and includes sequential activities organised and implemented by professional school counsellors with the active support of parents or guardians, teachers, administrators, and the community (Gysbers et al., 2008). The MCGP consists of a number of individual lessons that are grouped into twelve categories that deal with career-related tasks. Its characteristics are similar to other educational programs and include several experiential learning activities (focused on achieving a number of career competencies) conducted on a regular, planned and systematic basis. The content element of the program consists of student competencies grouped into the three areas of career planning and exploration, knowledge of self and others, and educational and vocational development (Gysbers et al., 1999).

Classroom presentations (for example, professional school counsellors in collaboration with educational staff members are involved in facilitating guidance curriculum activities in classrooms) and large-group presentations (for example, professional school counsellors present career days or other similar type activities for big groups of students) are used to help students achieve the guidance competencies (Gysbers et al., 1992). At the elementary school level, MCGP helps children master the skills and develop the attitudes necessary to be successful, such as decision making, exploration of educational and occupational possibilities, interpersonal communication and self-concept development (Gysbers & Lapan, 1994).

In middle high school, MCGP focuses on the rapidly changing needs of young adolescents. The program emphases begun in elementary school are adjusted to fit the special needs of these older students. In addition, students begin to consider the future beyond high school with a four-year plan that covers graduation requirements and takes into account students' interests and career plans (Gysbers & Lapan, 1994). In high school, the MCGP assists students to become responsible adults who can develop realistic and fulfilling life plans based on clear understandings of themselves and their needs, abilities, interests and skills.

Clearly, it is evident from the review of the MCGP that the inclusion of the word ‘comprehensive’ in the program name is justified. The MCGP not only provides a means of structuring career guidance within educational programs, it also supports the holistic development of children and adolescents, including social and personal development. However, having professional school counsellors manage the MCGP and its rollout severely limits the application of the MCGP to other countries and education systems. The main reason behind the limited generalisability of the MCGP is that most countries do not have a well-established system of school counsellors who can take responsibility for its implementation. This is particularly relevant to the present research when one considers that South Africa’s education system is characterised by limited access to skilled career counsellors, if available at all.

Although the MCGP might not be suitable for direct assimilation into non-American based education systems, there are important lessons and principles to be learned from the program. For example, a major benefit of the MCGP is its focus on measuring its impact and effectiveness in schools which is underpinned by a constant willingness to improve the guidance program. Empirical research conducted in the state of Missouri has shown that when professional school counsellors have the time, resources, and structure of a comprehensive guidance program

in which to work, they contribute to positive student academic, personal/social, and career development as well as to the development of positive and safe learning climates in schools (Gysbers et al., 2008). According to Gysbers et al. (1992), it is only through systematic evaluation practices that we can promote the development of accountable guidance programs. This clearly indicates that, whatever programs are developed and integrated into schools, ensuring systematic evaluation of the program is just as important as the program itself. This is even more necessary when the program developed is novel and specifically developed to fill an existing gap identified in research, limited in policy support, and lacking in practical exposure. One such novel program that has undergone considerable development is The Real Game Series (Barry, 2001).

The Real Game Series

The Real Game Series is a career education resource designed for young learners (Grades 3 to 12) that introduces learners to the world of work by helping them to develop an understanding of the options and opportunities available to them and the implications and importance of their choices (Barry, 2001). It presents a set of curriculum materials designed to bring interactive, experiential learning to classroom and group settings in order to increase students' perceptions of the relevance and importance of their school experience (Jarvis & Keeley, 2003). The Real Game Series is a useful step towards individual learning and career planning, and it includes school subject choices. It uses elements of role-play, group work and individual investigation in order to help students develop the knowledge, skills and attitudes they will need to assess and make decisions about further education and career options. The Real Game Series was developed in Canada and by 2007 ten countries, excluding South Africa, were offering programs from The Real Game series.

The Real Game Series (Barry, 2001) is a comprehensive, developmentally sequenced series of career building programs, set in the context of nonthreatening, engaging, fun, real-life adult situations that assist students in thinking through and determining life planning, choices, and challenges. In the process, students learn to appreciate the relevance of their school courses, and they learn and practice the career management skills needed to achieve goals. According to information published on its website, the Real Game series enables students to: discover unique personal skills and talents with respect to life/work roles and relationships in community settings; build and reinforce a positive self-concept and develop positive relationships with others; see how school subjects and activities relate to future life and work roles; observe links between education and training achievements, and income and lifestyle options; explore a range of teamwork, problem-solving and communications skills, and develop effective work habits in the context of living and working in a community; explore diverse work and community roles and discover what aspects of these roles bring most satisfaction; explore links between work and broader life roles, including the dynamics of building, living in and contributing to a community; understand that a local community is part of the global economy; prepare to make good choices regarding family, school and community activities; and move forward into an uncertain future with hope, confidence and enthusiasm (Barry, 2001).

The Real Game Series offers role-playing scenarios in which groups of participants are transformed into communities of working adults (Barry, 2007). This enables participants to imagine and experience through role-play their possible future lives and livelihoods while learning and practising the Blueprint career building competencies. There are five Real Game Series programs available for students in Grades 3 through 12, as well as a program for adults. These programs are: *The Play Real Game* (Grades 3/4 plus - Ages eight plus), *The Make It Real*

Game (Grades 5/6 plus - Ages ten plus), *The Real Game* (Grades 7/8 plus - Ages twelve plus), *The Be Real Game* (Grades 9/10 plus - Ages fourteen plus), *The Get Real Game* (Grades 11 and 12 - Ages sixteen to eighteen), *Real Times*, and *Real Life* (Adults - Ages eighteen plus) (Barry, 2007). The Play Real Game program is of particular relevance to the current study as it specifically focuses on grades three and four learners.

The Play Real Game is divided into ten sessions presented in class. In this game children take on adult roles during which they learn about work/life skills and adult decision-making (see The Play Real Game in Department of Education, Training and Employment, 2002). According to information published on the website, children use their knowledge to create a town and identify and locate the services and businesses needed. Based on their 'role', children find work in their own neighbourhood and learn about hiring workers. Throughout the activities presented in class, children consider the benefits of a new business coming to their town. They prepare and rehearse a presentation about their town for a potential new business owner.

According to Barry (2007), a growing body of international research helps explain why The Real Game series is such a valuable learning tool. For example, *The Real Game: Evaluation Results* (Dimmitt, 2007) shows that students who played The Real Game experienced positive long-term learning outcomes. The 2004 OECD Report cites the Blueprint for Life/Work Designs and The Real Game Series among the most promising practices in the 36 countries studied (Barry, 2007).

In conclusion, The Real Game Series provides schools with a safe zone of proximal development (Daniels, 1996; Kozulin, 2004; Vygotsky, 1978) and is said to help transform the classroom into a temporary interactive community hub (Barry, 2007). This program also provides a practical, direct way to engage and share the rich, diverse knowledge and experience

of a community's adult work force. The Real Game also provides a new way for teachers and students to interact. Students become largely responsible for giving life to their learning because the more actively they imagine, the more engaging the play becomes. Concurrently, teachers become facilitators and catalysts, thereby more fully tapping into their own creativity and life learning.

The MCGP and The Real Game Series are both influential career programs and have contributed considerably to the field of career development. The Real Game Series in particular has in recent years attempted to make the transition from a hands on, in-class activity to the utilisation of technology as a learning resource. For example, The Real Game (focusing on children aged twelve to fourteen) is available in two formats: online, delivered in an IT suite with teachers accessing in-class presentational material and students accessing interactive worksheets; or hard copy, delivered in a traditional classroom using a PC and projector and students using hand outs (Barry, 2012). Although the online resource focuses on an older sample than the present study, it is still a valuable resource to include in the current overview as it provides some insight into similar types of career learning programs. As described later, online or computer-based career education programs that focus on the developmental stage of childhood are extremely rare. In The Real Game, students role-play as single adults in occupational roles. They see how schoolwork relates to career choices and therefore to lifestyle and income. Within their job-role, students have the opportunity to explore adult realities, such as budgeting (taxes, mortgage or rent, other bills and transport), work life balance, different work and family roles and career making decisions.

Clearly, the Real Game Series is moving in the right direction in terms of the criteria proposed for effective learning programs because it focuses on exposing children to intentional

career learning experiences while using the strengths of ITC in the classroom. As can be seen from its description above, the content of the Real Game specifically targets learners capable of processing increasingly complex forms of career information (e.g., the awareness of taxes) which would not be appropriate for younger learners. However, the use of technology in presenting increasingly complex and expanding information regarding careers allows vicarious learning to take place within a protected learning environment. One of the benefits of technology is its ability to manage vast amounts of information. The amount of information available today is increasing exponentially and so is the need to record it, process it, store it and share it with others (Bialobrzeska & Cohen, 2005). Computers, either alone or in combination with some other form of technology, provide the means to do all these things quickly and efficiently. It is with this in mind that computer-based career programs are described next.

Computer-based programs

Computer based career guidance systems have their origin in the late 1960s with early developers such as Donald Super (1970; Computer Assisted Counseling), Martin Katz (1988; New Technologies in Career Guidance, The Interactive Computer), and David Tiedeman (1968, 1970; who was involved in the development of the Education & Career Exploration System and Employee Development Planning System) viewing this technology as a means to operationalise their theories of career development, choice, and decision-making. Harris-Bowlsbey and Sampson Jr (2005, p. 48), in referring to these earlier systems, state that

> …it was their dream that users, through interaction with the system, would learn concepts of their theoretical positions, practice them as they made choices, and even incorporate them into their understanding so that future choices might be made without the support of the machine.

However, it was not until the last decade of the twentieth century that technology truly allowed for the development of user-friendly career programs. Global technologies are changing the way individuals learn about what they will do in life and individuals now have new ways of finding options for action, whether in their political, religious, consumer or working life (Law, 2006a,b). It is these technological advances that have opened the door to the development of new and exciting career programs within the education and career development environments.

Historically computer-based applications developed in the early 1990s were limited in terms of their application and function mainly because of the hardware and software technology available at that time. This made it challenging for most career guidance programs to achieve their true potential in the field of career development. With the introduction of the World Wide Web and the reduction in production costs of end-user technology, computer-based career programs have increased in popularity, allowing access to those individuals actively engaging in career development tasks (Grabe & Grabe, 2007; Harris-Bowlsbey & Sampson Jr, 2005). Research has demonstrated the positive effects of the use of these systems and web sites in order to increase self-knowledge, occupational knowledge, awareness of the need to plan, and career decidedness (Harris-Bowlsbey & Sampson Jr). However, according to the latter authors extant research has focused mainly on adolescent and adult populations, thus neglecting earlier career developmental stages. In addition, the emphasis has mainly been on the provision of career information and career assessment[11], with less attention given to the development of experiential programs, especially evidence based programs like the GCBC™.

[11] Career assessment, which includes interest inventories, ability rating scales, values inventories and the like, are available in a number of different formats including pen and paper as well as online, computer-based formats.

Computer-based career exploration programs are typically welcomed by children mainly because they grow up in the information age and are often computer literate and able to receive maximum benefit from using this medium (Turner & Lapan, 2005). However, technology, and in particular a computer-based career exploration tool, is by no means a quick solution. Nor is it the answer to the many obstacles already highlighted in this thesis when it comes to providing children with the necessary career information and experiences. What is important to note is that computer technology can be used appropriately or inappropriately and that it should be seen as a tool and not as a solution (Cooper, 2005). Therefore it is important to use a set of standardised guidelines when examining digital environments for children, just as one would for any other learning tool or experience designed for children (NAEYC, 2004). For example, children's skill in spelling, typing, spacing, punctuation, syntax, alphabetization, scanning, and tracking may vary (Busey & Doerr, 1993) and children in the same class at school may differ in their ability to decode, follow directions, and stay on task (Cooper). For learning to occur children need a previously existing knowledge and experiential base on which to scaffold new information if it is to have meaning for them (Mayer, 2003). Thus, for very young children who may have little experience with digital environments, an interface that mimics real life using graphics is supportive of a child's developmental needs. The most important realization here is that developmentally appropriate digital environments for children support both mastery of knowledge and growth (Cooper). It was therefore critical that the GCBC™ conformed to these parameters for program design and this is discussed in greater detail in Chapter 6.

It is at this stage also important to differentiate between two forms of computer-based career programs, namely web-based career programs (for example, online websites) and workstation-based (for example, standalone software applications). Depending on the resources

available (in terms of access to the internet, hardware requirements, and number of workstations), each of these categories provide access to a wealth of information and career learning opportunities.

Web-based (i.e., online) career education programs utilise the internet as the platform on which the various elements of the career program can be delivered. The global nature of the World Wide Web makes it possible to collect in one place a vast repository of knowledge in the field of career development, including theory, applications, best practices, research, tools and techniques (Harris-Bowlsbey & Sampson, 2005). This is a notable advantage as it provides easy access to vast amounts of career information with the only requirement being access to the internet. A potential pitfall of online career education programs is that not all learners accessing the information have developed the necessary skills needed to effectively use the information. This is particularly relevant in the present sample as the eight to ten year old learners still lack many of the career development skills, in addition to functional computer literacy skills, that would be expected to manage vast amounts of career information.

The other form of career program is workstation-based or standalone software applications. Here software, often referred to as an application, is installed on a workstation (for example, a computer in the classroom) and learners can access the information on the computer or the program can be presented to a larger group using a data projector. The benefit of workstation-based applications, according to the researcher, is that a facilitator can guide children through various steps involved in the program and the pace of exploration can be managed. The drawback of this format is that accessibility of the information by a wider population is greatly reduced because the program can only be accessed on computers with the installed software. The GCBC™ was designed as a workstation-based application because of the

need to involve a facilitator in the presentation of the program (this is described in detail in Chapter 6).

Although a number of web-based career programs exist, only programs that include a focus on the developmental stage of childhood were considered in this overview. One such career information program available on the internet is *Paws in Jobland,* a computer-based resource aimed at young learners. This program is described next.

Paws in Jobland

Paws in Jobland is a multimedia career and life skills development product for junior elementary school learners (Pace Career Centre, 2009). Simple images and descriptions of more unusual jobs, such as Colour Technologist or Copywriter, aim to broaden children's concept of the opportunities open to them in their future lives. According to the Pace Career Centre, this is the first product of its kind in South Africa to address the career education aspect in the Life Orientation learning area and it serves as an introduction to the world of work at a level that children can relate to.

Internationally, Paws in Jobland has been used as an online educational tool that introduces children aged seven to eleven years to a variety of occupations (CASCAiD, 2011). In Paws in Jobland, children can explore a town called 'Jobland' with the help of Paws, an animated dog. Paws helps children to meet individuals in different job areas and find out about what jobs they do. The addition of audio narration and onscreen text further supports the development of reading and listening skills, while children engage with the career content. Children can navigate around Jobland by clicking on different buildings in Jobland and explore places such as a hospital, office, building site, shops and an airport, to name a few (CASCAiD).

This online program also offers children an interactive quiz that encourages problem-solving and develops Information Technology and Communication (ITC) skills (CASCAiD, 2011). Children are asked a series of questions about things that they like to do, things that they are good at, or things they are interested in, and then the program presents the children with a list of occupations that they may enjoy. According to information published on the website, Paws in Jobland helps teachers to deliver many elements of the curriculum in a range of subjects, including English, Mathematics, ICT, Design and Technology, Art and Design, Citizenship, and Geography (CASCAiD). In addition, a set of Paws in Jobland worksheets and teachers' notes accompany the program to provide useful and interesting lesson ideas. Children can use Paws in Jobland to help them complete a range of activities which also support cross-curriculum themes, including creativity, key skills and thinking skills.

The question can be asked: why then develop and design a career learning intervention if Paws in Jobland already exists? The answer to this question lies in the fact that the GCBC™ aims to further the field of early career programs by looking at what is available and then addressing deficits that might exist in current programs. In addition, a major criticism of Paws in Jobland is the lack of published research on the program which is contrary to the recent calls by researchers and practitioners for evidence-based career interventions (for example, Hughes, 2011).

Paws in Jobland covers career information for more than 100 occupations and it is the researcher's opinion that it could potentially lead to confusion with eight to ten year old children. Career development theory states that children are not ready to make career decisions during this early developmental stage and that the focus of interventions should rather be on establishing age appropriate career skills, which include: becoming concerned about the future, increasing

personal control over their lives, convincing themselves to achieve in school and at work, and developing competent work habits and attitudes (Super, 1990; Super et al., 1996). Paws in Jobland is a wonderful resource for early career intervention; however, there are areas that could be improved on. These include: providing activities that will increase awareness of the benefits of educational achievement; increasing awareness of the relationship between work and learning; facilitating the development of age appropriate career skills to understand and use career information; facilitating the recognition of personal responsibility in acquiring good work habits; and creating an awareness of how work relates to the needs and functions of society. These are just some of the features that the GCBC™ has tried to integrate as part of its learning content and this is further discussed in Chapter 6.

Career education programs summary

While the number of career development programs for children is limited, much can be learned from the programs that do exist. For example, evidence suggests that career programs should assist children to acquire a better understanding of themselves in relation to the world of work and to develop a greater understanding of the diversity of life roles in which individuals engage on a daily basis. What is particularly critical is that children should learn to appreciate the relevance of their school subjects, and learn and practice the career management skills needed to achieve goals. Successful career learning programs appear to have learning at the centre of their content, with learners expected to participate in a range of learning experiences, thus engaging and sharing the rich, diverse knowledge and experience of age appropriate career development skills. In addition, these learning programs must also ensure that they provide a new way for teachers and children to interact, with children largely responsible for giving life to their learning.

Recent technology advances have resulted in early childhood educators moving away from asking the simple question of whether information technology is developmentally appropriate for young children. Rather, educators have become more concerned with *how* ICT can be effectively used to facilitate children's learning and development (Wang & Hoot, 2006). From the information available it is clear that by creating appropriate technology-based learning activities, supportive learning environments, and developmentally appropriate activities for children, teachers can provide a variety of positive learning experiences for young learners (Keengwe & Onchwari, 2009).

These considerations are important elements of career development programs and consequently should inform the development and design of new career learning programs. Therefore appropriately designed career learning programs need to include: a learner focus; endorsement and support by management and all stakeholders; up-to-date information; a variety of curriculum resources; appropriately trained personnel; and be coordinated, monitored and evaluated (McCowan & McKenzie, 1997; MCEETYA, 2009; Patton & McMahon, 2001). Experts in child development (Appel & O'Gara, 2001; Clements & Samara, 2002; Downes, Arthur, & Beecher, 2001) support these recommendations. They further suggest that developmentally appropriate digital environments should support the child as a unique individual, encourage exploration, experimentation, and risk taking, encourage critical thinking, decision making, and problem solving, offer quick feedback, be interruptible, keep records, offer new challenges, build on previous learning, encourage reflection and metacognition, and support social interaction. These guidelines provide the basis for the design and development of the GCBC™ and are discussed in Chapter 6.

Chapter Summary

The public policy goals which authorities expect career guidance services to address fall into three main categories according to Watts and Sultana (2004). The first category is learning goals and includes improving the efficiency of the education and training system and managing its interface with the labour market. The second category of labour market goals includes improving the match between supply and demand and managing adjustments to change. The third category of social equity goals includes supporting equal opportunities and promoting social inclusion. As can be seen from the earlier overview, education policy relating to career education does attempt to address these goals; however, some countries are more successful than others in doing so.

The OECD (2004a) review highlights key areas that could assist lifelong career development learning and it acknowledges the importance of early career intervention. According to the OECD review, the first key area highlighted is the fact that the foundations of career self-management skills (i.e., decision making and self-awareness) are established at an early age. This view is consistent with that of the career development theories reviewed in Chapter 2. Despite this awareness, career education and guidance at the elementary school level is limited or nonexistent, and there is little systematic provision for exploring the world of work (Lapan, 2004). Secondly, children need to make a smooth transition from elementary school to the initial years of secondary education particularly as the educational choices that they make at this point have major implications for later education and career options (OECD). Central to this transition is the provision of career guidance to assist children in accomplishing this goal. Thirdly, although career education is offered at lower secondary school level either as a separate subject or subsumed within another subject, it is offered in widely differing ways, often not

acknowledging the career development needs of learners and with little connection to the wider school curriculum. Finally, career services frequently target learners at key decision-making points (for instance, when they are choosing school subjects). What is surprising is that, despite the emphasis on lifelong learning, elementary school education programs presently devote few resources to career development (Lewis, 2005).

If career services are both to develop important skills for life and work as well as assist with more immediate decisions, there are significant implications for schools. First, schools must adopt a learning-centred approach, over and above an information and advice approach (OECD, 2003). This means building career education into the curriculum. Second, schools must take a developmental approach, tailoring the content of career education and guidance to the developmental stages that students find themselves in, and including career education classes and experiences throughout the school years, not just at one point in time (OECD). Third, schools need to adopt a more student-centred approach through, for example, incorporating learning from and reflecting on experience, self-directed learning methods, as well as learning from significant others such as employers, parents, alumni and older students (OECD). Lastly, schools will need to incorporate a universal approach, with career education and guidance forming part of the education of all students, not just those in particular types of schools or programs (OECD).

These are four broad guidelines that, if implemented, will greatly benefit all learners by providing the foundation for lifelong career development. While career education is more evident in secondary schools, it is recognised that there is a need for a closer relationship between elementary and secondary schooling in the development of such programs so that knowledge and experiences are systematically organised across the years from preschool to Grade 12 (Gysbers, 2007; McMahon & Carroll, 2001). Such recognition would require that

children are introduced to career education in their preschool and early elementary years, and that the concepts contained in such programs are developed and reviewed through the elementary years according to identified needs (Gillies et al., 1998). Although effective elementary career interventions have been reported in the literature (e.g., Beale, 2000, 2003), the development of more broad-based theoretically driven career prevention programs is essential to better prepare children for the future demands of the 21st century workforce (Schultheiss, 2005).

Conclusion

An important realization is that learners need to be at the centre of a radical rethink of careers services within a lifelong learning framework in order to ensure access to navigational tools throughout a lifetime of work and study transitions (Flederman, 2008). The ultimate goal is that children, through their participation in age appropriate career programs, must be able to capitalise on an array of educational and training opportunities without being prematurely tracked into narrowed career paths (Lapan, 2004). What is evident from the literature reviewed is that there is much overlap between what theory says and what policy makers expect. However, in addition to addressing these issues, policies for career guidance in schools need to shift away from an approach that focuses only on immediate educational and career choices, towards a broader approach that also tries to develop career self-management skills (for example, the ability to make effective career decisions and to implement them). This requires an approach embedded in the school curriculum which incorporates learning from experience (OECD, 2004a). It is here that the GCBC™ can have an influential role in encouraging career self-management skills in a population group that, in years gone by, were marginalised and excluded from participating in career developmental tasks. The focus now shifts to providing an overview

of existing national and international career research in an attempt to position the current research in the forefront of early career development programs.

CHAPTER 5

RESEARCH REVIEW

In this chapter, following a brief overview of career research, the focus will shift to research specific to the career development of children. Within this specific focus, three main research themes will be considered, namely: the most frequently researched career theory constructs within the developmental stage of childhood; research on career education programs; and how research on Information Communications and Technology (ICT) interventions in the classroom benefits career education service provision. The chapter will conclude with a summary of research recommendations suggested by the literature in the field of children's career development.

Overview of Career Development Research

Despite all that is known about childhood career development, the literature continues to reflect society's desire to separate children from work and labour with the reasoning that children should be free from the responsibilities and concerns ascribed to later age periods (Hartung et al., 2005), a phenomenon that has been described as the cultural moratorium of childhood (Zinnecker, 1995). In addition, extant career literature spanning the early work of Parsons (1909) through to more recent times reflects a prevailing research bias towards adolescent and adult career behaviour and a consequent failure to adequately consider and link childhood dimensions of career development to lifespan career development (Vondracek, 2001). What is particularly surprising is the slow and often dilatory research response to identified deficits within the career literature, to the detriment of expanding our knowledge in this field. For example, in a book published more than 30 years ago, *Children and work: a study of socialisation*, Goldstein and Oldham (1979) pointed out that the adolescent and adult age periods are preferred as research

foci because they extend the most visible benchmarks in the transformation of youth into formal workers.

This trend to focus on adolescent and adult samples persists despite the fact that a call to focus on children's career development was already made during the early 1960s (see, for instance, Borow, 1964). The present researcher is of the opinion that important and repeated research recommendations have been overlooked by limiting the exploration and understanding of career development to age groups where changes in career behaviour are most noticeable (Hughes & Karp, 2004). This has resulted in the career developmental stage of childhood being largely overlooked when in fact research indicates this is where career development services may be most needed (Eccles, 1999; Gysbers, 1996; McMahon & Watson, 2008a,b; Skorikov & Patton, 2007).

Historically, career research has focused on a variety of topics within career development and career choice. Such topics include the role of career aspirations in career compromise and circumscription (Lapan & Jingeleski, 1992; Leung, 1993), the effectiveness of early career aspirations in predicting later career choice and attainment (Holland, Gottfredson, & Baker, 1990), the influence of career aspirations in the pursuit of educational and career opportunities (Lent, Brown & Hackett, 1996), and the impact of variables such as gender (Davey & Stoppard, 1993) and culture (Arbona & Novy, 1991) on career choice. Little of this research, however, has focused on the career development of children. Currently, similar trends persist with research revealing a prevailing bias towards adolescent and adult samples (Pohlman, 2003; Turner & Conkel, 2010). It would seem that, although the career developmental approach moved career theory and research from a static to a process conception of career development, the focus within

that literature has remained predominantly static in relation to developmental stages, with a skew toward adolescence and adulthood (McMahon & Watson, 2008b).

Ironically, while human development theory and scientific inquiry have overemphasised child focused, growth-oriented accounts of development (Elder, 1998), career psychology has overemphasised adolescence and early-to-middle adulthood (Hartung et al., 2005). That said, there has recently been a steady increase in research that specifically focus on children and the establishment of childhood as an important formative period of career development (e.g., Hartung et al.; Howard & Walsh, 2010; McMahon & Watson, 2008, 2009; Porfeli et al., 2008; Schultheiss, 2008). This research provides a focus for this chapter.

Research Specific to the Career Development of Children

The next subsection of the chapter provides a contextual overview of research specific to the career development of children as a means of positioning the present study within a limited, yet increasingly important and relevant research field. In this overview a distinction is made between international and South African research given the context of the present study.

International Research

The past two decades have been characterised by a considerable expansion in research on career development in childhood which has led towards the integration of early career behaviour into lifespan, systemic models of career (Skorikov & Patton, 2007). This increase in research is evident in two reviews on childhood career development (i.e., Hartung et al., 2005; Watson & McMahon, 2005) and a special section of the Career Development Quarterly (2008, 57, pp. 2-95) dedicated to career development in childhood. The two reviews confirmed what career researchers have advocated for decades (e.g., Borow, 1964), namely, the need for a greater focus on understanding the career development of children. The special section in the Career

Development Quarterly included articles dedicated to understanding career development during childhood and represented a major step towards achieving what McMahon and Watson (2008) identified as lacking in the field of early career development, namely, "action rather than reaction in the career literature" (p. 4).

Although these additions to the literature have significantly contributed to our understanding of early career development, many challenges within career theory, practice and research remain unaddressed (McMahon & Watson, 2008). Similarly, the earlier review conducted by Hartung et al. (2005) called for more systematic research attention on the childhood antecedents and dimensions of career choice and career development across the life span.

Hartung et al. (2005) conducted a comprehensive review of empirical career literature that addressed early-to-late childhood (ages three to fourteen years) using a life span developmental framework. The authors reviewed more than 200 articles, monographs, and chapters and grouped this literature according to dominant themes, namely, career exploration, career awareness, career expectations and aspirations, career interests, and career maturity/adaptability. Watson and McMahon's (2005) review used learning as a unifying theme and highlighted the need to understand more holistically the influences on and the process of career development learning in children. This latter review established that the career development learning of children has consistently received little attention. Watson and McMahon also noted that intrapersonal and interpersonal factors influencing children's career development, as well as environmental and societal influences, have been neglected areas of research. Overall, these two reviews found that extant career literature is largely disconnected

from developmental science and education and is limited to basic cross-sectional research designs and statistical models.

Although there has been a concerted effort to redress these deficits in the field, a search through scientific journals and publications (from 2005 to 2012) reveals a limited emphasis on children's career development compared to adolescent and adult career development. Most publications during this period are cited in special journal issues and a book (Skorikov & Patton, 2007) on career development in childhood and adolescence where the emphasis of the chapters was skewed towards adolescence. These publications do indeed stimulate thinking and can provide an opportunity to reflect on theoretical assumptions as they pertain to childhood career development; however, there is a need for researchers to have an interest in children's career development beyond special journal issues and book editions. More so, the present investigator believes that researchers also need to move towards the development of research based practices in an attempt to redress the lack of evidence-based programs in early career development (see, for instance, Hynes & Hirsch, 2012). Research into evidence based programs is the focus of a later section of this chapter.

For the purpose of this research review, Hartung et al.'s (2005) five themes or dimensions, namely career exploration, career awareness, career expectations and aspirations, career interests, and career adaptability are used as a means of structuring the review. These constructs closely resemble key foci of the present research.

Career exploration

Career exploration is an essential behaviour driving career development and, according to Patton and Porfeli (2007), can be traced back to some of the earliest and most influential statements in career psychology (see, for instance, Ginsburg et al., 1951; Super, 1957). Super's

(1960) early work on career curiosity and behaviour is today recognised as pioneering and forward thinking. It was through such work that he was able to propose a lifespan developmental model in which childhood curiosity was seen as a fundamental antecedent behaviour influencing initial career learning during the growth stage and later career exploration (Patton & Porfeli, 2007).

Currently, early to middle childhood is widely regarded as the period when children physically and psychologically explore the outer world and organise the resultant information into increasingly complex categories and associations (Patton & Porfeli, 2007). Within the broader parameters of career exploration in childhood, Schultheiss (2008) describes several articles which have addressed sex role stereotyping (Helwig, 2001) and parental influences on career choice (McMahon & Patton, 1997; Trice, Hughes, Odom, Woods, & McClellan, 1995).

A consistent theme within extant research has been the influence of parents on children's career exploration (e. g., Lee, 2012; Trice & Knapp, 1992; Young & Friesen, 1992). This research suggests that parental involvement during earlier stages of career development, through the provision of emotional support, guidance, and information, can significantly influence children's ability to later successfully negotiate career developmental tasks (Wiesner, Vondracek, Capaldi, & Porfeli, 2003).

Although there is a small but growing body of literature examining aspects of children's thinking about careers (e.g., Schultheiss et al., 2005; Seligman et al., 1991; Trice et al., 1995), this literature generally describes the content of *what* children think about their career choices but has yet to investigate the developmental nature of *how* children think about career choice (Howard & Walsh, 2010). Research conducted by Harkins (2001) found that when young children are asked what they would like to do as adults, their answers often represented the depth

of their experiences with the world of work. What children know is often shallow at best (Skolnik, 1995), and it may reflect the exaggerated role models they have seen on television for example (Huston, Wright, Fitch, Wroblewski, & Piemyat, 1997).

Schultheiss et al. (2005) explored childhood career development by examining fourth- and fifth-grade children's career and self-awareness, exploration, and career planning as part of a writing assignment. The purpose was to gain insight into the career development process in childhood by examining children's responses to open-ended questions about themselves, influential others, goals, and decision making. Forty-nine elementary school children (i.e., 19 boys, 30 girls) participated in this study with ages ranging from nine to twelve years old. In terms of career exploration the researchers found that exploration encompasses both self-initiated exploration and exploration that is introduced and guided by important others, for example by teachers and family members. Consequently the researchers called for coordinated efforts to deliver empirically supported comprehensive career interventions in school settings as a necessary and meaningful contribution to facilitate the development of career skills, including career exploration, during children.

In an earlier study on children, Goldstein and Oldham (1979) found that when children were asked to describe the job-search process, the emphasis of their responses shifted from citing the mechanics of finding a job in the earlier grades (e.g., looking at help wanted signs, in classified ads, or asking friends and relatives) to the process of matching personal interests and abilities to current job opportunities during the 5th and 7th grades. In another study focusing on children, Trice et al. (1995) included 949 elementary school children as participants (i.e., 168 kindergarten children, 239 second graders, 272 fourth graders, and 270 sixth graders) and found clear evidence of children actively involved in career development processes. Both studies

support the view that career exploration proceeds from a broad exploration of possible career identities to an increasingly deep exploration of core features of the self (interests, values, and life goals, for example) in relation to specific career opportunities that are perceived as suiting these core features.

Extant research supports the view that childhood is an important period of career exploration, while arguing that children should not be encouraged to make career choices when they are in elementary school (Beale, 2000; Parker & Jarolimek, 1997). There is however a need to provide elementary school children with career exploration activities that will assist them in thinking about possible career interests as well as help them recognise how school-based learning has a direct link with the world of work (Beale & Nugent, 1996). For example, research suggests that children should be able to connect school learning with what happens in the workplace and that curricular activities facilitate the solution of real-world problems (Harkins, 2000). Even young children can begin to gather information about careers and acquire the skills and competencies that will one day support success in the workplace (Duffy, 1989). It is these early experiences related to the world of work that provide a foundation for later learning and ensure that children's knowledge frameworks are more fully developed when they reach young adulthood (Harkins, 2001). This is particularly relevant considering that research seems to suggest that many young people fail to see the relevance of their academic learning to future work and life roles (Hughes & Gration, 2009).

In view of the research presented above it can be seen that the development of career exploration skills during childhood is needed for successful career development during subsequent stages (i.e., adolescent decision-making). This constitutes the link between career exploration and the present research given that research evidence suggests children can benefit

from career development programs that promote career exploration skills (Gysbers et al., 2008; Hanover Research, 2012; Magnuson & Starr, 2000). Furthermore, framing learning experiences in terms of career exploration and development may also help keep children engaged in learning (Hynes, 2012). This latent goal is seen as a priority in South African schools which over the last few decades have been characterised by high levels of learner dropout (Akhurst & Mkhize, 2006; OECD, 2008; SAQA, 2009). However, as described throughout the present research, programs that aim to facilitate the development of age appropriate career skills during childhood (i.e., including career exploration) are significantly lacking. The next career construct that forms part of this research review is children's career awareness.

Career awareness

Career awareness is defined as having an understanding of various types of careers and it often refers to the initial phase of career education appropriate to the elementary school level (Beale, 2000). As career awareness is an important construct contributing to children's knowledge of careers, there is a need to explore the processes that underpin career awareness. One of these processes is the way in which children learn about careers.

Based on their research of primary school children, Watson and McMahon (2005, p. 122) suggest that children's career learning may best be understood as "a recursive process between children and a broad array of influences from their social and environmental contexts", such as society (e.g., socioeconomic status), ethnic background, the media, school, the home environment, and the family. As described in Chapter 3, children's career awareness should be shaped by a learning process which is a function of their socialisation. However, in today's complex world of understaffed schools, increased residential mobility, and increasing

demographic and cultural diversity, the impact of these systemic influences on children's career awareness can be a challenge to assess (Turner & Lapan, 2005).

In order to better understand career awareness as part of a sequence of career development skills, there is a need to consider current research on this career construct during childhood. Watson and McMahon (2005), for example, have researched career awareness during childhood using their Revised Career Awareness Survey (RCAS) (McMahon & Watson, 2001) with young children in a number of settings (Watson & McMahon, 2007; Watson, McMahon, Foxcroft, & Els, 2010). For example, Watson and McMahon (2007) investigated whether children can connect school-based experiences to future careers that interest them on a cross-national sample of 497 South African and 365 Australian Grade 6 and 7 school children. The findings revealed that the majority of children were indeed able to make curricular, extra-curricular, or general school connections to future careers that interested them. An interesting finding was that males made fewer curricular and general school connections and more connections to extra- curricular activities than females.

The gender differences found in Watson and McMahon's (2007) research aptly leads into another predominant topic in childhood career research which is the influence of career gender stereotyping on children's career awareness. One such study (Tracey & Ward, 1998) investigated the structure of fourth through to eighth grade children's interests according to Holland's (1997) typology and found that girls were more likely than boys to report Artistic, Social, and Conventional interests (i.e., traditional female dominated careers). Boys, however, were more likely than girls to report Realistic and Investigative interests (i.e., traditionally male dominated careers). These findings seem to support Gottfredson's (2002, 2005) constructs of

circumscription during childhood and highlight the fact that there are indeed important influences during these formative years.

One of these important influences during the childhood years is the family and, as described next, the family has been a popular theme in children's research (e.g., Schulenberg, Vondracek, & Crouter, 1984; Seligman, Weinstock, & Owings, 1988; Silbereisen, Vondracek, & Berg, 1997). Although a number of studies have confirmed the importance of family influences in children's career development, Blustein, Juntunen, and Worthington (2000) suggest that the exact nature and extent of such family influences has yet to be fully understood. As a means to "encapsulate the research into a meaningful overview of family influences", Whiston and Keller (2004, p. 498) conducted a review of 77 studies examining the interface between family of origin and career development. Their review represented a wide diversity of disciplines (i.e., counselling psychology, career psychology, education, family therapy, and human development) and found that there are empirical trends that suggest that families do influence children's career development in specific and predictable ways. Specifically they found that the career development of children was influenced by two interdependent family contextual factors (i.e., family structure variables and family process factors). Key findings from this research review are described next.

Using a large sample and a cross-sectional design, Trice et al. (1995) examined the effect of parental careers and family configurations on the career plans of elementary school children. Based on brief interviews with children at different grade levels, they found that children living in family situations other than two-parent homes (e.g., in single-parent households, with extended family, or in foster care) were substantially more likely to express limited career aspirations as opposed to children in two-parent homes. Identification with parents' work,

however, seemed to weaken by sixth grade. These findings could be indicative of career awareness and aspirations being shaped by factors other than the family, namely, an awareness of societal perceptions of certain careers or an acknowledgment of personal attributes in relation to career aspirations.

In another study of parental influence on children's career aspirations, Trice, McClellan and Hughes (1992) found that elementary school children are influenced by direct suggestions related to their career aspirations and that children are most likely to cite their parents as making career suggestions to them. Helwig (1998) conducted a similar study and examined the influence of parental expectations on the development of career aspirations and expectations during elementary school. Using a longitudinal study, Helwig gathered information when children were in second, fourth, and sixth grade, and compared children's reports of their own career goals with their perception of their parents' career expectations for them. The findings from Helwig's study suggested that children early in elementary school tended to aspire to careers within the same career category (e.g., technical, clerical, and service) as their parents' expectations of them; however, as children progressed through the elementary grades, they increasingly reported their own aspirations rather than the aspirations their parents had for them. Thus, in terms of contributing to children's career awareness, it is clear that parental influences continue to be a relevant construct for research today, despite its lessening influence during subsequent developmental stages. Whiston and Keller (2004), for example, deduced that the available research indicated that parental variables seem to have the most influence during the early elementary years, with the influence waning in the later elementary years.

Tracking the changes between children's career developmental and cognitive, emotional and social development over time has also been the focus of a number of research studies. It is

widely accepted that children's knowledge of careers seems to become more comprehensive and detailed as they become older (McCallion & Trew, 2000; Seligman et al., 1991). These studies confirm Goldstein and Oldham's (1979) seminal research which suggested that elementary school children's perceptions about careers shifts from egocentric and concrete to more abstract and objective. More recently, Skorikov and Patton (2007) found that children's career-related attitudes and behaviour undergoes various qualitative and quantitative changes as a result of the epigenetic unfolding of the child's capabilities and learning through self-chosen and socially assigned career, educational, and leisure activities.

It is the relevance of children's participation in 'socially assigned' career activities in facilitating their career awareness that constitutes the link between existing research (as highlighted above) and the present research.

Career expectations and aspirations

The relationship between career aspirations and expectations is explained by Patton and Creed (2007), who suggested that initial career aspirations during childhood are adjusted throughout subsequent years of development (i.e., from initial fantasy aspirations to tentative, and then final, expectations) as they become increasingly aware of personal and contextual barriers impeding the attainment of these aspirations. For the present review only aspirations are considered because of its link with childhood development.

Career aspirations refer to an individual's desired goals given ideal circumstances (Rojewski, 2007) and they have been a popular field of research in childhood career development. Some of the topics researched include career preferences (Gottfredson, 1981; Stockard & McGee, 1990), career aspirations and expectations (Helwig, 1998, 2001; Phipps, 1995; Sellers, Satcher, & Comas, 1999), and career aspirations and perceptions (Cox, 2004;

Crause, 2006) to name but a few. Howard et al. (2011), on the other hand, reviewed research of career aspirations in relation to the influence of race/ethnicity (Cook et al., 1996), gender (Powers & Wojtkiewicz, 2004), and social class (Schoon & Parsons, 2002). These studies all demonstrated how critical the career development of children is in relation to their subsequent career development. In particular, studies by Trice (1991) and Trice and McClellan (1993) have pointed to the predictive value of early career aspirations on later career choice.

Research has consistently demonstrated that career aspirations and expectations in childhood are relatively stable over time and provide substantial predictive power for later career aspirations and, to some extent, eventual attainment (Rojewski, 2007). When asked why they aspired to a particular career, children in the senior grades of elementary school were more able than younger school children to describe a reason or motivation (Howard & Walsh, 2011). Although conventional wisdom suggests career aspirations and choices begin to crystallise during late adolescence, Rojewski cites increasing evidence that this process may well begin earlier. Indeed, according to Wahl and Blackhurst (2000), tentative plans for postschool education may actually be formed in the elementary school years with career preferences evident as early as the kindergarten years.

To illustrate the prevalence of career behaviour during the childhood years Schultheiss et al. (2005) focused on 49 (i.e., 19 boys, 30 girls) fourth (i.e., 34 children) and fifth (i.e., 15 children) grade children's career and self-awareness, exploration and career planning. These children were from an underserved urban population and were between the ages of nine to twelve years. The aim of the study was to contribute to theoretical knowledge by using a grounded theory approach to explore career development during childhood. According to these researchers the results provided a broadened understanding of how children learn about work

with the research findings indicating that the children had already begun to hold ideas about the importance of earning money, providing a home for one's family, balancing work and family, and helping others through their work.

Howard and Walsh (2010) researched children's conceptions of career choice and attainment and evaluated whether reasoning levels varied by grade level and perspective-taking complexity. Two separate studies were completed with the first focusing on 60 children (i.e., 20 in kindergarten, 20 in the third grade, and 20 in the sixth grade) and the second study on 72 children (i.e., 24 in kindergarten, 24 in the fourth grade, and 24 in the eighth grade). The first study used the Conceptions of Career Choice and Attainment (CCCA; Howard & Walsh, 2010) instrument to evaluate whether concepts and reasoning levels about career choice and attainment vary by developmental grade levels. The purpose of the second study (Howard & Walsh, 2011) was to replicate the first study by demonstrating grade level differences between children's concepts of career choice and attainment and to extend these results by assessing whether reasoning levels were associated with children's perspective-taking ability. Howard and Walsh's findings indicated that younger children (i.e., Grade K) were more likely to use reasoning strategies associated with fantasy and magical thinking and older children (Grade 6) were more likely to consider personal interests, abilities, and job requirements. It seems that, with ongoing cognitive development and interaction with their environments, children begin to use better organised reasoning, in that their thought processes are more logical, flexible, and organised than they were during early childhood (Howard & Walsh).

Increasing age in children appears to coincide with more complex and abstract perceptions of the world of work. A reason for this could be that cognitive development plays an important role in the career perceptions of children (Magnuson & Starr, 2000). Research

conducted by Grobler (2000) further emphasises the impact of cognitive development on career aspirations. Grobler argued that children's career aspirations and reasoning reflect their changing modes of understanding the world. Thus increasing cognitive capacity (which is dependent on age-related development) allows children to eliminate more career aspirations with increasing age. Grobler's study also provides much support for Gottfredson's research and the developmental stages of circumscription and compromise.

As childhood perceptions about careers are the precursors to adolescent career development and later exploration of the world of work, Howard and Walsh (2011) underscore the need to expand our understanding of career development during the elementary and middle school years. With the present research, much can be gained in terms of understanding how children utilise career learning experiences and it is possible that the information gained through such career learning experiences can contribute to childhood career expectations.

Career interests

Although there is a wealth of research examining career interests in adolescents and adults, there is a paucity of such research with respect to children (Tracey, 2001). According to Tracey, the limited literature on children's career interests focuses primarily on aspirations and not on the broader construct of interest itself or its structure. Typically, children are asked what career they would like to have as an adult and then this aspiration is related to a wide variety of variables (Phipps, 1995; Trice et al., 1995). Hartung et al.'s (2005) review of research on interest development in childhood indicated that studies have almost invariably found that girls prefer stereotypically female careers, boys prefer stereotypically male careers, and that boys report a higher number and broader range of career interests (Birk & Blimline, 1984; Hammond & Dingley, 1989; Karre, 1976; Miller & Stanford, 1987; Stockard & McGee, 1990; Vondracek &

Kirchner, 1974). These differences have been attributed to gender identity development and the general process of career role knowledge development (Stockard & McGee, 1990). As is evident from the studies cited, much of the research is dated and this largely reflects where children's career research has been.

One of the most widely used approaches to classifying career interests is Holland's (1997) RIASEC structure. However, relative to adults, much less is known about the validity of using the RIASEC interest structure with children and adolescents (Sodano & Tracey, 2007). This research deficit prompted Tracey and Ward (1998) to investigate the relevance of interest structures across age (i.e., from childhood through to adulthood) using the RIASEC structure as a means of categorising expressed interests for samples of fourth and fifth graders, sixth through eighth graders, and university students. Using language appropriate for third grade learners, Tracey and Ward assessed preferences for everyday activities that children as young as eight years old were familiar with and which were logically grouped into the RIASEC types. They found that the RIASEC types were not as descriptive of how younger children rated their liking of or competence in different activities. However, the research suggested that as children develop their interests become more differentiated, resulting in a better fit to the RIASEC structure. The implication of this finding is that the RIASEC structure needs to be revised when used with children (Sodano & Tracey). These findings provide further support for refraining from directly applying existing adult career constructs to childhood. For example, it has been found that the validity of the RIASEC model was positively related to age, with the model's structure fitting college students well, middle school students moderately, and elementary school students poorly (Tracey, 2001).

According to Sodano (2011), the interpersonal aspects of career interests and competencies have yet to be adequately examined in children. This author tested the relevance of existing adult career constructs applied to the developmental stage of childhood. A vector fitting procedure was applied to data from adults to demonstrate the intersection of career interests and interpersonal dispositions from the perspective of the Interpersonal Circumplex (ICP). The same procedure was then applied to the interests and competencies and interpersonal dispositions in a sample of sixth grade children. Sodano found that the specific interpersonal meanings of the Realistic, Investigative, and Social interests for children were consistent with how adults viewed these same interests.

These findings suggest that the interpersonal interpretations of these particular interests are expected to remain stable from middle school onward. However, the specific interpersonal meanings for the Enterprising, Conventional, and Artistic interests differed between the child and adult groups. The Conventional and Artistic interests were the opposite on both of the interpersonal dimensions across the two developmental groups, while the children's "cold and dominant" interpersonal view of the Enterprising domain indicates that they view it as "somewhat bossy and even arrogant" (Sodano, 2011, p. 119). Consequently the findings suggest the Enterprising interest may be viewed less favourably by children compared to adults. Sodano's research clearly emphasises that different interpersonal interpretations of interests can be made by children compared to adults.

Similarly it is important to note that how children describe careers may also change over time, with elementary school children more likely to describe careers in terms of their activities and behaviours, and older children more likely to focus on interests, aptitudes and abilities (McMahon & Watson, 2005). What we know about career interests seems to further suggest that

a new conceptualisation of childhood career interests within lifespan career development is needed, especially as career interests can change over time. Tracey (2001) suggested that research on career interests in childhood would benefit from a focus on content more relevant to children, their activities, and their liking of them. Tracey further emphasised that an assessment of interests in activities in which children actually engage would provide a more appropriate assessment of interests; however, this has rarely been undertaken.

Some of the recommendations proposed in research include that the facilitation of children's career interests can be encouraged through educational activities that expose children to new experiences and information (Schultheiss et al., 2005). In addition, Sodano and Tracey (2007) suggest that teaching the RIASEC model earlier to children can be accomplished by utilising prototypical careers within the context of RIASEC types and structuring the information presented to children so that more general and concrete descriptions are applied when talking about diversity in terms of career interest. Clearly there is a need to provide children with appropriate and relevant information during these formative years, especially as studies have demonstrated how critical the career development of children is in relation to their subsequent career development.

On the subject of providing children with career learning experiences, Sodano and Tracey (2007) believe that efforts aimed at the career education of children might best be served by providing information on the world of work from the perspective of Holland's model of interests, although this model would need to be presented according to the developmental level of the targeted population. In particular, program developers and educators can codesign learning experiences that provide opportunities for children to acquire new skills and tap unique talents

that might otherwise have been overlooked. The timing of these learning experiences needs to be considered so that they can be appropriately assimilated into children's developing self-concepts.

Career adaptability

Career maturity, defined as an individual's readiness for career decision making (Super, 1990), has received considerable attention in the literature and has been one of the most prevalent variables in research on adolescent and adult career development (Powell & Luzzo, 1998). However, the use of this term has been increasingly criticised especially when applied to children's career development (Watson, 2008). Ten years prior to Watson, Vondracek and Reitzle (1998) also disapproved of the construct's conceptual bond to developmental stage models, and cited the lack of sensitivity to time and culture as factors that could no longer be overlooked. Thus, in recent years, the term career adaptability has become the preferred term.

Recognising childhood as the dawn of career development and also the centrality of career adaptability across the life span, Hartung et al. (2008) assert that the antecedents of career adaptability are established during childhood. These authors contend that, although a prototypical chronology of development can be identified, the interaction of personal and contextual factors yields significant individual variability within this chronology. Thus, career adaptability develops at varying rates beginning in childhood and continuing across the life span. Consistent with theory, Hartung et al. (2005, p. 408) found that the research they reviewed supported age-graded increases in "vocational maturity" during childhood.

In an earlier study, Nelson (1978) found increases in cognitive career maturity among children as young as preschool to third grade level. Similarly, Borgen and Young (1982) investigated how fifth- through to twelfth-grade children and adolescents process career information and construe the world-of-work. Their findings indicated that children in the lower

age groups construed careers more in terms of the activities and behaviours associated with these careers, whereas older children and adolescents preferred more sophisticated descriptions of careers in terms of variables such as interests and the steps involved in preparing for, entering, and progressing in a career. The two studies mentioned previously are quite dated, necessitating the need to update what is known about career adaptability during childhood.

More recently, Walls (2000) examined cognitive career adaptability levels among third-, sixth-, ninth-, and twelfth-graders. Significant developmental progress was found in that children in each progressively older age group conveyed more accurate knowledge about careers in terms of status, requirements, and earnings. Similarly, Howard and Walsh's (2011) research established that, as children mature cognitively, they are better able to explain the processes of career choice and attainment, a result also found by Phipps (1995). It was confirmed that as children are better able to understand cause and effect relationships, they are increasingly able to identify specific educational and training experiences required for various careers, which is a key aspect of career adaptability (Howard & Walsh).

Given the need to increasingly understand children's career development, this brief overview of international research illustrates the lack of information that still persists. This consistent schism between career theory, practice, and research, although reflective of the career psychology discipline in general, limits an indepth understanding of the dynamic nature of children's career development (McMahon & Watson, 2008). In addition, most research on career development in childhood has focused on children in the United States, with little research published from other countries (Whiston & Brecheisen, 2002). The discussion now shifts to an overview of children's career research endemic to the South African context which is the focus of the present research.

South African Research

Career development has predominantly been studied in the context of middle class, westernised cultures thereby ignoring calls for greater attention to the career development of nondominant and disadvantaged groups (McMahon, Watson, Foxcroft, & Dullabh, 2008). The research cited so far is international in nature, with South African research on career development being limited largely to secondary and tertiary students (Ortlepp, Mahlangu, Mtshemla, & Greyling, 2002; Stead & Watson, 2006; Watson, Stead, & De Jager, 1995; Watson, Stead, & Schonegevel, 1997). Even more critical is the lack of career development research that focuses on South African children.

Overviews of South African career research (Stead & Watson, 1998; Watson & Stead, 2002) have indicated that the multicultural context of South Africa, which is an important factor in understanding career development, has received insufficient attention to date. De Bruin and Nel (1996) and Watson, McMahon, and Longe (2011) further emphasise the limitations in extant South African research with its prevailing bias towards white, high school research participants. It therefore appears that if we continue to follow these historical trends we run the risk of marginalising large numbers of individuals because predominant career theories do not adequately address the career development of noncaucasian, nonwesternised individuals (McMahon & Patton, 2002). Thus the challenge in recent decades in South African career psychology has been to develop more inclusive career practices and research that can reach out to minority groups and be more responsive to individuals' contexts (Akhurst & Mkhize, 2006).

For a number of years, Watson and McMahon (2005, 2007a, 2007b, 2008; McMahon & Watson, 2009) have called for the exploration of career development in terms of context and process. What is particularly needed, in this regard, is systemic research that focuses on the

career development of children from diverse socioeconomic and ethnic backgrounds, as children's career development research needs to be contextually grounded within the contexts where such development occurs (Watson et al., 2010). In this regard, McMahon et al. (2008) have emphasised the need for research measures and approaches sensitive to children, as well as to particular cultural groups.

Although the number of studies on South African children's career development is limited, some noteworthy research does exist. Watson et al. (2010), for example, researched the career aspirations of urban Black, isiXhosa speaking, South African upper elementary school children of low socioeconomic status with a sample of 274 children from Grades 5 and 6. Two open-ended questions from the RCAS were analysed with the results revealing that most children aspired to social and investigative type careers. More significant was the fact that over 80% of the sample aspired to high status careers (i.e., careers requiring university training) The fact that South African research demonstrates a trend for isiXhosa-speaking South African elementary school children to aspire towards professional status level occupations reflects a degree of idealism in their career aspirations when viewed against the environmental-societal realities of the educational and employment context of South Africa (De Lannoy & Lake, 2009; Watson et al., 2010).

In another study, Watson, McMahon, and Longe (2011) researched the career development of rural, low socioeconomic status, Black upper elementary school children in relation to their occupational interests and aspirations on a sample of 292 children (i.e., 154 girls and 138 boys). The results revealed that children were more interested in and aspired more towards professional status level occupations in social (i.e., people) and investigative (i.e., scientific) type categories. Several significant gender differences were found with girls aspiring

more to Social type occupations and boys more to Investigative type occupations. These trends suggest that the children's career aspirations largely reflected gender traditionality (Watson et al.).

Similarly Watson, Foxcroft, and Grobler (2001) investigated the career aspirations and perceptions of five year old South African children. This sample consisted of 87 children from two cultural groups, namely black and white. The results of this study suggest differences in career aspirations and perceptions between South African cultural groups with more black children aspiring to social (e.g., nurse, teacher, police officer) and investigative type careers (e.g., doctor, scientist, veterinarian). On the other hand, Realistic type careers were more popular amongst white children. It was, however, of interest to note that no black children aspired to Artistic careers and there was a greater trend to aspire to fantasy careers compared to their white peers.

In a longitudinal research study the career aspirations and perceptions of predominantly white, middle- to upper socio-economic status children over a twelve year period were tracked. This study commenced when the children were aged five years and continued throughout formal schooling through to their Grade 12 year. The children were interviewed on a yearly basis and their responses recorded concerning their awareness of careers and the career aspirations they held. Given that the longitudinal project had a twelve year span, individual research projects (with each focusing on different age ranges) extended the longitudinal project (Cox, 2004; Crause, 2006; Dean, 2001; Hargreaves, 2007; Hunter, 2009; Marshall, 2010; Olivier, 2004). Dean researched the career aspirations and perceptions of four to eight-year olds, Cox six to nine-year olds, Olivier seven to ten-year olds, Crause the nine to twelve-year old period, Hargreaves nine to thirteen-year olds, Hunter twelve to fourteen-year olds, and Marshall the

fifteen to sixteen year old period. As the project developed, more indepth analyses of factors impacting on the children's career development were possible.

The results from these successive studies provided some support for human and career development theory (Cox, 2004; Crause, 2006; Dean, 2001; Hargreaves, 2007; Hunter, 2009; Marshall, 2010; Olivier, 2004). An important finding of this longitudinal study was that Holland's (1997) Enterprising and Conventional type careers were consistently the least popular career aspirations during the early years of the project (Cox; Crause; Dean; Hargreaves; Olivier). However, as children approached adolescence (between twelve to fourteen years), the findings indicated an increase in the popularity of the Enterprising typology (Hunter; Marshall). These findings correspond to that found by Sodano (2011) and provide support for Gottfredson's (2002, 2005) theory where children are seen as moving from an orientation to gender roles to choosing careers based on social valuation (from ages twelve to fourteen years).

The longitudinal research revealed that environmental and several societal factors, in particular socioeconomic status, have an important influence on children's career development, in particular their career aspiration development. Children's career aspirations were found to be influenced by occupational status as defined by the dominant culture (Hunter, 2009). Furthermore, there was a correlation between socioeconomic status, career status level and children's career aspirations (Marshall, 2010). A persistent recommendation in all these studies was the call for baseline information on children's career development which could be used in the development and design of age appropriate career programs.

Overview of Research on Career Education Programs

Although several researchers have advocated that career development may be intentionally supported and fostered through career education programs, few examples of such

programs during the elementary school years exist. This view is supported by Patton and Porfeli (2007) who found that increasing effort has been devoted to developing education programs that facilitate career development learning in schools, but that most programs target adolescents (Turner & Conkel, 2010) or students at risk (Legum & Hoare, 2004). Given the lack of attention to the career development learning of children in the literature there is a corresponding lack of attention to children's career development in practice (Hynes & Hirsch, 2012; Watson & McMahon, 2007).

More than a decade ago, Baker and Taylor (1998) conducted a review of literature on career education programs and concluded that the programs reviewed seem to have modest effects. However, these authors defended the results by stating that "given the difficulties associated with setting up and conducting well-designed experimental research projects in this domain and in identifying useful dependent measures, perhaps these modest effects may be viewed as encouraging" (p. 46).

Subsequently, Watson and McMahon (2005) reviewed extant research on children's career development and included a focus on the role of career education in promoting the career development learning of children. They found that, although career education programs were discussed (e.g., Caspi, Wright, Moffitt, & Silva, 1998; Gysbers, 2007; Gysbers & Lapan, 1994; Hoffman & McDaniels, 1991; Starr & Gysbers, 1988), the impact of such interventions has seldom been reported.

In one of the few studies to date that reported the impact of career development interventions, Gillies et al. (1998) evaluated a ten-week career education program for sixth-grade children. Their results indicated that the program, which focused on helping children to acquire a better understanding of self and the diversity of life roles in relation to the world of work, helped

sixth grade Australian children to develop a better understanding of career information sources, more interest in career information and a better perception of the relationship of school to work. Furthermore, McMahon, Gillies, and Carroll (2000) found that children's career development was enhanced as a result of career education lessons, with Australian children showing an increased ability to list careers and to identify a favourite occupation.

The benefit of exposing children to a career education program was also indicated by Legum and Hoare (2004) who assessed the effects of a nine-week career intervention program on at-risk (i.e., in danger of failing the academic school year) middle school children's (i.e., Grades 6 and 7) career maturity levels, self-esteem, and academic achievement. This study was based on a pre- and post-test design and collected data from 27 at-risk middle school children representing the experimental group and 30 at-risk middle school children making up the control group. The career program implemented focused on exploring careers in conjunction with subsequent high school planning and was only presented to the experimental group. Legum and Hoare suggested that, although not statistically significant, their study demonstrated that at-risk middle school children's career maturity levels (i.e., attitude and competency) and academic achievement improved after the implementation of the career intervention program. They further concluded that with increased career awareness and knowledge of careers during the elementary and middle school levels, at-risk middle school learners will be prepared to make more informed decisions when selecting the high school program most likely to help meet their career goals. A critical finding from this study which has relevance throughout all levels of schooling is that as children begin to connect their academic accomplishments with the expectations of the world of work, they are more likely to understand the significance of remaining in school and may make more prudent decisions concerning their short- and long-term futures.

There seems to be support for exposing children to a variety of experiential career learning activities during the childhood years. For example, Schultheiss (2008) noted that there have been descriptions of exploratory and experiential activities such as a visit to a hospital (Beale, 2000) or how to run a restaurant (Beale, 2003), the use of children's literature to infuse career development concepts (Brathwaite, 2002), and multicultural career fairs (Murrow-Taylor, 1999). To illustrate the impact of such experiential activities, Beale (2000) asked children to complete a feedback form focusing on four broad statements following their participation in a fieldwork activity (i.e., visiting a hospital). On the first statement, that is, "*our field trip helped me to learn more about hospital workers and what they do*", 98% of the children had a positive response with only one child disagreeing. All of the children agreed with the statement, "*I believe other students would enjoy a visit to the hospital*." To the third statement, "*I enjoyed the activities we did before, during, and after our field trip*," 88% of the children agreed. And finally, 93% of the children agreed with the statement that "*this field trip helped me to better understand what happens to people who go to the hospital*." Clearly the personal accounts of children reflected a positive perception of the intentional career learning program, however, limited information is available to draw conclusions regarding the impact of this intervention.

While some studies report on specific career education interventions, others have examined the influence of school on children's career development (Watson & McMahon, 2005). As indicated earlier, the school as an influential source of learning in the career development of children is broadly recognised but narrowly researched (Watson & McMahon). Nevertheless, the impact of school-based learning on career development is recognised with studies confirming that children are indeed able to identify school learning that related to careers that interested them (McMahon et al., 2000). Of particular interest in this latter study conducted

by McMahon et al. is the fact that career development learning was drawn from the whole school experience of the children. For example, while most of the learning experiences nominated by the children related to subjects, activities and topics covered in the academic curriculum, the authors identified that the children also nominated learning experiences derived from extracurricular activities and their general participation in school.

Despite the limited research available, several authors have called for the implementation of career education programs (Gregg & Dobson, 1980; Hoffman & McDaniels, 1991; McMahon & Carroll, 2001) as a source of learning realistic career information, challenging career gender stereotypes, and educating parents in their role in their children's career development (Wahl & Blackhurst, 2000). As young children express interest in careers and begin to learn about them, research has established that they can be assisted in beginning to understand how career goals are achieved (Phipps, 1995).

Phipps's (1995) investigated the career dreams and knowledge of 80 eight- to eleven-year-old children and found that children in this age group are clearly able to state what they want to be when they grow up and why. Her research confirmed that education, generally, may acquire increased importance to children if they see it as an investment in themselves, begin to see how it relates to the attainment of specific career goals, and are encouraged in their pursuit of solid educational foundations for these goals. Moreover, coordinated efforts to deliver empirically supported comprehensive career interventions in school settings is needed to make a meaningful contribution to the education and development of children (Schultheiss et al., 2005).

However, as is evident from the current overview, such proposed and ongoing career intervention efforts are often constrained at the elementary school level by a lack of basic research on how children learn about, are socialised to, and develop an orientation towards the

world of work in family, school, and other community contexts (Hartung et al., 2005). Furthermore, despite the identified benefits of career education programs and their researched success internationally, such programs are severely lacking in South African schools (Hargreaves, 2007). Consequently the need for appropriately designed career programs has been underlined by a number of studies in previous decades (e.g., Mtolo, 1996; Ntshangase, 1995), and more recently by Akhurst and Mkhize (2006). The present researcher supports the need for developing such programs but extends the call to include research validating the effectiveness of career education programs in general and, specifically, on those focusing on the developmental stage of childhood.

Recently evidence-based practices have been in high demand by practitioners, professional organisations, and governmental agencies (Jenson, Clark, Kircher, & Kristjansson, 2007) in order to narrow the gap between research and practice (Chwalisz, 2003). Evidence-based practices refer to research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs (No Child Left Behind [NCLB], 2002). Three key domains are considered in the process of establishing evidence-based practices: integrating, and providing, best available research evidence; formalising and calling on practitioners' expertise; and sensitivity and key awareness of client preferences (i.e., clients' values, preferences, characteristics, and circumstances) (Spring, 2007). It is the expertise gained from these practices which can also be used to develop evidence-based programs with clearly identified linkages between core components and expected outcomes for an identified target population and established organisational supports for implementation (Metz, Espiritu, & Moore, 2007). Considering the existing lack of evidence-based practices aimed at career development during the elementary

school years, there is a clear and pressing need to develop such practices, hence the focus of the present research. Using an evidence-based approach in the development, design, and trialling of Growing-Up: Children Building Careers™ (GCBC™), an attempt was made to provide an example of such an intentional career learning program. The provision of clear research evidence supporting the effectiveness of the intervention prior to implementing the program with children is a prerequisite of an evidence-based program (Raines, 2008).

This review of career education has revealed a range of programs, none of which incorporated the use of technology. Given the widespread use of technology in education and the use of technology in the present research related to the GCBC™, the review now shifts to an overview of research on ICT interventions in elementary school education.

Overview of Research on ICT Interventions in Elementary School Education

Already discussed in this chapter has been extant career research focusing on the developmental stage of childhood, as well as an overview of research on career education programs during the elementary school years. Another topic relevant to the present research is the use of computer technology by young children in elementary school learning programs. Consequently this is the focus of this particular subsection of the chapter. The research described here focuses on the use of ICT in the classroom generally, and not specifically on computer based career education programs. The decision to include this body of research was taken in view of the fact that the literature review revealed that no computer-based career exploration activities (i.e., learning programs) has been supported and/or evaluated through research. Thus the emphasis is broadly on ascertaining whether computers can indeed be seen as an appropriate instructional medium for children during the elementary school years.

Over the past two decades, researchers investigating the use of computer technology by young children have moved from questioning whether computers can help young children learn, to suggesting how educators and parents can best use computers to maximise learning (Clements & Sarama, 2002; Hyun & Davis, 2005). Moreover, compared with older students, children demonstrate higher gains in learning outcomes using ICT (Volman & Van Eck, 2001) and have a more positive attitude to using ICT in their learning activities. Furthermore, Dwyer (2007) commented that ICT learning experiences at an early age can potentially positively change children's later learning experiences.

Research has consistently found that children will increasingly make substantial use of ICT as a learning tool in the first years of elementary school (Acha, 2009; Agar, 2003; Clements & Samara, 2002; Downes et al., 2001; Dwyer, 2007; Goodison, 2002; Grabe & Grabe, 2007). Although the use of ICT in the early elementary school years has its own unique potential for learning (Clements & Samara, 2002; Goodison; Kilderry, Yelland, Lazaridis, & Dragicevic, 2003), there is a need to differentiate between research focusing on the benefit to teachers (i.e., as facilitators of learning) and children (i.e., the intended target population of ICT based programs).

Research conducted by Hayes (2007) attempted to qualitatively describe and examine the ways in which teachers, in a range of settings, utilise ICT in their classroom practices to mediate children's learning experiences during the elementary school years. Six schools were selected, with teachers who were considered to be innovative and confident users of ICT in their classrooms nominated as research participants. For the most part, the participants had considered views about their teaching and linked it to children's learning. The findings suggested that teachers had been slow to adopt ICT practices and, according to Hayes, reflected their efforts to

discern how best to incorporate new technologies into old teaching practices. The findings further concluded that teachers need support to develop new approaches to teaching and greater access to reliable technology before the powerful ICT learning environments that have been heralded are realised (see also, in this regard, Agar, 2003; Appel & O'Gara, 2001).

Goodison (2002) investigated elementary school children's awareness of the linkage between ICT and the way they learn within the context of a school that has been particularly successful in integrating ICT into the curriculum. Children were interviewed by their teachers and included 85 children from three schools. However, for the research published a subsample of 30 children were selected (i.e., 15 children aged seven and 15 children aged ten). Goodison found that, despite the fact that many of the most illuminating contributions came from the older children, it was intriguing to observe even those as young as seven were at times capable of articulating instructive insights into their own learning processes.

From the research available there is an increasing expectation that all elementary school children and their teachers should actively use ICT in learning activities (Agar, 2003; Clements & Samara, 2002; Dwyer, 2007). Already emphasised as important tools to use within classrooms (see Chapter 3 in this regard), ICT interventions are currently seen as major learning tools across a variety of topics and fields, including learning related to literacy (Lankshear & Knobel, 2003), numeracy (Clements, 2002), and social development (Kilderry et al., 2003; Wang & Ching, 2003). Within the ICT field of research, there is evidence of the positive effects of using computers with children. For example, there is some evidence to suggest that children with limited prior knowledge of a topic tended to learn better with technology (i.e., multimedia) than with conventional material, as did learners identified as 'visual' or 'auditory' in their learning styles (Kamil, Intrator, & Kim, 2000). Other research (e.g., Sharp, Bransford, Goldman, Kinzer,

& Vye, 1995) suggests that dynamic visual displays like animations and simulations are superior to static media for building mental models and comprehending stories. However, such research also reveals that there are practical considerations that impact on perceptions of the effectiveness of ICT programs (Dwyer, 2007; Haugland, 1992; Keengwe, 2007).

Dwyer (2007) conducted research into computer-based learning in elementary schools, and in particular focused on differences between the early and later years of elementary schooling. Seven case study schools, which included four high schools and three elementary schools, were selected to participate in the study. Over a three year period 287 teacher interviews were conducted and 71 classroom observations were undertaken. Of these, 123 interviews and 30 classroom observations took place with the elementary schools. Dwyer's findings are indicative of the current juxtaposition between what research indicates (i.e., the need to integrate ICT in schools) and practice implications (i.e., the limited rollout and support for ICT interventions during the elementary school years). For example, although the research literature has established that ICT supports and enhances the early years of learning (Kilderry et al., 2003; Lewin, 2000; Yost, 2003), Dwyer's research reveals that in practice this debate is unresolved. With particular reference to the three case studies reviewed by this latter author, several aspects of differing practices and attitudes have been described. These included: (a) restrictions in terms of computer-based resources, time available for computer use and type of use; and (b) the current curriculum which mitigates against valuing ICT in the early years of elementary school.

Nevertheless, there has been an increase in research on the effectiveness of computer-based instruction as a viable instructional tool during the elementary school years. For example, Mioduser et al. (2000) conducted research on the contribution of computer-based instruction when compared with more conventional modes of instruction (i.e., teacher instruction with

textbooks) to early reading skills acquisition, as well as the effects of specific features of computer technology on early reading skills performance. Forty-six pre-school children (i.e., aged five to six years) participated in the study and were assigned to one of three study groups that received different treatments. The results from this study indicate that children who participated in the reading intervention program with computer materials significantly improved their phonological awareness, word recognition, and letter naming skills relative to their peers who received a reading intervention program with only printed materials or those who received no formal reading intervention program. Consequently, the authors emphasised that it is advisable to invest effort in the development of computer-based learning material and in research that maps children's learning processes within these computer environments (Mioduser et al., 2000).

In another interesting research project, five- to six-year-old kindergarten children's conversations and emerging inquiries relating to the use of computers in a technology-rich classroom were explored (Hyun & Davis, 2005). This study did not assess children's ability to operate computers, but focused on how children communicated while using computer-based technology in their learning. According to Hyun and Davis, noticeable changes occurred in the children's level of inquiry as they were introduced to new computer software programs and hardware. Initially, children were excited about the seemingly 'magical' nature of the technology (for example, one clicking finger motion brought up an interesting image with a sound). As the novelty wore off, children's sense of wonder about the technology motivated them first to explore their new tools and then to seek an understanding of the technology. Becoming more confident in their abilities to use and understand the technology, children then became eager to share their new knowledge. What was particularly striking in this research was the change in

how children's conversations about the new learning experience and technology developed. Hyun and Davis (p. 125) commented that the children's conversations about new technology evolved from "wanting to have" to "wanting to explore" to "wanting to understand functions" to "wanting to express what they already know." This sequence of children's talk illustrates change and growth over time as children are able to move from a concrete experience to more advanced learning and application of previously acquired learning (Hyun & Davis).

The positive influence of integrating ICT within a structured learning program with children is thus supported by research. In particular the research conducted by Mioduser et al. (2000) revealed that children who received a computer-based intervention significantly improved literacy skills relative to their peers who received a paper-based reading intervention. The findings of Hyun and Davis (2005) further suggest that children's experience of using computer-based interventions can have a positive effect in how they manage and make sense of previously learned information. Such findings allow researchers to draw conclusions regarding the educational benefits of ICT learning programs; however, there is also a need to consider the impact of these types of programs on children's social skills.

According to Wang and Ching (2003), studies focusing on ICT in the classroom have documented rich and productive peer interactions (e.g., Dickinson, 1986; Dillenbourg, 1999). Regarding these processes, however, there is a lack of a satisfactory explanation about what creates a successful collaboration with computers (Littleton & Light, 1999). Wang and Ching suggest that an answer could be the computer's capacity to help externalise mental representation (Scaife & Rogers, 1996) and to help articulate ideas as the key to its role in peer collaboration (Crook, 1994). Irrespective of the technological considerations supporting successful in-class collaboration (i.e., between the ICT program and participants, and between participants

themselves), Wang and Ching recognised the importance of structuring the learning environment to allow successful collaboration between children. For example, classroom rules such as limits on time and number of participants, and the structure of the physical environment such as computer placement and surrounding chairs, both enable and constrain children's collaborative computer use. These environmental factors provide assurances of fairness while also imposing structures on turn-taking and group work that are unrelated to the ICT program's goals or children's collaborative learning.

Given the lack of career learning programs utilising computer-based programs, the studies mentioned above provide tangential support for the development of a computer based career learning tool for children. The dearth of computer-based career education programs that target the elementary school years is evident from a recent literature search through major databases and scientific journals, including Academic Search Complete, Education Source, ERIC, Humanities International Complete, PsychInfo, and Teacher Reference Centre. A combination of search terms including 'computer-based' and 'career education', and 'computer-based' and 'career interventions', initially revealed a number of publications. However, when the search was narrowed to include only peer reviewed publications with 'children' as the target group, only eight results were returned. From these eight articles, not one explicitly described a computer-based career education program specifically but rather referenced 'computer-based', career', 'education', and 'children' as separate constructs within the text. Thus, in terms of the type of program developed in the present research (i.e., a computer-based career exploration tool for elementary school children), no other similar type of program currently exists or, if it does, has produced published findings.

Even though not a computer-based career exploration tool, Porfeli et al. (2008) describe a fully web-based, theoretically eclectic battery of instruments developed to conduct basic, longitudinal, interdisciplinary research spanning the elementary, middle, and high school grades with the aim of assessing the antecedents of adolescent career development. This battery of instruments necessitates computer skills (e.g., using a mouse and keyboard in a Web environment) consistent with competencies typically expected of second- and third-grade students in public education (International Society for Technology in Education, 2000). The pilot test included fourth- through to sixth-grade children who were assessed in their school setting (Porfeli et al.). In their review, the latter authors state that the preliminary psychometric properties (i.e., reliability and construct validity) were promising and were generally consistent with the growing literature suggesting that the Web-based environment is a valid milieu for conducting survey research (see, in this regard, Buchanan & Smith, 1999; Johnson, 2005).

In conclusion, it is clear that research on specific computer-based career learning programs designed for children is significantly lacking. However, this does not imply that ICT cannot effectively be used in the realm of career learning programs. Patton and Porfeli (2007) state that all intentional career learning programs provided through technology should aim to integrate ICT, curriculum, and group work with the integration largely being undertaken by the individual, with support and explanation by the counsellor or facilitator. Therefore a sound understanding of the ways in which ICT environments are established in the early elementary school years is necessary if the potential learning benefits of ICT for children are to be capitalised on (Dwyer, 2007).

Research Review Summary

Most of what is known about career development in childhood represents a descriptive rather than an explanatory analysis of career development (Skorikov & Patton, 2007). According to Skorikov and Patton, advancements in measurement and research design appear to be critical if empirical research on childhood is to be furthered as a distinct and unique stage of career development. Similarly, systematically testing, refining, and integrating different career theories is a crucial factor in developing theoretically sound and practical models of childhood career development.

The present research review has highlighted several issues about career practice as it relates to children's career development. Although researchers generally agree that career exploration, career awareness, career expectations and aspirations, career interests, and career adaptability are crucial in educational and career planning (Holland, 1997; Porfeli, 2004; Savickas, 2002; Super et al., 1996; Vondracek, 1995), there is a gap between career services provided at an elementary school level and the research that should inform such programs (Porfeli et al., 2008).

McMahon and Watson (2008) raise the question of why historically identified issues related to children's career research remain essentially the same issues today. For instance, there is consistent criticism of the lack of a theoretical and organising framework within which to conduct research on children's career development (Hartung et al., 2008; Schultheiss, 2008). Porfeli et al. (2008) further comment on the neglected status of children's career development and how critical such neglect is considering that the foundations for future career development are laid at this developmental stage. This schism comes at a time when contemporary demands for evidence-based practices make explicit the need for programmatic research to substantiate the

effectiveness of career invention programs (Schultheiss, 2005; Whiston, 2002). The importance of bridging this gap with collaborative, multidisciplinary research is critical for the future of childhood career development theory, research, and practice (Schultheiss).

One way in which the career development of children can be intentionally influenced by schools is through the formal provision of opportunities for intentional career development learning (Patton & Porfeli, 2007). These meaningful career learning experiences must be sensitive to theoretical guidelines, previous research recommendations, and a general awareness of age-appropriate learning experiences. To strengthen the connection between school learning and future career development, educators should provide children with experiences that more clearly link academic learning areas with a variety of careers (Schultheiss et al., 2005). Further, career education needs to focus on building the skills needed for planning, goal setting, and decision making.

What is evident from the current review is that technology has significant potential to widen access to career information and career guidance, but that such technology is insufficient (Hughes, 2011). There is also limited evidence on the use and impact of ICT in supporting career programs in schools. This suggests that a combination of technology with classroom experiences seems most appropriate for career development learning during the elementary school years. Although it is often difficult to demonstrate the direct impact of career services, research evidence demonstrates that career programs can and do make a significant difference in terms of learning outcomes such as increased self-confidence, self-esteem, motivation, and enhanced decision making (Gillies et al., 1998; Hughes; Magnuson & Starr, 2000; Gysbers, 2007). There is also evidence that effective career services, which can be technology based, support significant participation in learning and educational attainment.

Finally, developmentally based career education programs that foster an exploratory attitude in children, and consequently promote the exploration of new domains and ideas, can broaden children's career knowledge and exploration of diverse careers (Beale, 2000, 2003; Schultheiss et al., 2005). Career exploration, identification with key figures, and exploration through play are all consistent with the formation of the self-concept in career development (Schultheiss, 2008). Hence, childhood interventions that facilitate exploration and self-concept development could significantly enhance early career developmental progress (Auger, Blackhurst, & Wahl, 2005; Gysbers, 1996, Hynes, 2012, Schultheiss et al.).

Relevance of Research Review to Present Research

Despite the limitations and marginalised status of the literature on children's career development, the research conducted to date suggests the significance of career development during childhood (Hartung et al., 2005; Watson & McMahon, 2005). It is clear that career development begins much earlier in the life span than generally assumed and that what children learn about work has an influence on the career choices they make as adolescents and young adults (Schultheiss, 2008). According to Schultheiss, there is a need thus for more systematic research on the childhood antecedents and dimensions of career choice and career development across the life span. Six conclusions for effective career education programs targeting the elementary school years have been drawn from the research review.

Firstly, although children may possess the necessary readiness to start learning about careers, the responsibility of combining age specific theoretical considerations, relevant research findings, and age appropriate career learning activities requires researchers to focus on more than just presenting career information in a 'child friendly' format. Rather Magnuson and Starr (2000) suggest that children must be provided with opportunities and freedom to explore and wonder

about the future, in particular about their future selves. The activities provided should assist children to build bridges to more complex learning and consequently career learning activities must begin with what children 'know' to help them move to what is 'not yet known'. There is also a need for children to develop a social understanding (including the awareness of self and others) and therefore opportunities must be provided for children to engage in frequent interactions with a variety of people.

Secondly, researchers, program developers, policy makers and educators need to work together towards a common goal in children's career development which is to provide children with meaningful career learning experiences during the elementary school years. Thus learners need to be presented with a variety of intentional or unintentional career learning activities in which exploration, curiosity, awareness, and achievement of age appropriate career developmental tasks are encouraged. These activities must be developed in line with career education policy goals, be sensitive to the needs of educators and learners, and be informed by best practice examples found in research on children's career development.

Thirdly, it is important to remember that career aspirations are shaped by children's awareness of careers, even though this might be limited at first. To circumvent children's aspirations being shaped by inappropriate or even inaccurate representations of careers, program developers can present children with an introduction into a world of work where the careers presented are based on principles of encouraging gender equity, cultural diversity, and equal opportunity irrespective of socioeconomic background.

Fourthly, it is necessary for children to become aware of the fact that, although socioeconomic contexts do influence career aspirations, an awareness of personal agency and decision-making can significantly influence future career decision making. This can only be

accomplished through intentional career learning experiences that encourage age appropriate career exploration, awareness, aspirations and expectations, interests, and adaptability during childhood as these facilitate the development of personal identity and connectedness to the social and interpersonal world.

Fifthly, children's career development learning needs to be seen as a recursive process between children and a broad array of influences from their social and environmental contexts (McMahon & Watson, 2009). Considering the interplay of a variety of influences during childhood, we need to ensure that children have received sufficient support in the development of age appropriate career skills to benefit from their increased capacity to make decisions.

And finally, from the information presented in this chapter it is clear that by creating appropriate technology-based learning activities, supportive learning environments, and developmentally appropriate activities for children, researchers can provide a variety of positive learning experiences for children.

The six research conclusions listed above constitute one aspect informing the development and design of the GCBC™ which is comprehensively described in the next chapter. These findings, in addition to the insights gained from career theory, career education policy and extant career programs ultimately informed the development and design of the GCBC™.

Conclusion

Although some may argue that the elementary and middle school years may be too early to think and learn about the world of work and to begin the process of establishing a career identity, the research findings presented in this chapter suggest otherwise. In this chapter research pertaining to children's career development, the effectiveness of career education programs, and the feasibility of using computer-based interventions in an intentional learning

activity were described. However, it is evident from the research overview that the concerns raised about the present and future status of the literature on children's career development persist. Research on children's career development reinforces the fact that children's career development continues to be described from a restrictive and limited base, whether this base be theoretical, research, or practice. Consequently, considering the relevant information reviewed in this and earlier chapters , including the key research recommendations of the present chapter, the focus now shifts to describing how the development of the Growing Up: Children Building Careers™ (GCBC™) program attempted to integrate salient features identified across Chapters 2, 3, 4, and 5.

CHAPTER 6

GROWING-UP: CHILDREN BUILDING CAREERS™: DEVELOPMENT AND DESIGN

Throughout the preceding chapters the focus has been on providing the reader with the theoretical and contextual rationale for the present study. This chapter provides an overview of the main theoretical (child, career, and learning theories), career education (including policy recommendations), program development suggestions, and research recommendations from the preceding chapters which were considered in the development and design of the Growing-Up: Children Building Careers™ (GCBC™). In addition, this chapter provides the technical details of the GCBC™ program development and design.

Attention to design that is developmentally appropriate and supportive of children's needs as exemplified by recent adult/child design collaborations (Druin, 2002; Large, Beheshti, Nesset, & Bowler, 2003) moves us closer to a wiser and more enlightened implementation of technology as a tool for children's learning. Digital environments, such as the GCBC™, are tools that broaden and extend learning possibilities for children and, according to Cooper (2005), an appropriately designed digital environment can provide a vehicle that takes children further than they might have travelled unassisted. However, before the focus shifts to a description of the program's content, graphic design, and technical development, a summary of the most important theoretical, policy, research, and practice recommendations and considerations that apply to this program development are provided. As described later in this chapter, these recommendations formed the contextual background for the development and design of the GCBC™.

Theory, Policy, Research and Practice Informing Career Program Development

Throughout the following subsection four key areas are examined which directly impact on the GCBC™ program development and design. Specifically, the most salient features and recommendations of theory (including child development, career, and learning theories), policy (i.e., career education policy), research (i.e., evidence-based career learning programs), and practice (i.e., available career learning programs) were used as a framework that could contribute to the development and design of the GCBC™, either in terms of program content or presentation format. Each of these four major areas is now described.

Theory and the GCBC™ Development and Design

This first section addresses the content areas proposed in Chapters 2 and 3 in which child development theories, career theories and learning theories were overviewed. This chapter presents the most relevant theoretical information for the conceptual formulation of the GCBC™ program.

Magnuson and Starr (2000) highlighted some of the most important contributions child and career development theories have made to the field of career interventions and these include that: children are naturally curious and seek to understand the world; look to more knowledgeable others for guidance; judge themselves by the responses of others to their self-initiated explorations; observe people at work and draw conclusions about the nature and desirability of the work; form ideas about themselves and their aspirations; and are shaped and influenced by meaningful career learning experiences. Each of these theoretical contributions can be directly linked to aspects of career program development. For the purposes of this chapter, these theoretical contributions are first identified and then related to the development of the GCBC™, a career learning program for children.

Two specific aspects of Piaget's theory were considered in the GCBC™ program development and design. The first relates to the need to stimulate curiosity during childhood and the second to children's ability to process information, which during these early stages of development is seen as being limited to concrete 'elements' and experiences. It has been documented that one of the key aspects of successful educational programs (i.e., learning programs) is the way in which curiosity is stimulated, facilitated, and developed. Piaget (1970, 1977) suggests that if curiosity as an early developmental construct has been nurtured, children will be more willing to explore during subsequent developmental stages. Considering that career exploration is one of the core career skills needed during adolescence, curiosity is seen as a precursor skill that needs to be established during childhood. Therefore, children's participation in an intentional career learning program should stimulate, facilitate, and develop curiosity about careers in order to support later exploration.

To encourage exploration as part of an intervention, the GCBC™ instructions for successful participation need to be clear, yet should also allow spontaneous exploration to occur. Children who are eight to ten years old are most likely in Piaget's (1970, 1977) concrete operational stage of development which means that their understanding of concepts such as change and comparison is physical rather than abstract. Thus, career content should be presented using concrete elements as far as possible, i.e., tools or objects that can be presented in a visual or tangible format to the child. Since children's understanding is still grounded in what is concrete and physical, Cooper (2005) suggests that children may have difficulty using electronic metadata. However, while a digital representation of a worker's tools of the trade (e.g., a digital display of the various tools a doctor uses) is not concrete, there is an observable reference to that which children have experienced concretely and understand (Cooper).

The years between six and eleven years of age represent a rapid period of developmental advances that establishes children's belief in themselves and their subsequent self-concept development. During middle childhood, children develop a sense of self-esteem and individuality, which has importance not only at a self-concept level but also in terms of the career aspirations they hold. It is here where age appropriate career interventions are most needed. From Erikson's (1985) theory, it can be deduced that the greatest obstacle for intentional career intervention provision lies in the fact that children's development is unpredictable and does not always conform to theoretical parameters in terms of age. This translates to developing and designing age appropriate career interventions that can accommodate a variety of learners at different stages of development. The concept of differentiation applies in that the program content is presented in such a format so as to accommodate strong, average, and still developing learners. Erikson also identified that children are dependent on others for learning opportunities and consequently age appropriate career interventions should include educators as facilitators in the learning process. In this regard the GCBC™ presents learners with the opportunity to gain mastery in a variety of career developmental skills thus facilitating children's development of what Erikson conceptualised as 'industry'. Children can participate in various activities where the goal is to gain self-awareness through their participation. It is anticipated that successful completion of the different GCBC™ activities can contribute to children's experience of personal achievement and reward which Erikson viewed as critical to the process of further development.

There are a number of key contributions from career theories towards program development. Super (1990) views the development of interests in activities both in- and outside of school as an important facet of the child's emerging self-concept and later career decision-making. It has been suggested that age appropriate career interventions can significantly assist the

achievement of the developmental tasks of Super's Growth stage (i.e., becoming concerned about the future, increasing personal control over one's own life, convincing oneself to achieve in school and at work, and acquiring competent work habits and attitudes). Career interventions should allow children to explore their developing interests in a non-judgemental and non-prescriptive manner. In addition, any career intervention directed at children should include a means of providing positive feedback as part of the learning activities presented. This is paramount, as it has been suggested that encouraging children's emerging interests during this stage is helpful in the development of their career readiness. In the early elementary school years, developing an awareness and appreciation of different kinds of work and workers is the primary emphasis; career exploration at this level is designed to create an awareness that work tasks represent applications of academic skills (Magnuson & Starr, 2000).

Savickas (2002; 2005) provides program developers with guidelines that can be used to identify content and activities needed for age appropriate career interventions. An added benefit of Savickas's career construction theory is that it provides program developers with a means of effectively integrating Holland's RIASEC model in a manner that is not prescriptive (i.e., it does not force individuals to only consider a limited range of careers) and that can be adapted to suit the information needs of children of various ages (for example, the younger the child, the simpler the information). This allows for the application of career construction theory within educational contexts because the various components of career construction theory can easily be translated into age specific learning program content. In addition, because Savickas views Holland's RIASEC model as a useful approach for appraising individual differences and for describing career groups, these types were used to organise the career information content included in the GCBC™.

Gottfredson's (1981, 2002, 2005) contribution to career program design is that the success of any age appropriate career intervention lies in its ability to translate the career content into manageable segments to be used in early career development. Therefore, a careful analysis of the complexity and comprehensibility of intended career material and interventions is needed to ensure that they are not too complicated, too abstract, or their vocabulary too difficult (Gottfredson, 2005). Activities should be short, elemental, discrete, and concrete. Gottfredson's theory also comments on the importance of challenging career stereotypes based on gender, status level, and the ability investment needed to achieve success. If these stereotypes are not challenged children tend to foreclose on large sections of their occupational map. It is for this reason that non-traditional career characters were selected for the GCBC™, for example, a female farmer.

Although not specifically reviewed in the present study, the Systems Theory Framework (STF) (Patton & McMahon, 1999, 2006) (similar to elements of career construction theory), recognises both content and process influences that contribute to children's career development. The contribution that the STF made to the GCBC™ was to acknowledge the importance of unique contextual influences, which could then be translated into the career narratives of the four main characters. Each character has a unique story that highlights different content and process influences. The STF has been used to suggest that career development theory needs to be viewed from a learning perspective; consequently a distinction was made between intentional and unintentional career learning experiences in the GCBC™. The GCBC™ was designed as an intentional career learning experience with specific reference to facilitating the development of age appropriate career skills.

An overview of learning theory also contributed to the GCBC's™ development and design as it was evident from such theory that meaningful learning experiences require that the learning activities should provide an opportunity to think, to feel, to perceive, and to experience as individuals relate with past experience and an ongoing interaction with the world throughout their lives (Clements & Samara, 2002; Kolb, 1984; Kolb et al., 2000; Krumboltz, 1996; Vygotsky, 1978). The GCBC™ activities need to connect the world of childhood play and adult workplace within the context of experiential learning. A consistent theme throughout the GCBC™ is learning, whether this is intentional or unintentional, and consequently all elements and activities of the GCBC™ were geared towards the acquisition of career awareness, curiosity about careers, self-awareness and exploration, and other age appropriate career skills.

For optimal career learning to take place, learners must be able to learn through social interaction; participate through learning with assistance from peers or educators or through assisting struggling learners themselves. Also important to consider in the development of the GCBC™ is the learning contexts in which children play an active role. Optimal learning takes place if a balance can be achieved between the traditional roles of teaching and efforts that collaborate with learners in order to help facilitate meaning construction in learners (Vygotsky, 1978). Consequently the GCBC™ activities need to provide opportunities for bridging the gap between providing information and co-constructing meaning.

Experiential learning theory suggests that learning through experiential activity can provide the context for career development learning to take place. In particular, it offers the potential for preparation for real-world tasks that will be faced in adulthood (Schultheiss, 2008). More importantly here is the suggestion that direct, simulated, and vicarious experiences can help children to connect school-based learning to the tasks they will undertake as adults (Schultheiss).

Connecting school-based learning to career information is critical if the foundation for lifelong career development is to be established during these early developmental years. This was one of the primary goals of the GCBC™ and, as described later, became a major theme throughout the GCBC's™ development.

Lastly, the method of presentation of the GCBC™ requires a sensitive awareness of what constitutes an appropriate multimedia format. From the information reviewed, it is clear that technology is beneficial to children's learning if used appropriately (Keengwe & Onchwari, 2009). Smeets (2005) draws attention to the need for technology-supported learning environments in early childhood and elementary education. The GCBC™ combines both verbal and nonverbal elements in a computer-based format and presents material in a way that promotes generative processing without overloading the capacity of the learner's information processing system (Mayer, 2001; Mayer & Moreno, 2003). These factors were all considered in the GCBC's™ development and design as will be evident later in the chapter.

Clearly, there is much theoretical support for intentional career learning programs; however, the guidelines proposed in theory only support one element of the GCBC's™ program development and design. Another element was the review of career education policy and this provided much insight into what policy makers expect from programs such as the GCBC™.

Policy and the GCBC™ Development and Design

Chapter 4 of the present thesis addresses policy issues and highlights the need for interdisciplinary collaboration when it comes to the development and implementation of career education programs during the elementary school years. An overview of policy relating to career guidance and education conducted by the OECD (2004) highlights the current deficit within the

field. Four main drivers for program development are summarised in this OECD report and they are discussed below in relation to the GCBC™ program development. These drivers are:

1. It is clear that the foundations of career self-management skills (i.e., decision making and self-awareness) are established at an early age. Despite this awareness, career education and guidance at the elementary school level is limited or non-existent and when it does exist it makes little systematic provision for exploring the world of work (Lapan, 2004). With regards to this driver, the GCBC™ aims to fill this gap by providing a research based career learning program directed at young learners and which focuses on exploring the world of work.
2. Young people need to make a smooth transition from elementary school to the initial years of secondary education, especially considering that the educational choices that they make at this point have major implications for later education and career options (OECD, 2004). Central to this transition is the provision of relevant career services (including career education and intentional career learning programs) to assist learners in accomplishing this goal. In this regard, the GCBC™ aims to assist learners at the elementary school level to develop age appropriate career skills with the assumption that these will benefit them at a later stage of decision-making at the secondary school level.
3. Although career education is offered at lower secondary school level either as a separate subject or subsumed within a broader learning field, it is included in widely differing ways, often not acknowledging the career development needs of learners and with little connection to the wider school curriculum (OECD, 2004). The GCBC™ used career development theory and child development theory as a guiding framework throughout its development and design (as described later in this chapter). The GCBC™ is seen as an intentional career

learning program, yet it offers much in terms of the development of literacy skills and consequently answers the call to connect career intervention programs with the wider school curriculum.

4. Finally, in lower secondary schools career guidance frequently targets learners at key decision-making points (for instance, when they are choosing school subjects). What is needed is recognition of the lifelong developmental needs of learners and, more importantly, providing learners with facilitated activities to develop age appropriate career skills. It is believed that the GCBC™ can fill this gap by orientating learners to the world of work and facilitating self-concept development during this crucial stage of career development.

As can be seen from the above four points, in terms of policy requirements the GCBC™ attempts to address concerns noted for program development and, therefore, it should provide sufficient space for career learning to take place. It is, however, important to ensure that the program attempts to integrate some of the more pertinent research recommendations as a means of bridging the gap between theory, research, and practice.

Research and the GCBC™ Development and Design

The major research findings as well as their implications for career learning program development have already been reviewed in Chapter 5. However, a brief summary is also provided here in order to contextualise the GCBC™ as a career learning intervention shaped and informed by theory, policy, practice, and for this particular subsection, research.

Research has consistently demonstrated that career aspirations and expectations are relatively stable over time and provide substantial predictive power for later aspirations and, to a lesser degree, their eventual attainment (Rojewski, 2007). These findings support research conducted by Schultheiss (2008) who found that some children have already begun to

conceptualise the importance of earning money, providing a home for one's family, balancing work and family, and helping others through their work. The contribution of research to the GCBC™ program development is the knowledge that attitudes towards work are formed early in life, so career services and programs should begin at an early stage (Savickas, 1993). Here it has been identified that early experiences can significantly help to shape an individual's future career.

According to Sodano and Tracey (2007), if children engage in activities and behaviours which could influence their developing self-concepts, efforts aimed at the career education of children might best be served by providing information on the world of work from the perspective of Holland's (1997) model of interests. However, the RIASEC model must be adapted and the information subsequently presented according to the developmental level of the targeted population. In the present research there are a number of instances where the RIASEC model was used, for example, to inform the selection and representations of careers used in the GCBC™.

Another important contribution from the research review is that, as children express interest in careers and begin to learn about them, they can be assisted in understanding how career goals are achieved (Phipps, 1995). This is particularly important considering that many children fail to see the relevance of their schoolwork to future work and life roles (Watson & McMahon, 2007). Furthermore it has been found that direct, simulated, and vicarious experiences are a key to help children connect school-based learning to the tasks they will undertake as adults (Harkins, 2000; Schultheiss, 2008). Consequently it was necessary to present career information in such a manner that would encourage children to interact with both the career characters and the career specific content. As is described later on this became the focus of one of the learning activities in

the GCBC™ (i.e., the Cape of Careers) where various career characters give children the opportunity to learn about the career and a variety of career specific 'tools of the trade'. Through participation in this activity children are made aware of the differences between careers not only in terms of the focus of the work, but also in terms of the various skills needed to succeed in these careers.

Individual interviews, group work sessions, access to career-related information and a wide range of work-related activities, appear to have a positive impact on the development of learners' career-related skills (Transitions Review Group, 2005). In addition, the general consensus is that it is important to integrate career education programs with the wider curriculum. It is here where Information Communication and Technology (ICT) can play an invaluable role because it has been found that, compared to older students, children demonstrate higher gains in learning outcomes with ICT. In addition, according to Volman and Van Eck (2001), children have a positive attitude to using ICT in their learning. Learning experiences that make use of technology at an early age can potentially positively change children's later learning experiences (Dwyer, 2007). Consequently it was decided to develop the GCBC™ in a computer-based format thus responding to recommendations made by Skorikov and Patton (2007) and Harris-Bowlsbey and Sampson Jr (2005).

Practice and the GCBC™ Development and Design

A final key aspect that needed to be considered was best practice principles of learning programs in career education and, in particular, computer-based career exploration or learning programs. An overview of the career literature suggests that there is considerable information available on the theoretical parameters that should guide program development; yet finding interventions that have used these parameters within their design proves difficult. It is therefore

important to track existing information on what is regarded as best practice principles for career learning program design, and then to use that information in the development and design of the GCBC™. This does not mean that research based interventions do not exist, as can be evidenced in Chapter 4; however, information about the format, content and design behind program development is limited.

An effective learning program requires the achievement of various forms of learning objectives, including demonstrating memory of previously learned materials by recalling facts, terms, basic concepts and answers (i.e., knowledge), a demonstrative understanding of facts and ideas by organising, comparing, translating, interpreting, providing descriptions, and stating main ideas (i.e., comprehension), and using new knowledge gained in solving problems (i.e., application) (Krathwohl, 2002). Although these represent only a few of the learning objectives identified in research, they do represent core objectives of programs presented during foundation (Grades 1 to 3) and intermediate phase learning (Grades 4 to 6) (Department of Education, 2002).

The Blueprint framework (Hooley et al., 2012; Jarvis & Richardt, 2000; MCEETYA, 2009) sets out an approach to career development which is underpinned by a learning paradigm. It advocates rejecting "the idea that career is just about making career choices and argue that in flexible and dynamic labour markets individuals need the ability to actively manage their careers" (Hooley et al., p. 1). This view is supported by the present researcher who attempted to translate theory, policy, and research about children's career development into an intentional career learning experience. The insights gained from the Blueprint documents were thus carefully considered in the development and design of the GCBC™ specifically because it is one of the few examples illustrating a means to bridge the gap between theory, research, and practice.

The Blueprint's distinctive contribution is not that it defines a particular learning model but rather, according to Hooley et al., (p. 8), that it "joins the question of 'what should be learnt?' to the question of 'how is it learnt?'"

Australia has for several years invested much interest in researching the core competencies needed in career learning interventions. The career education curriculum framework and outcomes developed by the Australian Education Council (1992), the key competencies recommendations of the Mayer Report (Mayer, 1992), the work of McMahon and Carroll (1999) in developing a K-12 career education program, and more recently, the Australian Blueprint for Career Development (ABCD) (MCEETYA, 2009) all provide examples of guidelines which can be used to develop career learning programs.

These guidelines were considered in the development and design of the GCBC™ and included four key elements that career interventions should cover. They are: children should learn about self in relation to work; children must learn about the world of work; children must learn to make career plans and decisions; and children must be able to implement career decisions and manage work transitions (Australian Education Council, 1992; MCEETYA, 2009). According to McMahon and Carroll (2001), each element, in line with career development theory, has a different emphasis for children of different age groups, with the latter two elements assuming greater importance and relevance in the last three or four years of secondary schooling. The manner in which these elements are used in the GCBC's™ development and design follows the principle that all elements are to be addressed, but the outcomes are shaped by the degrees of maturity and the developmental nature of career education for eight to ten year olds. The four key elements that career interventions should cover were used in the GCBC's™ development and design to ensure what is expected of a career intervention program.

The information presented here was also linked with information gathered in Chapter 4 which provided an overview of career education programs. Here it was found that career programs should assist children to acquire a better understanding of themselves in relation to the world of work and to develop a greater understanding of the diversity of life roles in which individuals engage on a daily basis. What is particularly critical is that children should learn to appreciate the relevance of their school education, and learn and practice the career management skills needed to achieve goals. In addition, educators have become more concerned with how ICT can be effectively used to facilitate children's learning and development (Wang & Hoot, 2006), and therefore the GCBC™ attempted to provide an example of such a program.

Each theory, policy document, available career learning program, and published research overviewed for the present research offers information that can shape ideas around the development and design of age appropriate career interventions for young learners. In summary, appropriately designed career learning programs need to include: a learner focus; endorsement and support by management and all stakeholders; up-to-date information; a variety of curriculum resources; appropriate trained personnel; and be coordinated, monitored and evaluated (McCowan & McKenzie, 1997; MCEETYA, 2009; Patton & McMahon, 2001). Furthermore, developmentally appropriate digital environments should support the child as a unique individual, encourage exploration, experimentation, and risk taking, encourage critical thinking, decision making, and problem solving, offer quick feedback, be interruptible, offer new challenges, build on previous learning, encourage reflection and metacognition, and support social interaction (Appel & O'Gara, 2001; Clements & Samara, 2002; Downes et al., 2001). The next subsection of this chapter describes how these recommendations were utilised in the development and design of the GCBC™.

The GCBC™ Development and Design

The purpose of this subsection is to describe the process which was followed in the GCBC™ development and design. This process consisted of a number of stages which spanned a three year period. To simplify the discussion of the many steps involved during this period, the information will be presented according to the eight broad stages of the GCBC's™ development which included: the concept formulation (which included the panel review; Stage 1); content identification and program elements (which included the program structure and the development of the story elements; Stage 2); character development and design (which included the four main characters, the twelve career characters, and the GCBC™ mascot; stage 3); audio and visual development (which included the audio recordings and sound elements, the graphic design of all program elements, and the editing and development of the video content; Stage 4); computer programming and software packaging (Stage 5); the pilot study (Stage 6); the workbook development and design (Stage 7); and lastly, the finalisation of the GCBC™ (Stage 8).

These eight stages of program development constitute one of the five phases of the broader research project. The remaining four phases are described in Chapter 7. Phase One, which is described in this chapter, specifically describes how the GCBC™ came into existence.

Stage 1

Concept formulation

The GCBC™ was developed over a three year period. This involved numerous consultations with key stakeholders within education, research supervisors, and software developers regarding the need for an age appropriate career exploration and awareness program for children.

The researcher broadly knew what the career intervention was supposed to address in terms of research-based guidelines. These guidelines, which have been reviewed earlier, provided the researcher with the parameters within which the GCBC™ could be designed. Although initial concepts concerning the GCBC™ were guided by research, the 'look' and 'feel' of the program was difficult to hypothesise about because of the limited number of career programs available for eight to ten year old children. In addition, during the concept formation stage of the GCBC™ it was necessary to consider a variety of potential themes (i.e., story elements that had to ensure continuity between the learning activities) that needed to be integrated into the working draft of the program.

A comparison of other age specific computer-based learning interventions (for example, CAMI [CAMI Educational Software, 2012] and Bookworm Adventures [PopCap Games, 2006]) as well as mainstream gaming (for example, Treasure Island [NevoSoft software, 2011]) further provided the researcher with insight into possible viable themes that could be translated into a functional computer-based program. The aforementioned software research resulted in an initial working concept draft which included the integration of information available on what is required for an age appropriate career intervention. Despite a thorough research and software review, few examples of similar type programs (i.e., career awareness programs for young children) were available. The result was that the working GCBC™ concept was vague and needed clarification before the next phase of program development could commence. This clarification was accomplished through consultation and supervision with the research supervisors and resulted in the preliminary concepts being translated into tangible program themes, elements, and learning activities.

At this early stage of the GCBC's™ development the researcher envisioned the career learning program to have a number of key elements which included: a 'mascot' or program character that would narrate the story elements and provide the link between the various learning activities; a homework workbook that would link the GCBC™ activities on consecutive days of schooling; and five distinct content areas or career learning activities that could be tied to curriculum themes presented using an interactive whiteboard during normal academic times.

Panel review

Considering that the primary researcher's home residence is in the Southern Cape, the local Education Department was initially approached to assist with the panel review. This procedure is comprehensively described in Chapter 7. The initial program outline and activity elements were presented to a panel of six key officials of the Western Cape Education Department (Eden/Karoo District) and included two psychologists, two curriculum advisors and two learning support educators. During this phase of the GCBC's™ development panel participants were encouraged to comment on the suitability of the content for Grades 3 to 4 learners who were the proposed sample for the final program. The panel was specifically asked to examine: a) the link between the GCBC™ and the General Education and Training Certificate (GETC) curriculum offered within the district; b) the GCBC's™ potential for use within schools; c) the relevance of the envisioned program content to standard lesson plans offered at present; and d) whether or not there were any potential pitfalls in terms of what was needed for a specific learning program such as the GCBC™ that needed to be addressed.

The support for the program was overwhelmingly positive and the panel expressed the desire to be kept informed of the program development progress. One suggestion was made which was that future development of the GCBC™ must involve departmental officials because

they would be able to develop unit standards which could be used in evaluation and assessment. Any learning program offered in schools needs to be linked to assessment procedures and these ideally need to fit the existing assessment model. A major obstacle for a career intervention program like this is that similar types of program do not exist; hence no assessment standards are available at present. The suggestion to involve departmental officials with the continued development of the GCBC™ was formally acknowledged and mandated as part of further development of the GCBC™.

Stage 2

Content identification and program elements development

The interpretation of the initial concepts into tangible program elements were brainstormed during the panel review stage and subsequent research supervision, and provisional program content was then hypothesised. It was hypothesised that the GCBC™ would reflect five learning areas constituting the five activities of the program. These five activities would introduce children to the following: understanding the importance of career narratives (activity 1); exposing children to age appropriate career information (activity 2); introducing the concept of self-awareness as a precursor to self-concept development (activity 3); linking school activities and developing interests to future careers (activity 4); and understanding the developmental nature of career decision-making (activity 5). The goal of the GCBC™ was to provide a single platform which could be used to expose children to a range of age appropriate career learning activities. Therefore, it was decided to combine these five activities into a common theme (i.e., explorers on a journey discovering unknown territory) and to present each activity (or learning area) as a separate island in a fictional world, each with a specific focus on a predetermined career learning objective.

In the final GCBC™ program each island would represent a separate lesson in the career learning process, yet sequentially these activities would provide learners with the opportunity to develop age appropriate career skills that have been proposed in theory, research, and practice recommendations. The five islands of the GCBC™ were named *Notuyoung*[12] *Island* (understanding the importance of career narratives), the *Cape of Careers* (exposing children to age appropriate career information), *Who-Am-I Island* (introducing the concept of self-awareness as a precursor to self-concept development), *Practise Mountain* (linking school activities and developing interests to future careers), and *Treasure Island* (understanding the developmental nature of career decision-making).

It was important to introduce a 'fun' element to these islands and to bring the GCBC™ closer to what children expect from a computer based activity. In brief, it was necessary to ensure that the program looked like and had elements of mainstream gaming, hence the introduction of the puzzle theme. Children are informed that there are five hidden puzzle pieces scattered throughout the GCBC™ world. Each island represents an opportunity to find one of these puzzle pieces. In order to successfully complete the program all five pieces need to be discovered. This 'hidden treasure' theme encouraged children to participate in the program and stimulated exploration throughout the various GCBC™ activities. These program elements are discussed next.

Program structure: The Five Islands of the GCBC™

Notuyoung Island

The first island or stage of the GCBC™ is called Notuyoung Island and it is here where children meet the four main characters of the program. These four characters, Jonas, Ling-Ling,

[12] Notuyoung Island is pronounced "*Not-too-young*" referring to the fact that children are 'not too young' to begin their career journey at elementary school level.

Mark, and Mary, all live on Notuyoung Island in a variety of different socioeconomic communities. Each character presents a career narrative that, on face value, describes some of the better known cultural types and socioeconomic environments known to South Africans. However, as discovered later, despite certain preconceived ideas about an individual's background and resultant career aspirations, these four characters reveal that career stories are unique and context sensitive.

The purpose of the visit to Notuyoung Island is to introduce these four characters and their unique life stories so that children can identify with them on some level. Diversity in terms of life stories is encouraged and the messages from the main characters is to be proud of who you are and acknowledge that we all have talents and skills that need to be developed. These four character stories are summarised in Appendices 16 to 19. The lesson that is hidden on this first island is the realisation that it does not matter where you come from. Limitations (for example, in terms of money or family support) are part of an individual's upbringing yet these do not have to have a detrimental influence on an individual's self-concept and future career aspirations. The researcher attempted to challenge some of the predominant stereotypes that currently pervade societal expectations related to career aspirations and family structure. For example, Jonas lives in a township (often characterised by poor educational infrastructure) yet he has a stable and supportive family environment which contributes to Jonas having a positive outlook on life and his future career.

Each of the main characters presents a set of context sensitive shaping influences which has contributed, directly or indirectly, to the characters' self-concepts. These influences range from personality factors, talents and abilities, financial limitations, family support or the lack thereof, future aspirations and the impact of role models to name several. At the end of this

lesson children are presented with a quiz where they are expected to match some of the story elements to the respective characters. This activity is followed with a homework exercise where children have to choose one of the career characters, read their story, complete a word search puzzle and complete a maze to find the missing puzzle piece, 'Puzzle Piece 1'. These activities are included in the GCBC™ to provide an opportunity for learners to develop their literacy skills and visual spatial coordination. As mentioned earlier, although the GCBC™ was developed as a career learning intervention, general scholastic skills form part of early career development requirements hence this latent focus of the program.

The next island that is visited in the GCBC™ is called the Cape of Careers and it is here where children meet twelve interesting career characters.

Cape of Careers

The Cape of Careers is the second stop on the GCBC™ program and introduces twelve career characters to children. These twelve career characters were selected using Holland's (1997) RIASEC model where two career characters representing each of the six Holland occupational types were selected. The author utilised this typology approach for coding job titles or broad interest categories given that the RIASEC model has recently been employed within career construction theory. The primary reason for including Holland's RIASEC typology as a method for organising program content was similar to that suggested by career construction theory, i.e., that these interest types are simply resemblances to socially constructed clusters of attitudes and skills (Savickas, 2005). Holland's typology has been previously used with children (Tracey, 2001; Tracey & Ward, 1998) to characterise the social organisation of careers. Holland's (1997) RIASEC model is the best known example for categorising careers and the model reflects key aspects of an individual's interests, self-beliefs, and aspirations. Savickas

views Holland's RIASEC model as a useful approach for appraising individual differences and for describing career groups. Holland's typology model was used to organise the career content included in the GCBC™.

Although Holland's coding system makes use of a three letter code to describe career types, only the first letter in each career type was utilised for current classification purposes. The rationale for limiting the classification of the twelve GCBC™ careers to a single 'type' or category stems from the fact that children are still in the process of developing and they may not yet possess the cognitive skills needed to benefit from a more complex three letter classification. For the Cape of Careers activity, the one letter classification of careers ensured that the learning activity was not overcomplicated. The RIASEC model, as suggested in career construction theory, became a tool to create awareness of different types of careers and was not used to limit children's career options [see Savickas (2005) in this regard]. The careers selected for the GCBC™ are presented in Table 2.

Table 2

Classification of the Career Characters Using Holland's Typology

Holland's Type	**Career 1**	**Career 2**
Realistic	Farmer	Chef
Investigative	Doctor	Veterinarian
Artistic	Photographer	Artist
Social	Nurse	Teacher
Enterprising	Entrepreneur	Restaurant Manager
Conventional	Accountant	IT Technician/Operator*

*coding from Onet Database Online

To remain true to the ‘game’ theme, it was decided to introduce a ‘spinning wheel’ as the method for choosing the career characters. Each character could be selected, visited, and reviewed as a means of exposing children to various career fields. The reason why two careers for each type were selected was to provide the facilitator with the option of adapting the amount of information covered to the age of the learners (i.e., in future roll-out of the program). For example, Grade 4 learners would be able to manage the information load of all twelve career characters in a short space of time (i.e., over a three day period), whereas Grade 3 learners would benefit more from exposure to career characters over an extended period. In the present research, however, the exposure time for the Grades 3 and 4 participants was exactly the same. What was important in the development and design of this activity was that the focus was on creating awareness of the different types of career environments, not on asking children to limit their choice to one of the twelve career characters presented in the GCBC™. While an overview of each of the twelve career characters is included in the appendices, a description of the activity is provided below.

The Cape of Careers starts with the program mascot, Dotty, introducing the concept of careers to learners who are told that they are to participate in a game. The game element is that children interact with The Career Wheel (see Figure 4) and, through pressing a button on the interactive whiteboard, spin the wheel to make a selection. All twelve careers are included on the career wheel and they are represented by a simple icon that relates to the career (i.e., a calculator icon for the accountant, a camera for the photographer). In Figure 4, the Veterinarian has been selected (i.e., the dog and cat icon is directly across from the purple arrow) and the veterinarian (i.e., the career character) shows up on the screen.

Figure 4. GCBC™ Screenshot of the Career Wheel

Once the correct environment has been selected, the career character shares pertinent information about what the career entails, with specific attention given to personal qualities and interests required for the career. For example, a veterinarian must: have respect and love for animals and must be able to work with them; be able to look for and find symptoms that can be treated in animals; be able to handle small instruments; and must have good vision, hearing, and health. Only four characteristics are listed here considering the need to protect children from information overload. This is one of the pitfalls that prevent existing programs from reaching their full potential.

As a career learning activity, the Cape of Careers also provides learners with the opportunity to explore the career environments and some of the tools of the trade of each of the career characters. Because children during this stage are largely focused on learning through

direct contact with information, it was important to expose children to the concrete elements that they would find in any particular career. The exploration of the tools of the trade of each of the careers also facilitated the development of literacy skills in that children learned new words and they were also exposed to the explanation of these words. This activity only focused on learning six tools of the trade. This was thought to be an appropriate number considering the learners' age and attention focus. An exploration of the tools of the trade for the veterinarian would then expose children to the following: medication; vaccination; exotic animals; microscope; safety equipment; and pets. Children can decide the order in which to click on these tools of the trade and they are then provided with a description of that element, construct, tool, or activity. Once all the tools have been selected, the program moves on to link school activities with the work of the career.

It is at this stage that children need to answer several questions about the learning that has taken place. One activity that proved enjoyable for the children was the linking and matching activity (see Figure 5). Children are presented with a puzzle-type activity where the tools of the trade are listed on the left and their function or description is listed on the right. Using the stylus pen and the interactive whiteboard children are called to the screen to make their selection and match two of these elements together. The quiz element was a necessary addition to the GCBC™ program considering the GCBC's™ emphasis on career learning. Part of this learning is about career information and this is where children are asked to reflect on the learning that has taken place.

What is important is that the GCBC™ only introduces the concept of career information to children and the information provided is by no means a comprehensive list of career requirements and attributes. Rather children are merely made aware of the importance of school

activities and their link with future careers. The exploration of each of the twelve careers ends with a congratulatory note and children are praised for their willingness to participate in the activity.

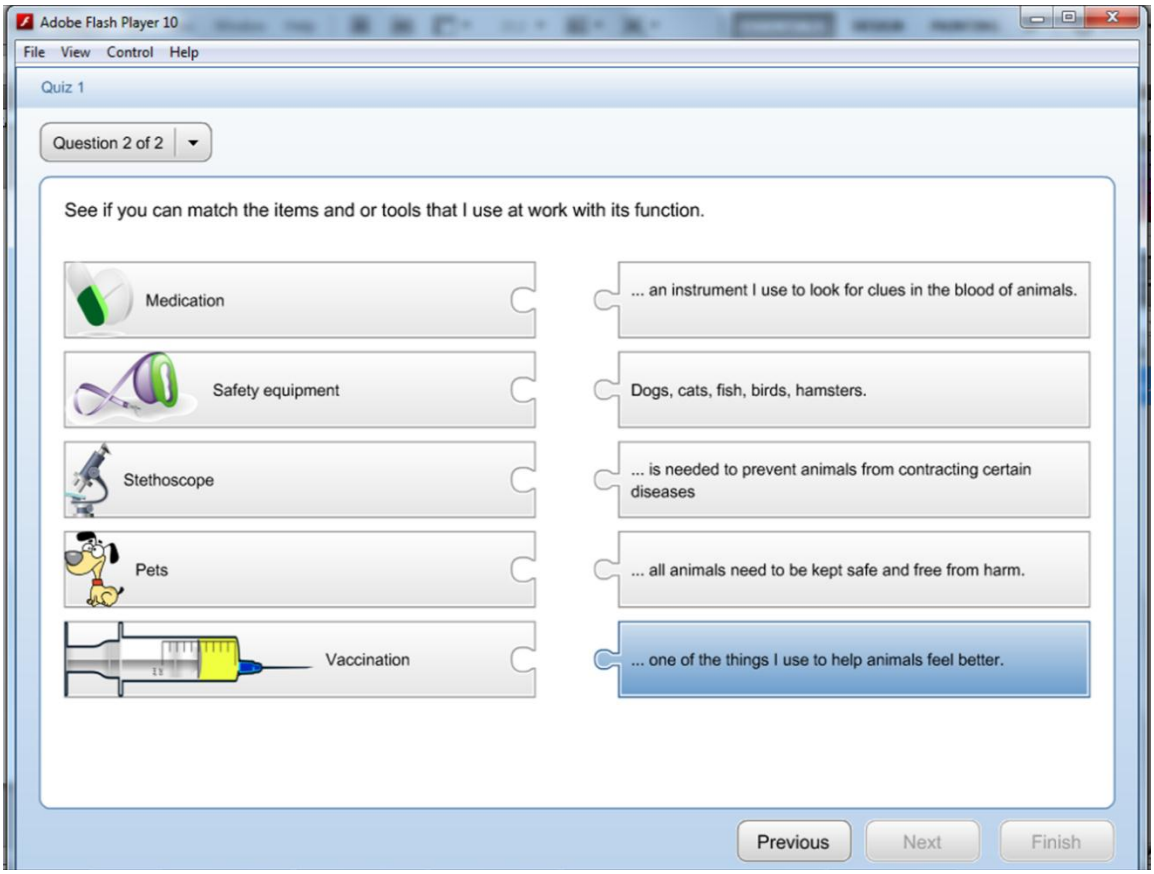

Figure 5. GCBC™ Screenshot of the Tools of the Trade Quiz (activity) - Veterinarian

In future rollout of the program it will be possible to better manage the amount of time spent on each of the career characters. This would allow educators to tailor their lessons to suit the developmental level of the children. The younger the learner the more time can be dedicated to exploring the various facets of the career. Each career is summarised in the GCBC™ workbook (see also Appendices 18 to 29) and children are expected to revisit the various careers as homework.

Who-Am-I Island

Who-Am-I Island is the third stop on the GCBC™ program and includes four activities, namely: how do I describe myself; how do I describe other people; important people in my life; and what I like and what I don't like. Each of these stops on Who-Am-I Island aims to facilitate the development of self-awareness and the identification of the systems of influence in children's lives. A brief overview of each of these stops is provided next.

Children's first activity on Who-Am-I Island is 'How do I describe myself'. Dotty introduces the topic of being different from the people around us. Children learn that they can describe people by referring to external qualities that they can observe just by looking at people (for example, they can describe people as being tall, short, having curly hair, and so forth). From here the focus turns to qualities that they can describe just by looking at the way people interact with others or the way people complete tasks (for example, happy, thoughtful, hardworking, inspiring, social, and so forth). Children are then provided with an opportunity to describe themselves. Various words are introduced and children can make a selection (limiting this selection to three words that best describe themselves) from this source list which includes a wide variety of descriptive pronouns. Once the words have been selected, children can reflect on the relevance of the words to themselves. During this activity, children become aware of the significant differences apparent in the way that different children describe themselves. Uniqueness is valued and encouraged throughout this activity and there is no pressure to conform to class norms or expectations.

Similar to the previous activity, activity two requires children to take what they have learned in terms of describing themselves and then to describe other people. Specifically, children are asked to describe their class teacher. Again a list of descriptive words is provided

and children can select three words that describe their teacher best (i.e., funny, interesting, punctual, honest, kind, strict, fair, friendly, encouraging, trustworthy). It was decided that only positive wording would be used in this activity (i.e., representing a range of positive characteristics) and any combination of words selected by children would be comprehensively discussed in class. Children take turns to come to the interactive whiteboard and use the stylus pen to select the words. Once the words are selected, the class is provided with the opportunity to reflect on the appropriateness of the words in describing their teacher.

The third activity on Who-Am-I Island has been included to stimulate children's thinking about important people in their lives. Career theory states that self-concept development during the early stages of career development requires that significant others play a major role in children's perception of themselves and their abilities (Super, 1990). The goal of this activity is for children to start comprehending that people around them can help in the making of important decisions and that certain people are strategically positioned in this regard. Depending on the problems or situations encountered, children can decide whether or not they need assistance in making key decisions. Again a list of words is presented on the screen. This time the words indicate a variety of people that form part of most children's social and environmental contexts. In this activity, the program mascot is on its way to visit the town mayor and the 'people' selected can travel with the mascot into town. The rationale behind this activity is that children's social and environmental contexts vary and sensitivity in this regard is needed. For example, some children might not have parents and they may have to depend on guardians for assistance. However, irrespective of the context in which a child functions, significant others do exist and do play a shaping role in children's career aspirations and perceptions.

The last stop on the Who-Am-I Island focuses on exposing children to the various types of careers or environment types proposed in theory. This section was included not as a means of scripting children in any particular career direction, but to suggest that there are various types of activities and environments out there and that they need to explore many possible areas before having to make a decision in the future. The environment or activity types are presented as opposing interests with children expected to indicate their preference to any of the two types on the screen. In the following example, children are presented with the two options of 'people' type activities and 'tools' type activities. These types are explained to children after which they can put up their hand and indicate their preference. If the children select 'people' as opposed to 'tools', they are reminded that they must allow themselves to experience practical (tools) type activities and vice versa. At the end of this stop, all six of Holland's activity types are presented on the screen and children can indicate their preference towards any one of these types. The class preferences are then further explored by means of asking individual children why they prefer the type they have chosen. As children listen to other participants' reasons for selecting a specific activity (i.e., different to their own preference) it provides an opportunity to stimulate curiosity and interest in other non-preferred types.

Once this activity is completed, children are provided with a homework exercise where they are expected to write a short newspaper story about their dreams and goals in life. If children struggle with literacy skills they can make use of a drawing to illustrate their goals and who they are. Successfully completing this activity prompts Dotty to present the third puzzle piece which is hidden at the top of the mountain on Who-Am-I Island.

Practise Mountain

Practise Mountain represents the practical application of knowledge gained through the first three exercises. This island starts with a general introduction to the island and sees the four main characters (Mark, Mary, Ling-Ling, and Jonas) return to the program. *"You all remember our friends from Notuyoung Island. Since you have learned so much about yourself over the last couple of days they wondered if you would be able to help them with a few things! I know you can."*

The challenge of teaching children about the different career types is assisted within this focus by presenting an overview of activity types. Dotty introduces the activity wheel which includes descriptions of Holland's (1997) six career types. In this activity children must select the four characters (according to their preference) and match the activities (found in each of the main characters' career narratives) to their corresponding interest type. The emphasis here is on age appropriate information and on being able to match school-based activities and interests to broader career themes. These broader career themes (i.e., Tools, Science, Arts, People, Business, and Office) correspond to Holland's (1997) theory and provide a means of categorising children's activity interests. Later in the program, children were also expected to match the 12 career characters introduced on the Cape of Careers into the activity wheel. This is described in more detail later in the chapter.

Matching the main career characters' activities and interests to the activity types listed on the activities wheel allowed the class to reflect and even challenge themselves on the learning that had taken place. While this activity may seem fairly advanced if one considers the Zone of Proximal Development (ZPD) and the influence of the More Knowledgeable Other (MKO) (Vygotsky, 1978), children successfully matched the presented character activity into its

corresponding activity type on the activity wheel close to perfect every time. They were able to draw from each other's insights and learners were able to respond to questions which they otherwise might have ignored. The rationale behind this activity was to make children aware of their unique interests and that these interests correspond to themes found within careers. The ultimate goal of this activity was to broaden children's exploration of various career fields in that children are actively encouraged to participate in activities found within all six career themes included on the activity wheel.

As already highlighted, children were also expected to match the twelve career characters (see Appendices 20 to 31) found on the Cape of Careers with the correct type found on the activity wheel. For example, Jules the farmer fits into the Tools type (Realistic type according to Holland's theory), and Ron the teacher fits into the People type (Social type according to Holland's theory). Each of the four main characters (Mark, Mary, Ling-Ling, and Jonas) has three career characters that they present to the class for assistance. With each career character, the main character introduces the career and asks what the nature of the work entails. For example, "What does a veterinarian do?" This question is followed with an additional question, namely, "in which group of activities do you think a veterinarian fits best?"

Again this could be considered a fairly complex task, yet with the career learning that has taken place, children possess the fundamental awareness of variations in career types and can successfully match the career characters into the activity wheel. By the end of this activity, children discover another puzzle piece and they are reminded of the fact that future possibilities depend on having an awareness of self and an awareness of a variety of careers. Children are not expected to make a career decision and they are encouraged to explore the six career types through school-based activities (summarised in the GCBC™ workbook). This message is

reflected in the GCBC™ workbook which provides a means of tracking their progress in terms of exposure to various activities and career fields. Each activity type includes a short list of activities that further expands their understanding of that particular field. Children must make sure that they complete all the activities listed in this section as a means of providing sufficient exposure to each type. A main feature of Practise Mountain is the emphasis on allowing adequate time and opportunity to experience what is available in the world of work. An important consideration here is that children need to be made aware of the importance of school-based activities in relation to the broader world of work. While children are not expected to make a career decision, it is these early career experiences that can stimulate children to consider exploration in areas that they might not have considered previously.

Treasure Island

The last island in the GCBC™ program is called Treasure Island. The visit to Treasure Island allows children to revisit some of the important lessons that they have learned throughout the GCBC™ program. However, an important addition to this activity is an emphasis on planning in successful career development. A practical example demonstrating this goal is that children are provided with known activities (for example, running a race) in which children are expected to arrange a sequence of words (describing the steps involved in running a race) in the correct order. These words emphasise the lesson to be learned, that individuals must consider the steps involved if they want to reach their goals. The steps referenced here are the steps involved when running or completing a race. There is a ‘starting line’, ‘on your marks’, ‘get set’, ‘go’, ‘finish’ the race, and then receive the ‘results’. To successfully complete a race these steps must be completed in order. Similarly, to successfully complete the activity children must put the various steps involved when running a race in the correct order.

After children have successfully accomplished the planning task, Dotty introduces the concept that planning a career also requires individuals to do proper planning and preparation. The steps of career planning required for children do not conform to career planning as proposed for adolescent or adult samples. Children are not expected to make any career decisions; however, the following four steps (as described verbatim in the GCBC™) provide children with important life lessons that they can understand and that can assist the development of age appropriate career skills:

Step 1: Well the first thing I realised is that it does not matter where we come from, we all are unique and have special skills. We just need to find out what they are! We need to know our strengths, things that we like and also the things that we don't like. These are just some of the things that I need to know about myself before I can make any decision.

Step 2: We must also make sure that we understand how important school is. I never knew that our school subjects can prepare us for a specific career one day. Also, if I have an interest in Art, People, Maths, Sports, and Languages these can develop into a career for me one day. I know that I don't have to make a decision now, but it does help to know that I have to do my best in school so that I can be prepared for the day when I can make that decision.

Step 3: Next, we must never forget that our parents, family members, guardians, or friends can assist us if we find ourselves in a difficult situation. The secret is that we have to make sure that we can trust the people that want to help us.

Step 4: Once we have collected all this information we can start to look at the different careers people around us are doing. Some of them might interest you while others might seem boring or something that you don't see yourself doing in the future. That's okay. What is more

important is to give yourself the opportunity to explore as many careers as possible. You can do so many great things if you only believe in yourself.

Treasure Island summarises the underlying theme of the GCBC™, namely that, despite differences in people, we all have a place in society. We all have a purpose in life. In recent years it has become necessary to overtly state this message as the socioeconomic contexts in which children develop often restrict personal development and development is dependent on the opportunities available to children. Dotty is tasked with presenting this message to the children as a summative thought about the experiences encountered throughout the GCBC™ program. This it does in the following words:

I told you that this was Treasure Island right? But did you know that treasure comes in many shapes and sizes. Treasure can be gold and silver but treasure can also be something like happiness or being confident that you have made the right decision. Being happy with whom we are and what we do is probably the biggest treasure that we can find. And the secret to being happy lies in the puzzle pieces that you have collected today. The best is that each of us is in control of our own life. We build our own life puzzle through the decisions we make and we can be proud of who we are. Just make the best of each opportunity. Remember that everyone is unique and that it is okay to be different. Some people are good at maths while others are good at art. Sometimes it just takes a little time to find out exactly what we are good at. These puzzle pieces are collected throughout your life. And as soon as you have found a puzzle piece that you like it becomes part of your life puzzle.

The GCBC™ workbook provides a summary of the learning that has taken place and children are expected to read the story of Treasure Island before they can claim the remaining puzzle piece.

Story elements

The GCBC™ program required that a number of characters be developed and designed. What was particularly important was that the characters had to have a 'look' and 'feel' that children could identify with. The 'look' refers to the graphic design, while the 'feel' concerns the character stories or, more specifically, the content of the character stories. In the GCBC™ program there are 17 characters that need specific reference. There are four main characters (i.e., Jonas, Mark, Mary, and Ling-Ling), twelve career characters (found on the Cape of Careers), and then there is one program mascot, Dotty, who serves as the program narrator and the link between the various activities. The process of development and design in terms of the content of character stories (i.e., the 'feel') is described next.

Stage 3

Character development and design

Four main characters

From the outset the goal was to have characters representative of a wide range of social contexts. Each character had desirable personal qualities while also having to deal with or overcome certain barriers or challenges. It was decided that this would allow children to experience some association with any of the characters because stories of barriers and challenges are common during the childhood years. The four main characters are included in the appendices (see Appendices 14 to 17). The characters were also designed with a consideration of the predominant cultures in the South African context. The four main characters included two boys and two girls, and they represent children from African, Coloured, White, and Asian descent.

The character stories were constructed with an emphasis on personal interests and qualities, the influence of family context, the awareness of environmental sensitivity, and the knowledge that every child possesses unique qualities and skills that must be developed during the early stages of career development. These story foci were identified as key constructs from the STF (Patton & McMahon, 1999, 2006).

Twelve career characters

The twelve career characters were selected based on their relevance to the GCBC™ program (i.e., two characters from each of the RIASEC types) and it was decided to assign non-traditional gender types to certain careers. The gender distribution was slightly skewed towards male dominance (seven male careers and five female careers) simply because of the fact that these characters were purchased from an existing database of raster images[13] and vectors[14]. Unfortunately, it seems that many of the concerns noted about the representation of females and minorities within the workplace is also present in the availability of these types of cartoon characters on an international database of more than 20,608,625 royalty-free stock images.

The challenge was to design the twelve characters selected in a similar style or, ideally, by the same graphic designer. In brief, the images needed to have a similar design style as consistency was a key element in the development and design of the Cape of Careers. Children were expected to absorb visual information and compare the different career characters with each

[13] Raster art consists of pixel information, where every pixel is assigned a colour value. This can create smoother and more detailed images for photos and paintings, but if the image is scaled (for example, increased in size), the program has to create new information resulting in a distorted look.

[14] Vector graphics is the use of geometrical primitives such as points, lines, curves, shapes or polygons, which are all based on mathematical equations, to represent images in computer graphics. Vector image files are easier to modify than raster image files. However, advanced editing programs and knowledge of vector editing is required. Animation images are also usually created as vector files.

other. If the career characters were inconsistent in their graphic representation then comparison would be difficult. For that reason the researcher identified a career character style, selected a graphic designer who created numerous career type images, and decided to only purchase vector based images as it would simplify the process of further editing the images to suit the requirements of the program. For example, Fran, the doctor, was purchased as a white female from the Shutterstock (www.shutterstock.com) database (i.e., the only option available on the website). However, it was required to change her race in order for her to be representative of the wider South African community. The vector based format allowed the researcher to apply a simple editing technique to change the skin tone and the hair colour to represent an African female. These changes were necessitated for a number of career characters purchased and they reflected a prevailing bias towards the availability of white male career characters. It was of interest to note that, on a cartoon level, many of the predominant stereotypes experienced in the wider community were evidenced by the limited representation of black, coloured, and female cartoon characters. Fortunately, the vector based format allowed for alteration of the purchased career characters and the 12 careers finally included in the GCBC™ were consequently more representative of the wider South African context.

Once the twelve career characters had been selected and edited to suit the GCBC™ requirements, the character stories were written. Each career character needed a general introduction, a reference to the type of environment preferred, a selection of six tools of the trade specific to the career, a consideration of school- based activities and their influence on later career development, and a quiz to assess the learning that had taken place. These elements are all included in the career character appendices (Appendices 18 to 29). The information about the careers was adapted (yet formally acknowledged in the research) from information published on

the Pace Careers website (Pace Career Centre , 2009) and is consistent with that provided in common resources about careers like the *Australian Job Guide* (Department of Education, Employment and Workplace Relations, 2011), and *MyFuture* (Department of Education, Employment and Workplace Relations , 2012). However, considering that the language used to describe careers in these resources targets high school learners, the language and descriptions needed to be adapted to suit the children of the present research. To accomplish this goal a foundation phase educator (i.e., trained to teach Grades 1 to 3) was tasked with the adaptation of the core career information presented in the character stories in order to ensure that the information was appropriate for the intended participants.

The GCBC™ program mascot

During the pilot study stage it became clear that the various activities needed to be introduced, summarised, and linked with each other. It was then decided to develop a program mascot that could link these various activities and who could narrate the children's journey. The search for a program mascot ensued with the challenge of finding a character that all children could potentially relate to. After considerable searching through the Shutterstock database, Dotty was discovered (please refer to Figure 6 and Appendix 30).

Dotty can be seen as the face of the GCBC™ program. This is the first character that the children meet, the link between the various activities, the narrator of the GCBC™ program, and the character that asks children to reflect on their experiences. Considering the important role that this character fulfils in the GCBC™ program, considerable effort was invested in the story elements of Dotty. Dotty's contribution to the GCBC™ program is evidenced by the amount of script entries in the GCBC™ text that were converted into audio format. The audio and video development is described next in this chapter.

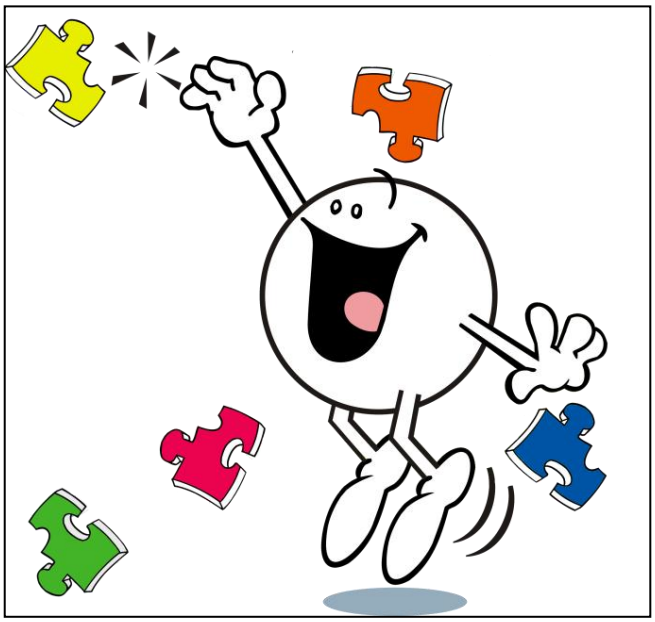

Figure 6. Dotty, the GCBC™ Program Mascot

Stage 4

Audio development

The audio and video development was a time consuming process and involved numerous stages of development and participation from a variety of volunteers. Each character had to have a unique character voice which could only be accomplished with the assistance of the volunteers mentioned in the program credits. Particular care was taken with the voices of the four main characters who had to resemble young children, both on illustration as well as audio level. To accomplish this goal, the researcher presented the school with specific criteria which they could use to identify four suitable candidates. These criteria included the following: two boys and two girls were needed; they had to be comfortable in reading to, and being recorded by, the researcher; they could not be in the same grade as the research participants (thus the Control Group school was selected to identify four suitable candidates), and the children's parents were to be informed of their participation in this activity. Four Grade 7 children were subsequently

identified (i.e., two boys and two girls) with permission obtained from the parents, the school principal, and the class teacher. Once the children were identified, the four learners were given a transcript that they had to practise over a weekend. The children were informed that the recording of these transcripts would take place during the following week. Only one day was allocated for the audio recordings and the researcher had to rely on the school for the identification of the children as well as the suggested time for completing the recordings. Considering the limited preparation and the once-off nature of the audio recordings it was felt that the children performed admirably.

The remaining audio recordings (i.e., the twelve career characters' voices and the program mascot) occurred one week after the children's voices were captured. Each volunteer was provided with a character script that had to be read out aloud and captured with a digital recording device in an mp3 format. The researcher then had a single recording (ranging between 10 and 25 minutes) for each character. This needed to be divided into smaller segments for programming purposes. The researcher was tasked with individually inserting and cueing these 867 audio clips into the GCBC™ program in order to match the corresponding text within the timeline of the story.

With reference to the audio elements included in the GCBC™ program, it is important to note that two songs were also purchased from the Stock Music Library on premiumbeat.com. It was important to consider the possible future commercialisation opportunities for the GCBC™ and therefore the researcher needed to ensure that all video, audio, and graphic elements were owned or purchased with the necessary commercial licences. For the two songs purchased, a *Mass Duplication* license was required. This allowed the reproduction of the songs as an integrated element into the GCBC™ program and this would also be sufficient for up to 10 000

copies. All other graphics, audio and video elements, and design elements are owned by the researcher.

Graphic design

As already indicated, the twelve career characters and Dotty were purchased from the Shutterstock database. Mary, Ling-Ling, Mark and Jonas, on the other hand, were designed from scratch by the researcher with the assistance of a local graphic designer. Draft designs of the four characters were presented to a number of children (n=6) and adults (n=8) to ascertain if the illustrations resembled children between the ages of eight to ten years old. It was decided that the main characters should visually resemble the intended age group of the participants in order to encourage an association between the main characters' career stories and the experiences of the children.

The initial drawings were judged by the children and adults mentioned in the previous paragraph to resemble children between the ages of six to eight years old. This information was relayed to the graphic designer. She then was tasked with making the children look older so that they resembled children between the ages of eight to ten years old. Once a few minor adjustments were made, the draft images were again shown to a new group of children (n=5) and adults (n=7) and this time the mean age estimated by these children and adults was 9 years old. For each of the main characters, background elements and themes needed to be designed that would match the story context of each character. These elements included a scene from the home environment, a school classroom setting, and a community setting.

The remaining graphics and illustrations were designed by the researcher and included many of the background themes, linking elements, and all of the remaining elements used in the GCBC™ video elements.

Video development

The video development involved the integration of graphics, audio, and animation elements to further support the exploration theme in the GCBC™ program. Children are constantly exposed to a range of multimedia influences and the GCBC™ needed to project a professional feel similar to other educational programs available on television. Therefore a number of video elements were designed and included in the final GCBC™ program. More specifically, an introduction video, five transition videos documenting the travel between the various islands, three puzzle video clips, and one "Big Finale" video were designed. The videos were designed using Adobe After Effects which is a video editing and special effects software. The videos were initially designed in an mp4 format utilising the H.264 codec which allowed for high quality videos and easy upload onto the internet. The dominant video codec today for web and mobile video is H.264. Its compression quality is better than any other widely available codec on the market, meaning that at the same bitrate, a H.264 video will generally look better than a video in another codec (and conversely, at the same visual quality, a H.264 file will generally be smaller).

However, because the GCBC™ program was designed on a flash based platform, mp4 videos are not compatible and the videos had to be converted into the flash compatible format (i.e., file extension .flv). This is a format designed for web video playback that offers high rates of compression and produces high quality video. FLV is becoming more popular on the internet since it can easily be embedded in a webpage and it is supported by the main operating systems via the Adobe Flash Player readily used in online media.

Stage 5

Computer programming and software packaging

As already described, the GCBC™ program development had numerous phases of development and design. Once the character stories were developed, the look and feel of the program started to take shape. The extensive program content was examined and streamlined into manageable sections or elements to be used within educational settings. Once the character stories were completed and the characters had 'faces', the focus shifted towards bringing them to life through unique character voices. It was at this stage necessary to develop and design the animation link between the various sections on the GCBC™. The end of the audio and visual development marked the start of the software development phase which was a time-consuming process. Trial and error ensued until a working draft of the program was finalised and presented to key stakeholders (i.e., learning support educators and departmental officials).

The GCBC™ program was designed using ActionScript 3.0 (3.0 represents the latest version) which is a computer programming language often called on in the design of animation type applications. ActionScript is the programming language for the Adobe Flash Player run-time environment. It enables interactivity, data handling, and much more in Flash content and applications. ActionScript is executed by the ActionScript Virtual Machine (AVM), which is part of the Flash Player (Adobe, 2011). ActionScript code is typically compiled into programming language by a compiler so that it is written and understood by computers such as the one built into Adobe Flash CS5 Professional. This code is then embedded in SWF files which are executed by the Flash Player, the run-time environment (i.e. what you see as a computer program). According to Adobe (2012), ActionScript 3.0 offers a robust programming model that will be familiar to developers with a basic knowledge of object-oriented programming.

ActionScript 3.0 makes use of the Flash format and programs that utilise this format are readily available on the internet (Adobe, 2011). Some of the technical considerations for the GCBC™ program included the need to combine images, text, audio, and video elements on a single platform. The only programming language that enabled the researcher to combine these elements was ActionScript 3.0. Unfortunately, because of limited experience in computer programming, certain compromises needed to be made in the development and design of the final program. For instance, the researcher envisioned a greater emphasis on animation throughout the program yet the available budget and time constraints did not allow for such an emphasis. The researcher is not qualified as a computer programmer, yet the difficulty of finding a suitable and affordable programmer with expertise in the field of animation resulted in the researcher undertaking this task. Considering this limited expertise and its impact on the final program, it was decided that the compromises were justified when one considers the novelty of the GCBC™ as an intentional career learning tool. The emphasis was directed more towards the need to test the content of the learning program than on a need to evaluate the level of the animations included.

Stage 6

Pilot study

From the initial concept development through to the subsequent program development, the present research attempted to design a program that was theoretically relevant, research based, contextually appropriate, and developed within the parameters proposed for multimedia program development. It was therefore necessary to have key stakeholders and the intended target population experience the various activities of the GCBC™ as well as critically evaluate the appropriateness of the language used within the program. To accomplish this goal a working

draft of the GCBC™ program was presented to educational psychologists, curriculum advisors, and Foundation Phase educators as well as a small sample of Grade 3 learners. The GCBC™ workbook (which is described in the next subsection) was also given to three individuals (i.e., one Grade 2 educator, one Grade 3 educator and one part-time author) to scrutinise the language used in the workbook. The goal was to have the language of the workbook on a Grade 3 level so as to accommodate learners aged eight through to ten years old.

The pilot study revealed that the GCBC™ computer based program, with the exception of a few spelling and grammatical errors, was judged to be appropriate for 8 to10 year old children in terms of the activities it presented. The GCBC™ workbook, on the other hand, needed to be simplified and the layout adjusted. These changes are described next.

Stage 7

Workbook development and design

The GCBC™ program has been positioned as an intentional career learning program, yet it was also important to relate the GCBC™ to broader educational goals. In South Africa there is a major focus on improving children's literacy and numeracy and consequently it was decided to include age appropriate information and stories with a career theme yet with a focus on the development of literacy skills. In addition, as many of the problems experienced by learners during the foundation phase of education are due to perceptual difficulties, the researcher also included puzzle and maze type activities that would facilitate the development of visual-perceptual skills and visual-spatial coordination. These puzzles served as an important link in the GCBC™ computer based program and allowed children to explore and discover, as part of their homework exercises, information about themselves, careers, and systems of influence.

Each of the islands included in the GCBC™ program is summarised in the GCBC™ workbook and this allows children to revise important lessons in their own time. It was also anticipated that the GCBC™ workbook would allow parents to become involved with their children's learning. However, before the workbook could be printed, the concerns noted in the pilot study needed to be addressed. The greatest changes were called for in the section on Practice Mountain. This section required simplification as it attempted to provide children with an early awareness of Holland's (1997) career or environment types. The researcher simplified the complexity of this section by making the activities more concrete, as well as making minor changes to the layout. Once these changes were finalised, the GCBC™ workbook was submitted for printing. Two copies of this workbook are available for review. The first is a blank workbook similar to the one handed out to children at the start of the GCBC™. The second is a compilation of Grade 3 and Grade 4 learners' workbooks where examples are provided which illustrates children's work.

Stage 8

Finalisation of the GCBC™

During the latter part of the development of the GCBC™ the focus shifted towards the packaging of the program. A consistent graphic design theme was developed, the logo was finalised and submitted for Trademark purposes, the GCBC™ software packaged in the Adobe Air executable file, and the GCBC™ workbook finalised and submitted for printing. The GCBC™ runs on the Microsoft Windows Vista or Windows 7 platform and requires the use of an interactive whiteboard (including audio capability). Because the GCBC™ is a novel program, the facilitator plays a vital role in connecting the computer based activities to classroom discussion and exploration. The researcher is not a computer programmer and the limitations of

his technical expertise may have prevented an error free program from publication. However, despite these possible limitations, the GCBC™ has been received with great interest and appreciation by the children, educators, educational psychologists, curriculum advisors, and departmental officials (as will be evident in later thesis chapters).

Fieldwork

The rollout of the GCBC™ program occurred over a five day period which was limited in terms of time allocated to conduct the fieldwork. At the end of each day's session, the children were asked to reflect on the day's activities, ask questions if they were uncertain or needed clarification of any of the activities covered, and presented with their homework exercises. The start of the next session would reflect on the previous day's activities and on the homework exercises. The discussion would then lead into the next activity (often referencing the search for the next puzzle piece to encourage curiosity and exploration). The five activities presented during the GCBC™ fieldwork are described next.

The five islands in the GCBC™ program represent five unique lessons or activities. These five activities or lessons were presented over a five day period. The researcher conducted two sessions per day, one with the Grade 3 learners (before the midmorning break) and one with the Grade 4 learners (after this break). The sessions ranged between 45 to 75 minutes depending on the complexity of the activity to be completed or the amount of content to be covered. The length of the sessions was a constant concern during the fieldwork in relation to the children's ability to concentrate for extended periods of time. With the support and guidance of the educators present during the lessons, they were able to recommend suitable times during the sessions for the learners to take a break which served to refocus their attention on the task at hand. During these sessions it was evident, however, that the Grade 3 learners struggled more to

focus their attention compared to their Grade 4 counterparts. This was noted and is discussed in the final chapter.

Due to the limited time available to conduct a research program during school hours, the researcher made certain procedural compromises during the fieldwork. For example, lessons were shortened and the discussion was limited to a few examples per activity. The GCBC™ program can be altered to suit the developmental needs of the children and future research is needed to ascertain the impact of longer activity sessions. One of the compromises that had to be made during the fieldwork stage was to limit children's exposure to only six of the twelve careers (included in the Cape of Careers) in class. The remaining six types were given as a homework exercise. This decision was made to allow the researcher sufficient time to cover elements of all five activities included in the GCBC™, even though the depth of exploration was affected. The primary reason behind this decision was that normal academic schooling continued throughout the GCBC™ fieldwork and, considering that the GCBC™ was completed during normal school hours, the impact of the GCBC™ had to be managed (i.e., the GCBC™ could not impact negatively on the children's participation in their normal academic program). Once the GCBC™ program could be established as a viable and reliable learning activity that conforms to the broader learning outcomes proposed for these early grades, then authorities would be more willing to allow more time to be invested into the program. However, this would be the goal of a follow-up investigation into the GCBC™ program and its relevance as a learning tool.

Summary

Challenges associated with the growing career learning needs of children highlight the importance of designing and adapting models, methods, and materials for career education and counselling for children who are just beginning to learn about the world of work (Stead &

Schultheiss, 2010). This chapter has presented more pertinent theory, research, and policy considerations which were referenced throughout the GCBC™ program development and design. These factors were all considered in the rationale for the present study and they informed the development and design of the (GCBC™).

The aims of the research (described in more detail in the next chapter) required the development of an intentional career learning program and testing the effectiveness of this program on children's career development learning. The GCBC™ was designed with due consideration of the most important recommendations found in theory and research. In addition, the GCBC™ has attempted to bridge the gap between career theory, research, practice and policy. From the information included in this chapter it is believed that the GCBC™ can be viewed as an intentional career learning program designed with a major focus on attempting to translate career theory and research into a computer-based format. However, in order for the GCBC™ to be considered as evidence-based, it needs to be trialled and tested with its intended target audience. This is the topic of the next chapter which describes the research methodology, the procedural steps followed in completing the present research, as well as providing research support for an evidence-based program.

CHAPTER 7

RESEARCH METHODOLOGY

The present study has been contextualised broadly within the limited field of early career development research and specifically within career development learning in childhood through its focus on career intervention. From the information presented in the previous chapters it is evident that, in order to better understand the career development of children, we need to acknowledge the necessity of studying the developmental processes of children's career behaviour rooted within their life contexts (Schultheiss, 2008). The gaps within existing research have been documented in Chapter 5 and, although there has been a recent increase in research on children's career development, more is needed to achieve a conceptual understanding of the early stages of career development. Clearly this requires a re-examination and reconsideration of theory, research, and practice to ensure that the formative years of childhood are optimally used to facilitate the development of age appropriate career skills.

In this chapter, the methodology of the present research is described including the problem formulation, research design, sampling and participants, qualitative and quantitative date collection measures, ethical considerations and procedure. Where possible the study has responded to research recommendations and best practice principles found in established research. The following subsection of the chapter describes the problem formulation, rationale, and primary aims of the research.

Problem Formulation

Childhood signifies the threshold of career development and involves an active period of preliminary self-engagement in relation to the future world of work (Hartung et al., 2005). Although it is generally acknowledged that critical career-related concepts and attitudes are first

formed in childhood (Hartung et al., 2008; Herr & Cramer, 1997), career theorists have placed limited emphasis on childhood career development theory, research and practice (McMahon & Watson, 2008). Thus there is an identified need in the literature to address these concerns and this was noted in Chapter 5.

In particular, many theorists (see, for instance, Gottfredson, 2002, 2005; Savickas, 2002; Super, 1957, 1980, 1990) agree that childhood is a time during which the developing self-concept is greatly influenced by a range of shaping influences, thus highlighting the need for career interventions that can nurture and develop personal and career-related growth. As a result, there is a pressing need for the development of relevant and age appropriate career interventions to translate theory and research recommendations into viable career learning programs for children (Magnuson & Starr, 2000). In addition, the development of these programs needs to be sensitive to the limited, yet constantly expanding, cognitive capacity associated with middle school children (Meadows, 2006).

Many of the challenges within the field of career theory, practice and research remain largely unmet, and much of what we know of children's career development is based on a limited understanding of such development during these formative years (McMahon & Watson, 2008). Considering the lack of baseline information on these early years of career development, it is surprising that there is an increasing focus on career development programs throughout most levels of formal education (Brolin & Loyd, 2004; Lapan, 2004). Although there is evidence of good practice principles to guide the development of career education services (see, for instance, the Australian Blueprint for Career Development, MCEETYA, 2009; and the Canadian Blueprint for Life/Work Design, Jarvis & Richardt, 2000), many countries still struggle to effectively develop age appropriate career programs which can be implemented across the elementary

school years. This is especially true for most developing countries where there is considerable evidence of "policy borrowing" from their more established counterparts (Watts & Sultana, 2004, p. 105). A lack of interdisciplinary collaboration further compounds the situation and has contributed to a lacklustre approach when designing career education programs (OECD, 2004).

All the theories, policy documents, and career education programs overviewed in earlier chapters recognise the need for early intervention as part of establishing a sound foundation for future career development to occur. At the heart of providing intentional career learning programs to children is the recognition of the need to develop more adaptive, resilient, and proactive approaches to children's present situations and possible future career selves (Savickas, 1997, Turner & Lapan, 2005). The attainment of these early career developmental tasks moves children closer to what theorists and researchers regard as career readiness (Watson, 2008).

Career readiness requires children to develop adequate self-knowledge in relation to careers and to acquire sufficient information on which to base later career and education decisions (Super et al., 1996). While assisting in anticipating changes in children's career aspirations as they mature and in identifying activities that allow children to develop essential career skills for successful career development, many current career education programs do not provide a description of the understanding that children have of work-related processes (Howard & Walsh, 2011). Through increasing our conceptual understanding of the evolution of children's career developmental processes, programs designed to enhance career development could be more sensitive and relevant to the level of children's career development.

Research suggests that children begin constructing ideas about the future and making judgments about the suitability of various types of careers for themselves as early as four years of age (Trice & Rush, 1995). As childhood conceptions about work and careers are precursors to

adolescent career development and later exploration of the world of work, it is critical to expand our understanding of career development during the elementary and middle school years (Howard & Walsh, 2011). Concomitantly, there is an increasing need for relevant, timely, and more comprehensive career development and education programs (Feller et al., 2005). To strengthen the impact of such career education within educational policies across the world, Collin and Watts (1996) emphasised the need for career services to be integrated within a learning framework.

The concept of career development as a dynamic interactive learning process is supported by career theory (for example, Gottfredson, 1996; Super, 1990), with learning being regarded as a construct that can bridge the fragmented conceptualisation of children's career development (Patton & McMahon, 2006). Over the last decade the field of children's career development learning has been dominated by researchers calling for a means to bridge the gap between theory and practice (for example, Hartung, et al., 2005; Schultheiss, 2008; Watson & McMahon, 2008,). Unfortunately, this call remains largely unaddressed, consequently maintaining the status quo of our knowledge in the field of children's career development and leaving practitioners to utilise the limited resources available.

Researchers generally agree that career exploration, career awareness, career expectations and aspirations, career interests, and career adaptability are critical in educational and career planning and in the choices made during adolescence and early adulthood (Holland, 1997; Savickas, 2002; Super, 1957; Super et al., 1996; Vondracek, 1995). Further, there is agreement that career development begins in early childhood. Yet there is a gap between career interventions at an elementary school level and the research that should inform such interventions (Porfeli et al., 2008). This division between research and practice comes at a time

when contemporary demands for evidence-based practices make explicit the need for programmatic research to substantiate the effectiveness of career education programs (Schultheiss, 2005; Whiston, 2002).

Internationally, the inclusion of career education within the elementary school years has received increasing support and is regarded as an important step towards preparing children for the transition from school to work (Ediger, 2000). At present, it appears that such support is largely based on broadly defined curriculum statements but is lacking in practical application within elementary educational settings (Flederman, 2008). Consequently, in line with international and national trends, there has been a call for on-going monitoring and evaluation of educational practices generally (DoE, 2002) in an attempt to ensure the successful alignment of policy goals and curriculum outcomes. By inference then, career-focused interventions (i.e., the orientation of learners to the concept of the world-of-work) should also be seen as a focus of such evaluation seeing that it has recently been included in the Revised Curriculum Statements for Grades R through to Grade 9 in South African education.

Learning through experiential activity can provide the context for career development learning to take place (Patton & McMahon, 2006). In particular, experiential learning theory offers potential for the preparation for real-world tasks that will be faced in adulthood (Beale, 2000, 2003; Schultheiss, 2008). More importantly there is the suggestion that direct, simulated, and vicarious experiences can help children to connect school-based learning to the tasks they will undertake as adults (Schultheiss). Thus connecting school-based learning to career information is critical if we wish to establish a foundation for lifelong career development during these early developmental years.

Developmentally based career education programs that foster an exploratory attitude in children and promote the exploration of new domains and ideas can broaden children's informational knowledge and exposure to diverse occupations (Schultheiss et al., 2005). Although children are not expected to make premature decisions regarding an anticipated career path, there is a need to provide them with career exploration activities that will assist them in thinking about possible career interests and the interrelatedness of the world of work (Beale, 2000).

Recent technological advances have also opened the door for the development of new and exciting career services within the education and career development environments (Grabe & Grabe, 2007; Harris-Bowlsbey & Sampson, 2005) and these can be beneficial to children's learning if used appropriately (Keengwe & Onchwari, 2009). Smeets (2005) supports this viewpoint and draws attention to the need for technology-supported learning environments in early childhood and elementary education. Recent technology advances have resulted in calls for career programs to be delivered using technology (Harris-Bowlsbey & Sampson) and there has been a recognition that technology can be effectively used to facilitate children's career development learning through experiential activity (Skorikov & Patton, 2007; Wang & Hoot, 2006).

Programs that introduce elementary school children to the world of work and that help them to understand the connection between what they are learning in school and what is expected in the work world are integral to promoting lifelong learning, a productive educational environment, and future successful transitions from school to work life (Schultheiss, 2008). The ultimate goal is that children, through their participation in age appropriate career interventions, should be able to capitalise on an array of educational and training opportunities without being

prematurely tracked into narrowed and foreclosed career paths (Lapan, 2004). Furthermore, framing learning experiences in terms of career exploration and development may also help keep youth engaged in learning (Hynes, 2012).

It is against this contextual background that the current research focused on the development and evaluation of a research-based computerised career exploration tool, Growing-up: Children Building Careers™ (GCBC™), which can be used for early intervention in children's career development. It is believed that this computer-based career exploration tool can significantly enhance the readiness of children to successfully negotiate the identified early developmental tasks of children's career development, that is: becoming concerned about their future; increasing personal control over career activities; forming conceptions about how to make educational and career choices; and acquiring the confidence to make and implement career choices (Savickas, 2005; Super, 1990; Super et al., 1996). These tasks have been identified as key focus areas in career construction theory (Savickas) and are discussed in the theory section of this thesis.

Involving children in career activities is not about expecting them to choose careers; rather it is about assisting children to develop career-related skills that will facilitate their career development and promote the growth needed for future career decision-making (Gysbers, 2007). The GCBC™ is a career development learning resource that aims to assist children to develop the age appropriate skills, knowledge and attitudes needed to make appropriate and relevant career choices in the future. More importantly, the GCBC™ aims to bridge the gap between career theory, research and practice in children through the development and evaluation of this intervention. In order to clarify the specific focus of the present research, the research aims are described next.

Research Aims

The primary aims of the present research are to:

1. Develop and design a computer-based career exploration program (Growing-up: Children Building Careers™ [GCBC™]) for South African children.
2. Quantitatively evaluate the effectiveness of the GCBC™ in enhancing children's career development by:
    a. Describing children's career development prior to their participation in the GCBC™ program.
    b. Describing any changes in children's career development following participation in the GCBC™ program.
3. Qualitatively evaluate children's participation in the GCBC™ as an intentional career development learning process.

Research Design

The three research aims highlighted above clearly call for three different approaches or methods to be followed in order to successfully complete the research. The first of these aims focuses on the development of the computer-based career exploration program and is described in Chapter 6. The second and third aims focus on measuring the program's effectiveness and consequently called for a research design which incorporates both quantitative (Aim 2) and qualitative (Aim 3) approaches.

Mixed Method Research

A major aim of the social and behavioural sciences is to develop explanations for various aspects of human behaviour (De Vaus, 2001). One way of determining the adequacy and validity of these explanations is to collect pertinent data through research, thereby evaluating the extent

to which the data are consistent with the explanation (Creswell, 2009; Kelle, 2006). As the aims of the current research are to develop and evaluate, quantitatively and qualitatively, the use of a career-based career exploration tool that would aid in developing age appropriate career development skills for children, a mixed research design utilising a pre- and post-test experimental method was adopted.

Mixed methods research is considered an emerging, innovative research strategy that is used across disciplines and that combines qualitative and quantitative data collection (Simpson, 2011). This form of research is a preferred method in social and health science research as problems addressed in these disciplines are complex and the use of either quantitative or qualitative techniques by themselves may be inadequate to address this complexity (Creswell, 2009). Integrated mixed methods designs allow researchers to follow emerging questions, rather than limiting their research to questions that are amenable to a particular method (Stange, Crabtree, & Miller, 2006).

As has already been indicated, the present study adopted a pre- and post-test research design, known within mixed research design as an experimental study (Kettles, Creswell, & Zhang, 2011). Quantitative and qualitative methods are mixed as part of a considered process to enable the maximum data to be extracted (Collins, Onwuegbuzie, & Jiao, 2006). The explanatory design (i.e., a form of mixed research design implemented in the present study) is a two phase mixed methods design where one type of data such as quantitative data is collected but where the researcher wishes to follow-up the results with further qualitative research, such as through the use of focus groups to gain indepth meaning of the quantitative results. The idea is that a single data set is not enough to answer the question and indeed that different questions need to be

answered. These different questions seek different answers and so each question requires different data (Kettles et al., 2011).

According to Patton (2002), quantitative and qualitative approaches represent fundamentally different epistemological frameworks for conceptualising the nature of knowing and social reality and it has been suggested that mixed methods research designs can bridge the qualitative-quantitative divide. While qualitative researchers aim for rich, deep, real and valid data, quantitative researchers attempt to attain hard, replicable and reliable data (Shih, 1998). The qualitative element can also help the researcher to understand the process of an intervention, the mechanisms that associate variables with each other or which help to develop treatment interventions (Kettles et al., 2011). Combining these historically separate research methods activates their complementary strengths and helps to overcome their discrete weaknesses (Stange et al., 2006). However, the efforts to combine qualitative and quantitative methods often lack a solid methodological basis in research practice and researchers frequently combine quantitative and qualitative methods without providing a clear rationale for their choice of methods (Kelle, 2006). Further, a significant drawback to this type of research method is that qualitative and quantitative findings are often not integrated in a coherent way when the results from such research projects are presented (Kelle). To understand the rationale behind selecting both quantitative and qualitative approaches in the present study the advantages and disadvantages of each are considered next.

Quantitative research is based on a positivist paradigm and is described as experimental, deductive, numeric, and realist (Peters, Abu-Saad, Vydelingum, & Murphy, 2002), and thus brings an element of objectivity into the research process. It also allows the researcher to present the multiplicity of the collected data in a coherent and functional way (Bless & Kuthuria, 1993;

Struwig & Stead, 2001). In the present research, quantitative data were collected at two intervals, prior to and following exposure to the GCBC™ program. This method constitutes a pre-and post-test research strategy that is often selected in educational research since it is relatively non-intrusive and the data analysis can be completed using a range of descriptive and inferential statistical procedures (Dane, 1990). A disadvantage of quantitative research is that it only focuses on statistical scores which means that detailed insight into the research problem may be compromised (i.e., findings not evident in the scores are not considered).

Conversely, qualitative research is based on an interpretive paradigm and is described as naturalistic, inductive, contextual, nonnumerical, and constructionist (Peters et al. 2002; Richardson, 2000) and has been revitalised in the social sciences in recent years (Toloie-Eshlaghy, Chitsaz, Karimian, & Charkhchi, 2011). The main reason for this resurgence stems from a research need to more comprehensively understand phenomena from the viewpoint of participants who are often neglected when quantifying findings (Kaplan & Maxwell, 1994). In this regard, qualitative research methods provide the researcher with the opportunity to gain insight into complex textual descriptions of how people experience a given research issue (Mack, Woodsong, MacQueen, Guest, & Namey, 2005) and they produce culturally specific and contextually rich data (Creswell, 2009). Another advantage of qualitative methods in research is that they provide participants with the opportunity to respond in their own words, rather than forcing them to choose from fixed responses, as quantitative methods do (Mack et al.). When used along with quantitative methods, qualitative research can help researchers to interpret and better understand the complex reality of a given situation and the implications of quantitative data (Patton, 2002). Consequently, in the present research qualitative methods were included which would add sufficient depth to the quantitative data obtained (Creswell, 2009; Kelle, 2006).

The present research into children's career development required the use of both quantitative and qualitative data, in order to comprehensively explore and describe the impact of an intentional career learning activity on children's career development learning. According to Kelly (2006, p. 309), results from the qualitative part of mixed research designs can help to "understand previously incomprehensible statistical findings" and a "lack of validity of quantitative measurement operations and instruments". On the other hand, the quantitative focus of a study can help to corroborate findings from a qualitative study and to transfer these findings to other domains.

Method

This next subsection furthers the discussion of how both quantitative and qualitative approaches were combined in the present research. It specifically describes how the research participants were identified, which measures were used to collect the data, how the ethical considerations were acknowledged and consent obtained, what procedures were followed during the fieldwork, and it also provides an overview of the data analyses and coding.

Sampling and Participants

Sampling issues are inherently practical and they are an important step in the research process because they help to determine the quality of inferences made by the researcher that stem from the findings (Bless & Kuthuria, 1993). According to Tashakkori and Teddlie (2003), scholarly decisions may be driven in part by theoretical concerns but, in practice, theory needs to inevitably meet the realities of time and resources. In both quantitative and qualitative studies, researchers must decide on the number of participants to select (i.e., sample size) and how to select these sample members (i.e., sampling method) (Collins et al., 2006). This process is described next as well as the demographic and biographical profile of the sample.

In the present research the sampling procedure and selection of potential schools and research participants were preceded by identifying a set of inclusion criteria (i.e., minimum criteria required for selection). Once the inclusion criteria were formalised, all schools that met the minimum requirements were considered for selection. A consideration for the present research was the impact of the geographical location of the number of suitable schools identified. The researcher is based in the Southern Cape region of South Africa, also known as the Garden Route, and subsequently this was where the research was conducted. This area constitutes a small geographic percentage of the larger Western Cape Province with George being the largest town, followed by Mossel Bay, Knysna, and Plettenberg Bay. Only schools from these towns were considered for the research because of their proximity to the District Office (Eden/Karoo) of the Western Cape Education Department located in George. This district office forms part of seven management areas (or districts) within the province and is governed by the Western Cape Education Department with its Head Office in Cape Town.

The identification of suitable schools depended on their inherent capacity to meet a number of predetermined inclusion criteria (i.e., geographic location, specific socioeconomic considerations, adequate sample sizes, and access to interactive learning resources). In the present study only schools that met these inclusion criteria were considered for selection. The first of the inclusion criteria focused on language requirements because the GCBC™ was developed as an English medium learning activity that would be presented in English. Therefore, only English medium schools or bilingual schools with dedicated English classes were considered. Furthermore, candidate schools were expected to have a minimum of 75 learners between the ages of eight to ten years (i.e., Grades 3 and 4). The 75 learners could be divided between the two grades per school (for example, 35 could be in Grade 3 and 40 in Grade 4) and

this was seen as a benchmark requirement for running the quantitative statistics (i.e., a sample size of 30 learners is required to run inferential statistics with confidence) (Hogg & Tanis, 2005). The last of the inclusion criteria focused on the technical infrastructure of the school. Schools were required to have a fully functional computer lab (indicating that learners have experienced ICT programs) as well as ready access to an interactive whiteboard as part of their mainstream academic classes. Schools meeting the above criteria were eligible for selection.

All elementary schools meeting the above criteria (but limited to the South Cape region) were initially considered for selection. Once the list of suitable schools was finalised (i.e., purposive sampling), a simple random sampling method was used to identify the two schools required for the research. Purposive sampling is a form of non-probability sampling (Polit & Hunglar, 1997) suggesting that the schools, and later on the learners, are selected with a specific purpose in mind and according to their relevance to the topic of investigation. Dane (1990) points out that the advantage of purposive sampling is that it allows the researcher to focus on key areas of investigation, which in turn will be critical for the research. However, a disadvantage is that generalisation might become difficult or impossible (Dane; Sheskin, 2000; Struwig & Stead, 2001). The reason why a purposive sampling technique was used mainly stems from the need to have a sample representative of children aged eight to ten years in Grades 3 to 4. The GCBC™ program was designed for this specific age group because this age span has been identified as an important formative period that currently lacks program support (Ediger, 2000; Gallavan, 2003; Magnuson & Starr, 2000).

Five schools conformed to the inclusion criteria and two were selected based on a simple random sampling method. These two schools were contacted to ascertain their willingness to participate in the study. Thereafter, formal consent was sought and subsequently granted through

the Head Office of the Western Cape Education Department for fieldwork to commence during January to March 2012. The selected schools were informed in writing of the research and a meeting was scheduled with the two school principals to discuss the research procedure. These steps are described in detail later in this chapter.

As already indicated, the research adopted a pre-and post-test experimental design, which required that the schools be categorised as one of two distinct groups, with the one acting as an experimental group and the other as a control group. A simple random sampling method was employed to determine which school would be the experimental group and which school would act as the control group. The equivalence of these two sample groups in terms of a number of subject variables is discussed later.

Ideally, with research that compares behaviour over time, the only differences between the pre- and post-test measurement should be the event proposed as the cause of any change (De Vaus, 2001). Therefore, in an attempt to limit the influence of external variables, the two schools selected needed to be homogenous in terms of socioeconomic status. Consequently, the sample included learners attending elementary schools that catered predominantly for middle- to upper socioeconomic status families where parents pay school fees. The geographic location of the school and the area of residence of the learners was an additional criterion in determining socioeconomic status.

The next phase in the sampling procedure involved identification of the research participants, with learners at the two schools selected in terms of their suitability to the program based on age and grade level. As can be seen in Table 3, the sample consisted of 146 learners between the ages of eight to ten years. The control group had 72 learners and the experimental

group 74 learners. The total sample consisted of 56 eight year olds, 74 nine year olds, and 16 ten year olds.

Table 3

Sample Group, Age and Grade

Group	Age							
	8 years		9 years		10 years		Total	
Control	26	36%	39	54%	7	10%	72	100%
Experimental	30	41%	35	47%	9	12%	74	100%
Total	56	38%	74	51%	16	11%	146	100%
	Grade							
	Grade 3		Grade 4		Total			
Control	34	47%	38	53%	72	100%		
Experimental	36	49%	38	51%	74	100%		
Total	70	48%	76	52%	146	100%		

A purposive sampling technique was again employed to select learners from the two grade levels (i.e., Grades 3 and 4). The two school groups were screened to ensure an equal distribution of gender (see Table 4) as well as ethnicity. Lastly, the control group had a mean age of 8.74 years (SD = 0.63) and the experimental group 8.72 years (SD = 0.67) and both groups had a similar distribution of ages between grades (i.e., the Grade 3 groups included learners aged eight to nine years, while the Grade 4 groups included learners aged nine to ten years). The total sample (N = 146) had a mean age of 8.73 (SD = 0.65).

Considering that the fieldwork took place during January 2012 (i.e., the first month of the academic year), the number of ten year old children was limited (many of the nine year old

children in Grade 4 would turn ten later in the year). The result was that the sample was skewed towards the younger learners (i.e., eight and nine year olds) at the time of collecting the pre- and post-test data. As described later, this was an important factor that had to be considered when collecting and subsequently interpreting the research results. Table 4 describes the sample size in relation to gender representation.

Table 4

Sample Group and Gender

Group	Gender					
	Female		Male		Total	
Control	41	57%	31	43%	72	100%
Experimental	38	51%	36	49%	74	100%
Total	79	54%	67	46%	146	100%

The size of the sample determines the extent to which the researcher can place confidence in the data and statistical procedures employed. A larger sample will yield statistics that are more representative of the actual values in the population than a smaller sample (Struwig & Stead, 2001). The sample of 146 children is large enough to produce statistically significant results given the types of data analyses employed (Sheskin, 2000). Even on the smallest scale of analysis (i.e., a comparison between the Grade 3 control and experimental groups), the sample sizes are sufficient to produce statistically meaningful test results; specifically more than 30 participants are needed to run inferential statistics with confidence (Hogg & Tanis, 2005).

To conclude the data collection phase of the research, two focus groups were included as the primary method of collecting the qualitative data as required for Aim 3 (i.e., one focus group for Grade 3 children and the other for Grade 4 children). Thus the focus groups constituted

10.5% (i.e., 8 children out of a possible 76) of the total sample of learners included in the experimental group. Group data are neither more nor less authentic than data collected by other methods, but focus groups can be the most appropriate method for researching particular types of questions and such groups are particularly suited to the study of attitudes and experiences (Kitzinger, 1995). Focus group discussions as a means of qualitative data collection are discussed within the Measures section of the current chapter, yet it is important to consider the process followed in identifying research participants for these groups.

The focus group participants were selected from the participants of the experimental group and included eight participants, namely, four boys and four girls. Each focus group had four learners, two boys and two girls who were randomly selected. Suggested group size for focus groups seldom goes beyond a minimum of four and a maximum of twelve participants per group (Krueger & Casey, 2009; Stewart, Shamdasani, & Rook, 2007). From a moderator stance smaller groups are easier to manage (Morgan, 1996) and, according to Carey (1994), with fewer children in the group there is a greater likelihood that the participants will interact.

This concludes an overview of the sampling procedures utilised to select the schools and allocate the children to the various subgroups needed for the research. The methodological focus is now directed towards describing the measures utilised in the current research. In this next subsection the discussion considers factors impacting on childhood assessment more broadly as a prelude to introducing the selected measures in text.

Measures

Critical to the current research is the measurement of change, more specifically the measurement of change in children's career development following exposure to the GCBC™. However, it is necessary to acknowledge that there are a number of concerns associated with

psychological measurement and in particular career measurement during the childhood years (Anthanasou, 2007; McMahon, Patton, & Watson, 2003; Vondracek, 1985). The most pertinent of these concerns is that according to Anthanasou (p. 22), "the assessment of career development has really been developed with adults in mind."

Research investigations focused on children are dependent on well-developed and child-sensitive measurement tools (Strickland, 2005). However, as is evident from an overview of the literature (i.e., Hartung et al., 2008; McMahon & Watson, 2008b; Schultheiss, 2008), there is a paucity of reliable and valid instruments that can efficiently and effectively be used with children. This view is supported by Stead and Schultheiss (2010) who found that, although many authors have called for more theoretically driven and empirically sound assessment instruments for use in both research and practice (e.g., Stead & Schultheiss, 2003; Watson & McMahon, 2005), few instruments currently exist (e.g., Stead & Chetty, 2002; Stead & Schultheiss, 2003; Stead, Watson, Gallant, & Sauls, 2001). For researchers who seek to study career development in children, this is a major challenge and often results in careful consideration of assessment practices.

Another concern regarding assessment during childhood is that few instruments exist that can reliably and validly measure children on a variable across the various ages and stages of development (Strickland, 2005). Usually, a different measurement tool is required for children at each stage of development and, according to this author, scores often do not have equitable meaning across the various stages. This can also result in a particular assessment working well for an eight year old child but which might be inappropriate for another child who is twelve. Indeed in the present research a number of factors, some of which have already been highlighted

above, had to be considered in selecting measures to gather information on children's career development learning. An overview of the measures selected is therefore provided next.

Quantitative data were collected using the following instruments: a biographical questionnaire which also included the parental consent form (see Appendix 1), the Childhood Career Development Scale (CCDS; Stead & Schultheiss, 2003), and two forms (i.e., sections) from the Revised Career Awareness Survey (RCAS, McMahon & Watson, 2001). Although both the biographical questionnaire and the RCAS capture qualitative data (i.e., verbal responses), these responses were coded so that quantitative statistics could be completed. The qualitative data required for Aim 3 were collected during two focus group discussions where a semi-structured interview was utilised (see Appendix 2) as well as feedback which was provided from the experimental group educators. An Educator Feedback Form (see Appendix 3) was provided to each of the experimental group educators to gather insight into their perception of the GCBC™ program. Each of these measures will now be described.

Biographical questionnaire

A biographical questionnaire (see Appendix 1) was developed which gathered information on important subject variables, such as the children's age, gender, grade level, socioeconomic status, and parental information. This questionnaire also served as the consent form in which parents or guardians agreed to their child participating in the study. Two additional sets of questions were included to gather information on the parents' awareness of their children's career aspirations as well as the children's access to and proficiency in using computers. These questions were specifically included to gather information on parents' awareness of their children's career development prior to the fieldwork stage of the GCBC™. In the second set of questions parents were asked if their children had ready access to a computer at

home and, if they did, to rate their children's proficiency in using computers. The information gathered from the biographical questionnaire was used to describe the sample demographics. The biographical questionnaire is attached as Appendix 1.

Childhood Career Development Scale – South African version (CCDS)

The availability of age appropriate career measures for children is significantly lacking (Anthanasou, 2007) and therefore the present research was limited to a choice from measures currently accessible. One such instrument is the Childhood Career Development Scale (CCDS). To date there are two versions of the CCDS, one of which is used in South Africa (Stead & Schultheiss, 2003, 2010) and the second for use in the United States (Schultheiss & Stead, 2004). The present study employed the South African version, which was developed with a sample of South African children between the ages of nine and thirteen years (i.e., Grades 4 to 7) with the primary focus of assessing childhood career development (Stead & Schultheiss, 2003). In a subsequent study (Stead & Schultheiss, 2010) the measure was also administered to school children with ages ranging from eight to fourteen years old.

The fact that a South African version of the CCDS is available was a major factor in its selection given the criticism of using international measures that may not be appropriate to the South African context (Stead & Watson, 2006). Another reason why the CCDS was selected is the fact that, according to its developers, its total score and its subscales can be employed usefully in the design and measurement of career education programs (Stead & Schultheiss, 2003). The GCBC™ was developed as an intentional career development learning program using the developmental tasks proposed in Super's (1990) Growth Stage (see, in this regard, Chapter 2) as the basis of its development. Considering its emphasis on childhood career development, the GCBC™ and the CCDS share a common theoretical consistency.

The CCDS consists of 48 items which are divided into eight subscales. The subscales have been designed to assess a child's career development across eight of the nine proposed dimensions of Super's (1990) Growth stage. The eight dimensions that formed the subscales of this measure included: Curiosity (i.e., inquisitive behaviours, 8 items, Cronbach's $\alpha = 0.69$), Exploration (i.e., engagement in activities related to exploration and the search for information, particularly through reading, 3 items, Cronbach's $\alpha = .54$), Information (i.e., awareness of the importance of acquiring information about work, 4 items, Cronbach's $\alpha = .67$), Key Figures (i.e., importance of influential role models, 4 items, Cronbach's $\alpha = 62$), Locus of Control (i.e., degree of control over their approach to schoolwork, studying and interpersonal interactions with friends, 8 items, a high score indicates internal locus of control, Cronbach's $\alpha = .77$), Time Perspective (i.e., thoughts about the future, 4 items, Cronbach's $\alpha = .70$), Self-Concept (i.e., self-knowledge, 7 items, Cronbach's $\alpha = .84$), and Planning (i.e., an awareness of the importance of planning, 10 items, Cronbach's $\alpha = .85$) (Stead & Schultheiss, 2010). The measure has a Likert scale design with scores allocated to item answers as follows: Strongly Disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly Agree = 5. These subscales as well as the total score have been coded as follows in the present research: CCDS1: Curiosity; CCDS2: Exploration; CCDS3: Information; CCDS4: Locus of Control; CCDS5: Key Figures; CCDS6: Time Perspective; CCDS7: Planning; CCDS8: Self-Concept; and CCDST: Total.

Psychometric properties for the CCDS were established on a sample of South African English-speaking learners who were attending a government elementary school. Stead and Schultheiss (2010) provided the following information regarding the composition of the sample. There was an equal distribution of gender types (i.e., both males and females comprised 50% of the total sample). The distribution between the four grades was evenly matched with Grade 4s

making up 24.9% of the total sample, Grade 5s 25.1%, Grade 6s 24.3%, and Grade 7s making up the final 25.7%. In terms of cultural demographics, 75% of the participants were White, 18.6% were Black, 4.6% were of Mixed Ancestry, and 1.7% were Indian. The sample mainly consisted of English-speakers which accounted for 77% of participants, the rest being made up of Xhosa-speakers (16%) and a variety of other languages (7%). The mean age of the sample was 11.16 years (SD = 1.28; range eight to fourteen years) and by grade the mean ages and standard deviations were: Grade 4 (M = 9.58, SD = 0.55), Grade 5 (M = 10.72, SD = 0.57), Grade 6 (M = 11.65, SD = 0.56), and Grade 7 (M = 12.66, SD = 0.59).

In a recent validation study the CCDS was found to provide "further support for the reliability and validity of the CCDS in the South African population" (Stead & Schultheiss, 2010, p. 85). Using a sample of 808 children in grades four through seven, evidence for the CCDS's construct validity was provided using confirmatory factor analysis, with eight factors confirmed (Stead & Schultheiss). To estimate construct validity, coefficients of congruence (Gorsuch, 1983) were obtained across two samples to assess the stability of the factor structure (Stead & Schultheiss). The results indicated that Self-Concept (.91), Planning (.91), Locus of Control (.89), Time Perspective (.82), Key Figures (.82), and Curiosity (.70), were more stable factors than Exploration (.61) and Information (.25). According to Stead and Schultheiss (2003), the CCDS total scores do not reflect excessive skewness or kurtosis and the distribution of scores is close to normal. At 0.89, the internal consistency coefficient of the total score of the 48-item measure is high, indicating that the items reflect the same attribute.

For the purposes of the present research the CCDS scores were used as proposed by Stead and Schultheiss (2003), with higher CCDS total and subscale scores reflecting further developmental progress for the total score and, within each career dimension, for subscale

scores. This suggests that higher total scores obtained on the CCDS imply a higher level of career development in children, while higher scores on the subscales of the CCDS imply developmental progress within a specific dimension or subscale.

Although the CCDS is seen as a self-report survey, in the present research both the CCDS and RCAS were administered to research participants by trained research assistants. This decision was taken in order to eliminate the potential impact of children's reading skills (which still might be limited during the eight to ten year old period) in their ability to understand the CCDS and RCAS questions. The questions were thus verbally asked and children could indicate their response by referring to a cue card (which had the five likert-type responses printed on the card). These steps assisted the research team to effectively manage the influence of extraneous variables yet, as described later, the research data still revealed limited internal consistency for a number of the subscales.

Despite the fact that the psychometric information available on the CCDS support its use as a method of data collection, a call has been made for further research to be conducted on its psychometric properties (Stead & Schultheiss, 2003, 2010). It is important to note that, while this scale has been deemed reliable for use in the proposed study, the scale was developed quite recently and it does not yet have a strong research base. It is also important to point out that the lowest age range of the current study (i.e., eight years old) constitutes the lowest age bracket the CCDS can accommodate. Considering that age specific norms have not been established, there is a need for caution when interpreting results which are described in detail in Chapter 8.

Revised Career Awareness Survey (RCAS)

Another measure that has been developed to add to the conceptual understanding of children's career development is the Revised Career Awareness Survey (RCAS; McMahon &

Watson, 2001). The measure is an example of a self-report questionnaire and is an adaptation of the Career Awareness Survey (CAS) originally developed by Gillies et al. (1998). Extant literature suggests that the RCAS has been successfully used as a reliable method of data collection in South African and Australian elementary schools (McMahon & Watson, 2005; Watson & McMahon, 2004). The original CAS has also previously been used to measure the effectiveness of a career education intervention in the upper elementary school (Gillies et al.) and therefore this warranted its inclusion in the present research.

The RCAS (McMahon & Watson, 2001) is designed to gather information about children's knowledge and understanding of the world of work and has five sections which have been described in the literature (McMahon & Watson, 2001; Watson & McMahon, 2004). Form 1 includes a series of open-ended questions about different aspects of children's personal-social knowledge such as their career interests, career influences, and sources of career information. The questions invite participants to: list jobs that interest them; nominate their favourite job; identify what would make them good at their favourite job; list who and what could influence them towards or away from the jobs they listed; report how they found out about the jobs they listed; and say how they could find more information (McMahon & Rixon, 2007).

Using open-ended questions, Form 2 focuses on career gender stereotypes and asks what careers children believe are more or less suitable for men or women. Form 3 also explores career gender stereotypes but this time provides participants with a list of prescribed occupations which they must then indicate as being suitable for either males, females or both. Form 4 explores the ability of children to recognise similarities between different types of careers with each item providing a list of three careers. In this form children are asked to name a feature common to all

three careers. Finally, Form 5 invites children to describe the link between listed careers and what they have learned at school.

Managing children's attention span during the pre–and post-test assessments was a major consideration in the present research. The children were expected to complete the CCDS and the RCAS during one facilitator assisted data collection interview and consequently it was decided to limit the RCAS to Form 1 and Form 4. The data collection was limited to these two forms mainly because Forms 1 and 4 provide sufficient variety in terms of the range of questions posed to children. Furthermore, some of these questions could be related to aspects of career development learning. Consequently the results obtained from these two forms could be used more effectively in the data analysis and discussion. The RCAS was included to broaden the measurement of children's career development beyond that measured by the CCDS and subsequently provided much insight as a pre- and post-test measure.

Focus group discussions

Qualitative data were collected during two focus group discussions where a semi-structured interview was utilised with a small subsample of children who participated in the GCBC™. Focus groups are a form of group interview that capitalise on communication between research participants in order to generate data (Krueger & Casey, 2009). Although group interviews are often used as a quick and convenient way to collect data from several people simultaneously, focus groups explicitly use group interaction as part of their method (Stewart et al., 2007). This means that instead of the researcher asking each individual to respond to a question in turn, individuals are encouraged to talk to one another, ask questions, exchange anecdotes and comment on each other's experiences and points of view (Kitzinger, 1995). According to the latter author, this method of data collection is particularly useful for exploring

individuals' knowledge and experiences and can be used to examine not only what individuals think but how they think and why they think that way. Group discussion is particularly appropriate when the interviewer has a series of open-ended questions and wishes to encourage research participants to explore issues of importance to them, in their own vocabulary, generating their own questions and pursuing their own priorities (Kitzinger, 1995; Krueger & Casey, 2009; Mack et al., 2005; Stewart et al., 2007).

To provide relevant structure for the focus group discussions, a semi-structured interview (see Appendix 2) was developed to gather information on children's learning experiences as well as their perceptions of the effectiveness of the program. The advantages of a semi-structured interview include that it allows for open and frank responses if rapport has been established with the interviewer, the observation of nonverbal cues, and the collection of personal information, attitudes, perceptions and beliefs (Gravetter & Forzano, 2006). A further advantage is its flexibility in structure which enables the interview to be adjusted should the situation require it. The benefit of using a semi-structured interview within a focus group discussion is that the group situation redresses the power of the researcher over participants, decreases researcher control, and encourages the free expression of ideas during informal interaction (Madriz, 2003; Wilkinson, 1998). Overall, it has been argued that the collective experience of focus groups can empower participants to take control of the research process and to discuss issues that are of concern or interest in a language and framework that makes sense to them. The semi-structured interview transcripts used in the present research have not been included as appendices but are available on request.

The research was limited to two focus groups, as the focus was on understanding the experience of the children and not on generalising the findings to a larger population. It was also

thought that balancing gender distribution in the focus groups to equal representation of boys and girls would be beneficial for obtaining a representative view of the larger sample.

Educator Feedback Form

The last measure utilised to gather qualitative data was the Educator Feedback Form (see Appendix 3) which gathered information on the two educators' (i.e., one Grade 3 and one Grade 4) perception of the GCBC™ program. The questions ranged from providing a general overview of the possible benefits of combining ICT and the GCBC™ in an educational program to specific questions which attempt to ascertain educators' views of how the career learning content was perceived by their classes. Thus, as highlighted earlier, the data collection consisted of both quantitative and qualitative data, with the quantitative data providing the breadth of exploration and the qualitative data providing the depth.

Ethical Considerations

Research ethics cover a range of areas, including: respect for human rights; benefit and harm analysis; responsibilities to research participants and others; fostering inclusion and participation; disparities of power; free and informed consent; confidentiality and privacy; research publications and dissemination; and researcher integrity (Bell, 2008b). Throughout the present research considerable effort was invested in ensuring high levels of ethical conduct and respect for the rights of the children participating in the study. Among its many objectives, child research informs policy and practice in ways that are intended to improve the lives of children and increasingly child research has endorsed participatory ways of ensuring children's perceptions inform research outcomes (Bell, 2008a). The need to acknowledge that children's rights exist in the moment where research interests and children's everyday lives intersect (see, for instance, Bell, 2008a) requires researchers to recognise and sufficiently implement a range of

measures to protect children's rights at all times. Therefore, researchers need to conduct research within a climate of respect for human rights, which includes treating all people affected by the research with dignity, and affording special consideration to children and other vulnerable populations (Bell, 2008b).

For this reason researchers are required to abide by certain ethical principles and codes of conduct, the goal of which is to ensure that research is carried out in a morally acceptable way (Struwig & Stead, 2001). These processes are clearly stipulated by the code of ethics for research at the Nelson Mandela Metropolitan University and The University of Queensland, Australia. The reason why two universities are listed is because the research supervisor and co-supervisor are faculty members at these two institutions.

The first ethical consideration to adhere to was to gain approval for the present research. As with most studies of this magnitude, consent to conduct research on children was sought on a number of different levels ranging from university approval, to the department of education, the level of school (i.e., written consent from the principal and school governing body, and verbal consent of the teachers involved), and finally parental and child consent. The process of seeking ethical approval to conduct the study started in March 2010 with the Psychology Department of the Nelson Mandela Metropolitan University (NMMU) confirming that the research conformed to the requirements proposed for postgraduate studies. From here the Health Sciences Faculty Research, Technology and Innovation Committee approved the proposal and it was submitted to the central Research Ethics Committee: Human (REC-H) for ethical approval (see Appendix 4). After approval was obtained from the NMMU, the next step was to seek ethical clearance from The University of Queensland (Appendix 5). This concluded the first phase of seeking ethical approval for the present research.

Once the research was cleared at the university level, the researcher applied to the Western Cape Education Department to conduct fieldwork in their schools (see Appendix 6). This second level of ethical clearance required approval from the Research Division of the Western Cape Education Department Head Office (see Appendix 7), as well as obtaining the consent and commitment of the principals participating in the study. The researcher followed Education Department guidelines in obtaining consent for the research and approval was confirmed during the latter part of 2011. Throughout this process the researcher provided information on the nature of the study (see Appendices 8 and 9), the requirements of the research, and the expectations of the schools participating in the fieldwork. Specifically, both principals (written consent) and the participating teachers (verbal consent) confirmed their participation in the study (which also included giving consent for using data from the Educator Feedback Form).

Prior to obtaining the last level of consent, whether verbal or written, it is expected that researchers must provide information to prospective child and adult participants about the research objectives, the process (including information about data collection and protection), and the intended outcomes of the research (Bell, 2008a). This information was comprehensively summarised in a letter sent to all parents who had children in Grades 3 and 4 at the two schools concerned (Appendix 12). Most parents confirmed their willingness for their children to participate in the study, with only a few unreturned consent forms. Only children whose parents signed and submitted the consent forms were included in the research. Even though the parents had already given consent for their children to participate in the study, the researcher still believed that it was necessary to have a discussion with children regarding their participation prior to the start of the fieldwork. During an introductory talk children were fully informed about

the research and that they had the option to withdraw at any time, without penalty and that any data collected from them would be immediately destroyed. Following this talk all children indicated that they were willing to participate in the study. As part of the process of gathering informed consent to conduct the research, all stakeholders[15] were informed that the research would not harm the participants, participation was of a voluntary nature, and information obtained would be treated as strictly confidential. These are seen as important considerations in ethical research practice (Skelton, 2008).

Another important ethical consideration was to avoid unnecessary intrusion into the private lives of research participants (Bell, 2008b; Skelton, 2008). All children participating in and affected by research have the right to confidentiality and privacy and therefore researchers must ensure participant and research data confidentiality. The steps followed in protecting the privacy of the data captured and ensuring the confidentiality of the research participants in the present study are described in the procedure section of the current chapter. However, briefly stated, no identifiable information was reported on, thereby protecting the privacy of the participants. The data was also de-identified and stored on a password protected database. Near the end of the fieldwork permission was also obtained to make a video recording from a subsample of the research participants.

Lastly, the provision of feedback to participating schools was seen as an important step in the research project particularly given the high level of school, educator, and child participation required. According to Bell (2008a), researchers should develop a strategy for publishing and

[15] Stakeholders include: The Western Cape Department of Education (Head Office) – Research Department, the School Governing Bodies of the control and experimental schools, the principals of the control and experimental schools, the class teachers of the Grades 3 and 4 classes, all the parents of the Grades 3 and 4 classes at the two schools, all the children in the Grades 3 and 4 classes, and the eight research assistants who assisted with the fieldwork.

disseminating research in a manner that is consistent with the information provided at the outset and that is sensitive to the relationships developed between the researchers and the participants. In the present research, group feedback was provided to the participating schools and to the parents of the participants in the form of a general written report. Furthermore, the dissemination of the research results and subsequent research products also had to be structured according to the highest adherence to ethical guidelines. Although only the experimental group was exposed to the GCBC™, the principal of the school utilised as the control group was informed of the willingness of the researcher to run the GCBC™ for the control group. Once the research is completed, the learners of the control group will then have the option of completing the GCBC™ if they request to do so.

Procedure

This subsection of the chapter provides an overview of the procedure followed in researching children's career development learning. In particular, the five phases that formed part of the research (which included the program development described in Chapter 6) are each described. These five phases included: Phase one – Program development and ethical approval; Phase two – Fieldwork (pre-test); Phase three - Fieldwork (GCBC™); Phase four - Fieldwork (post-test); and Phase five – Fieldwork (focus groups). Each of these phases is described below.

Phase one – Program development and ethical approval

The stages involved in the GCBC™ program development can be reviewed in Chapter 6 with the focus in this chapter directed more towards understanding how the program development fitted into the larger research project. Once the program was finalised, the research entered the fieldwork phase where approval was obtained from the two universities involved as well as the Western Cape Education Department. Schools that conformed to the research

requirements in terms of the language of instruction, minimum number of children needed, and the availability of technology as instructional media were identified and approached for participation. Meetings were arranged with the two school principals during which their involvement was confirmed and their requirements noted.

Following these discussions the principals were provided with formal documentation indicating pertinent information about the pre- and post-test assessments and obtaining consent from the parents (Appendices 10 and 11). The two educators (Grades 3 and 4) from the experimental group were also consulted and verbal consent was obtained which confirmed their willingness to participate during this initial planning stage. Considering that the educators would not be directly involved in the facilitation process, it was important to clarify their role throughout the fieldwork stage. The two educators of the experimental group in particular had an important role to play as observers and, if needed, maintaining discipline in the classroom setting. The next stage involved the selection of the participants, with information about the study, the consent form, and the biographical questionnaire sent to all parents who had children in the Grade 3 and Grade 4 classes. Parents needed to complete both the consent form as well as the biographical questionnaire prior to the fieldwork session. In addition, parents were asked not to prepare children in any way regarding careers, as this would affect the validity of the results.

Phase two – Fieldwork (pre-test)

The fieldwork was divided into four distinct periods which have been included here as Phases 2 through 5. After consent forms were collected and the sample of participants selected, the primary goal was to collect the pre-test data from both the control and the experimental groups. Each school had close to 75 participants which required optimal efficiency in terms of data collection timing and procedures considering the limited time available for this stage of the

research process. Only one day per school was allocated for the pre-test data collection with each child expected to complete the CCDS as well as Forms 1 and 4 of the RCAS. It was decided that the most effective way to accomplish this task was to have a team of researchers responsible for asking the questions (i.e., reading them verbatim from the questionnaire) and capturing the responses of the children. Consequently, eight research assistants were trained in the administration and capturing of data for the CCDS and the RCAS. They were also trained in how to introduce the assessment measures to the children and how to deal with different scenarios (for example, if a child did not want to respond to the questions). This procedure was deemed necessary as a means of controlling variables such as the varying levels of reading proficiency evident in such a young sample. Another reason why research assistants were utilised was the need to ensure that all children understood and appropriately responded to the CCDS and RCAS questions. Therefore the 'self-report' format was changed to a 'facilitator guided' format which eliminated reading level as an extraneous variable that could negatively impact on the results.

Furthermore, although exposing children to the world of work is supposed to form part of the Life Orientation curriculum from early elementary grades, neither of the selected schools had planned activities or structured programs in place covering career learning content prior to or immediately following the fieldwork phase. Such programs could have influenced children's career development and it was necessary to limit the career learning of children from both groups to their participation or non-participation in the program. Therefore, prior to commencing with the pre-test, the researcher consulted with key educational personnel at both schools. In particular, class teachers and the school principals were instructed to continue with their normal academic program for the duration of the study and, as confirmed by the teachers, this did not include a focus on career topics. This would mean that changes in terms of children's (i.e., in the

experimental group) career development, if any, could be considered related to participation in the GCBC™ program. However, unintentional career learning, for example through after school discussion and conversations between research participants, could not be controlled for.

Practical arrangements regarding the pre- and post-test assessments were consistent throughout the data collection period. For example, a suitable venue was identified in each of the schools and furnished with sufficient desks, chairs, and stationery to accommodate seven research assistants (i.e., one of the eight research assistant was always on standby) and seven children. The desks were arranged in such a manner so as to ensure privacy (i.e., during the one-on-one interview format) by providing enough space between respective tables thereby also limiting the possibility of overhearing answers from other children.

On the day of assessment the primary researcher was responsible for overseeing the data collection procedures and ensuring that the limited time allocated was used appropriately. Once the research assistants were seated at their tables, seven children were called with each allocated to a research assistant. The research team administered the CCDS and the RCAS to both the control and experimental groups in this way in order to acquire information on the children's career development. The time taken to complete both the CCDS and the RCAS ranged between 25 to 35 minutes per child. This translated into each research assistant responsible for interviewing approximately ten learners per school. As soon as a child completed their assessment they were excused and replaced by the next child. This process continued until all children were interviewed. For most of the day all children were in a controlled teaching environment which discouraged children talking to each other about the CCDS and the RCAS.

As children had to be assessed on two occasions it was important to link data from the first assessment with that of the second assessment. To accomplish this goal all children were

allocated a number based on their grade level followed by a number representing the number of learners selected in the study (for example, 3-16-pre would be a grade 3 learner, number 16 in the group of 34, with data collected during the pre-test). The assessment measures for each of the schools were also colour coded to ensure that the data collected could be captured correctly. The pre-test data for the experimental and control groups were collected on two consecutive days during January 2012 and securely stored in a locked filing cabinet.

Phase three – Fieldwork (GCBC™)

The GCBC™ fieldwork consisted of five sessions (ranging between 45 and 75 minutes each) and was presented during normal school hours to the Grade 3 and Grade 4 classes separately. The primary researcher facilitated the sessions while the grade educators were present, although not directly involved in the presentation. The educators were tasked with observing the children during the sessions as well as inbetween the five fieldwork days (i.e., making notes if children during normal academic learning referred to the GCBC™ activities). These notes were integrated into the Educator Feedback Form (see Appendix 3) and are described in Chapter 9.

At the beginning of the fieldwork each child was provided with one of the GCBC™ workbooks which would serve as an important link between the five contact sessions initially planned. The classroom in which the fieldwork took place was fitted with an interactive whiteboard (and accompanying stylus pen), a data projector, a laptop, and a set of computer speakers. The classroom was also preselected because it was large enough to comfortably accommodate each of the grade groups. Considering that all the information is included in the GCBC™ program, children were not expected to access additional resources. Each session was concluded with a summary of the day's session as well as instructions for the homework

exercises. While the experimental group participated in the GCBC™, the children in the control group continued with their usual academic program to ensure that the results of the research were not compromised. The facilitator also kept a journal documenting his experiences throughout the week. The data collected in this journal has been integrated into Chapters 9 and 10. The purpose of this journal was to provide an opportunity to reflect on each day's experiences. In particular, the researcher focused on summarising his experiences as the facilitator so that these personal accounts could be used to shape future revisions of the program.

Phase Four – Fieldwork stage (post-test)

Once the baseline information had been collected and captured, and the experimental group exposed to the five sessions of the GCBC™ program, the researcher concluded the formal assessment by completing the post-test evaluation (for both groups) on consecutive days. A similar procedure to that of the pre-test was followed. In terms of the timing of the post-test, a five day period had lapsed between the experimental group learners completing the program and completing the post-test assessments. It was decided that the five day delay between completing the GCBC™ and the post-test assessments would provide sufficient balance between collected information on children's learning retention and personal experiences deemed as meaningful.

Although individual children's pre- and post-test assessments would not be compared with each other statistically, it was still deemed necessary to have a coding system which would assist the researcher in accessing a child's results for qualitative purposes. The process described in Phase two – Fieldwork stage (pre-test) was again followed, thus ensuring the privacy and confidentiality of the children and the data captured. The post-test data was collected on two consecutive days during February 2012.

Once the CCDS and RCAS pre- and post-test fieldwork were finalised the quantitative data obtained from these two measures were captured and entered into a statistical database. This database would later be used for the statistical analysis. All data entered into the database were checked and rechecked for consistency and accuracy thereby ensuring the integrity of the research database.

Phase Five – Fieldwork (focus groups)

Finally, to ensure adequate depth to the research two focus group discussions with a randomly selected subsample of Grade 3 and Grade 4 children were arranged (five days following the post-test data collection session). It was vitally important to gauge the effectiveness of the program not only in terms of content but also in terms of the experience of the children (i.e., what they enjoyed and what was helpful). To accomplish the latter goal, the focus group discussions provided insight into the children's perceptions of their experiences throughout the GCBC™ fieldwork.

The focus group discussions were conducted in a classroom with the four learners (two boys and two girls per focus group) sitting around a table. The researcher was also seated at this table and introduced the focus group sessions as a means of looking back at the experiences gained through their participation in the GCBC™. The focus groups lasted between 30 to 35 minutes, with the Grade 4 group taking more time than their younger counterparts. The reason for the Grade 4 focus group taking longer (10 minutes longer) was due to the fact that the Grade 4 learners discussed more extensively in terms of the length of their responses, as well as the greater content presented in their answers.

The facilitator, using the semi-structured interview questions, (see Appendix 2) guided the focus group discussion with the responses of the children recorded on a dictaphone. These

responses were then transcribed and content analysed for further discussion (see Chapter 9). Guided facilitation, using a semi-structured interview protocol, focused on elements of Super et al. (1996) and Savickas's (2005) self-concept development and also covered other discussion questions (e.g., how did the children experience the activity, what did they enjoy, etc.). The focus group discussion also allowed for any discussion that might arise among the children spontaneously (Patton, 2002).

Data Analysis

The statistical analysis implemented in the present research had five broad purposes. Firstly, the biographical information was analysed using descriptive statistics (i.e., frequency counts and percentages). This provided the researcher with valuable information regarding the sample demographics. The analysis for the biographical questionnaire started with descriptive statistics and included frequency counts and percentages, which were described in terms of the total sample, as well as per grade and per sample group.

Secondly, inferential statistics were used to determine measure stability (i.e., test-retest reliability) (only for the control group) and internal consistency (i.e., Cronbach's Alpha) of the data collected. The inferential statistics referred to above were needed to determine the level of confidence which could be assigned to the CCDS and the RCAS results.

Thirdly, in order to quantitatively measure the effectiveness of the program, insight was needed to statistically compare the children's career development prior to and after exposure to the GCBC™. The scores of the control group would thus be compared to that of the experimental group to determine whether there were any significant differences between the two groups during both assessment periods. Therefore the pre-test and post-test results for both the

control and experimental groups were analysed using dependent t-tests (i.e., for the CCDS) and chi-square coefficients (i.e., for the RCAS).

Fourthly, once the significance of the results could be established, descriptive statistics (i.e., frequency counts and percentages) were used to comprehensively describe the CCDS and the RCAS data obtained from the control and the experimental groups.

Finally, in response to Aim 3, the qualitative data collected from the two focus group discussions and the Educator Feedback Forms were analysed using approaches that differed considerably from the quantitative statistical methods already described. A separate chapter has been dedicated to the qualitative data analysis (see Chapter 9). Each of these steps is outlined below and they are grouped according to the type of analysis conducted.

Quantitative data analysis

Biographical questionnaire

Before detailed analyses of data collected during the pre- and post-test assessment could commence, it was necessary to better understand the sample demographics. This was particularly relevant to the present study considering that the information reviewed earlier in this thesis revealed two key factors that have not received adequate attention in the South African research literature to date. These are related to a) career development being part of the developmental stage of childhood, and b) technology becoming an accessible and viable format for presenting learning content and programs. In an attempt to gain insight into the perception of parents of these two issues, a number of questions were asked in the biographical questionnaire related to the South African context. These responses were captured and analysed using descriptive statistics including frequency counts and percentages.

The biographical questionnaire constituted the first set of data to be analysed and, following the discussion of the descriptive statistics, the focus shifted to analysing the children's responses. The processes of data analyses followed for the remaining two measures (i.e., the CCDS and the RCAS) are described next.

CCDS data coding and analysis

The CCDS is a measure that provides the researcher with data in nominal format, thus no additional coding was needed prior to completing the statistical analysis. For statistical purposes, it is important to note that CCDS subscale scores and CCDS total scores were included in the data analysis of this study. The descriptive statistics were used to reduce large amounts of data to concise numerical summaries which could be displayed using tables and charts (Hinton, 2004; Sheskin, 2000). This means that the large amounts of raw data collected during the two assessment periods (i.e., pre- and post-test) could be reported efficiently and in a way which is more accessible to the end user.

In order to evaluate the effectiveness of the program, a comparison between the control and experimental groups was needed. However, before this process could commence, the results of the CCDS and the RCAS at the pre-test stage were examined in order to ensure that there were no statistical differences between the two groups. Once completed, it was necessary to determine the validity and reliability of the data collected (described in detail later in this chapter). A brief overview of this process has been provided here.

An assessment of the internal consistency of the data collected from the CCDS was accomplished using Cronbach's alpha. The data for the pre- and post-tests for both the control and experimental groups were analysed for internal consistency which, if found adequate, would support drawing conclusions with confidence. If internal consistency could not be established, or

found to be insufficient, further exploration would be needed to offer evidence as to what could be contributing factors. Once this process was completed, the focus shifted towards providing a detailed description of the pre- and post-test results for each of the CCDS subscales (i.e., the eight subscales that make up the CCDS), as well as the CCDS total score.

The data analysis for the CCDS consisted of frequency counts and percentages which provided a descriptive account of the quantitative data. These results are presented using both the pre- and post-test scores and are supportive of further analyses. Particular attention is given to any variation noted between the control and experimental groups which, if required, could be further analysed in terms of statistical significance. Each of the subscales is described separately to determine if career development learning during the childhood years can be reflected in a measure such as the CCDS. The results of the pre-test and post-test for both the control and experimental groups were further analysed using inferential statistics (i.e., dependent t-tests) based on the results of both groups as measured on the CCDS. Dependent t-tests were used to analyse each of the eight subscales included in the CCDS for both the control and experimental groups at the pre- and post-test stages. The t-test is the most commonly used method to evaluate differences in means between two groups (Dane, 1990). If the results from any of the dependent t-tests proved to be significant at a 0.05 significance level, then post-hoc analysis would be carried out to determine where significance may lie.

RCAS data coding and analysis

Although the RCAS is used to collect qualitative data, the answers recorded on this measure were content themed and coded in order to quantitatively explore children's answers. As has been indicated in the Measures section of the present chapter, the RCAS was initially developed to obtain information on children's awareness of careers. It collects qualitative data

from children and therefore the responses needed to be coded in the present research to allow for a statistical analysis of the results.

Two forms of the RCAS, Forms 1 (which included nine questions) and 4 (which included six questions), were administered to the children with their responses content themed and subsequently coded for each of the questions. Initially the data was coded using the verbatim responses provided by the children. For example, on question six children were asked "*how did you find out about those jobs that you wrote down?*" The first round of coding looked at the variety of children's responses provided (e.g., from my parents, a teacher told me, my brother, I saw someone on TV, or I am good at it, I like to design, to name a few illustrative examples). As can be seen from these examples, a broad range of answers was captured and new items were added until saturation of data took place (i.e., children started to provide similar responses (i.e., categories) and children's answers could be linked with the broader categories already identified). All answers were initially coded, with these responses (i.e., categories) later content themed to facilitate and simplify the discussion of the results. For example, the items/responses above were collated into broader themes including social factors, interpersonal factors; intrapersonal factors; environmental factors, and so forth.

Although the RCAS was developed to gain insight into children's career awareness, the nine questions of Form 1 were considered in terms of their ability to measure elements of career development learning. After examining each of the questions it was clear that certain questions could be more directly linked to learning whereas other questions primarily reflected awareness of careers. In the present study, questions one (i.e., *"What jobs are you interested in doing when you grow up?"*), three (i.e., "*What is it about you that would make you good at your favourite job?"*), eight (i.e., "*When you think about jobs, what information do you need to find out?"*), and

nine (i.e., "*What do you do at school that might help prepare you for the jobs that interest you?"*) had particular relevance to the aims of the research. The remaining questions were seen as relating more to career awareness and included: questions two (i.e., "*Of those jobs you wrote down, which one is your favourite?"*); four (i.e., "*Who could influence you toward or away from choosing jobs?"*); five (i.e., "*What could influence you toward or away from choosing jobs?"*); six (i.e., "*How did you find out about those jobs that you wrote down?"*); and seven (i.e., "*How else could you find out information on jobs?"*). Each of these questions is described as a separate content theme, with the results of both the control and experimental groups compared to each other.

The manner in which the data was coded for questions one to nine also determined how the data could be analysed. For example, questions one and two ask about children's career aspirations. Children's responses could be coded according to the aspired career and its relevant Holland (1997) typology code (for example, a doctor could be coded as an Investigative type career). However, in the present research, the status level associated with the career was used as the primary mode of coding children's responses (for example, a doctor would be coded as having a status level of 1 indicating a high status level career). The status level of the career relates to the level of training required for successful entry into a particular career. Such levels have been defined for most of the careers mentioned by the children. In terms of development, children in this developmental stage are said to be influenced by an orientation to social valuation (Gottfredson, 2002, 2005). Thus coding the data according to status level would offer an opportunity to ascertain the relevance of career development theory to a sample of eight to ten year old South African children. These status levels are presented in Table 5.

Table 5

Status Levels of Occupational Aspirations

Status Levels	Description
1	High-level workers (e.g., tertiary education such as university or university of technology)
2	Middle-level workers (e.g., college diploma)
3	Skilled workers (e.g., technical college or matriculation, i.e., Grade 12)
4	Semi-skilled workers (e.g., Grade 8, 9, or 10)
5	Unskilled workers (e.g., elementary school or no education)

The six questions of Form 4 of the RCAS were coded according to Holland's (1997) RIASEC typology. An overview of each of these types has been provided in Appendix 51 Table 55. Two additional codes were provided focusing on children who were not able to or who did not offer a response (i.e., Coded as 0), and children who offered a 'closely related response' (i.e., Coded as 7). This second addition was called for in view of the fact that some children offered answers which could not directly be linked to the preferred Holland's type yet showed an ability to link activity based behaviour to an understanding of differences in careers (for example, in the case of the three Artistic careers namely, *actor, fashion designer, singer,* many children responded by saying "they all are famous").

Reliability and validity in quantitative research

Reliability in quantitative research has primarily focused on the concept of consistency, which concentrates on instrumentation and outcome (Lewis, 2009; Shadish, Cook, & Campbell, 2002). Lewis states that instrumentation issues primarily evolve around survey instrument reliability (i.e., whether it consistently [reliability] and accurately [validity] captures the variables

it was designed to measure). However, according to Roberts (2006), reliability is a necessary but insufficient condition for validity and, although the questionnaire under consideration may be reliable, it might not be deemed a valid means of collecting the required data.

In the present research data validity was a factor as, according to the present researcher, the two measures used to collect data during the pre- and post-test have limited research support for measuring the effectiveness of career interventions. Specifically, in terms of the foci of the two measures selected, the CCDS (i.e., measuring children's career development) and the RCAS (i.e., measuring children's career awareness) measure constructs different to that encouraged by children's participation in the GCBC™ (i.e., career development learning). Furthermore, although the RCAS has been used previously to evaluate the effectiveness of a career intervention (Gillies et al., 1998), the sample used in this study focused on older children as opposed to the eight to ten year old children of the present research.

Essentially, any research tool should provide the same information if used by different people (i.e., interrater reliability), or if it is used at different times, for example, on consecutive Friday mornings (i.e., test-retest reliability) (Roberts, 2006). However, Roberts concludes that methods of estimating the reliability of measures have several limitations. For example, test-retest reliability is potentially flawed if respondents' previous experiences in the first testing influence responses in the second testing. Moreover, intervening events between two administrations (as was the case with the GCBC™ in the present research) may account for differences between the two sets of results (Bryman & Cramer, 2004) and contribute to flaws in external validity (Robinson Kurpius & Stafford, 2005).

In the present research, evaluating the reliability and validity of the CCDS and the RCAS using test-retest methods was not the primary goal of the research. However, it was still

necessary to ascertain whether the data collected could be used with confidence. Two different approaches were used with the CCDS (which captures nominal data) with the scores subjected to measures of internal consistency (i.e., using Cronbach's alpha) and test-retest reliability (i.e., measuring the consistency of the data collected from the control group at both assessment periods). The RCAS (which captures categorical data), on the other hand, proved more challenging and, after consultation with a statistician, it was decided to focus on chi-square measurements to compare the scores obtained from both groups.

The researcher focused on validating the data collection procedures (i.e., ensuring high levels of consistency during both the pre- and post-test assessment periods), the capturing of the data on the computer, and the subsequent data coding (in the case of the RCAS) as a means of improving face validity.

The steps needed to ensure reliability and validity of quantitative data differs somewhat from the steps needed to ensure trustworthiness of qualitative data. The steps taken to ensure that the qualitative data collected could be used with confidence are described next.

Qualitative data: Trustworthiness

Qualitative data analysis is largely inductive, allowing meaning to emerge from the data rather than the more hypothetical-deductive approach of quantitative research (Kisely & Kendall, 2011). This variation between the different research approaches is evidenced by the fact that "a qualitative researcher accepts that there are 'multiple realities', not just one objective reality. In particular, the 'truth' is in the informant's perspective, not that of the assessors" (Kisely & Kendall, p. 364). However, although there are distinct variations in the manner in which data is collected and analysed, there are also noteworthy similarities. For example, important quantitative research constructs such as reliability and validity have equivalent qualitative

counterparts. In the present research, the reliability and validity of the qualitative data collected were assessed by establishing the trustworthiness of the qualitative data (Lincoln & Guba, 1985).

The importance of ensuring the validity of qualitative research is found throughout the qualitative methodology literature (e.g., Creswell & Miller, 2000; Lincoln & Guba, 1985). As qualitative researchers are often perceived as the research instrument, they must ensure that the information they report and record is accurate and not oversimplified or misinterpreted (Lewis, 2009). Therefore, in presenting the results in Chapter 9, it was important to ensure sufficient reference to the steps taken to ensure trustworthiness of the data (i.e., credibility, transferability, dependability, and confirmability) (see Guba, 1981; Lincoln & Guba, 1985) of the data collected. These four steps, if followed correctly, provide validation of the trustworthiness of qualitative research which, according to Shenton (2004), is often questioned by traditional researchers who tend to prefer quantitative methods. Validity and reliability in qualitative research cannot be addressed in the same way as in quantitative research (Hinton, 2004). It was therefore necessary to validate the results collected through qualitative methodology with relevant and accepted procedures which could be contextualised within an existing field of research.

Credibility

Credibility refers to the element that allows others to recognise the experiences contained within the study through the interpretation of participants' experiences. Thomas and Magilvy (2011, p. 153) suggest a number of strategies which can be used to strengthen the credibility of a study such as "prolonged and varied time spent with the participants, interview techniques, and the transcripts, while writing the final report and using the words of the participants." The researcher considered and implemented a number of these recommended strategies which

included prolonged and varied time spent with the children as well as using the verbatim words of the children (Thomas & Magilvy).

In addition, peer review as a strategy to improve the credibility of results is also recommended and should take place throughout the research to ensure credibility and avoid problems that would be difficult to correct at later points in the study (Lewis, 2009). Consequently, the researcher actively participated in ongoing peer review throughout the research process which included the conceptualisation of the study, the program development, the fieldwork and, most importantly, throughout the qualitative data analysis. The peer review consisted of regular meetings and informal dialogues with colleagues working at the Western Cape Education Department who were actively involved in discussions regarding the program development and curriculum implementation throughout the Southern Cape region of South Africa. The researcher also engaged with the two research supervisors overseeing the study.

Furthermore, to ensure credibility in qualitative research it is important to acknowledge that what an individual fails to record while collecting data is often as important as what is collected (Lewis, 2009). Therefore, audio recordings of interviews (which were employed in the present research) can help validate descriptive data. In addition, to further ensure credibility the researcher documented his experiences of the focus group discussions using a journal and made specific reference to children's actions (i.e., non-verbal behaviour), interactions (i.e., specific patterns of talking by the group participants), and other cues that could not be captured using the audio recording device.

Transferability

Another important qualitative construct is that of transferability or "how one determines the extent to which the findings of a particular inquiry have applicability in other contexts or

with other subjects/participants," (Lincoln & Guba, 1985, p. 290). One strategy to establish transferability is to provide a dense description of the population studied by providing descriptions of demographics and geographic boundaries of the study (Thomas & Magilvy, 2011). One of the benefits of a mixed research design, as evidenced in the present research, is that comprehensive and detailed descriptions of the research participants have already been provided. The data presented as part of the quantitative analysis of the sample contributes to the transferability of the qualitative results.

Dependability

In addressing the issue of reliability, quantitative researchers employ techniques to show that, if the work was repeated in the same context, with the same methods and with the same participants, similar results would be obtained (Shenton, 2004). Dependability occurs when another researcher can follow the decision trail used by the researcher (Thomas & Magilvy, 2011). In order to address the issue of dependability more directly, the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results (Shenton). These include the following: describing the specific purpose of the study; discussing how and why the participants were selected for the study; describing how the data were collected and how long the data collection lasted; explaining how the data were reduced or transformed for analysis; discussing the interpretation and presentation of the research findings; and communicating the specific techniques used to determine the credibility of the data (Thomas & Magilvy). In the present research, the methodology that underpins the study is described in detail and therefore contributes to the dependability of the data collected.

Confirmability

Lastly, confirmability, which is similar to objectivity in quantitative terms, occurs when credibility, transferability, and dependability have been established (Creswell & Miller, 2000; Lincoln & Guba, 1985). The traditional meaning of objectivity is that if a large number of people report experiencing the same thing, it is objective, and if only a single person experiences it, then it is subjective (Lewis, 2009; Lincoln & Guba). Here, according to Shenton (2004), steps must be taken to ensure as far as possible that the research's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher. To ensure confirmability of the present research results the researcher had to be reflective, and maintain a sense of awareness and openness to the study and unfolding results (Thomas & Magilvy, 2011).

Qualitative data analysis

To accomplish this goal the researcher content themed the information collected from the focus group discussions and used an approach referred to as thematic analysis. Thematic analysis is a widely used qualitative analytic method within psychology and it offers an accessible and theoretically flexible approach to analysing qualitative data (Braun & Clarke, 2006). The semi-structured interview used in the focus group discussions had a number of questions which attempted to record the perceptions of children while completing the GCBC™. However, there were also questions included which could provide insight into children's career development learning.

The two focus group discussions were subjected to a rigorous process of review, analyses, reflection, and subsequent reporting in the research. For example, the recordings were listened to on numerous occasions with specific attention paid to first impressions. These

interviews were subsequently transcribed, checked, and rechecked to ensure that the transcribed data directly matched the original recordings. From here the audio recordings were again listened to in order to pick up on any salient responses which might not have been previously identified. The researcher was able to identify a number of themes in the children's responses which were noted prior to asking an independent analyst to review the transcripts. This analyst also provided insights on the manifest and latent themes present throughout the two focus group discussions. The two sets of themes were compared and critically examined to ensure that there was sufficient overlap between the themes proposed.

Once this process was finalised, four broad themes were formalised in the qualitative research results chapter (i.e., Chapter 9) of the present research. The four themes are: *Participants' Experience of the GCBC™*; *The GCBC™ as an Intentional Career Learning Activity*; *Career Decision-Making in the Context of Lifelong Learning*; and *The GCBC™ and its Relationship to Curriculum Content* and these are described in Chapter 9.

Summary

Mixed method research studies are increasingly called for given the complexity of research problems requiring answers beyond simple numbers in a quantitative sense or words in a qualitative sense (Mack et al., 2005). A combination of both quantitative and qualitative data can provide a more complete analysis of research problems. Researchers can situate numbers in the contexts and words of participants, and they can frame the words of participants with numbers, trends, and statistical results.

Research in career development involves the process of collating information from assessments, observations, and inferences drawn from research data into a meaningful whole, with the information compared against an implicit benchmark or explicit criterion in order to

enable a judgement to be made (Anthanasou, 2007). However, much of our understanding of childhood career development is based on adult theories and the application of these adult theoretical constructs to childhood. The information gathered through assessment, in particular when the career development of children is assessed, cannot be compared against implicit benchmarks or against explicit criteria simply because these elements have not been effectively researched in childhood.

Conclusion

This chapter has described the methodology used in the current study. Specific attention was given to aspects such as the method used, the sampling procedures employed, and the procedures followed to obtain consent for the research. The chapter also examined the assessment measures and the data analysis procedures followed. Ethical guidelines considered important to the study were discussed. Chapter 8 will present the quantitative research results and Chapter 9 will present the qualitative research results'.

CHAPTER 8

QUANTITATIVE RESULTS

The focus of the research now shifts to presenting the quantitative results. The present chapter has been structured according to aim two of the study which was to explore and describe children's career development prior to and after exposure to the GCBC™ career exploration program.

This chapter begins with a detailed description of the results of the biographical questionnaire. Some descriptive statistics related to the sample have already been reported in the previous chapter. However, the present chapter describes the results related to the career interests of the children as perceived by their parents, as well as the accessibility of computers in schools and households. Thereafter the results related to the Children's Career Development Scale (CCDS; Stead & Schultheiss, 2003) and the Revised Career Awareness Survey (RCAS; McMahon & Watson, 2001) for the control and experimental groups, as well as a separate analysis of the Grade 3 and Grade 4 groups (where possible) are described.

Inferential statistics are initially presented which focus on issues such as measure stability (i.e., test-retest reliability), internal consistency (i.e., Cronbach's Alpha), and statistical significance (i.e., dependent t-test) of changes noted between the control and experimental groups following exposure to the program (see subsection on inferential statistics: pre- and post-test measures). Secondly, the chapter presents the descriptive statistics (i.e., frequency counts and percentages) related to the CCDS and RCAS (see subsection on descriptive statistics: pre- and post-test measures).

Biographical Questionnaire: Descriptive Statistics

This particular section of the chapter focuses on information provided by parents or guardians of the research participants. The results related to three key questions are described and include: parents' or guardians' report of children's career aspirations; parents' or guardians' aspirations for their children; and computer access and computer literacy of children (as rated by their parents or guardians).

Parents' or Guardians' Report of Children's Career Aspirations

As part of the biographical questionnaire, parents were asked whether their children had expressed a particular interest towards any career during the last year. The results as reported in Table 6 indicate that for the total sample approximately two-thirds of the parents reported that their child had expressed a preference towards a particular career while the remainder had not.

Table 6

Parents' or Guardians' Report of Children's Career Aspirations

Group	Career					
	Yes		No		Total	
Control	44	61.11%	28	38.89%	72	100%
Experimental	51	68.92%	23	31.08%	74	100%
Total	95	65.07%	51	34.93%	146	100%

There was no significant difference between the control and experimental groups [χ^2 (1, N=146) = 0.98; p =.323], suggesting that the two groups were similar in terms of this descriptive feature. A follow-up question asked parents or guardians to indicate which career their child was interested in with the responses coded according to the status level of the career (Table 7). Thus, for example, if the child expressed an interest in becoming a doctor, this career would be coded

using Holland's status level classification explained in Chapter 7 (i.e., as a 1 or high-level worker given its classification as a career requiring university training).

Table 7

Skill Level of Children's Career Aspirations

Child's Aspiration	Group					
	Control		Experimental		Total	
High-level workers	22	30.56%	22	29.73%	44	30.14%
Middle-level workers	13	18.05%	22	29.73%	35	23.97%
Skilled workers	9	12.50%	7	9.46%	16	10.96%
No expressed interest	28	38.89%	23	31.08%	51	34.93%
Total	72	100%	74	100%	146	100%

Here it is interesting to note that of the approximately two-thirds of children who had expressed an interest in a particular career in the previous year (see Table 6), 54.11% of parents indicated that their child aspired to careers requiring either a university degree, or a university or technology diploma (i.e., high-level workers), or to careers requiring, for example, a college diploma (i.e., middle-level workers). As reported in Table 6, over a third of the parents or guardians indicated that children had not expressed an interest in a particular career and consequently they did not offer a response to the follow-up question. The remaining 10.96% of parents or guardians indicated that their child expressed an interest in a career classified as 'skilled work' (i.e., a technical college or Grade 12 qualification is needed for entry into the career).

Parental or Guardians' Aspirations for Children

In the biographical questionnaire parents and guardians were also asked to indicate their own aspirations for their children. These results are presented in a similar manner to those of the previous question in that they provide a summary of the status level (i.e., the level of training required as entry requirement) for the careers parents aspire to for their children. In order to relate parental preferences with children's expressed interests it was decided that information would be more meaningful if the results were reported in this manner. These results are summarised in Table 8.

Table 8

Parental Aspirations for Children's Future Careers

Parental preference	Group					
	Control		Experimental		Total	
High-level workers	21	29.17%	23	31.08%	44	30.14%
Middle-level workers	8	11.11%	16	21.62%	24	16.44%
Skilled workers	1	1.39%	0	0.00%	1	0.68%
No particular aspiration	42	58.33%	35	47.30%	77	52.74%
Total	72	100%	74	100%	146	100%

The results of Table 8 for the total sample revealed that more than half of the parents indicated that they had no specific career aspiration for their children. The remaining parents indicated that they had specific aspirations for their children, of which nearly a third held aspirations relating to high level workers, close to 17% to middle-level workers and less than one percent expressed a preference for their child to become a skilled worker.

Computer Access and Computer Literacy

Because Growing-Up: Children Building Careers ™ (GCBC™) is a computer-based career exploration tool, data was gathered about the availability of computers both at school and at home. Information gathered through the biographical questionnaire confirmed a high level of access to computers both at home and at school for most children. While 100% of the children had access to computers at school, 82.87% of the children had access to computers at home as well.

A second question was asked in relation to children's perceived computer literacy and these results are presented in Table 9.

Table 9

Parents' or Guardians' Rating of Children's Computer Literacy

Computer Literacy	Group					
	Control		Experimental		Total	
Skilled	7	9.72%	3	4.05%	10	6.85%
Above Average	13	18.05%	28	37.84%	41	28.08%
Average	44	61.11%	42	56.76%	86	58.90%
Below Average	4	5.56%	1	1.35%	5	3.43%
Poor	4	5.56%	0	0.00%	4	2.74%
Total	72	100%	74	100%	146	100%

Parents and guardians were also asked to rate their child's proficiency in using computers. The range of responses offered included: poor (i.e., child cannot use a computer); below average (i.e., child can use some features of a computer, including educational games, but always under supervision); average (i.e., child can initiate and use basic programs of a computer

under supervision and on their own); above average (i.e., child can initiate and use more advanced computer programs including browsing the internet), and skilled (i.e., child can work independently on a computer and can manage increasingly advanced software programs and internet browsing).

As can be seen from Table 9, parents of over 90% of the children indicated that their child had at least average computer literacy. What can be deduced from these descriptive statistics is that computers are readily available in most households and that parents and/or guardians can recognise their children's proficiency in effectively using this type of learning medium.

In general, the results of the biographical questions confirm that the control and experimental groups share sufficient biographical homogeneity to assume similarity between the two groups. The following subsection presents the inferential statistics related to the pre- and post-test assessments, in particular, information related to the test reliability and significance of test scores.

Inferential Statistics: Pre- and Post-Test Measures

The purpose of this subsection is to analyse the scores obtained from the two data collection periods (i.e., pre- and post-test assessments) using inferential statistics. Specifically, the statistical analyses described here focus on two separate constructs, namely test reliability and statistical significance relating to the comparison of the test scores between the control and experimental groups. Within the domain of test reliability it is important to note that only the CCDS was subjected to a review of test stability and internal consistency. This decision was necessitated due to the fact that the two instruments used in the present research represent two different approaches of data collection, with the CCDS collecting nominal data and the RCAS

categorical data. In order to successfully measure for test stability (i.e., test-retest reliability) and internal consistency (i.e., Cronbach's Alpha) nominal data is required and, after consultation with a statistician, the decision was made to limit this particular discussion to the CCDS results. However, later in this chapter the significance of test scores for both the CCDS and the RCAS are described in an attempt to draw inferences about the results in relation to the effectiveness of the GCBC™ as an intentional career development learning program.

Three sets of inferential statistics are described in the present subsection. Firstly, although the intention of the research was to measure the effectiveness of the GCBC™ as an intentional career development learning program and not the effectiveness of the CCDS as a data collection tool, the pre- and post-test design allowed for the investigation of the test-retest reliability (i.e., stability) of the CCDS. Given the limited use of the CCDS to date, it was necessary to examine its psychometric properties with the present sample. Only scores captured for the control group were used for this purpose because the experimental group was exposed to a researcher introduced variable (i.e., the GCBC™ program) between the two assessments. Test-retest reliability can only be assessed in situations where both the participants and the context remain constant. Secondly, the internal consistency of the CCDS is described for the measure as a whole, as well as for each of the eight subscales. These scores determine the level of confidence which can be attributed to the test findings. Thirdly, the inferential statistics described in this subsection focus on the inferences which can be drawn from a comparison between the control and experimental groups. Here dependent t-tests were used for the CCDS (representing nominal data) and chi-square analyses for the RCAS (representing categorical data).

Test Reliability

The concept of reliability refers to the consistency with which a measuring instrument, as in the case of the CCDS, measures whatever it is supposed to measure (Hinton, 2004). Attention is devoted to determining the test reliability of an instrument because this is closely associated with its validity (Roberts, 2006). Consequently an instrument cannot be valid unless it is deemed reliable. For the purposes of the present research, two approaches to measuring test reliability were followed, namely test-retest reliability (i.e., stability) and internal consistency. Oakes (2003) states that test-retest reliability and internal consistency are the most commonly used indices of the reliability of tests and measures and these were thus considered in the present research.

Stability

Stability, in social science research, is measured by correlating test scores obtained from the same participants over a period of time on the same measure. In the present research, the researcher made use of test-retest reliability to measure the consistency of the CCDS as a data collection tool. According to Sax (1997), if participants respond consistently from one test to another (in the present research this would be the pre- and post-test measurement), the correlation between the scores will be high (Sax 1997). Therefore reliability is determined from the correlation between the CCDS scores on the two assessment periods. Important to note here is that only the control group scores were considered for measuring the test-retest reliability of the CCDS.

To determine the measure stability for the CCDS (i.e., test-retest reliability), the relationship between the scores obtained for the control group from the pre-test and the post-test assessments were considered. The degree of correlation between the scores obtained was

determined by using Pearson's correlation coefficients. For example, scores which range between 0.0 and 0.2 indicate that no relationship exists between the factors measured. Scores between 0.2 and 0.4 indicate a low correlation and between 0.4 and 0.7 a moderate correlation. Lastly, scores which range between 0.7 and 1.0 are indicative of a high correlation between the factors measured. Conventionally, a measure which scores equal to or greater than 0.70 is considered reliable for research purposes (Bland & Altman, 1997; Spiliotopoulou, 2009). It is also suggested that scores above 0.70 support the construct validity of the various items included in the scale (Sheskin, 2000).

Test-retest reliability for the CCDS: Control group

The test-retest correlation coefficients for each of the eight CCDS subscales are summarised in Table 10.

Table 10

Test-Retest Correlation for the CCDS: Control Group

	CCDS1b	**CCDS2b**	**CCDS3b**	**CCDS4b**	**CCDS5b**	**CCDS6b**	**CCDS7b**	**CCDS8b**	**CCDSTb**
CCDS1a	0.65								
CCDS2a		0.51							
CCDS3a			0.36						
CCDS4a				0.66					
CCDS5a					0.58				
CCDS6a						0.56			
CCDS7a							0.57		
CCDS8a								0.49	
CCDSTa									0.71

As previously mentioned in Chapter 7, these subscales as well as the total score have been coded as follows in the present research: CCDS1: Curiosity; CCDS2: Exploration; CCDS3: Information; CCDS4: Locus of Control; CCDS5: Key Figures; CCDS6: Time Perspective;

CCDS7: Planning; CCDS8: Self-Concept; and CCDST: Total. The correlation coefficients were determined using the pre-test (for example, CCDS1a) and post-test (for example, CCDS1b) scores.

As can be seen from the reported results, the test-retest reliability coefficients for the eight subscales ranged from 0.36 to 0.66. It can therefore be deduced that for the current sample of eight to ten year old South African children, the CCDS evidenced low to moderate levels of test-retest reliability. When the CCDS total score is examined, it appears that there is some degree of reliability for the total score.

Test-retest reliability for the CCDS: Grades 3 and 4

The researcher also investigated whether there were differences between the Grade 3 and Grade 4 subsamples in terms of test-retest reliability. A summary of these scores are included in Appendix 31 of the present research. When the scores of both the Grade 3 and Grade 4 control groups are examined only one subscale (i.e., Locus of Control as measured for the Grade 3 control group) reported adequate levels of test-retest reliability. The remaining subscales obtained reliability coefficients between 0.32 and 0.69 and therefore caution needs to be taken when interpreting the test scores or drawing conclusions from the test results of the CCDS.

Internal consistency

Whereas test stability measures how consistent an instrument is over time (i.e., test-retest reliability) (Hinton, 2004), internal consistency is concerned with the interrelatedness of a sample of test items and should be determined before a test can be employed for research or examination purposes to ensure validity (Tavakol & Dennick, 2011). Although the CCDS has been subjected to psychometric validation previously (Stead & Schultheiss, 2003, 2010), the sample of participants in these studies had a mean age of 9.64 years (SD = 0.54) and 11.16 years

(SD = 1.28; range eight to fourteen years). The sample of children in the present study had a mean age of 8.73 (SD = 0.65) and, considering that no age specific norms currently exist for this measure, it was decided to subject the measure to an evaluation of internal consistency. To describe the internal consistency of the CCDS during both the pre- and post-test assessments, Cronbach's alpha coefficient as an indicator of internal consistency was computed.

The most sophisticated and widely applied index of internal consistency is Cronbach's alpha which examines the average inter-item correlation of items in a questionnaire (Cortina, 1993; Spiliotopoulou, 2009). If all items measure the same thing (without any error) alpha will be equal to one. If there is no shared variance in the items, then these are supposed to reflect 'error' resulting in alpha being equal to zero (Hinton, 2004). As described earlier, a measure with an alpha equal to or greater than 0.70 is considered reliable for research purposes and supports the measure's construct validity. These results are described next.

Cronbach's alpha as a measure of internal consistency

Table 11 provides a summary of the statistical analysis conducted to measure the internal consistency for the CCDS total sample results. As can be seen from these results, for the total sample (pre-test) six of the eight subscales of the CCDS revealed a level of internal consistency below 0.70. These subscales were Curiosity, Exploration, Information, Key Figures, Time Perspective, and Self-Concept. The two remaining subscales (i.e., Locus of Control and Planning) and the total CCDS were found to have adequate levels of internal consistency measured at above 0.70. These findings suggest that, although some evidence of internal consistency for the CCDS is evident, there is a need to further validate the internal consistency of individual subscale items.

Table 11

Internal Consistency of the CCDS: Pre- and Post-Test

			Pre			Post		
Subscales		**Items**	**Total**	**Control**	**Exp.**	**Total**	**Control**	**Exp.**
Curiosity	CCDS1	8	0.58	0.66	0.49	0.74	0.76	0.72
Exploration	CCDS2	3	0.47	0.48	0.46	0.45	0.31	0.53
Information	CCDS3	4	0.63	0.58	0.65	0.62	0.56	0.60
Locus of Control	CCDS4	8	0.70	0.69	0.71	0.74	0.76	0.86
Key Figures	CCDS5	4	0.54	0.55	0.53	0.62	0.62	0.60
Time Perspective	CCDS6	4	0.63	0.60	0.67	0.68	0.67	0.51
Planning	CCDS7	10	0.75	0.68	0.80	0.83	0.82	0.81
Self-Concept	CCDS8	7	0.68	0.64	0.71	0.79	0.73	0.84
Total	CCDST	8	0.79	0.80	0.79	0.88	0.88	0.86

During the post-test assessment for the total sample, four of the eight subscales (in addition to the CCDS total score) reached adequate levels of internal consistency (i.e., levels greater than 0.70). These subscales were Curiosity, Self-Concept, Locus of Control, and Planning. It is interesting to note that the internal consistency of both the Curiosity and Self-Concept subscales improved during the second round of assessments (i.e., post-test). For the remainder of this section, only the post-test scores will be described.

When the results are scrutinised, there appears to be a trend in relation to the CCDS's internal consistency measurement. Subscales consisting of three or four items revealed internal reliability scores consistently below 0.70, while those subscales with seven items and more revealed internal reliability scores above 0.70.

Internal consistency between the pre- and post-test assessments

When the post-test results of the total sample are compared with the pre-test findings, four of the eight subscales (i.e., Curiosity, Locus of Control, Planning, and Self-Concept) had an internal coefficient score of 0.70 and higher. These were the subscales where the number of individual items comprising the subscale is higher than for the remaining subscales. The four remaining subscales (i.e., Exploration, Information, Key Figures, and Time Perspective) evidenced an improvement in their internal consistency, yet remained at levels below the preferred internal reliability coefficient of 0.70. It is important to note that an improvement in internal consistency does not equate to program effectiveness and only indicates greater levels of stability in terms of responses provided to the various subscale items. Thus the variation in scores noted between the pre- and post-test assessments for the total sample requires further discussion to ascertain the reason for these increases during the post-test analyses.

The results of the present research revealed that the post-test internal consistency scores (i.e., Cronbach's alpha) measured for the CCDS total score as well as for the eight CCDS subscales indicated greater levels of internal consistency. If these increases were isolated to the experimental group scores one could assume that it was influenced by the introduced program. However, increases in internal consistency were observed for both the control and experimental groups.

The results further emphasise the need to develop age appropriate career assessment measures for use in practice and research. In order to ascertain the impact of the GCBC™ on children's career development learning, dependent-t tests were used to compare the CCDS scores obtained from the control and experimental groups in the pre- and post-assessment. These findings are described next.

Pre and Post-test Comparison between Control and Experimental Groups

This chapter has already provided insight into the CCDS's test-retest reliability as well as its internal consistency as measured by Cronbach's alpha. These findings suggest that for the current sample of eight to ten year old children caution should be exercised when making inferences or drawing conclusion from the CCDS scores. However, it was still necessary to subject the collected data to further analyses that specifically compared the scores of the control and experimental groups. These results are described next.

Dependent t-tests for the CCDS

Four sets of dependent t-tests are described in this subsection. They include: a comparison of scores between the control and experimental groups (pre-test); a comparison of scores between the control and experimental groups (post-test); a comparison of scores between the Grade 3 control and experimental groups (pre- and post-test results); and lastly, a comparison of scores between the Grade 4 control and experimental groups (pre- and post-test results). The description of the statistics are brief and all conclude that, although there was improvement measured on the CCDS between the pre- and post-test assessment periods, the differences between the two groups were not statistically significant. It needs to be acknowledged that the test developers of the CCDS clearly specify the parameters within which the CCDS can be used with confidence (i.e., children aged nine to fourteen years) and that the present research deviated from these guidelines (i.e., with the mean age of the sample measured at 8.74 years). However, the decision was made to include the CCDS as a data collection measure because it shares key constructs of career development theory in childhood with those of the GCBC™.

Control and experimental groups: CCDS pre-test

As can be seen from the results in Appendix 32 Table 23, a comparison of scores between the control and experimental groups for the pre-test assessment on the CCDS revealed that there was no significant variation between the two groups. These results further support the similarity between the two groups prior to the career program being introduced. In addition, the fact that there was no significant difference noted between the two groups provides validation for the sampling procedures followed in the present research. The next set of inferential statistics reported is a comparison between the control and experimental group scores as obtained during the post-test assessment utilising the CCDS.

Control and experimental groups: CCDS post-test

A summary of the t-test scores for the control and experimental groups during the post-test assessment for the CCDS can be found in Appendix 33 Table 24. The similarity between the two groups on the pre-test data was anticipated seeing that neither the control nor the experimental group would have been exposed to any formal intervention. However, it was surprising to note that no significant difference between the control and experimental groups was evident during the post-test analysis. The results indicated that, although there was some evidence of variance between the two groups, these differences were insignificant despite the experimental group being exposed to the career program and the control group to normal academic schooling.

Grade 3 control and experimental groups: CCDS pre- and post-test

A comparison of scores between the control and experimental groups for the Grade 3 subsample revealed insignificant variation between the pre- and post-test assessment periods. These results can be found in Appendix 34 Table 25.

Grade 4 control and experimental groups: CCDS pre- and post-test

Similarly, there was insignificant variation between the pre- and post-test assessments for the Grade 4 subsample (i.e., between the control and experimental groups). The scores for the Grade 4 subsample are included in Appendix 35 Table 26. One statistically significant variation was noted during the pre-test data analysis for the Exploration subscale, suggesting that this variation was not related to the GCBC™ program (i.e., the introduced variable). In addition, it should be noted that the statistical significance of these scores must be interpreted with caution given that the internal consistency of the Exploration subscale was questionable. Therefore these findings may best be explained by the low internal consistency attributed to this subscale which, according to the researcher, is a consequence of the limited number of the subscale's items (i.e., only three out of the forty eight items of the CCDS address childhood exploration).

Similar to the CCDS, the RCAS as a data collection tool can be said to lack psychometric support. However, as the two instruments represent fundamentally different methodological approaches, the need for psychometric support for the CCDS is seen as more of a priority as opposed to the RCAS. It has already been noted that the process of data analysis for the CCDS (i.e., a quantitative measure collecting nominal data) differs from that of the RCAS (i.e., a qualitative measure with responses coded to collect categorical data). After consultation with a statistician it was concluded that it was only possible to examine the CCDS scores for stability (i.e., test-retest reliability) and internal consistency. However, it was still necessary to ascertain whether the RCAS results could be used to make inferences regarding the effectiveness of the GCBC™ (i.e., the statistical significance of test scores).

According to the researcher, both the CCDS and the RCAS are being used for the first time in combination as part of a broader investigation measuring the effectiveness of an

intentional career learning experience (i.e., the GCBC™) in a pre- and post-test research design. Considering the differences between the two measures, different approaches were followed in analysing their results, especially in reporting the statistical significance of changes observed between the two participant groups. The focus now shifts to discussing the inferential statistics of the RCAS findings with specific attention paid to a comparison of test scores between the control and experimental groups. To accomplish this latter goal chi-square analyses were used to test for the significance of the relationship between categorical variables (Hinton, 2004).

Chi-square tests for the RCAS

The current review of the statistical analyses for the RCAS attempts to clarify the significance of test scores obtained during the post-test data collection. As described later in the chapter, on face value the RCAS results indicated that there were noticeable differences in scores obtained from the control and experimental groups during the post-test assessment. Therefore, there was a need to consider the statistical significance of test score variance at post-test level for the total sample. To simplify the discussion and cohesively integrate the test findings, each of the chi-square tests is described within the descriptive statistics section for each of the questions. However, to remain consistent with the discussion of the test reliability and statistical review of the present chapter, it is necessary to briefly comment on the RCAS findings here.

The analyses of the results considered variations between the control and experimental groups' scores for all the responses noted on the questionnaire. However, this approach may overlook subtle variations between the control and experimental group data. In such cases, single response items which could be attributed to increased levels of career awareness or career development learning were further analysed using another chi-square test. These items would be

those which during the post-test data collection evidenced noteworthy variation between the control and experimental group scores.

Control and experimental groups post-test: RCAS Form 1

It has already been acknowledged that not all questions included in the RCAS could directly be linked to aspects of career development learning. However, questions one to nine of the RCAS Form 1 still provided for interesting reading. For example, questions seven (i.e. "*How else could you find out information on jobs?"*) and nine (i.e. "*What do you do at school that might help prepare you for the jobs that interest you?"*) indicated significant variation in scores at post-test level between the control and experimental groups when all responses coded for the questions were considered. On question seven, significantly more children of the experimental group identified 'Media Influences' (including computers) as a viable means of accessing career information. On question nine, the variation in scores between the control and experimental groups could be attributed to significantly more children of the experimental group being able to identify a specific school subject related to their preferred career aspiration.

The remaining questions for Form 1 revealed little variation between the control and experimental groups when all responses for each question were analysed. However, single item analyses revealed significant variation between the control and experimental groups for questions one (i.e., *"What jobs are you interested in doing when you grow up?"*) and five (i.e. "*What could influence you toward or away from choosing jobs?"*). These findings are described in detail in the descriptive data analyses for the RCAS.

Although not excluded in the analyses, the remaining five questions of Form 1 revealed no statistically significant variation between the control and experimental groups during the post-test analyses. However, despite no statistically significant changes observed between the control

and experimental groups, there were noteworthy trends which illustrate greater awareness of careers in the experimental group following exposure to the program.

Control and experimental groups post-test: RCAS Form 4

As has already been suggested, the six questions of Form 4 provided a unique opportunity for children to demonstrate their awareness of careers. Four of the six questions revealed statistically significant variation between the control and experimental group scores during the post-test assessment. Here it was found that significantly more children of the experimental group were better able to identify a similarity between the sample careers listed on each of the questions. These scores are described in more detail under the descriptive statistics subsection later in this chapter. The findings for the two remaining questions seem to indicate that the responses for these questions were negatively influenced by factors not considered at the time. For example, for question ten it is believed that children's responses were contaminated by the instructions and examples provided at the start of Form 4. For question fifteen (i.e., finding a similarity between the three Conventional type careers), it is believed that the responses were negatively influenced by the limited time devoted to the exploration of these career characters during the GCBC™ fieldwork. Despite all the practical arrangements and planning prior to the fieldwork, it was only during the actual activity presentation that it was realised that the time allocated to the Cape of Careers activity was inadequate. Consequently the time dedicated to the exploration of the Conventional type careers was negatively impacted on seeing that these careers were presented at the end of the activity which overlapped with the school breaks as described later.

Inferential Statistics Summary

Before the CCDS and the RCAS results are further explored in terms of descriptive statistics it is necessary to draw some conclusions regarding the inferential statistics presented above. This is particularly relevant considering that the data analysis completed for the CCDS suggested that there was no statistically significant difference between the control and experimental groups for the sample as a whole, as well as for the Grade 3 and Grade 4 subsamples during the post-test assessments. The RCAS, on the other hand, revealed a number of statistically significant variations (i.e., with the experimental group participants evidencing greater levels of career awareness following exposure to the GCBC™).

Descriptive Statistics: Pre- and Post-Test Measures

The discussion now focuses on providing an overview of the descriptive statistics used to summarise the research data. The descriptive statistics firstly focus on the CCDS and thereafter on the RCAS. Frequency counts and percentages are used to provide a descriptive overview of the quantitative data collected using these two measures.

Childhood Career Development Scale (CCDS)

In terms of the overall performance on the CCDS, Stead and Schultheiss (2003) suggest that a higher score on the CCDS indicates a higher level of career development. In this subsection the pre- and post-test scores for the total sample, as well as for the control and experimental groups, are presented and discussed.

What is noticeable throughout the discussion of the CCDS results is that most of the children's responses fall within the 'Agree' or 'Strongly Agree' categories with limited responses obtained for the three remaining categories, namely, 'Unsure', 'Disagree', and 'Strongly Disagree'. Consequently, the discussion of scores may appear to be skewed towards

only presenting these upper-end responses yet this accurately reflects the scores obtained from the research participants. Due to the fact that the CCDS lacks age specific norms, raw scores have been used as an indicator of career development for children with higher scores indicating greater levels of career development.

CCDST: Childhood Career Development Scale total score

The first set of scores is the CCDS total score. The total score consists of the combined totals for the eight subscales. A summary of these scores is provided in Table 12 for the pre- and post-test assessments for both the control and experimental groups.

Table 12

CCDS Total Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDST	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	34	47.22%	29	39.19%	63	43.15%	44	61.11%	45	60.81%	89	60.96%
Agree	37	51.39%	42	56.76%	79	54.11%	27	37.50%	26	35.14%	53	36.30%
Unsure	1	1.39%	3	4.05%	4	2.74%	1	1.39%	3	4.05%	4	2.74%
Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

When the scores for the total sample are compared for the pre- (i.e., 43.15% indicating ‘Strongly Agree’ and 54.11% ‘Agree’) and post-test (i.e., 60.96% indicating ‘Strongly Agree’ and 36.30% ‘Agree’) assessments, it is evident that the post-test results present a considerable increase in children’s career development as measured on the CCDS. The reduced number of

responses in the ‘Agree’ category is a consequence of an increase in the ‘Strongly Agree’ category (i.e., during the post-test data analysis).

An exploration of the scores of the control and experimental groups revealed that both groups scored higher during the post-test assessment. From the statistical trends observed it appears that greater levels of career development are evidenced by an increase in the ‘Strongly Agree’ category and a decrease in the ‘Agree’ category. Although no significant difference between the control and the experimental groups was observed, these results suggest a greater increase in levels of career development for the experimental group. This conclusion can be drawn from a larger increase measured on the ‘Strongly Agree’ response item during the post-test phase for the experimental group (i.e., 21.62%) as opposed to the increase noted for the control group (i.e., 13.89%). From this point onward the discussion will primarily focus on presenting the results of the ‘Strongly Agree’ category as an indicator of increased levels of career development. Where necessary the discussion will include the remaining categories in order to comprehensively describe the results. In addition, the focus will be on variations noted between the control and experimental groups rather than the scores obtained for the total sample. Each of the eight subscales is now discussed in greater detail.

CCDS1: Curiosity

The first subscale is Curiosity which, according to Super (1990), can be understood as a strong need for more information about a specific topic and which usually stimulates some form of inquisitive behaviour. The subscale of Curiosity includes eight items (for example, *I wonder about the things I learn in school*) that reflect enquiring thoughts and behaviours (Stead & Schultheiss, 2003). Table 13 illustrates the performance of the total sample as well as the control and experimental groups on this subscale.

Table 13

CCDS Curiosity Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS1	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	16	22.22%	15	20.27%	31	21.23%	29	40.28%	25	33.78%	54	36.99%
Agree	37	51.39%	38	51.35%	75	51.37%	32	44.44%	33	44.59%	65	44.52%
Unsure	16	22.22%	21	28.38%	37	25.34%	10	13.89%	16	21.62%	26	17.81%
Disagree	3	4.17%	0	0.00%	3	2.05%	1	1.39%	0	0.00%	1	0.68%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

A comparison of scores between the control and experimental groups revealed that differences noted between the pre- and post-test results are not significant. Both groups showed an increase in scores coded under the 'Strongly Agree' category and a decrease in responses for the 'Agree' category which indicates greater levels of career development (i.e., as measured on the Curiosity subscale) during the post-test assessment. On this particular subscale there were a higher number of responses coded on the 'Unsure' item response during both the pre- and post-test assessments. It would be interesting to determine whether this latter response indicated that the children were unsure of the question (i.e., they did not understand the question) or whether it indicated that they understood the question, yet lacked the insight to confidently respond in terms of the other four responses listed. This analysis was not possible during the present research.

CCDS2: Exploration

Super (1990) distinguishes exploration from curiosity as the physical activity of searching for information in order to satisfy curiosity needs. Super's theory also places the

participants of the present research within the Growth stage, which is characterised by children's exploration of the world around them. Only three questions included in the CCDS specifically refer to exploration as a career development skill (for example, *I like to explore my world by visiting libraries*). The results for this subscale are presented in Table 14.

Table 14

CCDS Exploration Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS2	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	43	59.72%	37	50.00%	80	54.79%	41	56.94%	45	60.81%	86	58.90%
Agree	22	30.56%	26	35.14%	48	32.88%	25	34.72%	18	24.32%	43	29.45%
Unsure	5	6.94%	10	13.51%	15	10.27%	6	8.33%	11	14.86%	17	11.64%
Disagree	2	2.78%	1	1.35%	3	2.05%	0	0.00%	0	0.00%	0	0.00%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

It has already been noted that there was limited internal consistency for this subscale during both the pre-and post-test phases and consequently there is a need for caution in the interpretation of the results as well as the inferences that can be drawn from the data. When the results for the control and experimental groups are compared it is clear that the experimental group evidenced greater growth in terms of the career development skills measured by this subscale (i.e., exploration). For example, during the pre-test phase, 50% of the experimental group indicated 'Strongly Agree' as their preferred choice on the subscale items. However, during the post-test the frequency count increased and the category percentage improved to over 60% of the children. This accounted for a 10.81% increase for the experimental group, whereas

the control group revealed a decrease of 2.78% (i.e., from 59.72% during the pre-test to 56.94% during the post-test).

In previous total score and subscale analyses, increases in career development were supported by increases in the 'Strongly Agree' category and decreases in the 'Agree' category as scores were primarily grouped under these two response items. This trend was only found in the experimental group on this subscale. The control group results indicate a reversal of this trend with a decrease in the 'Strongly Agree' category and an increase in the 'Agree' category during the post-test assessment. Although these results are encouraging for the GCBC™ program, the inferential statistics determined that the differences measured between the groups were not statistically significant.

CCDS3: Information

The Information subscale consists of four items that assess the child's understanding of the value or use of career information (for example, *I am interested in finding more information about different occupations*) (Stead & Schultheiss, 2003). Stead and Schultheiss (2010) conceptualise this subscale as having "an awareness of the importance for the use of occupational information and how one acquires this information" (p. 79). The results for the control and experimental groups as well as for the total sample are summarised in Table 15.

An overview of the total group results revealed that there was considerable growth between the pre- and post-test periods (with a 19.17% growth in the total subscale score on the 'Strongly Agree' rating). Similarly, the control and experimental groups revealed increases in the number of responses coded for the 'Strongly Agree' category and decreases for the 'Agree' category. For example, the experimental group increased by 21.62% on the 'Strongly Agree' response and decreased by 16.21% on the 'Agree' category. The control group, on the other

hand, showed an increase of 16.21% on the ‘Strongly Agree’ response and a decrease of 15.28% on the ‘Agree’ category. Although the experimental group achieved higher scores on this particular subscale and greater growth between the assessment periods these differences were not statistically significant.

Table 15

CCDS Information Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS3	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	35	48.61%	35	47.30%	70	47.95%	47	65.28%	51	68.92%	98	67.12%
Agree	30	41.67%	25	33.78%	55	37.67%	19	26.39%	13	17.57%	32	21.92%
Unsure	5	6.94%	8	10.81%	13	8.90%	5	6.94%	8	10.81%	13	8.90%
Disagree	2	2.78%	4	5.41%	6	4.11%	0	0.00%	1	1.35%	1	0.68%
Strongly Disagree	0	0.00%	2	2.70%	2	1.37%	1	1.39%	1	1.35%	2	1.37%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

Interestingly, on this particular subscale there was a notable difference observed for the ‘Disagree’ response item. For example, during the pre-test data analyses less than five percent of the total sample indicated ‘Disagree’ for the majority of subscale items. However, during the post-test assessment less than one percent of the total sample still indicated ‘Disagree’ as their preferred response. Although not statistically significant it is interesting to note that the biggest shift in the children’s responses (i.e., on the ‘Disagree’ item response) came from the experimental group participants. It appears that during the post-test assessment children of the experimental group showed greater interest in finding out information as indicated in responses captured for the Information subscale.

CCDS4: Locus of control

The next subscale described is that of Locus of Control. As previously mentioned, the participants are currently in the Growth Stage which Super (1990) theorised as a career developmental stage in which individuals begin to gain more control over their lives as well as become more future orientated. Eight questions contribute to the Locus of Control subscale score (for example, *I have control over how much effort I put into my work*). The scores obtained for the pre- and post-test data collection for the control and experimental groups as well as the total sample are summarised in Table 16.

Table 16

CCDS Locus of Control Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS4	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	42	58.33%	40	54.05%	82	56.16%	47	65.28%	50	67.57%	97	66.44%
Agree	27	37.50%	31	41.89%	58	39.73%	21	29.17%	22	29.73%	43	29.45%
Unsure	3	4.17%	3	4.05%	6	4.11%	4	5.56%	2	2.70%	6	4.11%
Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

On this particular subscale an analysis of scores revealed that there was notable variation between the groups, although these differences were not statistically significant. The two prominent score categories of ‘Strongly Agree’ and ‘Agree’ followed a similar trend as noted earlier with increases in the ‘Strongly Agree’ category and decreases in the ‘Agree’ category during the post-test data analysis. The post-test results indicated that both groups had improved

levels of career development for the Locus of Control subscale on the 'Strongly Agree' item response, although the experimental group evidenced greater levels of improvement between the two assessment periods.

CCDS5: Key Figures

The Key Figures subscale scores, as reported in Table 17, relate to items about the participants' role models. Super (1990) described key figures as interesting or helpful people who have played a meaningful role in a child's life. Four questions make up this subscale (for example, *I want to do the same job as someone I look up to*) and the subscale provides an opportunity to gain insight into the prevalence of role models in the child's life. Earlier in this chapter it was noted that seven items are preferred in subscale design if internal consistency coefficients are to be calculated with confidence. Key Figures represents one of the four subscales where the internal consistency of the items was calculated below the preferred 0.70 level, thus caution is recommended when interpreting these results.

Table 17

CCDS Key Figures Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS5	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	33	45.83%	26	35.14%	59	40.41%	43	59.72%	35	47.30%	78	53.42%
Agree	27	37.50%	25	33.78%	52	35.62%	18	25.00%	19	25.68%	37	25.34%
Unsure	9	12.50%	17	22.97%	26	17.81%	7	9.72%	16	21.62%	23	15.75%
Disagree	0	0.00%	5	6.76%	5	3.42%	4	5.56%	4	5.41%	8	5.48%
Strongly Disagree	3	4.17%	1	1.35%	4	2.74%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

Improvement between the pre- and post-test stages for both the control and experimental groups was again evident, however these differences were found not to be statistically significant. During the post-test assessment, the control group's scores improved by 13.89% (on the 'Strongly Agree' item response) and resulted in 59.72% of the control group responding positively to the 'Strongly Agree' response. Similarly, the experimental group evidenced a 12.16% increase and improved from 35.14% to 47.30% on this particular item response. A number of responses were also coded on the 'Disagree' response category. Interestingly, the control group during the pre-test had no responses coded for this category; however, during the post-test over five percent of these participants changed their responses and selected 'Disagree'. The experimental group participants remained fairly consistent in their responses measured on this response category (i.e., 6.76% during the pre-test and 5.41% during the post-test).

CCDS6: Time perspective

The sixth subscale, Time Perspective, consists of four items described by Stead and Schultheiss (2003) as reflecting the participant's awareness of how the past, present, and future can be employed in planning future events (for example, *I think a lot about my future job*). The items on this subscale are focused on future plans which revolve around career selection and the items ask whether the participant has given this subject any thought. In the present research this was the only subscale where there was a decrease in scores obtained between the pre- and post-test phases for the total sample (i.e., a 4.79% decrease was noted during the post-test phase for the total sample score). Table 18 contains a summary of the results.

When the scores for the control and experimental groups are compared it is evident that the decrease in total sample scores was caused by the control group achieving a high level of responses on the 'Strongly Agree' category during the pre-test assessment (i.e., 76.39%). There

was a noticeable difference in scores on this item response between the control and experimental groups during the pre-test stage. However, during the post-test stage the scores on the 'Strongly Agree' category were fairly similar with the control group results at 66.67% and the experimental group at 66.22%.

Table 18

CCDS Time Perspective Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS6	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	55	76.39%	49	66.22%	104	71.23%	48	66.67%	49	66.22%	97	66.44%
Agree	14	19.44%	19	25.68%	33	22.60%	17	23.61%	19	25.68%	36	24.66%
Unsure	2	2.78%	6	8.11%	8	5.48%	5	6.94%	4	5.41%	9	6.16%
Disagree	1	1.39%	0	0.00%	1	0.68%	2	2.78%	1	1.35%	3	2.05%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	1.35%	1	0.68%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

Therefore it appears that the concerns noted regarding a decrease in the total sample scores between the two assessment periods can be accounted for by a decrease of 9.72% found for the control group during the post-test assessment. The experimental group revealed no change between the pre- and post-test assessments (i.e., 66.22% measured on both occasions). Although these results do not conform to the statistical trend already observed in the CCDS data analysis (i.e., that improvement is noticeable between the pre- and post-test assessment), the differences measured between the two groups were not statistically significant.

CCDS7: Planning

Planfulness as measured by this subscale of the CCDS can be associated with an awareness of the importance of planning (Stead & Schultheiss, 2003). Ten questions make up this subscale; thus it represents the longest of the eight subscales. Questions such as "*it is important for me to plan things out before I do them*" and "*it is important to have a plan when I do things*" attempt to gain insight into the children's ability to understand the importance of planning as a career development skill. The scores obtained from the pre- and post-test for the total sample, as well as for the control and experimental groups, are summarised in Table 19.

Table 19

CCDS Planning Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS7	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	51	70.83%	54	72.97%	105	71.92%	50	69.44%	55	74.32%	105	71.92%
Agree	19	26.39%	19	25.68%	38	26.03%	17	23.61%	16	21.62%	33	22.60%
Unsure	2	2.78%	1	1.35%	3	2.05%	5	6.94%	3	4.05%	8	5.48%
Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

There were no differences in scores between the two assessment periods for the total sample scores (i.e., they remained at 71.92% on both assessments). A marginal improvement was found for the experimental group on the 'Strongly Agree' item response during the post-test assessment and a slight decrease for the control group for this same category was noted. No statistically significant variation between the two subgroups was found. This suggests that, while

planning as a career development skill during childhood (specifically for the eight to ten year old period) is starting to develop, it may not be facilitated by career interventions until later stages of cognitive and career development.

CCDS8: Self-concept

The last of the CCDS subscales, Self-Concept, relates to children's level of self-knowledge or self-understanding of what interests them, as well as their insight into what type of person they perceive themselves to be (Stead & Schultheiss, 2010). This is the eighth subscale of the CCDS and consists of seven items that, according to Stead and Schultheiss, (2003), assess awareness of self-knowledge (for example, *I know what type of person I am*). The scores for this particular subscale are summarised in Table 20.

Table 20

CCDS Self-Concept Subscale Score: Control and Experimental Groups

	PRE-TEST						POST-TEST					
	Group						Group					
CCDS8	Control		Experimental		Total		Control		Experimental		Total	
Strongly Agree	44	61.11%	41	55.41%	85	58.22%	47	65.28%	49	66.22%	96	65.75%
Agree	27	37.50%	30	40.54%	57	39.04%	24	33.33%	18	24.32%	42	28.77%
Unsure	1	1.39%	3	4.05%	4	2.74%	1	1.39%	7	9.46%	8	5.48%
Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	72	100%	74	100%	146	100%	72	100%	74	100%	146	100%

Percentages may not add up to 100% due to rounding of final numbers

An overview of the CCDS results for the total sample revealed an increase of 7.53% between the two assessment periods with close to two-thirds of children during the post-test

phase indicating a preference for the ‘Strongly Agree’ item response (as opposed to the 58.22% at the pre-test phase). A 4.17% increase was noted for the control group and a 10.81% increase for the experimental group. Similar to other subscales, the differences between the two subgroups were not statistically significant, although the experimental group showed greater levels of improvement between the two assessment periods.

CCDS summary

A comparison of scores between the control and experimental groups indicated that, although not statistically significant, the results support a consistent theme of the experimental group indicating greater levels of improvement between the assessment periods. This trend was observed on five of the eight subscales, namely: Exploration, Information, Locus of Control, Planning, and Self-Concept. It was only the subscale of Time Perspective where no increase was evident, with the experimental group revealing a similar score on the ‘Strongly Agree’ item response rating during both assessments. However, the control group evidenced a decrease between the pre- and post-test periods on this particular subscale. A possible explanation for this result has been provided above and, similar to other subscales with fewer than seven items per construct, may necessitate the revision of the subscale construction of the CCDS in order to further strengthen it as a reliable and valid research tool. The remaining two subscales, namely Curiosity and Key Figures, indicated growth between the two assessment periods for both the control and experimental groups.

The improvements noted here should also be considered within the context of limited exposure to the GCBC™ program by the experimental group (i.e., the short and time constrained roll-out of the GCBC™ program over a five day period). It is anticipated that prolonged

exposure to the various program elements might strongly influence the career development of the participants. The RCAS results are reported next.

Revised Career Awareness Survey (RCAS)

A second measure, the RCAS developed by McMahon and Watson (2001), gathered additional quantitative information on aspects of children's career development. The measure is an example of a self-report questionnaire and is an adaptation of the Career Awareness Survey originally developed by Gillies et al. (1998). The rationale behind its selection was that it provides participants with an opportunity to put into their own words their understanding and subsequent answers to the questions posed in this semi-structured questionnaire. Therefore, while the CCDS does not focus on personal recollections and context sensitive information, the RCAS provides the opportunity to collect such data, content theme the information, and statistically present the qualitative information as nominal data.

It is important to note that, similar to the CCDS, limited information is available regarding the use of the RCAS as a measure to evaluate the effectiveness of career development learning programs. It should be noted that the original CAS has previously been used to measure the effectiveness of a career education intervention in the upper elementary school (Gillies et al., 1998) and therefore warranted its inclusion in the present research. Considering that the RCAS measures children's career awareness, not all items can directly be linked to career development learning and this resulted in some items being excluded from indepth analyses. Nevertheless, the RCAS provides sufficient insight into children's career awareness, thus providing researchers with valuable information which can be used to better understand this early career developmental stage. For the present research Forms 1 and 4 were selected because they provide sufficient

variety in terms of the range of questions posed to children. All items were analysed and, where possible, linked to aspects of career development learning.

Each of these questions is described separately and their relevance to career learning is noted. The statistical significance of change noted between the control and experimental groups has also been indicated for each question. Both the descriptive statistics tables and the chi-square analyses are included in the appendices. Where necessary additional statistical information has been provided (both in the appendices and in the discussion chapter) to comprehensively explore where there was statistically significant variation as measured on single item responses between the control and experimental groups. For example, question 1 of Form 1, revealed no statistically significant variation between the control and experimental group when all five response codes are combined in the analysis. However, when the analysis focuses on the single response item concerning the number of children able to identify three or more careers, it becomes evident that significantly more children of the experimental group offered responses coded in this category at the post-test level.

The discussion will firstly describe scores obtained from Form 1 (which included nine questions), and thereafter the focus will describe the data collected from Form 4 (which included an additional six questions).

RCAS: Form 1

RCAS01: What jobs are you interested in doing when you grow up?

It is important to re-emphasise that the children's answers to this question were coded not as to the type of career/s mentioned but rather to the number of careers mentioned. This question helps provide insight into the children's career awareness and aspirations. Consequently, an increase in the number of careers mentioned would indicate greater awareness of careers. While

children during this career developmental stage are not expected to make career decisions as such, the exploration and awareness of various careers helps prepare children for later career decision making (Beale, 2000). For the purposes of the present research, it would be interesting to note whether children in the experimental group (following exposure to the GCBC™) would mention more careers than their peers in the control group. The results from the pre- and post-test data collection can be found in Appendix 36 Table 27.

Form 1 question one had five possible response codes (i.e., 0 = no response, 1 = could mention one career, 2 = could mention 2 careers, 3 = could mention 3 careers, 4 = could mention 4 or more careers). A chi-square test of independence indicated that there was no significant difference between the control and experimental groups during the post-test analyses [$\chi 2$ (4, N=146) = 2.80; p =.59] when all responses were examined. However, when the scores are individually considered, it becomes evident that there was an observable difference between the control and experimental group scores which suggests the need for further analysis. Furthermore it was also decided that two of the categories would be combined in this subsequent analysis to simplify the discussion. Thus the categories of 'could mention 3 careers' and 'could mention 4 and more careers' were combined into a single category (i.e., 'could mention 3+ careers') because both responses represent a greater awareness of careers (i.e., in terms of number of careers mentioned).

The largest change in terms of pre- and post-test results was found in the 'could mention 3+ careers' category. Here the experimental group showed an increase of 13.52% following their participation in the GCBC™, while the control group showed a decrease of 5.55%. As indicated earlier, although a comparison between the control and experimental group scores for question one as a whole (i.e., all responses coded) did not reveal any statistically significant findings, on

this particular item there was a statistically significant difference (see Appendix 36 Table 28). The analysis revealed that significantly more children of the experimental group were able to identify three and more careers as their response to question one [$\chi 2$ (1, N=146) = 4.25; p =.039]. This increase in the experimental group's responses suggests that children who participated in the GCBC™ could identify a broader range of careers which, in turn, is indicative of greater career awareness.

RCAS02: Of those jobs you wrote down, which one is your favourite?

The next question of the RCAS Form 1 was not analysed in terms of potential career learning (and subsequently not subjected to determine statistical significance for changes noted between the control and experimental groups). However, it provided insight into the types of careers eight to ten year old children are interested in. This question asked children to identify their favourite career from the careers mentioned in question one. The career identified as the child's favourite was coded into one of five groups, with each code representing a distinct category of training requirements as well as its status level (i.e., societal perception of the career) when compared to the other classification types.

From the results it is clear that the majority of children aspired to careers coded as high level workers and middle level workers. Children's responses coded during the pre-test assessment indicated that the following careers are the most popular careers aspired to (i.e., in order of preference): Teacher, professional sportsperson, doctor, fashion designer, engineer, police officer, scientist, lawyer, game ranger, singer, artist, fire fighter, archaeologist, PetroSA worker (South Africa's oil company located near Mossel Bay where the research was conducted), physiotherapist, pilot, and veterinarian.

Theory suggests that children during this stage of career development are largely influenced by an orientation to social valuation (Gottfredson, 1981, 2002, 2005), a hypothesis that is supported in the present research. The results obtained for the total sample indicated that 84.93% of children aspired to either high level or middle level careers. As expected, career aspirations towards the upper two levels of the coding system were consistently found in both the control and experimental groups, with only a slight increase (i.e., 8.1%) noted in the experimental group during the post-test assessment. For the total sample, control and experimental groups there was a consistent relationship found between children's aspirations and status level, with noticeably fewer children interested in following careers from lower status level classifications. These results are summarised in Appendix 37 Table 29.

RCAS03: What is it about you that would make you good at your favourite job?

Question three of the RCAS Form 1 asks children to think about themselves in relation to the careers they aspire to. These results are summarised in Appendix 38 Table 30 where both the frequency counts, percentages and chi-square findings are reported. The coding for this particular question requires some description. In the preceding question, children were asked to identify their favourite career. The subsequent question (i.e., RCAS03) asks children if they can identify a quality or behaviour that they recognise in themselves which could directly be linked to their favourite career. For example, if a child lists a veterinarian as their preferred career on RCAS02, a relevant statement in RCAS03 would be "I like animals". An unrelated statement would have no particular reference to the identified career and could not be tied to any preparatory behaviour needed to pursue the career identified in RCAS02. Using the example of a veterinarian, an unrelated response could be "I like to win".

Both the control and experimental groups as well as the total sample revealed an increase in the post-test assessment frequency counts and percentages as evidenced by the number of children responding with a statement related to their favourite career. During the pre-test 23.61% of the control group responded with a statement related to their favourite career, whereas 54.17% of the control group responded during the post-test. The experimental group evidenced a similar trend with 27.03% in the pre-test and 43.24% in the post-test responding with a statement related to their favourite career. There was no statistically significant variation found between the control and experimental groups during the post-test analyses [$\chi 2$ (2, N=146) = 2.24; p =.33].

RCAS04: Who could influence you toward or away from choosing jobs?

There was considerable stability found between the pre-and post-test periods for the control and experimental groups and the total sample for question four (see Appendix 39 Table 32). The most striking variation (although not statistically significant during the post-test comparison between groups) was found in the 'No Response' category where the number of children in the experimental group who refrained from providing a specific answer to RCAS04 during the pre-test (i.e., 51.35%) dropped to 33.78% during the post-test. No similar change was observed for the control group.

Thus the results obtained for the experimental group indicate that more children provided an answer. Of the responses coded, most children (total sample) identified parents (i.e., 41.78%) or some significant other (i.e., 14.38%) (ranging from family members to teachers) as a primary influence that could shape their career aspirations. This would support previous research that has found parents to be a significant influence in shaping career aspirations and perceptions during childhood (see, for instance, Bandura et al., 2001).

RCAS05: What could influence you toward or away from choosing jobs?

RCAS04 and RCAS05 are similar in their phrasing and during the fieldwork it became apparent that children struggled to differentiate between what was expected from these two questions. Consequently, a number of children provided similar responses on both sets of questions. During the post-test assessment more children from the experimental group identified environmental factors (including school and extracurricular activities) as shaping influences. These results are presented in Appendix 40 Table 33. Chi-square analyses for children's responses on this particular question revealed that there was no statistical significance between the two groups during the post-test assessment (i.e., when all responses are considered in the analyses). The single item analyses for the 'Environmental' response did reveal however that significantly more children of the experimental group identified environmental influences as an influence on career aspirations during the post-test analysis.

It is possible that the experimental group participants could make a better distinction between questions four and five following the program exposure, with question four asking about significant others and question five about other shaping influences. However, there remained a large percentage of children who refrained from giving an answer to this question which may be explained by the level of cognitive development needed to make this link. This would support the view that children's cognitive capacity during the eight- to ten year old period is still in the process of development. As cognitive development increases, so will the ability of children to differentiate between, and manage, increasingly complex sets of information which need to be integrated and assimilated for future career decision-making.

RCAS06: How did you find out about those jobs that you wrote down?

The identification of sources of career information is regarded as part of the process supporting career awareness. RCAS06 considers how children attempt to gain or access career information. As can be seen from the results there was no statistically significant variation observed or measured between the responses coded for the control or experimental groups. These results are presented in Appendix 41 Table 35.

The responses coded for this particular question indicated that children were able to identify a range of potentially viable sources of career information during both the pre- and post-test assessment periods. The largest change in response to this question was noted for the experimental group during the post-test assessment where children identified environmental factors (including vicarious learning at school) as the main source of career information. The experimental group showed an increase of close to 18% between the assessment periods in identifying environmental factors as a viable source of career information. For some reason, unknown to the researcher, the control group showed an increase in the 'Media Influences' category.

RCAS07: How else could you find out information on jobs?

Question seven provided the researcher with greater detail regarding children's awareness of other sources of career information that could shape their career behaviour. The answers provided during the pre-test assessment ranged from interpersonal/social factors (for example, parents and teachers) through to media influences (including the Internet and computers, books, newspapers, and magazines). These results are summarised in Appendix 42 Table 37 and they indicate that there was a statistically significant variation observed and measured between

responses coded for the control and the experimental group [$\chi 2(5, N=146) = 12.01$; $p = .034$] during the post-test analysis.

The responses provided by the control group during both assessments remained largely consistent, with little variation noted between assessments. However, the experimental group revealed a statistically significant shift in terms of their acknowledgement of sources of information identified, particularly with reference to media influences, hence the present result. This increase in the number of responses coded under the 'Media Influences' category is also reflected in a decrease in the number of children who refrained from offering a response to this particular question. During the pre-test, 35.14% of the experimental group offered no response to this question, whereas this decreased to 17.57% during the post-test. Media influences accounted for 35.14% of responses for the experimental group during the pre-test and increased to 60.81% during the post-test phase.

RCAS08: When you think about jobs, what information do you need to find out?

In terms of the responses coded for this particular question, no noteworthy variance was found between the control and experimental groups in either the pre- or post-test assessments (please refer to Appendix 43 Table 39). The information children see as relevant mostly concerned the nature of the work and is less focused on conditions of employment, the steps needed to gain entry into a career field, and the lifestyle anticipated.

RCAS09: What do you do at school that might help prepare you for the jobs that interest you?

One of the career developmental tasks of childhood has been identified as increasing personal control over career activities which, during the early stages of career development, can be related to school-related activities. In addition, convincing oneself to achieve in school and at

work is another career development task that has been recognised as forming part of childhood career development. The information gathered by question nine attempts to access children's awareness of the link between school-related activities and their career aspirations. Children's responses to this question are summarised in Appendix 44 Table 40 and, as can be seen from the results, a statistically significant difference was observed between the control and experimental groups.

Of note is the fact that the children who participated in the GCBC™ could mention specific school subjects needed to follow careers that they were interested in. For example, if the child expressed an interest in becoming an artist they could identify art as an important school subject as preparation for this career. Similarly, children who expressed a preference towards medical type careers could identify mathematics as an important subject to focus on during these early years. Children in the experimental group evidenced an increase of 32.44% in identifying a school subject that forms part of the long term preparation for future careers. During the pre-test only 4.05% of learners of the experimental group could correctly identify a particular school subject related to their preferred career choice. However, during the post-test assessment 36.94% of participants successfully identified a specific school subject which could be linked directly with their career aspirations. No change was noted in the control group, thus suggesting that participation in the GCBC™ program may have prompted this particular career development learning in the experimental group.

This concludes the results of Form 1 of the RCAS and the focus now shifts to presenting the data collected from Form 4 of the RCAS. In terms of measuring the effectiveness of the GCBC™ program (i.e., career development learning), questions ten to fifteen of Form 4 of the

RCAS were identified as possible key items because they presented an opportunity for children to demonstrate their awareness of careers.

RCAS: Form 4

As part of the data collection, Form 4 of the RCAS was administered in order to ascertain whether eight to ten year old children could benefit from the GCBC™ as an intentional career learning activity. The GCBC™ material uses Holland's occupational typology (1997) as a means of structuring career information. Questions ten to fifteen ask children to identify a similarity or theme in three careers listed, with each question representing one of Holland's occupational types (i.e., question ten focuses on Realistic careers, question eleven on Investigative careers, and so on).

In order to assess whether this career developmental skill was facilitated by the GCBC™ program, questions ten to fifteen were included as part of the pre- and post-test data collection procedures. These results are described over the next few pages.

RCAS10: Motor mechanic, hairdresser, pilot

The results of the first question of Form 4 are summarised in Appendix 45 Table 42. The three careers listed all form part of the Realistic type interest and were based on the South African dictionary of occupations (Taljaard & Von Molledorf, 1987) and verified using the more recent Dictionary of Occupational Codes (Gottfredson & Holland, 1996). The primary code rather than the three letter code is used in the current analyses. As can be seen from the results, an increase in children's ability to identify a similarity between the three careers listed was revealed in both the control and experimental groups. During the pre-test, 67 learners (i.e., 36 for the control group and 31 for the experimental group) could identify some similarity (i.e., they work with their hands or they work with tools) whereas 91 learners (i.e., 50 for the control group

and 41 for the experimental group) could identify this similarity during the post-test. The children's responses were coded as Realistic if it conformed to characteristics associated with Realistic type careers. These scores represented a fairly large number of the participants, and because no statistically significant difference was observed between the control and experimental groups, further exploration was called for.

On closer inspection it became apparent that the children's responses to the first question were largely influenced by the examples provided as part of the administration process of the RCAS. Form 4 of the RCAS provides instructions that introduce the learner to the process of answering the questions. "*For each of the groups of jobs below, write down something that they ALL have in common*". Hereafter a couple of examples are provided, including an example that closely resembles the Realistic type category (for example, "*builder, gardener, hairdresser = work with their hands*"). It was found that many children used this model answer to provide a response for this first question. Therefore it is believed that further analysis of this first question is not possible in light of the possibility of contamination created by the practice examples provided.

RCAS11: Vet, doctor, scientist

The second set of careers provided could all be categorised as Investigative type careers. There were no examples provided in the instructions that pertained to Investigative type careers. Thus, it may be deduced that if children were able to identify similarities between the careers that this was due to their ability based on their career information and career awareness. The results for this question are summarised in Appendix 46 Table 44.

As can be seen from these results, one observable difference was noted between the control and experimental groups [$\chi 2$ (4, N=146) = 10.05; p =.03946]. The experimental group

revealed a statistically significant increase in the children's ability to identify Investigative type similarities between the careers provided. During the pre-test, 27% of the experimental group was able to identify an acceptable similarity and this increased to nearly 42% following their participation in the GCBC™. No difference was observed in the responses provided by the control group.

During the GCBC™ fieldwork, the careers of doctor and vet formed part of the learning activities presented during class and homework exercises and thus it can be surmised that there is a high likelihood that the statistically significant variation between the control and experimental groups was a consequence of the program exposure.

RCAS12: Actor, fashion designer, singer

The third set of careers are categorised as Artistic type careers. There were no examples provided in the instructions that related to this career type so the findings were deemed as more indicative of children's career awareness. Similarly to the previous question, encouraging trends were observed during the post-test assessment with children better able to identify Artistic type similarities between the listed careers. The results of this question are summarised in Appendix 47 Table 46.

As can be seen from the results, a similar trend was observed in this question as for the previous question in that children in the experimental group indicated a noteworthy increase in their ability to identify Artistic type similarities between the careers provided following exposure to the career learning activity. When this increase was examined further (not compared to the control group), it was found that there was a statistically significant increase between the two assessment periods [$\chi 2$ (1, n=74) = 4.04; p =.045]. During the pre-test, 32.43% of the experimental group was able to identify an approved similarity which increased to 48.65%

following their participation in the GCBC™. A slight increase in scores was also noted for the control group, however, this was found not to be statistically significant.

RCAS13: Teacher, nurse, receptionist

Social type careers are the focus of question thirteen of the RCAS. Here children are expected to identify the listed careers as all focusing on helping people. The results for the pre- and post-test assessments are summarised in Appendix 48 Table 49.

The control group (i.e., 43.06% of responses coded for 'social') were able to correctly identify a similarity between the careers during the pre-test, yet during the post-test only 38.89% of the control group were able to repeat these results. In the experimental group, a substantial increase between the two assessments was measured with the pre-test (36.49%) and the post-test (56.76%) revealing a 20% increase in the children's ability to correctly identify a similarity between the careers. A statistically significant variation between the groups was found which is best explained by more participants of the experimental group correctly identifying social type similarities between the careers during the post-test assessment. Again we see that more children in the experimental group had an increased ability to identify similarities during the post-test assessments. The increased ability of children to successfully identify these similarities could potentially be attributed to children's participation in the GCBC™ program.

RCAS14: Lawyer, sales assistant, bank manager

Next participants were asked to identify similarities between careers classified as Enterprising type careers. The results are summarised in Appendix 49 Table 51. From these results it appears that the children initially struggled to identify shared characteristics prominent to the Enterprising type, and included many Social type characteristics in their responses (i.e.,

during the pre-test assessments). There was no statistical significant difference between the control and experimental groups during the pre-test assessment.

However, during the post-test assessment there was a statistically significant variation between the control and experimental group's responses [$\chi 2$ (4, N=146) = 10.91; p =.02754]. More participants in the experimental group could accurately identify behaviour or characteristics classified as Enterprising type characteristics or behaviour. Here it was noted that during the pre-test 20.27% of the experimental group participants correctly responded with information related to Enterprising type characteristics. Following their participation in the GCBC™ this percentage increased to 36.49%. The control group's responses remained stable during both the pre- and post-test periods and reflected no statistically significant variation.

RCAS15: Secretary, accountant, bank worker

The last of the questions included in the RCAS Form 4 provides a list of careers classified as Conventional type careers. What was of interest when the scores were analysed was the large number of learners who did not respond to this question during both the pre- and post-test assessments (see Appendix 50 Table 53). This was found in both the control and experimental groups in both the pre- and post- test phases. No statistically significant variation was noted between the control and experimental groups, a finding that may reflect the relatively low number of respondents.

It has also been previously acknowledged that a limitation of the present research was the amount of time allocated to the various learning activities. This was particularly relevant in the case of exploring the conventional type careers on the Cape of Careers segment of the GCBC™. Unfortunately time constraints forced the researcher to limit the discussion and exploration of the

learning activities related to these types of careers, a fact which might have negatively impacted on the current test results.

RCAS summary

The RCAS results provided support for the GCBC™ as an intentional career learning program even though the purpose of the RCAS is to gain insight into children's career awareness. Statistically significant variations between the control and experimental groups were measured on a number of questions from Form 1, and on most questions of Form 4 (excluding questions ten and fifteen). It therefore appears that, in terms of the RCAS results, there is a consistent theme with children of the experimental group indicating greater levels of career awareness during the post-test stage. When these results are considered in the context of the present research there is likelihood that these greater levels of career awareness were stimulated by children's participation in the GCBC™ program.

Conclusion

In this chapter the quantitative data collected during the pre- and post-test assessments have been described (i.e., both inferential and descriptive statistics). It is interesting to note that when the results of the CCDS and the RCAS are compared more questions than answers are provided. For example, the CCDS results indicated that the slight variation between the control and experimental groups during the post-test analyses were not statistically significant. The RCAS results, on the other hand, suggest statistically significant variation on a number of test items and appear to support the GCBC™ as a meaningful career development learning intervention.

On closer comparison these findings seem contradictory at times, yet a possible explanation could be the limited test-retest reliability of the CCDS on the current sample of

children. On the other hand, the RCAS findings might also not be an accurate descriptor of career development learning during childhood (with its focus on assessing children's career awareness) and consequently calls for further analyses to determine the relevance of the GCBC™ as an intentional career development learning program. The discussion of the results presented in the current chapter is comprehensively described in Chapter 10. This chapter also addresses concerns noted in the review chapter and provides recommendations for future research of childhood development and childhood career development.

The next chapter reports on the qualitative data. The qualitative data provided much insight into the experience of the children while completing the GCBC™ program and, as described in the next chapter, suggested the relevance of the GCBC™ as an intentional career learning experience.

CHAPTER 9

QUALITATIVE RESULTS

In this chapter, the results related to the qualitative data collected from the focus group discussions and the Educator Feedback Form (see Appendix 3) are presented. Where possible the chapter will also report on key observations made by the researcher during the fieldwork stage (i.e., as documented in the researcher's fieldwork journal). The qualitative data was specifically gathered in order to gain insight into the children's experience and perceptions of participating in the GCBC™. Two focus group discussions were conducted. In each focus group (i.e., one Grade 3 and one Grade 4 focus group), four learners were present (i.e., two boys and two girls). The Educator Feedback Form was completed by two educators. The results are therefore presented in two sections. First, the results related to the children's experience and perception of the GCBC™ will be presented. Second, the results related to the educators' feedback will be presented.

Children's Experience and Perceptions of the GCBC™

The following qualitative results present the subjective and experiential accounts of the children. The results of the focus group interviews are reported according to four broad themes identified in the data analysis which support the qualitative research aim of gaining insight into the children's perception of participating in the GCBC™. The four themes are: participants' experience of the GCBC™; the GCBC™ as an intentional career learning activity; career decision-making in the context of lifelong learning; and the GCBC™ and its relationship to curriculum content. Where appropriate, these themes will be illustrated by extracts from the focus group transcripts. In this way the words of the children will be presented. The transcript line number will be indicated in brackets after each representative statement. Results related to

each theme will now be presented in turn beginning with the experience of the participants of the GCBC™.

Participants' Experience of the GCBC™

The GCBC™ was designed as an intentional career learning program and the focus group interviews gathered data on the subjective experience of the children participating in the program as well as their perceptions of its effectiveness.

The focus group interviews revealed that children consistently reflected on a positive experience of the GCBC™ and that they were able to mention a number of key design features and elements which contributed to their approval. For example, a Grade 4 boy thought "*Dotty was very funny in her little karretjie [small car]"* (Line 379, Boy 2). A Grade 3 boy also found Dotty amusing, especially when she "*got into the car and sped away"* (Line 30, Grade 3, Boy 1). Another Grade 4 boy commented that "*I liked the different characters*" (Line 384, Boy 1), while the first boy followed up his previous comment with "*I liked it when we went to Treasure Island. That place was lekker [nice]"* (Line 383, Grade 4, Boy 2). On the topic of children's perception of the various learning activities (i.e., the five Islands of the GCBC™), a Grade 3 girl suggested that she *"liked all of them"* (Line 27, Girl 2). Importantly, one of the Grade 4 boys remarked that *"we learned a lot about different careers and different people"* (Line 381, Boy 1).

The previous comments are illustrative of the positive experiences that the children consistently described. In addition to these comments, children remarked that they enjoyed the learning content (i.e., "*I really liked learning about careers and what I can become one day"* Line 7, Grade 4, Boy 2; "*[I learned that] you can be whatever you want to be"* Line 86, Grade 3, Girl 1), the characters (i.e., "*the characters were very nice also"* Line 29, Grade 4, Boy 1), the story elements (i.e., "*I enjoyed the different scenes"* Line 23, Grade 4, Girl 2), and the design

considerations (i.e., "*it was nice music and I really enjoyed the videos"* Line 26, Grade 4, Girl 2). Children also seemed to appreciate the computer-based format (i.e., the presentations on an interactive whiteboard) and the interactive elements of the GCBC™ with one child commenting "*my most memorable experience of the program was using the interactive pen on the board"* (Line 62, Grade 4, Boy 1). Similarly when asked about the computer-based format the Grade 3 learners were clear in their answer (i.e., "that was fun, that was nice" Line 32, all four children). From the above dialogue and responses it would appear that the children experienced the GCBC™ as an enjoyable experience which contributed to their eagerness to participate in the various learning activities (which was confirmed in the researcher's journal entries on days one through five).

Throughout the focus group discussions it was interesting to note that Grade 3 children appeared to make more 'general' comments about the GCBC™ program whereas the Grade 4 children were more specific in terms of their answers. Nevertheless, all of the children expressed their enjoyment of the GCBC™ which was reflected in the words of a Grade 4 girl who "*enjoyed it a lot*" (Line 377, Girl 2). Near the end of the focus group discussion, the researcher asked whether or not the GCBC™ program should be presented to children from other schools and whether other children would benefit from participating in the GCBC™ program. The overall response of the children is probably best summarised by the two Grade 3 girls who asserted that "*I think they will love it*" (Line 197, Girl 1), and "*everyone needs to have fun with this*" (Line 214, Girl 2).

The GCBC™ as an Intentional Career Learning Activity

More than being a fun and enjoyable program, the GCBC™ was designed primarily to facilitate intentional career development learning. For the purposes of this discussion, the most

relevant content which addresses learning was extracted from the two focus group interviews. Two subthemes were identified with the first focusing on learning and the recall of program content, and the second subtheme focusing on learning related to future decision-making. These two subthemes are described later in this section; however, the GCBC™ as an intentional career learning activity is described here more broadly.

It is important to note that both the Grade 3 and 4 focus groups participated in the same GCBC™ program and were exposed to the same questions in the focus group discussions. The introduction to both focus groups was similar and started off by reminding children of the program they had participated in the prior week (i.e., *so last week we did that program on careers).* The first question (i.e., *what did you learn about careers?)* provided the children with an opportunity to reflect and comment on the learning that was anticipated to have taken place through their participation in the program. The results related to the Grade 3s will be presented first.

The Grade 3 focus group's responses emphasised the need to be aware of the many different careers there are. One girl initiated the conversation by stating "*that there are all kinds of different careers*" (Line 6, Girl 1). This prompted the second girl's response "*and you have to study*" (Line 7, Girl 2). One boy stated that "*there are like thousands and like millions of jobs out there that you can choose from*" (Line 8, Boy 1).

Similar to the Grade 3 responses, Grade 4 children also emphasised that there are different careers available ("*there are lots of different careers"* Line 3, Boy 1). One Grade 4 boy demonstrated greater depth in understanding that various careers require different skill sets for success ("*we need different skills for different careers",* Line 5, Boy 1), as well as the fact that a greater awareness of careers is stimulated by learning about differences in the many careers

available (“*you can learn about different jobs”,* Line 7, Boy 1). The same boy also said: “*you can learn and choose and decide and think what job is best for you while you are still young”* (Line 10, Boy 1). Although many of the responses here seem isolated to a single boy, it was noted that this particular child was much more confident in voicing his opinion early in the focus group as opposed to the other learners in the group. The remaining three children often agreed with what Boy 1 said (as indicated in the researcher’s fieldwork journal) and later in the focus group interview expressed their own opinions more freely. An interesting observation that was made in the researcher’s field notes, and confirmed in the qualitative data analysis, was that it appeared that the Gr 3 children made more general comments about the GCBC™ program whereas the Gr 4 children identified specific details.

The first of the two subthemes is described next and this subtheme considered children’s responses in relation to specific aspects of learning.

Learning and recall of program content

Throughout the GCBC™ program children were exposed to specific career information and participated in a number of activities which provided information regarding the relationship between school based activities and careers. Although the GCBC™ offers children the opportunity to experience these various career-related activities, which are aimed at the development of age appropriate career skills, the researcher was curious about the children’s ability to recall specific details about the GCBC™ content. The recall of information may not be indicative of career development learning, yet learning in itself should indicate that sufficient cognitive investment had taken place.

All the children (i.e., both the Grade 3 and Grade 4 focus groups) could recall the names and specific details of the four main characters (“*Jonas wants to be a soccer player or coach,*

Mary wants to be an artist, Ling-Ling wants to be a scientist and Mark wants to be working with tools I think" Line 92, Grade 3, Girl 1*)*. They were also able to recall all five islands (i.e., Notuyoung Island, Cape of Careers, Who-Am-I Island, Practise Mountain, and Treasure Island) as well as the twelve careers explored on the Cape of Careers (i.e., farmer, chef, doctor, vet, artist, photographer, teacher, nurse, restaurant manager, entrepreneur, IT technician, and accountant). Further, children were able to describe specific information about careers explored in the Cape of Careers activity as illustrated later in this chapter. The fact that children could recall specific career information as presented in the GCBC™ (i.e., in the Cape of Careers) was of particular interest given that considerable information is presented in this activity. This demonstrates that children do have the ability to manage and absorb the level of career content provided in the GCBC™.

During the focus group discussions, the children had an opportunity to reflect on all five learning activities presented throughout the GCBC™ fieldwork. Here it was decided to only broadly introduce each learning activity and then to ask children what they had learned on each of the islands (*I would like you to tell me what you learned on each island you visited last week?).* Hereafter each island was individually discussed (e.g., "*what did you learn on the first island?*" and children could offer a response if they wanted to. The questions of the semi-structured interview were intentionally asked in this manner so that children could identify the experiences which were most meaningful to them and not be prescribed content that they should focus on (for example, leading questions to identify core content).

What was particularly interesting was that, while Grade 3 children could clearly recall each island and identify a broad description of the content learned (e.g., specifically relating to the Cape of Careers children learned "*how their job works*" Line 72, Grade 3, Boy 1; "*and what*

you need to do" Line 73, Grade 3, Girl 2), the Grade 4 learners not only recalled each of the islands, they also provided details regarding the core learning activities specific to that island. This point is illustrated best where the Grade 4 learners identified the Cape of Careers and expanded on their discussion to recall what they had learned from the Artist ("*When you are an artist you don't always need paint, you can use colours, drawings*" Line 136, Grade 4, Boy 1). This example is further illustrated below where the Grade 4 children specifically referred to the Artist's tools of the trade (see Figure 7). Where possible, extracts from the focus group interviews have been provided where children identified the various tools of the trade.

Figure 7. GCBC™ Screenshot: Tools of the Trade – Artist

The artist's trade tools presented in the computer-based GCBC™ activity included six tools: protective clothing ("*an old shirt so that you don't mess everywhere on your clothing*",

Line 131, Boy 2*),* palette, canvass and various forms of painting surfaces (*"you need paper",* Line 130, Boy 1), paint ("*paint brushes and paint and things like that"*, Line 134, Boy 2), paintbrushes (*"you need paint brushes",* Line 133, Girl 1), and pencils and crayons (*"crayons",* Line 135, Girl 2). Please refer to the screenshot of this activity (see Figure 7) to view each of the tools of the trade presented in this activity. As can be seen, children were able to recall most of the elements presented in the GCBC™ activity. This information was important considering that the GCBC™ artist emphasises that 'art' can take on many forms and be created across mediums.

Unfortunately soon after the children finished discussing the artist the conversation moved to a different topic and it was only in retrospect where the researcher recognised the oversight of not exploring more of the careers within this exact format. Although reference was made to all the career characters throughout the focus group discussion, a limitation here was that more time could have been invested into exploring each of the careers individually.

Learning related to future decision-making

The GCBC™ as an intentional career learning activity attempted to provide children with a range of experiences which could facilitate the development of age appropriate career skills. The GCBC™ aims to be more than a career information tool and it was important to ascertain whether or not the program's activities stimulated future thinking about careers. Treasure Island, the fifth and final activity of the GCBC™, was seen as a learning activity where the various aspects of career skills development were integrated by the program mascot, Dotty. In the focus group discussions children were tasked with identifying the four core themes (or steps) which constitute a broader focus in terms of career development learning as opposed to merely recalling program content. After introducing Treasure Island to the children, they were asked what they had learned ("*Now the last one … Treasure Island … What did we learn on Treasure Island?"*

Line 140, Researcher). A follow-up statement was provided ("*there were four steps",* Line 141, Researcher) so that children could direct their responses towards the learning themes of Treasure Island as opposed to offering more general learning responses. The four lessons to be learned in the GCBC™ were identified in both the Grade 3 and 4 focus group discussions and are described next.

The first of these learning themes is to realise that "*we are all unique*" (Line 142, Grade 3, Girl 1) and that "*it's ok to be different*" (Line 94, Grade 4, Girl 2). On a number of occasions children from both focus group discussions alluded to this fact as an important theme throughout the GCBC™. The next learning theme presented in the GCBC™ (e.g., the Cape of Careers), and summarised on Treasure Island is that children need to realise that "*school is important*" (Line 147, Grade 3, Girl 1) in terms of lifelong development because it can "*help you prepare for choosing your job*" (Line 148, Grade 3, Boy 1). The third learning theme was to realise that there are people who can help you if you need help and assistance in making decisions (*"you can ask your guardians, your mom and your parents or your friends*" Line 343, Grade 4, Boy 1). The final learning theme that the GCBC™ attempted to convey was that children do not have to make immediate (or premature) career decisions. Children are constantly growing and developing and through subsequent years in school "*we will learn more about what we want to do*" (Line 350, Grade 4, Boy 2).

These responses represent a successful outcome of career development learning which was a goal of the GCBC™ program. Further, the children were able to identify the underlying themes of the GCBC™ that were apparent in the career activities and character narratives presented throughout the program. One theme which surfaced in the data analysis, and which

requires further exploration is career decision-making in the context of lifelong development. This theme is discussed in more detail in the next subsection of the chapter.

Career Decision-Making in the Context of Lifelong Development

The GCBC™ was designed as an intentional career learning experience which could be used as a means of structuring learning activities aimed at facilitating the development of age appropriate career skills. It was particularly important to communicate effectively to participants the benefit of developing age appropriate career skills during childhood, as well as delaying career decisions until later developmental stages. In the focus groups it was necessary to ascertain whether children understood this message, i.e., that it is not necessary to make career decisions during childhood and that the emphasis should be on exploration, discovery, and increasing awareness of the world of work.

A number of responses from the Grade 3 focus group discussion illustrate the effectiveness of the GCBC™ program in supporting the message that career decision-making is part of a developmental process and that awareness about self and careers are more important during the childhood years. For example, the children's responses of "y*ou don't have to choose a job that your mom says you have to"* (Line 43, Grade 3, Girl 1) and "*you could decide your own career"* (Line 153, Grade 3, Girl 1), "*we are all unique"* (Line 142, Grade 3, Girl 1; Line 201, Grade 3, Girl 2), *"…and that everyone is different"* (Line 58, Grade 3, Girl 2) all reflect important elements of career awareness. But it was the words of one of the two Grade 3 boys which provided the researcher with some assurance that the GCBC™ program was rightfully positioned as a tool to facilitate the development of age appropriate career skills: "*Dotty said you have to start thinking about it (careers) so when you are older you actually know what you want to be one day"* (Line 157, Grade 3, Boy 1).

This particular response has two parts with the first part (*Dotty said you have to start thinking about it…)* focusing on the career skill needed (i.e., becoming concerned about the future), and the second part (*so when you are older you actually know what you want to be one day)* focusing on positioning career decision-making as part of a developmental process which starts to gain momentum as children develop. In a final question relating to decision-making children were asked whether they had to decide on their career now. The children were quick to respond with a resounding "*no*" and "*not at all*" (Line 154, all four children).

The Grade 4 children evidenced similar responses to questions related to making premature career decisions (i.e., that it is not necessary to make a career decision when you are young) which illustrate the presence of age appropriate career skills. For example, the children's responses illustrated that they understand the importance of thinking about themselves in relation to future roles: *"you are never too young to think about what you want to do"* (Line 86, Boy 1). The Grade 4 children also identified the fact that "w*e are all unique"* (Line 329, Girl 2) and that it is okay *"being different"* (Line 334, Girl 2) from others. The most important evidence of learning related to contextualising career decision-making as part of a developmental process. This was supported by the responses of all four children to the question of what Dotty said in relation to whether children have to make immediate decisions. Here the response was a clear *"no"* (Line 99, all four Grade 4 children).

In the example above it is clear that the GCBC™ can be regarded as an age appropriate learning activity (i.e., children could recognise that they are not expected to make a career decision when they are young). However, the GCBC™ emphasises children's participation in a range of school-based experiences as contributing to future career attainment, for example the understanding that over the next couple of years "*we will learn more about what we want to do"*

(Line 350, Grade 4, Boy 2). This awareness is critical if children are to make connections between school-based learning and the world of work.

The need to relate GCBC™ learning activities to mainstream schooling was a key consideration throughout the GCBC's™ development and design and the next subsection describes whether this was successfully achieved.

The GCBC™ and its Relationship to Curriculum Content

The last of the four themes is the relevance of the GCBC™ program to the curriculum content of Grades 3 and 4. It was necessary to establish if children could relate the career learning stimulated by the GCBC™ to school-based learning or preparation. One such answer was provided following the question posed by the researcher as to what the children thought would stay with them for the next few years in relation to what they had learned about careers: "*Maths! I like maths and I am good at it"* (Line 49, Girl 1). In this response the Grade 3 girl identified mathematics as an important subject and she linked this subject with information about her self-concept (i.e., that she perceives herself as having good mathematical skills). Although not enough to generalise to the larger sample, this response illustrates that this particular child's awareness regarding the importance of school subjects was encouraged through participating in the GCBC™.

As part of the data analysis, the researcher looked for examples from the children themselves that demonstrated that they identified such a relationship between the GCBC™ activities and curriculum content (including homework as a curriculum-related activity). Consequently the researcher examined how children described the homework activities presented in the GCBC™ workbook. Throughout the GCBC™ program, and specifically the homework exercises, children were expected to complete a number of word search puzzles, mazes, and

other activities with a career theme. Here is was necessary to ascertain how children experienced these activities.

Children responded positively to the question exploring whether they enjoyed doing the puzzles and the word searches and they indicated that they found the activities enjoyable, for example "Y*es, I love it*" (Line 165, Grade 3, Boy 2) and "*I loved the first homework, I finished all of them in two days"* (Line 167, Grade 3, Boy 1). These types of activities are fairly common in educational programs; however, the career theme of the GCBC™ activities makes these learning experiences novel. Both Grades 3 and 4 children's responses during the focus group discussions suggested that they enjoyed the GCBC™ homework exercises which are illustrated in the following examples: "*Oh, that was so fun!*" (Line 163, Grade 3, Boy 1); *"So awesome, I loved it. I finished all of them"* (Line 183, Grade 3, Girl 2); "*Enjoyed it a lot*" (Line 377, Grade 4, Girl 2). The children's responses also indicated that they were motivated to invest time and effort in completing the homework exercises irrespective of individual skill level (*"[It was] extremely easy which makes it extremely fun!"* Line 205, Grade 3, Girl 1; *"I did that, those were super easy"* Line 305, Grade 4, Boy 2; *"I was struggling with Ling-Ling only"* Line 321, Grade 4, Boy 2).

It was also important to ensure that all homework and class-based activities catered for children of different skill levels. In an attempt to access information on whether this goal was achieved the researcher wanted to know whether children felt they were able to complete the homework exercises. Children's responses revealed that the activities were sufficiently flexible so that one child could complete all the activities while another could focus on those elements which they felt competent in: "*I didn't write my story, I just drew pictures"* (Line 178, Grade 3, Boy 2). This response was formally acknowledged by the researcher who emphasised that

drawing pictures was as acceptable as writing. The researcher's response was supportive of the uniqueness and differences between individuals (a consistent theme of the GCBC™ program).

Lastly, the data analysis also tried to illuminate where children's responses in the focus group discussions directly linked with curriculum content as expected to be covered in schools. Unfortunately at present limited attention is devoted to career content in the foundation phase (i.e., Grades 1 to 3 in the South African education system) and consequently the discussion here focuses more on general themes found within the Life Skills curriculum presented in schools. Here it was found that the formal Life Skills curriculum (DoE, 2002) closely mirrors core themes of the GCBC™, such as recognising unique qualities in people ("*different people all like different things*", Line 193, Grade 4, Boy 1), identifying strengths and weaknesses ("y*ou had to start thinking about yourself"*, Line 196, Grade 4, Girl 2; "*we learned about ourselves and other people*", Line 191, Grade 4, Boy 2), increasing awareness of the talents and skills children have ("*they teach us that you need to have skills in school to achieve what your goal is*", Line 118, Grade 4, Boy 1), and facilitating an awareness of the future ("*you had to learn what you want to do and what you like"*, Line 197, Grade 4, Boy 1). As illustrated in the above extracts, many of the Life Skills curriculum elements can be recognised in the responses provided by the Grade 4 learners after participating in the GCBC™ program. This supports the relationship between the GCBC™ for curriculum content offered in schools.

Results of Educator Feedback

To more fully explore the relevance of the GCBC™ as an intentional career learning activity it was also necessary to gain the experience and insights of the educators present during the fieldwork. The two educators completed a feedback form (see Appendix 3) following the GCBC™ fieldwork. This data provided insight into their perceptions of the program and its

impact on the children's career development learning. As part of the Educator's Feedback Forms the two educators were also provided with an opportunity to make suggestions and recommendations regarding program content or format which could assist future development and adaptation of the GCBC™.

The first question focused on the educators' perceptions about the use of computers in the classroom for such programs as the GCBC™. Both educators were optimistic about the potential of computers as an effective tool to facilitate learning during these early years of formal schooling. The Grade 3 educator suggested, in particular, that the GCBC™ program "*seemed to appeal to the children and they were excited about it. It's interactive, visually attractive and relevant to all types of family setups and it seems to be a step by step guide to discovery.*" However, in her response this educator indicated that the children's attention span may be a factor that needs to be considered and that possibly the program could be "*tweaked for the Grade 3's*". The Grade 4 educator also expressed a positive perception concerning the use of computers and stated that:

> *A program such as the one you have developed would certainly prove beneficial to pupils of all ages in helping them to build ideas and to expose them to the varied and vast number of careers that are 'out there' when they one day leave school.*

When the educators were asked to comment on what they believed the children learned through their brief exposure to the GCBC™ content, they listed a number of important areas. For example, they stated that the children learned that: "*they are all different and unique, each with talents and personality traits*" (Grade 3 Educator); "*they discovered much about themselves and the program made them think more clearly about things*" (Grade 3 Educator); "*they need to, and are not too young to, think about their futures in the work place*" (Grade 4 Educator); "(they

need) *to think about careers other than the ones they have already been exposed to*" (Grade 4 Educator); and "*a few will have realised the importance of their school education and their subject choices in high school*" (Grade 4 Educator). These responses reflect the developmental tasks identified in career theory and which shaped the development and design of the GCBC™ program. Further, the educators provide support for the GCBC™ as a meaningful career learning experience.

The educators perceived the GCBC™ as a program which could be assimilated into the existing curriculum. According to the Grade 4 educator, "*the program could easily be included in many areas of learning in the classroom*". This comment is supported by the Grade 3 educator who found a direct link between the GCBC™ content and the academic program covered in Grade 3: "O*ur theme in life skills at the beginning of the year is about discovering their (children's) strengths and areas of growth. GCBC™ complimented my teaching"*. This is an encouraging finding and provides credence to the view of the GCBC™ as a meaningful career learning experience which can be successfully implemented in educational settings.

As reported in the previous chapter and earlier in this chapter, children's career developmental learning evidenced various levels of improvement after participation in the GCBC™ program. Consequently educators were asked to comment on whether this type of learning was important for children and why. The Grade 4 educator responded thus:

> *Very important. There is a huge gap in our education program in this area. Very few pupils enter their final stages of their school careers knowing what they actually want to achieve or study once they leave school. If this research has stimulated even a few children to think about their choice of career it will have been worthwhile.*

This response contextualises the need to provide career learning experiences throughout formal schooling as a prerequisite for optimal learner development. What is particularly relevant in this educator's answer is that she effectively reflects both the rationale behind the present research as well as the intended purpose of the GCBC™. The learning behind the GCBC™ is not only directed at career development learning, it also provides children with opportunities to develop other skills (*"children need to learn assertiveness early in life"* Grade 3 Educator) which will further facilitate the development of a positive self-concept (*"the more they know about themselves the more confident they become"* Grade 3 Educator*).*

Educators were also asked to identify potential pitfalls of the GCBC™. The two educators had different opinions in this regard with one educator focusing on the presentation context ("*My main concern is centred around holding their attention*" and *"better presenting clear guidelines/rules with regard to the interaction of the pupils and the interactive whiteboard"* Grade 3 Educator) and the structuring of the homework as part of the GCBC™ program ("*the homework instructions also need to be very clear*" Grade 3 Educator). The other educator's opinion focused more on what is needed in terms of rolling out the program in schools ("*the teacher presenting the program would need to be 'sold on the idea' of GCBC™ and needs to be enthusiastic and well trained for it to be successful*" Grade 4 Educator). These are valuable contributions which are discussed further in the final chapter.

It was at this stage necessary to assess what the educators would recommend in terms of additions to the GCBC™ program. These educators were strategically positioned to observe children's participation in various learning activities and they could make valuable recommendations to strengthen the delivery of the program. The Grade 3 educator recommended that it would be beneficial to include *"videos of children dramatising what they'd like to be one*

day with follow-up discussions". The emphasis on seeing children demonstrating their understanding of careers was a recommendation also supported by the Grade 4 educator who called for *"some practical interaction between the pupils to illustrate the careers being presented".*

The final question posed to the educators focused on general recommendations and suggestions related to the GCBC™. The Grade 3 educator suggested that the program would be easier and more beneficial to complete over a longer period. This would encourage greater assimilation of the content to be learned: "*I think if it is done over a longer period of time (for example completing one career per day) it would have tremendous value for children.*" This was indeed an original consideration for the GCBC™ but because of time constraints certain compromises were necessary during the fieldwork, which resulted in an approved five day period. The Grade 4 educator supported the recommendation of extending the influence of the GCBC™ by suggesting "*shorter periods of work but on a more regular basis as a means to maximise the learners' attention to the program".* This educator also recommended that the roll out of the program required sufficient adaptation of the learning content so that the information presented was age appropriate and relevant throughout subsequent years of development.

There appear to be encouraging signs of support for the GCBC™ to be integrated within the broader education system, but with some caution as suggested in the Grade 4 educator's feedback: "*I see a real need for something like this, as long as it is not 'flogged' in every grade to the extent that the pupils lose interest in the very thing that is there to help and guide them."*

Conclusion

This results chapter has allowed for a systematic analysis of the various levels of the qualitative research data collected throughout the fieldwork. It is interesting to note that this

focus on the particular and subjective accounts of the GCBC™ program revealed the program's benefits. Further, the GCBC™ appeared to be relevant and beneficial in facilitating the development of age appropriate career skills. The discussion of the quantitative and qualitative results is presented in the following chapter, which also includes an acknowledgement of the limitations of the current research as well as recommendations for future research of childhood career development.

CHAPTER 10

DISCUSSION

"I am not afraid of storms, for I am learning how to sail my ship."

Louisa May Alcott (1868)

In writing this final chapter, it has proved difficult to remain an objective researcher and I find myself drawn to the analogy of being both an objective narrator and a subjective passenger reporting on a journey that goes beyond the pages of this thesis. In many ways the quotation highlighted above reflects this personal journey; however, the quotation also supports the rationale behind the development of Growing-Up: Children Building Careers™ (GCBC™). For the last four years, this journey has been characterised by personal and professional growth while enduring the many 'storms' that characterise research into unchartered waters such as in the case of research about career development learning programs for children.

When the above quotation is considered in relation to career-decision making (i.e., with the 'storm' representing the uncertainty and insecurity pervading career choice), it is preparation and learning which can direct the individual in the midst of such uncertainty. If the quotation is related to the career developmental stage of childhood it can be linked to a core theme advocated by practitioners and theorists in the field, namely that direct, simulated, and vicarious experiences are needed to help children connect school-based learning to the tasks they will undertake as adults (Harkins, 2000; Schultheiss, 2008). Developing such a learning experience was the goal of the present research; specifically its goal was to design an example of a computer-based career exploration program which could assist and facilitate the development of age appropriate career skills (see Savickas, 2005, and Super, 1990, in this regard).

This final chapter begins with a review of the research aims along with discussion of the most pertinent research findings. Where possible this discussion considers information presented in earlier chapters, specifically where theory, policy, practice and research converge on a shared interest in better understanding the field of children's career development. In addition, the chapter considers the significance and acknowledges the limitations of the present study and provides recommendations that may assist future researchers, program developers, and practitioners in expanding on the research.

Review and Discussion of Research Aims

This discussion of the results is guided by the research aims as proposed in Chapter 7 with Aim 1 (i.e., to develop and design a computer based career exploration tool) considered first. Following this discussion, Aims 2 (i.e., measuring the effectiveness of the GCBC™) and 3 (i.e., evaluating children's experience of the GCBC™ as an intentional career development learning activity) are discussed in relation to the quantitative and qualitative results obtained from the pre- and post-test assessments.

Aim 1: Development and Design of a Computer Based Career Learning Program

The first aim of the research was to develop and design a computer-based career exploration program that could be used to facilitate the development of age appropriate career skills for eight to ten year old South African learners. The computer-based format was identified and supported by the literature and extant research (see Chapters 3 and 5) as a viable means of presenting career content. In addition, the computer based format allowed for the career content to be presented in an entertaining and exciting manner (see the subsection on children's experience of the GCBC™) while staying true to the guidelines proposed for successful learning programs by theory, research, policy, and practice. For example, the twelve 'tools of the trade'

learning activities[16] presented during the 'Cape of Careers', illustrates the practical application of theory, research, and practice recommendations. In particular, these activities provided children with 'concrete' elements (although digital in nature) as part of a structured learning activity which, according to child development theory (i.e., Piaget, 1970, 1977) and experiential learning theory (e.g., Kolb, 1984) encourages and facilitates learning during the elementary school years. The researcher believes that the children benefited from visually seeing and exploring the tools of the trade associated with each of the careers.

Children during this stage of development (i.e., eight to ten year olds) still largely understand concrete elements better than more abstract concepts and that is why the GCBC™ activities, both computer-based and homework exercises were endorsed by the educators and children as a meaningful learning activities. Furthermore, since the computer-based activities were presented in class, it allowed for interaction between the learners and this accounted for learning from and between each other (i.e., referred to by Vygotsky [1978] as the more knowledgeable others). Each activity was also structured in such a manner to facilitate collaboration between the learners and the facilitator, thus, creating a context conducive for enhanced learning or zone of proximal development (ZPD) (i.e., learning which would not be possible if the child was required to complete the activity alone). It has already been documented that if we want to know what a child is ready to learn (specifically in terms of career learning), we cannot look at what the child can learn when working alone (which will be limited seeing that few children are exposed to intentional career learning); we must see how far ahead he/she can go when offered assistance (as is evident in the relationship between children and the facilitator of the GCBC™ program) (Crain, 2000). Where possible, examples of the learning activities have

[16] A hands-on, digital exploration of a variety of career instruments, tools, or skills as required by each of the twelve career characters.

been discussed in this thesis and have also been provided for review (e.g., in the GCBC™ workbook, the GCBC™ DVD, and the GCBC™ computer-based program) to illustrate its link with theory, research, and practice.

In the present research the term 'evidence-based' was considered in two specific foci of the research, namely in the program development of the GCBC™ and in researching the effectiveness of the program as an intentional career development learning program. Firstly, as described in Chapter 6, the GCBC™ program was shaped by the available literature and research regarding the career development of children (i.e., the research-based support for each of the learning activities presented in the program). Each of the GCBC™ components is available including the GCBC™ computer-based program, the GCBC™ workbook (hardcopy), and the overview of the GCBC™ program (DVD). These products are seen as evidence confirming a successful attainment of Aim 1 of the present research. Secondly, in order to call the program an evidence-based program the research tested and measured the program's effectiveness in facilitating children's career development (i.e., there was a need for research evidence supporting the effectiveness of the program as an intentional career development learning program). To accomplish this second goal, Aim 2 was proposed and is described in the next subsection.

A detailed description of the program development stages has been provided in Chapter 6 and, as is evident in that overview, the GCBC™ not only focused on the GCBC™ as a computer-based career exploration tool, it also considered recommendations made to integrate ICT and mainstream academic learning (for example, literacy skills) as part of the program format. Consequently a hardcopy workbook was developed that would act as a link between the classroom sessions (i.e., the five learning activities of the GCBC™) and the necessary homework activities. This workbook also acted as a means of tracking children's progress through the

various learning activities as the homework exercises had to be completed following each of the learning activities presented.

In terms of program development, the GCBC™ learning activities selected for the GCBC™ program and the workbook not only provided career information (as in the case of the program), they also complemented academic skills being developed in the curriculum (for example, encouraging reading and learning new vocabulary through reading the character stories in the workbook), fine motor and visual-spatial skills (i.e., completing the mazes and word search puzzles), planning skills (i.e., completing the mazes as well as the matching of career and skills activity), and creating opportunities for children to practice their writing skills (i.e., completing the newspaper article about themselves). As described in the thesis, these are all important academic skills which contribute to the successful development of learners and are required in formal schooling. The development of these skills is particularly relevant for the holistic development of children during the foundation phase (i.e., Grades 1 to 3) and subsequent stages of formal schooling in South Africa (DoE, 2002).

From the children's responses presented in Chapter 9 it appears that they enjoyed the various GCBC™ activities and their positive perception of the program further contributed to their willingness to engage in the learning activities. During the program development stage it was also necessary to remain sensitive to the academic needs of a variety of learners (i.e., in terms of their academic skills) and thus the GCBC™ homework exercises encouraged the children to attempt activities in which they felt comfortable. Consequently all children could experience a sense of achievement (i.e., through flexibility of the outcomes proposed for each of the learning themes), thus contributing to what Erikson (1985) referred to as a sense of industry. The rationale behind these design considerations is that, according to the researcher, positive

experiences gained through achievement in school-based learning encourage the development of a positive self-concept. Furthermore, early career interventions provide the ideal venue for the promotion of social action initiatives aimed at improving academic achievement and expanding future career options for all children (Schultheiss, 2005).

Thus, it is evident that the GCBC™ conforms to what is expected from an age appropriate career development learning program (see also the educator feedback presented in Chapter 9). In addition to its firm foundation in literature and research, data was gathered during the research to measure the effectiveness of and to build an evidence base for the GCBC™.

Aim 2: Measuring the Effectiveness of the GCBC™

The second aim of the research was to quantitatively evaluate the effectiveness of the GCBC™ in enhancing children's career development by firstly describing children's career development prior to their participation in the GCBC™ program, and secondly describing any changes in children's career development following participation in the GCBC™ program. The quantitative research results presented in Chapter 8 are discussed next in relation to aim two. Two distinct sets of results are examined, with the first referring to insights gained from the Children's Career Development Survey (CCDS) (Stead & Schultheiss, 2003, 2010) and the second referring to insights gained from the Revised Career Awareness Survey (RCAS) (McMahon & Watson, 2001). Although not statistically analysed, reference is also made to specific comments made by the research assistants who were asked to complete a feedback form following the fieldwork. These comments offer insight into the CCDS and RCAS as data collection tools.

The Children's Career Development Survey (CCDS)

The CCDS is a quantitative measure that was developed to collect information on children's career development. Eight of the nine dimensions proposed by Super (1990) were included as subscales (with the exclusion of the interest dimension). Each of these dimensions (i.e. Planning, Exploration, Information, Self-Concept, Key Figures, Curiosity, Locus of Control, Time Perspective) were considered in the GCBC™ program development and design and each dimension can either directly or indirectly be linked to a program activity or a series of activities. Given that there were theoretical similarities between the CCDS and the GCBC™ it was surprising that the CCDS post-test results revealed no statistically significant variation between the control and experimental groups. The first possible reason may lie with the CCDS instrument itself and this is discussed below.

Psychometric properties of the CCDS

The inferential statistics presented in Chapter 8 suggested that the CCDS for the current sample of children in the control group had low to moderate levels of test-retest reliability on most of its eight subscales. A likely reason for this finding is that the mean age of the children in the present research (i.e., 8.74 years) falls at the lower limit proposed for the effective use of the CCDS as a data collection instrument. However, considering the limited availability of assessment measures within the field of children's career assessment, the CCDS and its previous application to the field of research justified its selection in the present study.

Furthermore it was established that the internal consistency of six of the CCDS subscales during the pre-test (i.e., Curiosity, Exploration, Information, Key Figures, Time Perspective, and Self-Concept) and four subscales during the post-test (i.e., Exploration, Information, Key Figures, and Time Perspective) were below the preferred 0.70 level for this specific group of

research participants. These psychometric findings suggest that the results need to be interpreted with caution considering that conventionally a measure which scores equal to or greater than 0.70 is considered reliable for research purposes (Bland & Altman, 1997; Spiliotopoulou, 2009).

Despite the concerns noted above, an interesting finding was that the internal consistency of the CCDS improved during the post-test assessment for both the control and the experimental groups. This trend has been found previously in research and has been attributed to the influence of an introduced intervention (see, for example, Vela Acosta, Sechrest, & Mei-Kuang, 2009). Vela Acosta et al. inferred that such increases in reliability suggested that the responses of individuals to items of the questionnaire were more consistent at post-test level, thus reflecting learning some general principles regarding knowledge acquisition.

If increases in internal consistency could be isolated to the experimental group scores one could assume that such increase was influenced by the introduced program. However, increases in internal consistency were observed for both the control and experimental groups. A possible explanation for these increases could be that the process of participating in the pre-test assessment encouraged children to initiate a process of self-reflection (which impacted on self-awareness) and that this resulted in higher levels of internal consistency during the post-test. In addition, children may have better understood the questions during the second assessment, with the responses thus indicating greater levels of internal consistency. Considering that the data collection processes and the research team remained consistent throughout the pre- and post-test phases for each of the schools on both dates, it is possible that the children were better able to understand and respond to the questions a second time around.

The CCDS, while regarded as a valid and reliable tool for data collection purposes with older samples, may need to be adapted for use with younger samples as noted in the present

research. This concern was also noted by the research assistants whose feedback following the fieldwork suggested that not all children were able to comprehend the questions asked in the CCDS. Several research assistants commented that a number of children became fatigued and responded to the CCDS in a predictable pattern. This pattern was observed especially for the eight year old learners (i.e., the Grade 3 group) during both the pre- and post-test phases.

The present fieldwork thus experienced similar limitations noted by other researchers in the field of children's career development (i.e., having limited access to age-appropriate career assessment measures) (see, for instance, Athanasou, 2007, in this regard). At present, in the opinion of the present researcher, there are no assessment measures available that can evaluate the effectiveness of intentional career learning programs for eight to ten year old children. As a result the researcher made use of the available measures with some reservation to measure children's career development learning. Consequently the CCDS results are discussed in terms of observable trends in the data analysis and there is no attempt to draw inferences regarding the effectiveness of the program. These trends are described next.

Pre-test and post-test results on the CCDS

The results collected during the pre-test stage revealed that there was no statistically significant difference between the two groups of children (i.e. the control and experimental groups). This was anticipated and validated the sampling procedures followed in the present research.

Similarly, there was no statistically significant difference between the control and the experimental groups at the post-test stage. The post-test assessment results revealed improved or higher responses for most CCDS subscales for the sample as a whole (i.e., both the control and experimental groups) which indicated that the children were more positive in responding to the

questions asked. Although these results do not reflect positively on the effectiveness of the GCBC™ as an intentional career learning experience, the results need to be considered against the inherent limitations posed by the CCDS for the current sample of children. These limitations have already been indicated earlier and indeed are described later in this chapter (see section on Limitations). These limitations include: the age range proposed for effectively using the CCDS; its self-report format; the relatively low levels of test-retest reliability established for the CCDS in the present research; and the variable levels of internal consistency found for each of the eight subscales during both the pre- and post-test assessments.

It is by no means the intention of the researcher to disqualify the validity of the CCDS as a measure of career development in childhood. However, as the CCDS findings did not provide the statistical results hoped for to support the effectiveness of the GCBC™ program in enhancing the career development of children, there was a need to further investigate the relevance of these findings. It was decided to illustrate key differences between the children of the present study and the children on whom the psychometric properties of the CCDS were based (see, for example, Stead and Schultheiss, 2003, 2010). This comparison concluded that the most obvious explanation for the low test-retest reliability and limited internal consistency of the test items in the present research centred on the impact of age (and by inference cognitive development) on the ability of the children to successfully engage with the CCDS test items. Similar concerns have been noted previously for the CCDS when eight year old South African girls' career development was the focus of a research project (Van der Westhuyzen, 2011).

In the present research a large portion of the children (i.e., 89%) were eight and nine years old (with a mean age of 8.74 years which falls at the lower limit recommended in terms of the use of the CCDS for data collection purposes). In addition, no age specific norms are

available for the CCDS and the exploration and discussion of the CCDS scores were based on raw score comparisons. Such psychometric concerns are duly noted by the test developers who have recently made a call for further establishing the psychometric properties and norms for the CCDS (Stead & Schultheiss, 2010). Despite these limitations and concerns noted for the CCDS it remains the only measure currently available which can quantitatively assess children's career development and this validated its selection as a data collection tool in the present research.

An overview of the results obtained for the CCDS total score as well as the eight subscale score analyses revealed that, while there is much value in the CCDS as a measure of data collection, there is a need to strengthen its psychometric properties as suggested by its developers (see, for instance, Stead & Schultheiss, 2010). Clearly the CCDS results did not lend the support hoped for in the present research but, considering the initial concern noted from the inception of the testing phase regarding effectively measuring the impact of the GCBC™, other methods of assessment were introduced. Thus two additional sources of information formed part of the data collection procedures, namely the RCAS (McMahon & Watson, 2001) and the qualitative data collection methods (including the focus group discussions and the educators' feedback forms).

The Revised Career Awareness Survey (RCAS)

The rationale behind the selection of the RCAS was that it provides children with an opportunity to put into their own words their understanding and subsequent answers to questions posed in the semi-structured questionnaire. These responses were content themed and coded in order to quantitatively explore children's answers in an attempt to measure the effectiveness of the GCBC™ as an intentional career development learning program. Therefore, what the CCDS lacked in terms of personal reflection and context sensitive information, the RCAS provided

through an opportunity to collect such data, content theme it, and statistically present this qualitative information for discussion. The insights gained from these results are described next.

Pre-test results

During the pre-test data analysis, a similar trend to that of the CCDS was evident in that no statistically significant difference was noted between the control and experimental groups. This provided further statistical evidence for similarity between the two groups of children (i.e., the control and the experimental groups). It also suggested that any change noted during the post-test data analysis would probably reflect on the introduction of and exposure to an external variable. In the present research it was believed that the introduction of the GCBC™ as an intentional career learning experience would reflect positively on the responses gathered from the participants of the experimental group during the post-test assessment.

Post-test results

An examination of the RCAS questions (Appendices 36 to 50) revealed that a number of items were closely related to learning concepts. For example, having a greater awareness of careers, being able to link school-based learning with future career goals, and identifying viable sources of career information all illustrate examples of career development awareness and learning. Questions ten to fifteen were specifically identified as key questions seeing that here children had an opportunity to illustrate their awareness of careers. These questions reflected more specific forms of career awareness, in particular, career information.

The RCAS post-test results (i.e., Form 1; see Appendices 36 to 44) revealed that on a number of questions there was statistically significant variation between the control and experimental groups, with the experimental group evidencing greater levels of career awareness following exposure to the GCBC™. More specifically, three questions (i.e., questions one, seven

and nine) indicated a statistically significant increase in the experimental group's scores following their exposure to the GCBC™ program. Further, question five suggested a statistically significant increase in the experimental group's scores between the pre- and post-test assessments to identify environmental influences (including learning experiences presented in class). The remaining questions revealed increases in children's career awareness, although not statistically significant, during the post-test assessment. It is, however, necessary to mention that of these remaining questions not all could be tied to career development learning (for example, question two) and subsequently were excluded from statistical analyses.

It is possible that the positive results for the experimental group may not be exclusively attributed to children's participation in the GCBC™ program and that these increases could be explained by the influence of other extraneous variables not accounted for in the present research. However, the increase noted between the pre- and post-test periods for the experimental group is an encouraging sign for supporting children's career development learning during this formative period. Having a greater awareness of careers during these early stages of career development has been identified as a prerequisite skill for successful career development during subsequent stages of development (Beale, 2000; Hartung et al., 2005; Magnuson & Starr, 2000; Schultheiss, 2008; Watson & McMahon, 2005). Furthermore, increases measured in children's career awareness following participation in the GCBC™ also bodes well for further exploration and the development of age appropriate career skills required for later career decision making as described throughout this research.

Another benefit of the GCBC™ appears to be its recognition of the importance of school-based learning on future career development. The GCBC™ program was specifically developed in line with Super (1981, 1990) and Savickas's (2005) theories which recognised becoming

concerned about the future and increasing personal control over career activities as two important developmental tasks associated with childhood. Seeing that the RCAS was introduced to measure the effectiveness of the GCBC™ it was encouraging to see the results reveal a statistically significant difference between the control and experimental groups. Most noticeably, children who participated in the GCBC™ could identify specific school subjects needed to follow careers that they were interested in. The results revealed that children in the experimental group had improved by 32% in their ability to identify school subjects that form part of the long term preparation for future careers. No change was noted in the control group, thus suggesting that participation in the GCBC™ program had prompted this career development learning.

One could argue that the skill referred to above (i.e., being able to identify a specific school subject related to a career interest) is not required during the elementary school years in light of the fact that children's career aspirations are not crystallised yet. However, having an awareness of the importance of school-based learning on future career development (see, for instance, Patton and McMahon, 2006; Schultheiss, 2005; Watson and McMahon, 2005) can greatly influence children's commitment to invest time and effort into these activities (i.e., subjects) (Gillies et al., 1998; Hughes, 2011; Magnuson & Starr, 2000; Gysbers, 2007). Appropriate career awareness during childhood is needed so that children can understand the importance of increasing personal control and commitment to a range of learning activities. For example, if children can understand how important mathematics is in terms of future career success (a fact emphasised by several GCBC™ career characters), they might be more willing to invest time and effort in mathematics homework activities.

Additional support for the GCBC™ was found when the results for questions ten to fifteen were reviewed (see Appendices 45 to 50). Here it was found that the experimental group

consistently performed better on the post-test assessment with differences in percentages between the two groups ranging from 14.86% to 20.27%. As mentioned in Chapter 8, the results from Question 10 (i.e., Realistic type careers) were excluded from the discussion because the children's responses to this particular question were thought to be contaminated by the practice examples offered. The statistical analyses for the rest of the questions indicated that four of the five career fields (i.e. Investigative, Artistic, Social, and Enterprising) revealed statistically significant differences between the experimental and control groups.

In summary, when the results from the control and experimental group participants are compared, it is believed that the statistically significant differences noted between the pre- and post-test assessment for the experimental group could be attributed to children's participation in the GCBC™ program. The results suggest that the children who participated in the GCBC™ could identify a broader range of careers indicative of greater career awareness. This inference can be drawn considering that no change was noted between the pre-and post-test assessments for the control group. These findings also suggest the potential of using the RCAS as a measure of career development learning that could be further investigated.

It is also worth noting that the increases described above were evident despite the limited exposure of the children (i.e., the experimental group) to the GCBC™ given the constraints of the fieldwork. It could therefore be anticipated that with more time dedicated to the various GCBC™ activities the impact of the program could have been even more pronounced.

Lastly, the results also seem to indicate that children's participation in the GCBC™ made them more aware of the potential of computers as meaningful sources of career information (see Chapter 8, RCAS07). Children in the experimental group reflected on the relevance of media influences (including computers) as a viable source for mediating learning content, a theme that

was also evident during the focus group discussions described in Chapter 9. The present research thus supports previous research which identified computers as a viable platform supporting learning during childhood (see, for instance, Harris-Bowlsbey & Sampson, 2005; Keengwe, 2007; Keengwe & Onchwari, 2009).

Aim 3: Children's Experience of the GCBC™ as an Intentional Career Learning Activity

The third aim of the research was to qualitatively evaluate children's participation in the GCBC™ as an intentional career development learning process. Throughout the GCBC™ fieldwork, there was a consistent question as to how to effectively measure career development in children with the limited and largely untested assessment measures currently available. This concern has been documented in research that has called for more relevant measures and instruments to be developed for use with children (see, for example, Anthanasou, 2007). Compensating for these concerns information gathered from two focus group discussions with children, as well as information gained from two Educators' Feedback Forms, were included in the research in order to provide a more holistic assessment of the career learning that was anticipated. It was particularly important to hear children retell their experiences as, according to Savickas (2002, p. 58), the dynamic construction of career is revealed through story as individuals "tell how the self of yesterday, became the self of today and will become the self of tomorrow." The focus group interviews thus provided an opportunity to hear whether children could reflect on changes in terms of their thinking following exposure to the GCBC™ and how they communicated their experience of the GCBC™.

Firstly, the stories shared by the children of the focus groups supported the idea that they enjoyed participating in the GCBC™ program, and that they found the computer-based format (i.e., a multimedia program presented on an interactive whiteboard) particularly stimulating. A

number of questions in the semi-structured interview invited the children to provide subjective accounts of their experience of the GCBC™ program. These questions focused on the children's perceptions of the content covered, the activities offered, the homework exercises which formed part of the project, and an overall rating of the presentation format (including their participation in using the interactive elements and the interactive whiteboard). The qualitative results provided evidence that both Grades 3 and 4 learners consistently reflected on a generally positive experience and, in support, were able to mention a number of specific GCBC™ elements which they enjoyed. These elements were that children: enjoyed the interactive elements of the GCBC™ (i.e., using the stylus pen to make selections and decisions on the interactive whiteboard); enjoyed the characters, found them amusing, and were able to learn from them; expressed a desire to engage in activities similar to those presented by the career characters; and they also commented positively on the music, videos, and homework exercises saying that they were enjoyable. It was also noted that although the activities provided much in terms of enjoyment, there was a more important element recognised by the children which suggested that the GCBC™ program helps children to learn more about careers.

The second theme identified in the qualitative data analysis was related to the GCBC™ as an intentional career learning activity. Although the quantitative data analysis revealed sufficient evidence supporting the GCBC™ as an intentional career development learning program, it was in the qualitative results obtained from the focus group discussions and the educators' feedback forms where the true benefit of the program was evident. Two specific subthemes of career development learning were considered to further illustrate this finding. The first subtheme describes children's responses to questions evaluating their ability in recalling program content (i.e., knowledge retention). The second subtheme of career development

learning focused on the children's ability to comprehend the steps involved in facilitating the development of age appropriate career skills. As described in Chapter 9, the information collected from both focus group discussions provided much support for viewing the GCBC™ as an intentional career development learning program with children able to identify specific program content (the first subtheme) and underlying learning themes (the second subtheme). The children's responses represent a successful outcome of career development learning which was the emphasis of the GCBC™ program.

More specifically, it can therefore be surmised that the recall of specific details of the GCBC™ as well as children's acknowledgement of the underlying learning themes provides evidence supporting the GCBC™ as an intentional career development learning program. It is further contended that this learning was supported through the computer-based format of the GCBC™. Furthermore, children's capacity to manage increasingly complex information is constantly developing (see, for instance, Piaget 1970, 1977 and Erikson, 1985) and it is believed that the GCBC™ is a step in the right direction in assisting the development of higher order cognitive skills (i.e., age appropriate career information). However, just because the GCBC™ program can provide children with an intentional career learning opportunity does not mean that children are fast-tracked into making a career decision. Throughout the development and design of the GCBC™ program it was never intended to encourage decision-making during these early stages of career development. Therefore to address this concern, a consistent message throughout the GCBC™ learning activities was to emphasise childhood as an important formative period which did not necessitate making premature decisions. The question that had to be answered was whether this message sufficiently came through in the various program activities. The response to this question is explored next.

Thus, the third theme which surfaced during the qualitative data analysis was related to career decision-making in the context of lifelong learning. Specifically the participants' responses confirmed that the GCBC™ sufficiently emphasised childhood as an important career developmental phase without children feeling pressured to make career decisions following participation in the program. Indeed the responses of the children provided the researcher with the assurance that the GCBC™ program represented a learning tool that facilitated the development of age appropriate career skills (see section on Career Decision-Making in the Context of Lifelong Development, Chapter 9).

The last of the themes, namely the GCBC™ and its relationship to curriculum content, revealed how the various GCBC™ activities closely mirror activities often found within classroom lessons. In addition the GCBC™ core themes, according to the educators, broadly reflect the curriculum content of the Life Skills learning area (which forms part of the formal curriculum) such as identifying strengths and weaknesses, increasing awareness of the talents and skills children have, and increasing personal control of school-based learning and activities. Such findings support the view that the GCBC™ program conforms to a viable program for rollout in schools and, as described in Chapter 4, such opportunities for children to make connections between classroom activities and future work roles are essential building blocks for facilitating the acquisition of age appropriate career skills (Zunker, 2006).

In summary, the goal of any research focusing on learning programs in childhood should be to assist practitioners in working with children. Even more critical is the need to provide such practitioners with evidence-based programs as a means of validating the program in question as a meaningful learning experience. The responses of the children and educators who participated in, or witnessed, the facilitation of the GCBC™ provide support for the GCBC™ as a meaningful

career learning experience which can be successfully implemented in educational settings. However, much more work is needed to better understand career learning which was measured within a limited context in the present research. What can be said at this stage is that the use of a computer-based platform in the presentation of the program content contributed to the career learning evidenced in the research results. This aspect is discussed in the following subsection.

Information Communication and Technology (ICT) within the Classroom

Considering that computers are regarded as important learning tools internationally (Cooper, 2005; Harris-Bowlsbey & Sampson, 2005; Keengwe & Onchwari, 2009), it was necessary to ascertain children's ability and familiarity with using computers nationally. At present the GCBC™ is a facilitator guided computer-based activity presented in a classroom, yet it is anticipated that the program has the potential to be used as a workstation based application (i.e., where children interact with the GCBC™ program from home or over the internet on an individual basis). Therefore it was important to assess if eight to ten year old children have the capacity to benefit from this learning medium.

The results from the biographical questionnaire presented in Chapter 8 confirm that computers are readily available in most schools and households and that parents and/or guardians can recognise their children's proficiency in effectively using this type of learning medium. These findings support the decision made to develop the GCBC™ as a computer-based career exploration tool in light of the fact that it has been suggested that computer technology can help support learning (Keengwe, 2007). This is an important finding seeing that it has been found that ICT is especially useful in developing the higher-order skills of critical thinking, analysis, and scientific inquiry (Roschelle, Pea, Hoadley, Gordin, & Means, 2000).

The RCAS results further indicated that both control and experimental group children could recognise computers and other forms of media as viable sources of career information. However, after participating in the GCBC™, significantly more children of the experimental group identified media influences (including computers) as a viable source of career information. The qualitative data thus provided support for combining career learning content and ICT seeing that the responses of the children and educators suggested that they could recognise the learning benefits of this medium. However, it has to be acknowledged that not everyone has been supportive of integrating computer technology into the classroom, referring to the high cost of implementation and the fact that it may be "potentially disruptive or misguided in some of its uses and in the end may have only marginal effects" (Roschelle et al., 2000, p. 77). Despite the diversity of opinions concerning the use of computers as instructional aids in learning environments it has been reported that developmentally appropriate digital environments for children support both mastery of knowledge and growth (Cooper, 2005) which was evident in the experimental group.

In the present example of the GCBC™, it seemed that the computer-based format (in particular the visual representation of the various program characters) allowed children to make subjective connections to many of the program characters. For example, during one of the focus group discussions the question was asked "*who is your favourite character?*" Here it was discovered that many of the children based their decision regarding their favourite character on having a shared interest or characteristic with the characters on screen. For example, a number of girls participating in the focus group discussion listed Mary and Ling-Ling as their favourite characters. On the other hand, the boys seemed to prefer Jonas and Mark as their favourite characters (i.e., when limited to the four main characters of Notuyoung Island). These results

suggest that children's preferences in terms of identifying with a digital onscreen character are largely shaped by gender. However, during the in-class presentation of the GCBC™ (Fieldwork of the GCBC™) there were also examples of girls selecting Jonas as their preferred character indicating that there were other factors that had to be considered.

A follow-up question in the focus group discussion attempted to clarify why children had selected their preferred character and it became evident that children identified characters with which they shared certain characteristics. For example, one boy (Grade 4, Boy 2) said that Jonas was his favourite character and offered the explanation that Jonas, just like the boy himself, likes playing soccer (i.e., the boy liked him "*mostly because he likes soccer*" Line 40, Boy 2). Although this response could raise questions about whether the characters were gender stereotypical, it does provide evidence that children on some level could establish a connection between their subjective realities and the fictional narratives presented on screen. This is encouraging seeing that each of the main characters (i.e., Mary, Ling-Ling, Jonas, and Mark) presents a narrative where they were able to overcome adversity (for example, being raised by parents who are divorced; adapting to the challenges of living in a foreign country; coming from a disadvantaged community; or having to adapt to boarding school).

If children are able to identify with one of the fictional characters (presented in a fictional world in a computer program), then there is also the possibility that, if adequate exploration of the character's narrative is undertaken, then certain contextual lessons can be transferred and learned by participation in the GCBC™. This includes challenging gender stereotypical thinking which is often associated with shaping children's career aspirations (for example, Gottfredson's theory of circumscription and compromise, 2002, 2005). The range of GCBC™ character stories provides practical examples of real life scenarios and they offer valuable life lessons that can be

used as a means of learning (by association) to overcome life's challenges and obstacles. The GCBC™ character stories represent a positive outcome to problem saturated life stories and provide participants with insight into those unique outcomes that contradict certain discourses which can restrict a child's career aspirations, exploration, and future decision-making.

Lastly, the benefits of combining ICT and the GCBC™ are broader than the learning discussed in this subsection. With the insights gained from consultation with stakeholders, the program was designed within a context of combining career learning with mainstream academic learning, including learning to read. According to Cooper (2005), learning to read may be the greatest cognitive challenge that young children face. Young children's understanding is largely concrete and sensory rather than abstract and symbolic (Piaget, 1970, 1977). Programs that offer children the ability to read text while also hearing the text read aloud in a clear, well-paced voice help young readers attach sounds to letters, syllables, and words (Cooper). Although this was not actively studied in the present research, the fact that the GCBC™ provides on-screen text for children to follow while the different characters interact with the participants is an example of how the program maintained sensitivity towards developmental considerations.

Clearly there remain a number of improvements which can be explored during any future revision of the GCBC™, including more control over the progression through the various GCBC™ activities (which currently is a timed process). It is anticipated that if a child can request multiple audio repetitions of sentences on-screen learning could be further facilitated. In addition, programs that are child-controlled support different learning styles (Liu, 1996), a fact that was not possible to assess during the present research. The impact of such features needs to be explored in subsequent revisions of the GCBC™. Nevertheless, the results of the present

research have shown its value in the career development learning of eight to ten year old South African learners.

Significance of the Present Study

The significance of the present study is described next and indicates how the research has attempted to: link theory, research, and practice; respond to policy makers' call for evidence based and research driven practice; develop an intentional career learning program for children; integrate career development learning with other curriculum elements; and use computer based technology as a viable means to present the career learning content.

While many of the challenges of children's career development remain, the GCBC™ presents an attempt to address some of these challenges by formulating an example of how theory, research, and practice can be integrated into an intentional career learning program. The rationale behind the GCBC's™ development was that recent research has called for "practical interventions that will build a firm foundation for children's life span career development" (McMahon & Watson, 2008, p. 4). The fact that the GCBC™ provides children with an opportunity to experience career content, to reflect on learning which has taken place, and to apply new skills learned, constitutes a practical intervention which can build the supportive cognitive structures required for later career decision making. In the career development phase of childhood these include: becoming concerned about one's future as a worker; increasing personal control over one's career activities; forming conceptions about how to make educational and career choices; and acquiring the confidence to make and implement these career choices (Savickas, 2002). Each of these career skills are associated with the Growth stage of career development proposed by Super (1990) and they provided key foci for the development of the GCBC™.

The present research also responded to policy makers' call for evidence based and research driven practices. This is particularly relevant in the South African context where education policy (particularly policy statements relating to career education) and curriculum (i.e., the orientation of learners to the world of work) have largely remained two separate entities. This prompted the present research to identify a means of closing the gap between policy and practice. As described throughout the thesis but particularly in the program development chapter (i.e., Chapter 6), the research base for the GCBC™ not only provided insight into the career content deemed relevant to childhood samples, the program itself was subjected to numerous stages of preliminary testing (i.e., pilot study), validation (i.e., testing the reading level of the career content provided in the program and the workbook), trialling (GCBC™ fieldwork), and formal measurement (i.e., pre- and post-test assessments). The combination of these stages contributes to the GCBC™ being viewed as an evidence based program which now, through the present research findings, has provided the first set of baseline information.

Examples of career development learning programs that target the developmental stage of childhood are limited internationally and in the South African context. Consequently the significance of developing the GCBC™ as an intentional career learning program specifically for elementary school learners is thus reinforced. During the developmental stage of Growth (Super, 1990; Super et al., 1996) children are expected to develop a future orientation and consequently '*becoming concerned about the future*' (Savickas, 2002, 2005) is one of the tasks which needed to be translated into a research based activity with sufficient reference to age appropriate developmental considerations. The construct of career awareness best describes the career developmental skill needed during these formative years and a number of the GCBC™ learning activities attempted to broaden children's understanding of the world of work. Career awareness

can be viewed as a foundational skill needed to ensure adequate career development throughout subsequent developmental stages (including career decision-making) (see for instance, Beale, 2000, 2003; Magnuson and Starr, 2000; Schultheiss, 2005; Starr, 1996).

The GCBC™ is thus ideally positioned to answer the call made for programs to facilitate the development of career exploration and awareness to begin before high school (see, for example, Gallavan, 2003; Gysbers et al., 2008; Harkins, 2000; McMahon & Carroll, 1999). The call to include career awareness programs during the elementary school years is justified considering the impact which limited career information can have on future career decision-making. It is believed that the GCBC™ as an intentional career learning experience for eight to ten year old children is well positioned as a computer-based tool which can facilitate the development of age appropriate career skills.

Another key lesson learned from the present research, and addressed by the GCBC™, is that the implementation of career learning programs does not have to come at the expense of academic learning (Mekinda, 2012). Put differently, career programs should not be seen as an add-on to mainstream academic learning (which will most likely result in it being largely ignored) but should rather be the common theme that ties together existing curriculum foci (i.e., literacy, numeracy, and life skills). This view is supported by Peterson et al. (1991, p. 64) who suggested that career learning programs must be moved "from a peripheral role as an enrichment activity to a central role as a required element of the curriculum." The GCBC™ was developed with a clear and precise goal, namely to provide educators and practitioners with a research-based career intervention to bridge the gap between theory, research and practice. As evident in Chapter 6 much thought was given to both the content and design features of the GCBC™. Each of the learning activities selected aimed to provide a means of translating theory into age

appropriate career awareness activities, yet it was in linking the career activities with existing curriculum content where the benefit of the program was most identified by experienced educators. The present research results have demonstrated that career development learning can coexist in the curriculum with other fields in complementary ways, for example, reading and career development learning. The research findings further suggest that learning outcomes that are desirable for children generally are able to be achieved through career development learning (for example, improving literacy skills through career themed stories; increasing the development of social skills through collaboration between children in a career learning activity; to name but a few).

Finally, the GCBC™ represents a computer-based career learning experience aimed at facilitating the development of age appropriate career skills during developmental ages where no similar type of program exists. Considering the novelty of the computer-based program, there is a need to acknowledge that the GCBC™ should be viewed as a pilot program that will need to be further developed in the light of the present research findings and the recommendations proposed. However, the research results provide much support for using ICT as a viable means to effectively present career development learning programs to elementary school children.

Limitations

Three specific limitations which directly impacted on the research have been identified. They include limitations imposed by the assessment measures utilised (including a focus on the assessment process itself), fieldwork restrictions, and the limitations evident in the GCBC™ program itself. Each of these limitations is described below.

Assessment Measures

One of the concerns of the present research has centred on the primary instruments used to measure career development learning in eight to ten year old learners, namely, the CCDS and the RCAS. The measures were selected because they broadly centred on aspects of children's career development and awareness, yet they lacked a specific focus on children's career development learning. These assessment concerns are identified and described next.

As has already been described earlier, the quantitative research results revealed somewhat conflicting findings. Subsequently three possible explanations could be offered in terms of understanding the research findings. The first concern was the possibility that the data collected from both the CCDS and the RCAS do not provide an adequate measure of career development learning for eight- to ten year old learners. Secondly, it also was plausible that both the CCDS and the RCAS are limited in their ability to measure career development with children of this age and therefore there is a need to be cautious when drawing conclusions regarding the effectiveness of the GCBC™ program. This is especially true when one considers the inconsistent findings of the CCDS and the RCAS results. Specifically, the CCDS results indicated no statistically significant variation between the control and experimental groups while the RCAS results confirmed statistically significant variation between the groups following program exposure (i.e., with the experimental group indicating greater levels of career awareness). The third concern was that it is also possible that the GCBC™ is not an appropriate career development learning program and would need revision before it can be successfully implemented with children.

In light of the research findings (which include the qualitative results presented in Chapter 9) it can be concluded that the CCDS results appear to contradict both the RCAS results

and the qualitative data which confirm the benefit of the GCBC™ program. In view of these latter findings the most likely conclusion that can be drawn is that the data collected from the CCDS may not provide an adequate measure of career development for this particular group of eight- to ten year old learners. According to its authors (Stead & Schultheiss, 2003), the CCDS has yet to be standardised for use with 8-year-old children for the South African population. However, the CCDS has been deemed a valid descriptive tool for use with older South African children (Schultheiss & Stead, 2010) even though norms have yet to be established. Another limitation of this measure, according to Schultheiss and Stead (2004), is its self-report response format. The authors point out that the self-perceptions of children may not be consistent with the perceptions of others involved in the child's life such as teachers and parents (Stead & Schultheiss, 2003). While the present results do not currently support the CCDS as a reliable data collection tool for evaluating the effectiveness of career learning programs for eight- to ten year old children, it should be noted that with minor adjustments it could be a valuable instrument for this specific type of assessment.

Developmentally children are expected to master increasingly complex sets of information (Piaget, 1970, 1977; Erikson, 1985); however, it needs to be acknowledged that a single measure cannot effectively be used across a broad age range without having age specific norms. Another concern regarding assessment during childhood, generally, is that few instruments exist that can reliably and validly measure children on a variable across the various ages and stages of development (Strickland, 2005) such as in the case of career development learning. Usually, a different measurement tool is required for children at each stage of development and, according to Strickland, scores often do not have equitable meaning across

various developmental stages. Each of these considerations can possibly provide an answer for the inconsistent results found between the CCDS and the RCAS.

Immediately following the data collection during the post-test fieldwork, the researcher requested feedback from the research team regarding their perception of the CCDS and the RCAS. The most pertinent comments have been extracted from the feedback sheets with the CCDS viewed as "*a difficult measure to use with the eight year olds*" (Research Assistant 3). "*The children seemed to get bored near the end of the measure, especially with all the questions that talk about 'planning'*" (Research Assistant 7). Some research assistants also indicated that it was their view that the children responded in a predictable fashion, for example, they felt that the children picked the 'Strongly Agree' response on most of the questions (i.e., seeing that it appeared to be the most appropriate answer). Despite all attempts[17] made to address these inherent administration issues, it is inevitable that some of the responses captured do not accurately reflect children's career development and career awareness as measured on the CCDS and the RCAS. The researcher believes that the information gained from the research assistants provide food for thought considering that, without the interview format followed in the pre- and post-test assessments, this information might not have been noted.

The RCAS also presented challenges considering that the measure was developed to collect information on children's career awareness. Although the RCAS results indicated that the GCBC™ program impacted on children's career awareness, it is recommended that its application to the field of measurement (in particular the measurement of career development learning) needs to be carefully considered. Similar to the CCDS, a number of the questions of the

[17] During the training of the research assistants, as well as on the day of testing, the research assistants were instructed to stop the assessment of children in cases like these and to first re-establish the purpose of the assessment (i.e., "this is not a test" and "we are just interested to find out how you view these questions").

RCAS were found to be "confusing [for] the learners" (Research Assistant 1). For example, although questions four (i.e., *who could influence you toward or away from choosing jobs?*) and five (i.e., *what could influence you toward or away from choosing jobs?*) present learners with two different questions, many of the children struggled to differentiate between what was required as a response to each of these questions.

One way to address the most pertinent concerns highlighted above is to consider ways in which the CCDS and the RCAS can be adapted to suit the needs of an even younger sample of children (i.e., eight years and younger). Research indicates that elementary school children are indeed shaping ideas about their positive career selves (Beale, 2000; Magnuson & Starr, 2000; Trice & McClellan, 1994; Trice & Rush, 1995), yet, measuring career development during these early years cannot take place unless more is done to adapt existing measures to suit the needs of children. Specifically, elementary school educators can be more actively involved in the development or revision of assessment measures targeting career development in childhood (especially children younger than nine years). It is believed that such efforts can move us closer to age appropriate evidence-based instruments which can effectively be used during the developmental stage of childhood.

Pre- and Post-Test Assessments as Unintentional Career Learning

Although not formally explored, the researcher is of the opinion that the data collection procedure itself contributed to children's career development learning. When the RCAS pre- and post-test results were analysed it was particularly interesting to note the increases evident for both groups between the two assessment periods, especially as no formal career intervention was provided to the children of the control group. The researcher believes that the pre-test assessments (for both the CCDS and the RCAS) may well have contributed to these changes

seeing that the questions posed in the assessment measures could have acted as catalysts in stimulating children to think about themselves in relation to future careers.

Both the CCDS and the RCAS may possibly have influenced the results through making children more aware of careers which might have remained unexplored without participation in the assessment. Therefore the assessment procedures themselves could be regarded as a form of unintentional career learning which could impact on the test results. This is evident in the fact that on a number of questions there was an improvement in the scores for the RCAS, although the changes were considerably greater for the experimental group. Similarly, despite the limitations noted for the CCDS, change was evident although not statistically so. Consequently it is believed that if change was found on such a young sample of participants in the present study, perhaps there would have been more significant change in an older sample.

Fieldwork Restrictions

The fieldwork restrictions identified as part of the limitations of the current research refer to the limited time which was available to conduct the GCBC™ program in the relevant school. In addition, the duration of the intervention and the limited time between the pre and post-test may have been insufficient to record significant differences. In retrospect, the rollout of the GCBC™ program to the experimental group may well have spanned a three week period rather than the one week as employed in the present research. These concerns were also noted by the educators present during the fieldwork who recommended that the program should be more gradually paced to ensure that effective processing of the various learning activities takes place between sessions. These comments were all considered and have been acknowledged as a recommendation which will significantly improve the effectiveness and the impact of the GCBC™ on children's career development learning.

Furthermore, as mentioned in Chapter 6, certain compromises needed to be made in the fieldwork stage due to the limited time available. It is anticipated that if the GCBC™ program is implemented over a longer period (thereby reducing the amount of information covered during each session), children would be able to significantly benefit from this. Extending the duration of the program would also allow more time for each of the learning activities and for exploring each of the career characters. This should have a positive impact on the learning which can be attained through processing the activity more comprehensively. Thus, additional time (i.e., time exposed to the learning content) and adequate processing of the activities (i.e., through questioning, reflecting, and further clarifying) are seen as prerequisites for increasing the effectiveness of this career learning program.

Program Limitations

It is also important to consider potential pitfalls of the GCBC™ program itself and to acknowledge the impact of some of the design concerns identified in Chapter 6. The computer program had a number of technical glitches which were unfortunately caused by the limited experience of the researcher in computer programming (i.e., writing in Actionscript 3.0). These concerns were noted and will be addressed in subsequent revisions of the GCBC™ program. Despite these glitches, the delivery of GCBC was unimpeded.

Related to the fieldwork restrictions (i.e., the limited time available to conduct the research), the GCBC™ program itself (as it was presented during the fieldwork phase) did not allow adequate time to reflect between the learning sessions. It was suggested by the educators that children did not have sufficient time to reflect on the learning activities and consequently that the children missed a number of opportunities to assimilate the information learned. Some of these recommendations and steps to rectify initial concerns have already been mentioned in the

fieldwork restrictions. However, it should be acknowledged that a number of these recommendations can be accommodated within the computer programming of the GCBC™ (i.e., providing more opportunities for the children to reflect on learning through an introduced activity). This, in turn, would assist the facilitator to better management the time dedicated to achieve each of the GCBC™ learning goals.

Recommendations

A number of recommendations are provided which arise from the findings of the present research as well as the information overviewed in the theory and research reviews. A distinction has been made between recommendations proposed for future research and those offered to improve the GCBC™ program as an intentional career learning experience. Specifically, five recommendations are provided and these are described next.

Recommendations Proposed for Future Research

The first recommendation is that there is a need for continued research into evidence based practices that facilitate career development learning in children, such as the GCBC™. One of the goals of the present research was to provide an example of how career theory, research, and practice into children's career development could be integrated in an intentional career learning program. Although the research was limited to eight to ten year old learners, important insights have been gained which provide research support for the integration of learning experiences as part of formal schooling. However, '*one swallow does not a summer make*' and similarly, one research study cannot provide a comprehensive understanding of how these elements can best be integrated into children's career development.

Secondly, considering that the focus of children's career research has been on identifying behaviour but not on researching the recursive nature of influences and processes on such

behaviour (Watson & McMahon, 2005) there is a need to broaden our understanding of these critical influences during childhood. For example, most research focuses on where children are at particular developmental ages but not how they got there nor how they are changing. The present research only focused on eight to ten-year old children and is a cross-sectional study. Ironically the present research contradicts the present research recommendation offered in that there is a need for longitudinal research to better understand the various influences that contribute to children's career development learning. There is also a need to reconsider how longitudinal research can be conducted in a more efficient and cost effective ways to encourage researchers to choose this method of data collection. This is especially relevant considering that longitudinal studies can provide an opportunity to track and evaluate the relevance of predominant theoretical constructs on children's career development. For example, future research could use a longitudinal design to follow the natural progression of reasoning about careers beginning in preschool and extending through high school (Howard & Walsh, 2011).

The third recommendation offered from the present research is the need for more intensive research into evidence-based intentional career learning programs. Seeing that career development activities can help children learn about the range of careers available, the skills required by various careers, and the pathways needed to enter those careers, research into relevant career learning programs could provide the foundation children need to think in increasingly complex ways about career choice and career attainment (Howard & Walsh, 2011). Although this is more commonly accepted, there is still a pressing need for future research to investigate whether exposure to career development activities in elementary school does in fact facilitate changes in levels of career reasoning. In line with the previous call for longitudinal research, the attainment of this research recommendation can only be achieved through an

approach tracking the development of learners from the start of formal schooling through subsequent years of growth and decision-making. If implemented, these recommendations could greatly assist in better understanding children's career development and could move the field closer to a more comprehensive and cohesive approach in career theory, research, and practice.

Recommendations Proposed to Improve the GCBC™ Program

While the present research results reflected positive support for the GCBC™ as an evidence based program, there are several recommendations emanating from the results which can be considered for subsequent revision of the program. Each of these recommendations as proposed by the researcher, educators, and children involved in the present research are described.

The first of these recommendations considers the role of the GCBC™ in relation to the development of career-related skills and the conditions under which interventions are most effective. From the information reviewed in the present research it is clear that career learning programs can and should be designed for children across a broad age range; however, the GCBC™ was designed for use with eight to ten year old learners. As the program currently stands, it is age specific and it requires follow-up support from career learning programs during subsequent years of schooling. It would be necessary to consider expanding the GCBC™ to include older and younger age groups in order to provide further program support for the development of age appropriate career skills during these years. Career development is an ongoing process that begins in childhood and continues through adolescence and into adulthood. Research suggests that career programs can engage and address children and adolescents' needs at various stages along the pathway from school to careers. Similar to The Real Game Series (Barry, 2001; Barry, 2007) (i.e., an example of a career program offered to different age groups),

the GCBC™ needs to be adapted to suit the developmental needs of individuals as they progress from an elementary and limited understanding of careers to the complex and intensive skills needed during the career-decision making stages encountered later.

The second recommendation offered to improve the GCBC™ program considers factors that can mediate the effectiveness of the GCBC™ and limit its impact on children's career development learning. The developmental level of children affects their ability to interact with digital technology as a means to satisfy their career information needs. Therefore, the principles of child development and learning that inform developmentally appropriate practice must be considered when designing digital environments for the very young (Cooper, 2005). The feedback received from the two educators present during the GCBC™ fieldwork provided much needed insight into what changes could be considered during subsequent revisions of the program. These comments have already been considered in Chapter 9 but are revisited here as a means of formalising the research recommendations.

For example, the GCBC™ could consider a pause function where the program could be stopped if necessary. This would also allow the facilitator to better manage the children's attention throughout the various GCBC™ activities which was a concern noted by the Grade 3 educator. More thought should also be given to the instructions that accompany the completion of GCBC™ activities as well as the homework exercises. One of the educators specifically recommended that these actions should be taken so that the full benefit of the program is achieved with children. In addition, an educator who is familiar with a class and trained in teaching may be in a better position to do this than a researcher who does not have teacher training. However, it is recommended that GCBC™ facilitators have an appropriate background in career development.

In terms of improvement to the program content, the educators provided valuable recommendations that can further improve the relevance of the GCBC™ as an intentional career learning experience, specifically relating to including videos of children and the way they view careers. These recommendations have been described in Chapter 9. Seeing that the present GCBC™ is recognised as a first version of a computer-based intentional career learning experience, these recommendations can be relatively easily integrated into subsequent revisions of the program.

The last of the recommendations focused more on how to improve the impact of the GCBC™ in the lives of children. Here it has been noted that the program would be easier and more beneficial to complete over a longer period (for example, ranging between 10 to 21 days). The rationale provided for extending the GCBC™ contact sessions focuses on the fact that the extra time would encourage greater assimilation of the content to be learned. The limited time available for the fieldwork has been duly noted in the limitations of the present research. These recommendations provide clear direction for subsequent development of the GCBC™. It is believed that the integration of these types of experiential learning activities could greatly contribute to the effectiveness of the GCBC™ as a meaningful career learning experience.

In comparison to other fields of study, the career development of children significantly lags behind in breadth and depth in research and theory. It is therefore hoped that the results of the present study will stimulate continued research in the field in order to facilitate the development of suitable career interventions at learning institutions across South Africa. It is believed that the integration of these proposed recommendations will greatly contribute to the effectiveness of the GCBC™ as a meaningful career learning experience.

Final words

Although some may argue that the elementary school years may be too early to think and learn about the world of work and to begin the process of establishing a career identity, the present research suggests otherwise. In concluding this chapter, and the research as a whole, the present researcher wishes to leave the reader with several key ideas and statements to encourage thinking and open avenues for further research and development in the field of children's career development learning.

Firstly, the lack of intentional career learning programs is often based on the assumption that children are entirely disconnected from the working world; however, early to late childhood may be the ideal time for career exploration because it is a developmental stage that is absent of the burden of making an immediate commitment (Porfeli & Lee, 2012). The results presented in the present research clearly support the relevance of intentional career learning experiences in the developmental phase of childhood.

Secondly, increasing the availability of intentional career learning experiences for children remains a significant challenge (Watson & McMahon, 2007). Despite the existence of theoretical frameworks, to date these have had little impact in practice on the provision of intentional career development learning programs, especially for children. Continued and more intensive research support is needed if this deficit in the field is to be overcome. McMahon and Watson (2008, p. 78) made a valid observation of career development research that focuses on children when they stated that:

> There is a sense of déjà vu when reading the invited contributors' comments on children's career development research because they introduce a research agenda with a long-standing history. This raises the question of why historically identified

issues related to children's career research remain essentially the same issues today.

From the findings of the present research it is clear that the journey of discovery of children's career development learning is only just beginning and we as researchers, program developers, teachers, and policy-makers have to consider interdisciplinary collaboration, not as a benefit to curriculum development and implementation, but rather as a prerequisite for the design and development of age appropriate career learning experiences. Framing learning experiences in terms of career exploration and development may also help to keep children engaged in learning (Hynes, 2012). It is believed that the present research is a step in the right direction; yet it is acknowledged that the GCBC™ as an evidence based program will need to continually consider and accommodate feedback, in order to further refine and strengthen the program.

Finally, to be deemed an age appropriate career learning experience for children we must always consider that the program itself (such as in the case of the GCBC™) must be enjoyed by children. Clearly the GCBC™ was able to successfully combine career learning content in a format deemed exciting and educational which is probably best illustrated in the words of the research participants themselves. I would thus conclude this thesis with the following words of a child from the experimental group who said *"can we do it next week again please?"* (Line 216, Boy 1).

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APPENDICES

APPENDIX 1: BIOGRAPHICAL QUESTIONNAIRE AND CONSENT FORM

THE UNIVERSITY OF QUEENSLAND

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

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SECTION 1: BIOGRAPHICAL QUESTIONNAIRE

Learner Information				
Name & Surname of Child		Age		
School		Gender	Male	Female
Grade				
Language Preference				
Parental Information				
Father's Name & Surname				
Occupation				
Highest Qualification (e.g. Gr. 12, Nat Dipl in Photography etc.)				
Mother's Name & Surname				
Occupation				
Highest Qualification (e.g. Gr. 12, Nat Dipl in Photography etc.)				
Address				

Awareness of Careers					
Has your child expressed an interest in a particular occupation during the last year?				**YES**	**NO**
If yes, what occupation?					
What career aspirations do you have for your child?					
Does your child have access to a computer at school				**YES**	**NO**
Does your child have access to a computer at home				**YES**	**NO**
I would rate my child's ability to use a computer as:	**1**	**2**	**3**	**4**	**5**
	Poor	***Below Average***	***Average***	***Above Average***	***Skilled***

SECTION 2: CONSENT FORM

I have read the Project Information Statement for Parents/Guardians explaining the purpose of the research project and have discussed it with my child. I understand that:

- My child's participation will involve participating in a two assessment sessions, and if part of the experimental group five in class lessons and possibly an interview.
- Participation is voluntary and my child is able to decline to participate and may withdraw from the study at any time without penalty.
- I have discussed participation in this research with my child, and he/she has agreed to participate.
- All information obtained will be treated in strictest confidence and that no names will be used in any written reports about the study.
- Student's information will not be revealed to parents and parents' information will not be revealed to students.
- I can call Mr Ewald Crause on 084 941 3203, Prof Watson on 041 504 2354 or Dr Mary McMahon on 61 7 3365 6511 for more information about the study, or the University of Queensland's Ethics Officer on 3365 3924 if I have any concerns about the ethical conduct of the study.
- A summary report will be made available to the school

I _____ give permission for my child to participate in the project.

Parent/guardian's signature: _____ Date: _____

If not parent, then please describe the legal authority for consent:

_____

Witness: _____ (Name) _____ (Signature) _____ (Date)

APPENDIX 2: SEMI-STRUCTURED INTERVIEW

Growing-Up: Children Building Careers™ - Focus Group Discussion

(A Dictaphone will be used to record the responses from the eight participants)

1. **What did you learn about careers?**

   _____

   _____

2. **What did you enjoy the most about Growing-Up: Children Building Careers?**

   _____

   _____

3. **What did you enjoy least about GCBC™?**

   _____

   _____

4. **What is most memorable for you about what you have done in GCBC™?**

   _____

   _____

5. **What did you learn about making career decisions one day?**

   _____

   _____

6. **What did you learn about what you need to find out before you make a career decision?**

   _____

   _____

7. **I would like you to tell me what you learned on each island you visited last week?**

   Notuyoung Island

   _____

   Cape of Careers

   _____

   Who-Am-I Island

   _____

   Practise Mountain

Treasure Island

8. **Tell me what you enjoyed about the workbook/homework exercises?**

9. **Tell me what you didn't enjoy about the workbook/homework exercises?**

10. **How do you think other children might benefit from doing this program?**

11. **Tell me a little about your experience of completing the assessments before and after GCBC™? Did you enjoy these assessments? Were you able to understand all the questions?**

12. **What did you find easy to learn in GCBC™?**

13. **What did you find hard to understand in GCBC™?**

14. **Is there anything else that you would like to still tell me about what you learned in GCBC™?**

APPENDIX 3: EDUCATOR FEEDBACK FORM

Growing-Up: Children Building Careers™: Educator Feedback

---

1. What are your thoughts on including technology and computer-based learning programs, such as Growing-Up: Children Building Careers™ in the classroom?

   _____

   _____

2. What do you think the children have learned?

   _____

   _____

3. How does the learning from GCBC™ complement what you are doing in the classroom?

   _____

   _____

4. How important do you think this learning has been for the children and why?

   _____

   _____

5. What do you regard as some of the positive attributes of GCBC™?

   _____

   _____

6. What do you regard as some of the potential pitfalls of GCBC™?

   _____

   _____

7. What would you potentially include in a learning program on careers specifically designed for 8 to 10 year old learners?

_____

_____

8. Tell me about any feedback that you might have received from your class after completing GCBC™?

_____

_____

9. Tell me about any feedback that you might have received from your class after completing the various GCBC™ workbook exercises?

_____

_____

10. Tell me about any feedback that you might have received from your class during the assessment phase (pre-test and post-test assessments)?

_____

_____

11. Do you have any additional comments that you would like to add or that you feel the researcher should improve on?

_____

_____

APPENDIX 4: NMMU ETHICAL APPROVAL TO CONDUCT RESEARCH

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Chairperson of the Research Ethics Committee (Human)
NMMU
Tel . +27 (0)41 504-2538 Fax. +27 (0)41 504-2778

Ref: [H10-HEA-PSY-007/Approval]

Contact person: Mrs U Spies

7 February 2011

Prof M Watson
NMMU
Department of Psychology
Faculty of Health Sciences

Dear Prof Watson

THE EFFECTS OF USING A COMPUTER-BASED EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT

Your above-entitled application for ethics approval served at the Research Ethics Committee (Human).

We take pleasure in informing you that the application was approved by the Committee.

The ethics clearance reference number is **H10-HEA-PSY-007**, and is valid for three years. Please inform the REC-H, via your faculty representative, if any changes (particularly in the methodology) occur during this time. An annual affirmation to the effect that the protocols in use are still those for which approval was granted, will be required from you. You will be reminded timeously of this responsibility, and will receive the necessary documentation well in advance of any deadline.

We wish you well with the project. Please inform your co-investigators of the outcome, and convey our best wishes.

Yours sincerely

Dr B Pretorius
Chairperson: Research Ethics Committee (Human)

cc: Department of Research Capacity Development
Faculty Officer, Faculty of Health Sciences

APPENDIX 5: THE UNIVERSITY OF QUEENSLAND ETHICAL APPROVAL

THE UNIVERSITY OF QUEENSLAND
Institutional Approval Form For Experiments On Humans Including Behavioural Research

Chief Investigator:	Dr Mary McMahon
Project Title:	The Effects Of Using A Computer-Based Exploration Tool On Children's Career Development
Supervisor:	None
Co-Investigator(s)	Prof Mark Watson, Mr Ewald Crause
Department(s):	School of Education; Department of Psychology, Nelson Mandela Metropolitan University, South Africa
Project Number:	2011000510
Granting Agency/Degree:	
Duration:	31st December 2014

Comments:

Expedited review - low risk.

Please insert corresponding contact details of the local ethics committee (eg, NMMU) into the Participant Information Sheet, if appropriate.

Name of responsible Committee:-
Behavioural & Social Sciences Ethical Review Committee
This project complies with the provisions contained in the *National Statement on Ethical Conduct in Human Research* and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:-
Associate Professor John McLean
Chairperson
Behavioural & Social Sciences Ethical Review Committee

Date 29/4/2011 Signature

APPENDIX 6: REQUEST TO CONDUCT RESEARCH IN SCHOOLS

THE UNIVERSITY OF QUEENSLAND

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• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Nelson Mandela Metropolitan University
for tomorrow

Att: Dr A.T. Wyngaard
The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000

24 August 2011

REQUEST PERMISSION TO CONDUCT RESEARCH IN SCHOOLS

Dear Dr. Wyngaard

My name is Ewald Crause, and I am a Doctoral student at the Nelson Mandela Metropolitan University (NMMU) in Port Elizabeth. The research I wish to conduct for my Doctoral thesis involves designing and developing a computer-based career exploration program for eight to ten year old South African learners. The study aims to evaluate the effectiveness of this program in enhancing children's career development by exploring and describing any changes in children's career development following exposure to the planned career intervention. This project will be conducted under the supervision of Professor M.B. Watson (NMMU, South Africa) and Dr. M. McMahon (The University of Queensland, Australia).

I am hereby seeking your consent to approach two of the English medium schools (primary schools) in the Southern Cape to provide participants for this project. Since the career intervention is computer based the selected schools should have a classroom with a fully functional interactive whiteboard and a minimum of 75 learners between the ages of 8 to 10 years old (Grade 3-4 learners). The two schools that have been identified as possible target schools are Milkwood Primary (Circuit 2) and Holy Cross Primary (Circuit 3).

I will provide you with a digital copy of my thesis proposal which includes information on the measure to be used in the research process, as well as a copy of the approval letter which I received from the NMMU Research Ethics Committee (Human). If permission is granted to conduct the research, I will seek further consent from the District Circuit Managers involved, the SGBs of the school, the school principal, and the parents and learners identified as potential participants.

In addition, this study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. You are of course, free to discuss your participation in this study with project staff (contactable on 61 7 33656511). If you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Officer on 617 3365 3924.

Upon completion of the study, I undertake to provide the Department of Education with a digital copy of the full research report. If you require any further information, please do not hesitate to contact me on ewaldcrause@mtnloaded.co.za or on 084 941 3203. Thank you for your time and consideration in this matter.

Yours sincerely,

Ewald Crause
Registered Psychologist
Research Co-ordinator

Prof. M. B. Watson
Supervisor
Nelson Mandela Metropolitan University

Dr. M. McMahon
Co-Supervisor
The University of Queensland, Australia

APPENDIX 7: RESEARCH APPROVAL LETTER - WCED

WESTERN CAPE
Education Department
Provincial Government of the Western Cape

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tel: +27 021 476 9272
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Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20110825-0056
ENQUIRIES: Dr A T Wyngaard

Mr Ewald Crause
Faculty of Health Sciences
Department of Psychology
Nelson Mandela Metropolitan University

Dear Mr Ewald Crause

RESEARCH PROPOSAL: THE EFFECTS OF USING A COMPUTER-BASED EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **01 September 2011 till 30 September 2011 and 18 January 2012 till 30 March 2012**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

    The Director: Research Services
    Western Cape Education Department
    Private Bag X9114
    CAPE TOWN
    8000

We wish you success in your research.

Kind regards.
Signed: Audrey T Wyngaard
for: **HEAD: EDUCATION**
DATE: 26 August 2011

APPENDIX 8: INFORMATION LETTER TO SCHOOL GOVERNING BODY

THE UNIVERSITY OF QUEENSLAND

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Nelson Mandela Metropolitan University
for tomorrow

REQUEST FOR PERMISSION FROM SGB TO CONDUCT RESEARCH IN SCHOOLS

RESEARCH PROJECT

I hereby apply for approval to collect data in your school.

I am a Registered Counselling Psychologist and busy with doctoral studies through the Nelson Mandela Metropolitan University. My field of study is Children's Career Development. The title of my thesis is THE EFFECT OF USING A COMPUTER-BASED CAREER EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT LEARNING.

The WCED approved my request to collect data for this project at three primary schools in the Southern Cape region of which your school is one. The reason why your school has been selected is the fact that the learner profile at your school conforms to that proposed by the inclusion criteria of the research proposal. The research requires that the schools selected should have: at least 75 learners between the ages of eight to ten years old (Grades 3 – 4), a fully functioning computer lab, and a classroom with an interactive whiteboard. The participants must be between the ages of eight to ten years old and should have English as their mother tongue.

Once participation has been confirmed, a baseline assessment of children's career development will be done (i.e., 2 pre-test questionnaires). Hereafter the schools will be allocated as either the control or experimental sample. The learners of the experimental group will be exposed to five 45 min -75min sessions of the career exploration program. The learners of the control group continue with their normal academic program. Once the baseline information is collected and captured, and the experimental group has completed the career exploration tool, the researcher will conclude the formal assessment by completing the post-test evaluation (i.e., 2 post-test questionnaires). This would happen not more than one to two weeks after exposure to the career intervention.

Following the above procedure, the researcher will select eight learners from the experimental group and conduct a focus group discussion. The facilitator (using the semi-structured interview protocol) will guide this discussion with responses of learners recorded on a Dictaphone. This then concludes the fieldwork phase of the research.

It is believed that this computer-based career intervention tool could significantly enhance the readiness of children to successfully negotiate the identified early developmental tasks of children's career development as proposed by current research. The career intervention aims to bridge the gap between human and career development theory, and between education and guidance policy and practice in eight to ten-year old children through the development of this intervention.

This study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. You are of course, free to discuss your participation in this study with project staff (contactable on 61 7 33985670). If you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Officer on 3365 3924.

The research will not harm the participants, participation is of a voluntary nature, and information obtained will be treated as strictly confidential. Children will be fully informed about the research and that they have the option to withdraw at any time. Once the research is completed, the learners of the control group will have the option of completing the career intervention if they request to do so.

Your participation in this study is sincerely valued and appreciated.

Kind regards

Ewald Crause
Registered Psychologist
Research Co-ordinator

Prof. M. B. Watson
Supervisor
Nelson Mandela Metropolitan University

Dr. M. McMahon
Co-Supervisor
The University of Queensland, Australia

APPENDIX 9: SCHOOL GOVERNING BODY CONSENT FORM

THE UNIVERSITY OF QUEENSLAND

Nelson Mandela Metropolitan University
for tomorrow

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Principal and/or SGB Consent Form

I give consent for you to invite the Principal, teachers and students from Years 2 - 4 to participate in the Influences on THE EFFECT OF USING A COMPUTER-BASED CAREER EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT LEARNING Project.

I have read the Project Information Statement explaining the purpose of the research project and understand that:

- The role of the school is voluntary
- The School may withdraw the its participation at any time without penalty
- Students in years 3 – 4 will be invited to participate and that permission will be sought from them and also from their parents.
- Only students who consent and whose parents consent will participate in the project
- All information obtained will be treated in strictest confidence.
- The names of the children will not be used and individual children will not be identifiable in any written reports about the study.
- The school will not be identifiable in any written reports about the study.
- Participants may withdraw from the study at any time without penalty.
- A report of the findings will be made available to the school and the SGB.
- I may seek further information on the project from
  Ewald Crause – Researcher (Counselling Psychologist): 084 941 3203
  Prof Mark Watson – Supervisor (NMMU): 041 504 2354
  Dr Mary McMahon – Supervisor 61 7 3365 6511 or The University of Queensland's Ethics Officer 61 7 3365 3924

_____ _____

Principal Signature

_____

Date

Please return to: Ewald Crause, Department of Psychology, PO Box 77000 • Nelson Mandela Metropolitan University

APPENDIX 10: LETTER OF CONFIRMATION TO SCHOOL ONE

THE UNIVERSITY OF QUEENSLAND

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Nelson Mandela Metropolitan University
for tomorrow

LETTER OF CONFIRMATION TO SCHOOLS

Dear Mrs. _____

Thank you for agreeing to take part in our study, which focuses on the development of a research-based computerised career exploration tool, *Growing-up: Children Building Careers™ (GCBC)™*, that can be used for early intervention in children's career development.

We confirm that we will be visiting your school on the 19th of January between 08:00 and 13:00 and again on the 1nd of February between 08:00 and 13:00. This is the pre- and post-test data collection dates.
The GCBC will be presented for 5 consecutive days from 23 to 27 January as per the arranged times.
The focus group discussion with eight of your learners have been scheduled for the 3rd of February. Time to be finalized. This concludes the fieldwork at your school.

Please find attached the *Biographical Questionnaire* and *Parents' Consent Form*. We would appreciate it if these forms are returned to the school prior to our visit.

Findings of the study will be submitted to you and the parents at your request.

We look forward to working with you on this project.

Yours sincerely

Ewald Crause
Registered Psychologist
Research Co-ordinator

Prof. M. B. Watson
Supervisor
Nelson Mandela Metropolitan University

Dr. M. McMahon
Co-Supervisor
The University of Queensland, Australia

APPENDIX 11: LETTER OF CONFIRMATION TO SCHOOL TWO

THE UNIVERSITY OF QUEENSLAND

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Nelson Mandela Metropolitan University
for tomorrow

LETTER OF CONFIRMATION TO SCHOOLS

Dear Mr. _____

Thank you for agreeing to take part in our study, which focuses on the development of a research-based computerised career exploration tool, *Growing-up: Children Building Careers™ (GCBC)™*, that can be used for early intervention in children's career development.

We confirm that we will be visiting your school on the 20th of January between 08:00 and 13:00 and again on the 2nd of February between 08:00 and 13:00.

Please find attached the *Biographical Questionnaire* and *Parents' Consent Form*. We would appreciate it if these forms are returned to the school prior to our visit.

Findings of the study will be submitted to you and the parents at your request. Your school has been selected as the control group, however, if you are interested we can arrange for the participants selected from your school to participate in the GCBC™ once the research has been completed.

We look forward to working with you on this project.

Yours sincerely

Ewald Crause
Registered Psychologist
Research Co-ordinator

Prof. M. B. Watson
Supervisor
Nelson Mandela Metropolitan University

Dr. M. McMahon
Co-Supervisor
The University of Queensland, Australia

APPENDIX 12: INFORMATION LETTER TO PARENTS AND GUARDIANS

THE UNIVERSITY OF QUEENSLAND

• PO Box 77000 • Nelson Mandela Metropolitan University
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Nelson Mandela Metropolitan University
for tomorrow

Parent/Guardian Information Statement

REQUEST PERMISSION FROM PARENTS TO CONDUCT RESEARCH WITH LEARNERS FROM THE GRADE 2 – 4 CLASSES

RESEARCH PROJECT

I hereby apply for parental consent for your child's participation in the abovementioned research.

I am a Registered Counselling Psychologist and busy with doctoral studies through the Nelson Mandela Metropolitan University. My field of study is Children's Career Development. The title of my thesis is THE EFFECT OF USING A COMPUTER-BASED CAREER EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT LEARNING.

The Western Cape Education Department (WCED) approved my request to collect data for this project at three primary schools in the Southern Cape region, one of which is the school where your child is attending. The reason why this particular school has been selected is the fact that it meets the criteria for inclusion as identified in the research proposal (e.g. being primary school with a fully functioning computer lab and where the learners are English proficient.

In phase 1, children will be asked a number of questions to gauge their level of awareness relating to careers. Hereafter the two schools selected will divide into a control and experimental sample where the researcher will run the various activities (age appropriate computer activities where children can learn more about themselves and careers). Once the five sessions have been completed, the researcher will conclude the formal assessment by again asking the learners a couple of questions relating to their awareness of careers.

It is believed that this computer-based career intervention tool could significantly enhance the readiness of children to successfully negotiate the identified early developmental tasks of children's career development as proposed by current research.

The research will not harm the participants, participation is of a voluntary nature, and information obtained will be treated as strictly confidential. Children will be fully informed about the research and that they have the option to withdraw at any time.

This study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. You are of course, free to discuss your participation in this study with project staff (contactable on 61 7 33985670). If you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Officer on 3365 3924.

Your participation in this study is sincerely valued and appreciated.

Kind regards

Ewald Crause
Registered Psychologist
Research Co-ordinator

Prof. M. B. Watson
Supervisor
Nelson Mandela Metropolitan University

Dr. M. McMahon
Co-Supervisor
The University of Queensland, Australia

APPENDIX 13: INFORMATION PROVIDED TO CHILDREN IN CLASS

THE UNIVERSITY OF QUEENSLAND

Nelson Mandela Metropolitan University
for tomorrow

• PO Box 77000 • Nelson Mandela Metropolitan University • Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

Consent Form for Child Participants

THE EFFECT OF USING A COMPUTER-BASED CAREER EXPLORATION TOOL ON CHILDREN'S CAREER DEVELOPMENT LEARNING

Explanation of the Study (What will happen to me in this study?)

If I agree to take part in the activity, I will have the opportunity to learn more about the many jobs that adults do and also learn a little more about myself (for example, what are some of the things that I enjoy, etc). I will receive lots of help while I am busy with the different lessons because the lessons are all on the computer in our school's computer lab and an adult will make sure that I know what I have to do. But before I can start learning about the different jobs I will be asked a couple of questions just to find out what I already know.

Benefits of Participating in the Study (Can anything good happen to me?)

I can learn more about myself, about the many jobs out there and the way that I make decisions.

I have read the Project Information Statement for Participants explaining the purpose of the research project and I understand that:

- If I am selected I will participate in an interview.
- My participation is voluntary.
- I may withdraw from the study at any time without penalty.
- I have discussed the project with may parents/guardians,
- Children's information will not be provided to parents and parents' information will not be provided to children.
- My name will not be used when any reports are written.
- A summary report will be made available to the school.

Contact Information (Who can I talk to about the study?)

Ewald Crause – Researcher (Counselling Psychologist): 084 941 3203
Prof Mark Watson – Supervisor (NMMU): 041 504 2354
Dr Mary McMahon – Supervisor 61 7 3365 6511 or The University of Queensland's Ethics Officer 61 7 3365 3924

Voluntary Participation (What if I do not want to do this?)

You are free to decide if you want to take part in the activities or not. You can stop at any time if you so choose.

APPENDIX 14: MAIN CHARACTER SUMMARY: JONAS

General Introduction of the Character

Hello there! My name is Jonas. I come from Notuyoung Island. The house where I live is just outside a big city on the island.

General characteristics

I'd like to tell you a bit more about myself so that you can get to know me a little better. I like to get to know new friends all the time. Do you? I also love playing outside with all my friends. Playing soccer is one of my favourite things ever. When I score goals I get really excited! I love it when my team wins, especially when we play for a prize. The other day I was chosen as the captain of my soccer team at school and my Dad said his company would give us new soccer shirts. Our soccer shirts are going to be green. One of my favourite colours is green, but I also like bright colours like red and orange. What are your favourite colours?

Family and Home

I'd like to introduce you to my family now, because they are the most important people in my life. Our family is very close and I'm lucky to have both my grandparents living with me. I have two sisters who are much older than I am. They are already married and they live with their own families in the town where I was born. You see, I was not born on Notuyoung Island. My family only moved here about two years ago when I was 7yrs old. When we moved to the island, my grandparents decided to come with us, because my

parents could look after them. I like spending time with my grandparents when my mom and dad are at work all day. My grandpa lets me have friends over and takes us to the soccer field down the road where they have a lots of green grass and goals with nets and everything! Grandma makes yummy biscuits and cakes for tea every Friday, but she also makes me eat all my veggies. She says it will make me stronger and fitter on the soccer field. I hope she's right, because I really don't like spinach – but I do eat a lot of it!

My Dad says we moved to Notuyoung Island because his company gave him a very good job here. My Dad's company builds houses, offices and even bridges all around the city. When our family moved here two years ago, my mom didn't have a job, but now she has her own housecleaning business. She has five ladies who work with her. They go into people's houses like a swarm of busy cleaning bees and they leave all the rooms clean and shiny! The weekends at my house are the best, because then the whole family is together. We play games and laugh a lot.

A day at school

Every morning of the week, my grandpa walks me to the bus stop around the corner from our house and makes sure that I catch the school bus in time. My school is not too far from our house, but it's a bit too far to walk there. My mom says that when I'm older I can maybe ride to school on my bike. That will be nice! When I get to school in the mornings I meet with my friends on the soccer field where we play five-a-side soccer for 15 minutes before the bell rings. I wish one day the bell wouldn't ring – then we could play for the whole morning! But going to class is actually a lot of fun too. I've got a lot of friends in my class this year and the teacher lets us work together in groups. There are boys *and* girls in my class and this year I was chosen as the class captain for the boys. My teacher says that I will make a good captain because I can be

responsible and strong without having to bully anybody. My favourite subject at school is physical education, because we learn about all kinds of sports like gymnastics, cricket, basketball and my favourite: soccer! We also learn about how the muscles of the body work together and how to stay fit and healthy. That's also why I like biology, because we learn about how the body works. I don't like science that much except when we do experiments in groups. That's exciting! I'm pretty good at English and Geography, but my dad says I must work harder at Mathematics if I want to be a good soccer coach one day. He says that Maths teaches your brain how to think better about game plans and strategy. I hope he is right! I still want to see how learning my times-tables will help me score better goals!

Systems of influence

The town where I was born is much smaller than the city on Notuyoung Island where my parents go to work every day. I am glad we moved to the island because where I come from we had no big sports fields or good soccer teams. If I had stayed in my place of birth I would never have thought of becoming a soccer coach, which is what I'd like to become one day. My mom says I can be anything I want to be. She says if I work hard enough then any of my dreams can come true. My dad also says that, but he always says I'll have to study further before I can be a good soccer coach. He says that he never got the chance to go to university and he wants me to go. He also says that soccer teams need managers these days - managers who know lots about business and how to deal with people. So he says I must go and learn about that kind of stuff when I finish school. My grandpa was a soccer coach when he was young, but he says that things have changed so much since his day. He says that coaching has become very scientific. Back in his day there also wasn't so much money paid to the players. I like the idea of making a lot of money one day because I've seen the houses my dad has built for his wealthy clients. I also want

a big house where my friends and family can come and stay all the time. My one older sister says I should study to become a doctor, because then I can go and help people in the town where I was born. She says there are many people who need medical help but not enough doctors there. I'm not sure about that though, because I'm scared of needles and my grandma says that doctors study for many, many years.

APPENDIX 15: MAIN CHARACTER SUMMARY: LING-LING

General Introduction of the Character

Hi there! My name is Ling-Ling and I live in a part of town where there are lots of beautiful homes with green gardens all around us. O yes, the house where I live is on Notuyoung Island!

General characteristics

Hi it's me Ling-Ling. Remember me? It's time to tell you more about myself. I haven't lived on Notuyoung Island all my life. The place where I was born is quite far from Notuyoung Island and we didn't speak English all the time there. So now I have to learn how to speak English a bit better. Luckily I love learning new languages. Actually I love learning about all kinds of things. Our whole family loves learning. For fun my family often visits interesting places like the zoo, the museum and the local library. I learn and discover new things every time we go there. My favourite dessert is ice cream and chocolate sauce, but I also like chocolate cake. What's your favourite?

Family and Home

If you don't mind, I'd like to tell you a bit more about my family. My mother and father are very loving, but very strict parents. They always give us everything we need, but they expect us to work hard at school and to not be naughty. My family came to Notuyoung Island two years ago to open our family's restaurant. The restaurant makes all the nice food we used to eat back in my

home country. My mother and father work together at the restaurant and sometimes they let me help in the kitchen over weekends. I have three older brothers and one younger sister, who I love very much. Unfortunately my two oldest brothers still live back in my home country, because they have not yet finished their studies at university there. My parents said that their education was very important. My eldest brother is in his last year of studying to become an accountant, while the second one is becoming a doctor. They are both really clever and I'm so proud of them. The youngest of my three brothers is at school with me here on the island. My little sister is still in nursery school. Every afternoon when my brother and I come home from school, we have a lot of chores to do around the house. After that my parents help us with our homework before they go to work in the restaurant for the night. Our babysitter comes at 5 in the afternoon and helps me and my brother with our learning of English. Her name is Cindy and she has really helped me read and speak better English. We are only allowed 30 minutes of television after supper and then I go and read in bed, while my brother practices piano. Some of my friends say I read too much, but I love it. I have hundreds of books in my room and I like them even more than toys. What is your favourite thing to do for fun?

A day at school

My school day begins before breakfast. Yes, you heard me. When all my friends are still fast asleep, my mother wakes me up to do extra mathematics exercises and English spelling tests. My mother says that a person's brain learns better early in the morning than late at night and I think she is right. After breakfast my father drives my brother and I to school on his way to gym. Before the first class at school starts, I meet my best friend Wendy under the big tree near the science lab. We like to tell each other about the books we read the night before and she sometimes brings her iPod for us to listen to music while we talk. Every Monday, Tuesday and

Thursday of the week my first class of the day is science, which is also my most favourite subject ever. Our teacher wears a beautiful white coat to protect her clothing from any chemicals or flames that we use during experiments. I've been getting better and better results for my science tests because I'm now starting to really understand the English textbook we're using. My teacher says that I could be top of the class soon, because I'm always so curious to learn more. Maths and biology are also subjects that I really look forward to because they're so very interesting, but English class is sometimes still confusing. The grammar rules we learn about in English are so different from my own language that I get things badly mixed up sometimes. "I've just got to keep working hard", is what my parents tell me. Then I'll do better. During breaks I like to meet with Wendy at the library. Wendy's parents also expect her to do extra work and reading, so it's nice to talk to her. We often take out books on strange topics that we've never heard about. Sometimes we really laugh at the big words and strange pictures we find in those books. What kind of books do you like to read?

Systems of influence

My science teacher, Ms. Smith, once told me about a profession called archaeology. She said that people who become archaeologists work for long hours to discover old bones, skeletons and stuff like pots and cave drawings that have been there for like hundreds and thousands of years. Ms. Smith says that I make her think of an archaeologist because I always like to discover new things and because I'm so curious. She also said that scientists can do a lot of different things, but that they always have to be curious - like discoverers exploring new lands. I think I'd like to be a science teacher like Ms. Smith. She looks so pretty in her white coat and she knows so much about *everything*! My father says I will not make enough money as a science teacher and that I should rather become a scientist who makes medicine and that kind of stuff. I'd like to find out

about the different kinds of scientists there are before I decide. My mother used to be a teacher in my home country and she loved her work. She says I must decide for myself. My friend Wendy says she wants to be a doctor one day, just like my older brother. Doctors also wear white coats, but I've never really liked hospitals very much. I think it's because when I was very young I had to go to hospital a lot. I like to learn about a lot of different things, so choosing just one career is going to be difficult. My oldest brothers said I should become a journalist, because they always have to go to lots of different places to find out interesting facts about those places or the people that live there. I'll have to get better in English for that, because you have to write well to be a good journalist. I also want to see many other places in the world, because coming to Notuyoung Island has been so exciting – and I would never have learnt so much if I had not travelled here.

APPENDIX 16: MAIN CHARACTER SUMMARY: MARK

General Introduction of the Character

Hello friend! My name is Mark. I live on a beautiful farm where there is a lot of space to play and run around. The farm is on Notuyoung Island.

General characteristics

Hi there again! It's me Mark. I'm the one who lives on the farm. Well, that is where my house is. I live some of the time at my house with my parents, and some of the time at boarding school with other boys and girls. I like home *and* boarding school, but my favourite place to be is on the farm where I get to play outside all day long. I really like to help my Dad on the farm with all the work he does. My favourite is to help him in his workshop and to ride with him on the tractor. I also help my mom in the farm store where I've learnt how to use the cash register, just like my mom can. My favourite animals on the farm are chickens, because their heads go backwards and forwards when they walk. What's your favourite kind of animal?

Family and Home

Now I'd like to tell you about my family. As you already know, I live on a farm and I also go to boarding school. My dad is a farmer, so he's like the boss or manager on the farm. His dad, who is my grandfather, was also a farmer. Being a farmer is hard work. My dad gets up very early in the morning and meets with his workers at the dairy where they begin milking the cows and

examining all the animals for diseases. On weekends I help my dad with the milking of the cows and afterwards we have coffee and rusks in his office next to the barn. My Dad says being a farmer is just like running a business these days. He first went to university to learn about engineering and building, but then when grandpa died my dad decided to come and work on our family farm. My mom also went to university to learn about business and advertising. That is where my parents met each other. My Dad says my mom is really clever with business stuff – even cleverer than he is! Because my mom is such a good business woman she has opened up a shop on the farm. She sells food, clothing, cleaning products, and all kinds of stuff to all the people who come to our farm. My mom's shop is where I learnt about working with money and giving the right change to customers. That is so much fun, especially when I get some money for my hard work. My grandma also lives with us on the farm and she says I know a lot more about numbers and money than she did when she was my age. I also have a little sister who is two years old, but she's too you to play with me outside.

A day at school

Boarding school is a lot of fun, but living close to the city is very different from being on the farm. There's more noise closer to the city, but also more friends to meet and different kinds of places to go. When I'm at school I get up really early, but luckily I'm used to that because of life on the farm. I get dressed, and then I wash my face. After that all the boarding school children eat breakfast in a big dining hall together, and then we get ready to go to school. On Mondays and Tuesdays we start the school day with one of my favourite subjects, which is Mathematics. Sitting in class is almost like helping mom at the farm store, because we count, add, subtract, divide and do all kinds of stuff with numbers. It's a lot of fun because I'm quite good at it. On Wednesdays and Thursdays we have one of my other favourite classes which is woodwork. In

woodwork I get to spend time in the school's workshop, which feels almost like Dad's workshop only there are many more machines and tools to work with. We make things like small chairs, tables and wooden frames for pictures. On Friday we have art class where I love to work with clay, paints and big sheets of paper. I'm not very artistic like my good friend Siviwe, but I'm quite good at making small farm animals with clay and building miniature houses with cardboard. After school we have lunch back at the boarding house and then we go to the sports fields. I quite enjoy playing tennis in the afternoons. Sometimes after school one of my favourite teachers lets me and my friends help her in the school's vegetable garden. I love digging in the ground and planting new seeds that grow into big plants. Have you ever worked in a vegetable garden?

Systems of influence

Because I've grown up on a farm I like to be outside more than being inside. Even when I was very little I would go out with my dad to see that everything was going ok with the orchards and wheat fields. Driving on the tractor with my dad was so much fun and he taught me all about how the engine works. When I was old enough, my Dad even showed me how to change the tractors gears and how to check the engine oil. In my Dad's workshop my Dad taught me how to use all kinds of tools. If I don't work on my Dad's farm with him one day I'd like to fix cars or learn more about electrical stuff. That will be cool! I think I would like that because I once even helped my dad fix my mom's radio, which was really interesting. My mom says that I must also study business like she did, because I can make a lot of money and because she likes working with me in her shop. But the shop can be a bit boring sometimes, because you have to be inside all the time. I like to be outside a lot! My woodwork teacher told me that he was really proud of me for working so carefully and neatly on the picture frames that we made in class. He said I'm

really good at working with my hands. My uncle is an architect, which means he designs and builds beautiful buildings and houses. I once went to his work where they were building a very big house. That was really cool, because I saw how the builders put the roof on top of the house – just like I've done with cardboard. My uncle says I should rather become an engineer, because I am very careful with my hands and because I like to figure out how stuff like machines, radios and engines work. I think the best job for me will be one that lets me be outside more than inside. Being inside all the time can be so boring!

APPENDIX 17: MAIN CHARACTER SUMMARY: MARY

General Introduction of the Character

Good day! My name is Mary and I live on Notuyoung Island. I live in a city where there are lots of big, tall buildings, shops and malls.

General characteristics

Hellooo! You probably remember, but my name is Mary and I'm the one who lives in the city with all the tall buildings, shops and malls. I love living there, because over weekends, when I'm not visiting my dad, I go with my mom to the mall where she works in the week. But we don't go there for work. We go for fun, fun, and fun. Nothing is more fun for me than walking around the beautiful shops and buying cool stuff, or just window shopping. The best is when my mom lets me bring my friends with me to the mall! We often watch movies and have milkshakes afterwards. My friends say I am very caring and I think it's true. When I visit my Dad every second weekend I like using his paints and brushes to paint pictures. Do you like painting?

Family and Home

If you've got some time I'd like to tell you a bit more about my family now. My mom says I'm like the princess in our family, because everybody treats me like one. I can't say that I really mind that! I am after all the only girl in the family... except for my mom of course. But she's

more like the queen of the family. My mom and I live together in a high-rise apartment block in the city. We have a really nice view of the city park with all its tall trees and green grass. It makes a really pretty picture. As I said before, I like going shopping at the mall with my mom and friends over weekends. My mom is a sales person at a store in the mall. She loves her job and she's always dressed so nicely when she goes to work. My mom says I've got the right kind of personality for her of job because I also like people as much as she does.

My mom and dad are divorced so every second weekend I go and stay with my dad at his house just outside the city. I like it there too, because there is a beautiful river with an enchanted forest right next to his house. I have found some really amazing flowers, twigs, and mushrooms in the forest. I like to paint pictures of the things I collect in the forest. My dad helps me paint nicely in his studio. You see my dad is a professional artist who paints and makes big sculptures. I am a whole fifteen years younger than my older brother who is 24 years old. Even though he's much older than me we are really close to each other. He has a girlfriend now so we don't see him at my mom's house as much as we used to. He's also really busy at work. His job takes him all over world. I'd love to travel to other places in the world one day. There must be so much to see and so many friends to make when you travel. Have you ever travelled to other countries?

A day at school

If you're like me then you probably don't really like Monday mornings after a fun weekend of shopping or playing with your friends. But when I get to school on Monday mornings I'm always happy because the day starts with my two favourite subjects – English and Art. My first period in the morning is English with Ms. Daniels. She's my favourite teacher and I love the poems and stories we read in her class. She knows so much about all kinds of stuff. She's really clever and speaks in really big words that I don't even know how to spell yet. Ms. Daniels says

I've got a real talent for writing, because I always get good marks for the stories and essays we have to write in class. The second period on a Monday is art class and by then I'm excited about the day ahead. My art teacher is Mr. Mbuli and he's the second best artist ever! My dad is the best of course, but Mr. Mbuli is also really talented. Mr. Mbuli is teaching us how to paint people's faces and I'm trying to paint my older brother's face. I'm going to give him the painting for his birthday next month if it looks nice. I love my school because I have lots and lots of friends there and the teachers are really friendly. At break time I have lunch with my friends around the school fountain. It's a really pretty fountain with a big dolphin sculpture jumping out of the water. The only yucky part of school is mathematics. I'm just not any good at numbers and that kind of stuff. My dad says that I must keep trying hard in maths, but even he didn't do so well at it when he was at school. My mom does help me with my homework, which helps a lot. I don't do much sport at school, but I am in the hiking club that goes on trips to places all over Notuyoung Island. That's really fun. Have you ever gone hiking?

Systems of influence

One day I'd love travel to many different countries all over the world, just like my brother does. My mom says his job is really stressful with long hours of lots of busyness. She says that if I want my own children one day I'll have to get a job like hers. I do want children because they are so cute, but I don't want to work inside all day long. That's boring. I know I said that I like shops and malls, but then I also like to be outside where I can see pretty things and discover stuff. My dad says I've got the talent to become an artist, but that I won't get rich quickly. I don't mind being poor, because my friends have got really rich parents and not all of them love the jobs that they do. I want my job to be something that I love. My friend Rachel says that she doesn't want to work because her husband one day will make the money. My mom says that's

not a good idea because girls and women must also have jobs and do something with their talents. My brother's girlfriend is a journalist who writes about stuff for magazines and newspapers. If I don't become an artist like my dad I will maybe write stories and books. One of my favourite books is *Harry Potter* and Mom says the lady who wrote those books made a lot of money from writing them. When I spoke to my brother on the phone the other day, he said that I must first travel all over the world before I decide what I want to become one day. He says there are so many new kinds of jobs that I've never even heard of. Ms. Daniels agrees with my brother, but she says that I must definitely do something that lets me be creative with my talents. I think she's right.

APPENDIX 18: CAREER CHARACTER SUMMARY - 1

Introduction

My name is Kevin and I am a Chef. Chefs are responsible for the planning, preparation and presentation of food in restaurants and hotels. Chefs have a lot of work to do but it is important to keep in mind that not all of the work is with food. Because I work in a busy kitchen I have to also manage other chefs and make sure that the food that we make are of the highest quality.

About my work…

To be a Chef there are a few things that you must know:

Chefs must:

- like to prepare different kinds of food
- make food taste and look good
- have a good sense of taste and smell
- always be clean and tidy (information adapted from Pace Career Centre , 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Cooking elements: A stove, an oven, and a microwave. We have to make sure that the foods we make are cooked just right. Nobody likes food that is burnt or not cooked properly. So knowing your methods of cooking is very important. In the kitchen I mostly use a stove, an oven, and a microwave, just like this one.

Seasoning : Aah, this I use to make the food I prepare taste really good. I often use salt, pepper and lots of spices. To make sure that I use just the right amount of seasoning and spices I often have to taste the food. Yummy.

Utensils : This is a whisk and a pot. When I make food I use lots of different utensils including a whisk to mix all the ingredients of a recipe together.

Recipe : As a chef I make a lot of food. And sometimes I forget the ingredients of a dish. Therefore I always follow the recipe. A recipe is a list of ingredients and step by step instructions of making a dish.

Blender : This is a blender. I use this for mixing all kinds of ingredients that I use in my recipes.

Cutting Board and a Knife: One of the most important tools in my kitchen is my knife and a cutting board. I have to be very careful when cutting meat and vegetables because the knife I use is very sharp and you can easily hurt yourself.

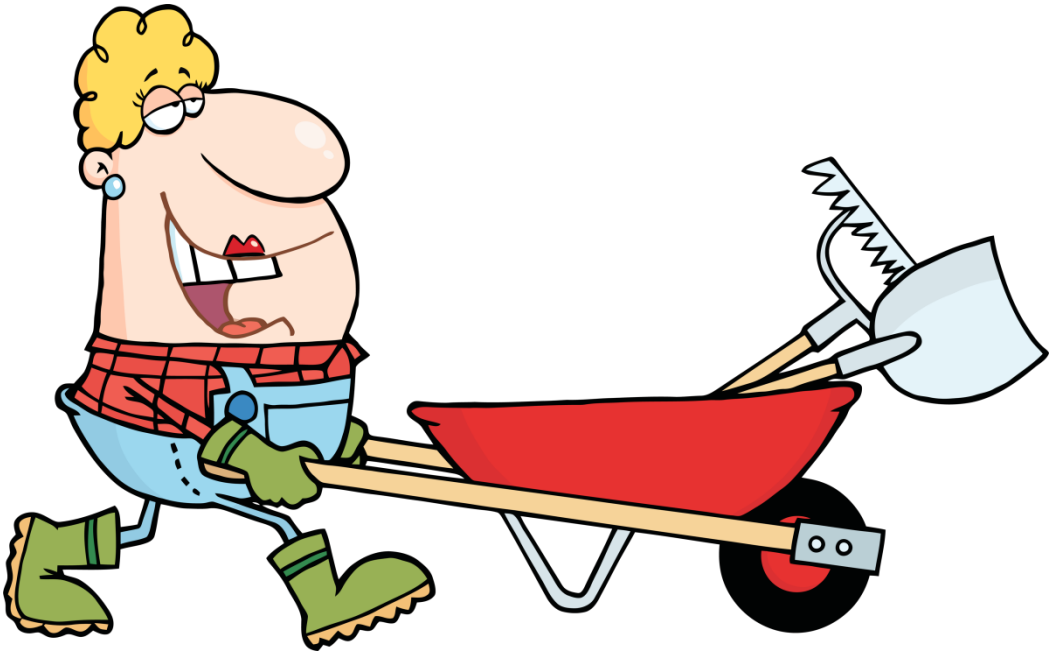
Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Chef? Two subjects that really helped me were English and Mathematics. In my kitchen I have to communicate well with my staff and customers and that is why English helped me. Mathematics was important because all my recipes require me to work with numbers. Oh I must remember, the cake I am making needs 5ml Vanilla Essence, 250 ml of milk, I need a cup of flour, and what else, Oops I forgot, I will have to go back to the recipe. The cake has to be perfect because my friend Cameron is coming to take a couple of pictures of my masterpiece. In the meantime, see if you can remember all the things I use in my kitchen.

Career Coding

Realistic

APPENDIX 19: CAREER CHARACTER SUMMARY - 2



Introduction

Hi there. My name is Jules and I am a Farmer. You all know what a farmer does hey? You don't? Well, let me tell you. As a farmer I work with almost all kinds of animals, crops, fruits and vegetables that you see in your supermarket. Farmers combine farming and business methods to ensure that they can successfully sell their products from the farm to the supermarket where you can buy them.

About my work…

To be a Farmer there are a few things that you must know.

A farmer should:

- enjoy working outdoors, in all weather conditions
- like working with plants and animals

- work very hard and have patience

- be able to work well with tools (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Windmill ***:*** As you might know, water is very important in farming. Whether you are farming with animals or crops they all need water. And some farms don't have enough water therefore I use a windmill to pump water from deep underground into small dams which I can then use as I need.

Irrigation/Watering system: Once the water has been pumped into the small dams on my farm I have to get the water to where it is needed. Just like you use a watering can to take water from the tap to the plants in your house I use something very similar but just a whole lot bigger. Farms can be very big and you need a lot of water.

Tractor ***:*** The first thing I have to do is prepare the field where I want to plant my seeds. I farm with animals and vegetables and both need room to grow. But when I want to plant my vegetable seeds I need to plough the field so that it is easier to plant the seeds. This is where I use my trusty old tractor.

Pitchfork ***:*** My animals eat a lot of hay. I feed them hay every single day and use my pitchfork to make sure that every animal camp has just enough hay.

Wheelbarrow ***:*** Farming is hard work. And sometimes you have to carry heavy things. It is much easier to move things around if I use my wheelbarrow. It really comes in handy.

Seeds ***:*** If I want to produce the best vegetables in the world I need the best seeds in the world. Vegetables come from seeds that we plant in the ground. Then if we give them just the right amount of water and sunlight the seeds grow into beautiful vegetables.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Farmer? Three subjects that really helped me were Mathematics, Science, and Geography. On my farm, Mathematics helps me with many of the things I do on the farm. For example, I have to count the animals, I have to make sure I have enough money to buy seeds and fertilizer, and so forth. The science I learned at school helps me to have a better understanding of living things and how to get the best out of my farm. And off course, Geography helps me to plan my farming activities. So, can you see how important those subjects at school where for me?

Career Coding

Realistic

APPENDIX 20: CAREER CHARACTER SUMMARY - 3

Introduction

Hi there. My name is Fran and I am a Doctor. You all know what a doctor does hey? You don't, well, let me tell you.

As a doctor I examine and diagnose patients, prescribe medicines, perform minor operations and provide different treatments for injuries, diseases and other ailments. So basically, when people do not feel well they can come to me and I'll help them feel better, well, most of the time at least.

About my work…

To be a Doctor there are a few things that you must know.

A doctor must:

- have a strong desire to serve the sick and injured;
- be able to make decisions in emergencies;
- be good at science and mathematics;
- be able and willing to work long hours (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Stethoscope : This is a big word for something that I use to listen to a patient's heart. Our heart is a very important organ and it is the first place where I look and listen if someone is not feeling well.

Medication ***:*** There are lots of medications that can help us feel better if we are sick. However, as a Doctor I must make sure that I prescribe the right ones otherwise you might even feel worse. The medications have big names and I must have a good memory to remember them all.

Patient files : Our health is very important to us. Therefor the doctor will keep notes of all your visits and illnesses and make sure that all the illnesses are treated quickly and to make sure that the best medication is prescribed. All these notes are kept in a file in the Dr's office.

X-Rays : As doctors we need eyes to look inside your body. An X-Ray is an example of these eyes. An X-Ray is a picture of your skeleton and can show me if you have a broken arm or bone.

Heart monitor : This is one of the machines I use in hospital when I want to see how well a patient's heart is doing. It can tell me how fast a heart is beating and many other things that I need to know when treating a patient.

Ambulance : If someone gets very sick and cannot get to the hospital an ambulance will drive out to the patient and bring them to hospital quickly. As soon as they are here I can start working to make them feel better.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Doctor? Two subjects that really helped me were Mathematics and Science. This might sound a little funny! Why would you need Mathematics and Science? Well, the first thing that you should know is that if you want to be a doctor you have to go to University. And to study Medicine at University you need Mathematics and Science. You know, when I think about it, maths helps me on a daily basis because I have to work out how much medication I should give a patient and I have to understand how the medication works and that is where the science comes in. Sounds interesting hey? So enough information from me, see if you can remember all the things I use in my practice.

Career Coding

Investigative

APPENDIX 21: CAREER CHARACTER SUMMARY - 4

Introduction

Hi there. My name is Jonathan and I am a Vet. You all know what a vet does hey? You don't, well, let me tell you. The word 'Vet' is short for a 'Veterinary surgeon'. We diagnose and treat sickness and injury in animals, and we also give advice on the care and breeding of all kinds of animals.

About my work…

To be a Vet there are a few things that you must know.

A Vet should:

- respect and love for animals and have an ability to work with them;
- be able to look for, and find, symptoms that can be treated in animals
- be able to handle small instruments;
- have good vision, hearing, and health (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Exotic Birds : Well, this one is quite interesting. Many people these days own birds as pets. And many of these birds do not occur naturally in our environment; they come from countries all around the world. So I thought I'd show this one to you because this means that you need special knowledge of how to treat these birds.

Microscope : Animals cannot talk like humans do so I have to look for signs and clues in their blood as to what might be a reason for them feeling sick. To do this I use my microscope.

Medication : There are lots of medications that can help animals feel better if they are sick. However, as a vet I must make sure that I prescribe the right ones otherwise they might even feel worse. The medications have big names and I must have a good memory to remember them all.

Safety equipment : Many owners like to take their pets for a stroll and often this is where accidents happen. A big part of my job is to advise animal owners on how to keep animals safe and to provide them with things like leashes or safety equipment. You can imagine how important it is to keep safety in mind when you are working with a sick lion on a game farm.

Vaccination : This is one of the methods we use to prevent animals from getting sick. Just like humans we give animals an injection when they are young which can prevent animals from contracting some of the known illnesses like rabies.

Pets : Veterinarians treat many types of animals: from dogs, cats and farm animals to birds, fish and reptiles. Veterinarians also give general advice to animal owners about vaccinations, animal hygiene, nourishment, and day-to-day care of animals in order to promote animal health.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Vet? Two subjects that really helped me were Mathematics and Science. Just like my friend the doctor working with people, maths and science for a vet might sound a little funny! Why would you need Mathematics and Science when you want to work with animals? Well, the first thing that you should know is that if you want to be a vet you have to study for six years after school. And to study to become a Vet you need Mathematics and Science. When you are older you'll find out more about these subjects so don't be too concerned now. What you should know is that Maths helps me when I have to work out how much medication I should give an animal and Science helps me to understand how the medicine works. What's that, I hear a telephone ringing? It might be Jules phoning from the farm. She's been having trouble with a sick bull on her farm and I said that I will help her. In the meantime, see if you can remember all the things I use in my practice.

Career Coding

Investigative

APPENDIX 22: CAREER CHARACTER SUMMARY - 5

Introduction

Hi there. My name is Michael and I ….am an Artist. You all know what an Artist does hey? You don't, well, let me tell you. Artists express thoughts, feelings and ideas by creating paintings or drawings. We put ideas or images into art, giving special attention to material, colour, line, form and texture. I create a variety of works using various things including paint, pencil, wood, clay, metal or other materials.

About my work…

To be a photographer there are a few things that you must know.

To be an Artist there are a few things that you must know.

An artist should:

- have artistic ability;
- be creative;
- have imagination
- be willing to work hard (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Pencils : Artists use a variety of material when creating their art. I often use the most basic of material, like a simple set of coloured pencils, to create the most beautiful art.

Protective clothing: When I start working with paint it is important to wear protective clothing. Nobody likes it when their new clothing gets paint on and that is why an old shirt or jacket like this can be so valuable.

Palette : A palette is a rigid, flat surface on which I can arrange and mix paint. A palette is usually made of wood, plastic, ceramic, or other hard material, and can vary greatly in size and shape.

Paint : I use different types of paint when I create my art. The two most common are water-based paint and oil-based paint.

Brushes : Paintbrushes are used for applying ink or paint. Paintbrushes are primarily used by artists for painted pictures. A special kind of drawing is the so called paintbrush-drawing, where drawings are done with paintbrushes instead of pencil or pen.

Canvass & Easel : A canvass is used by artists as a painting surface, typically stretched across a wooden frame and an easel supports the canvass for an artist. They are collapsible and overall very slim in stature to fit in small spaces around the studio.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become an Artist? Two subjects that really helped me at school were Visual Art and Languages. When you are older you'll find out more about subjects like Visual Art, but I'll tell you a little about it right now. Visual Art includes drawing, painting, printmaking, mixed media, photography and multimedia. You can see how this subject helped me in becoming an Artist hey? Languages are also important subjects, especially when considering that some artists use words to create their art. For example, they write poems, novels, and some even write songs. But wait, I can't stay here and chat to you. I am painting this picture for my friend Trevor. He works on computers and would like to have a painting for his office. See you later, in the meantime, see if you can remember all the things I use in creating my art.

Career Coding

Artistic

APPENDIX 23: CAREER CHARACTER SUMMARY - 6

Introduction

Hi there. My name is Cameron but most people call me 'Snap'. I am a Photographer. You all know what a Photographer does hey? You don't, well, let me tell you. Photographers use cameras to record people, places, objects and events on film or electronically. A photographer must use different skills to obtain the desired effect. Most photographers use the same basic equipment, but may specialise in a particular area of photography.

About my work…

To be a photographer there are a few things that you must know.

A photographer should:

- be creative and have a great imagination;
- be artistic;
- be patient and accurate;
- be able to make people feel comfortable in front of the camera (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Camera lenses : One of the most important pieces of equipment for any photographer is a good quality lens. Lenses help us to take pictures of subjects that are either very close or very far. Have you heard your parents say 'zoom in zoom in' when taking a family picture? Well it is the lens that enables us to 'zoom in'.

Camera : This is one of the most important pieces of equipment. A good quality camera will ensure good quality photographs.

Flash : Flashes and lighting are a necessity if you are taking photographs in darker areas or at night. I love it when I use my flash!

Batteries : Most cameras are battery operated and not having enough batteries to cover your shoot will land you in hot water!

Memory cards : Most digital cameras function in much the same way as a traditional camera that uses film to record images, except that in place of the film, images are captured and preserved in the camera's digital memory like this removable memory card.

Printer : Digital cameras allow us to transfer photographs to our computer for editing purposes. Today we can print photographs at home right from your studio if you have a good quality computer and printer.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Photographer? Two subjects that really helped me were Visual Art and Mathematics. When you are older you'll

find out more about subjects like Visual Art, but I'll tell you a little about it right now. Visual Art include drawing, painting, printmaking, mixed media, photography and multimedia. You can see how this subject helped me in becoming a photographer hey? Maths is always important because being a photographer means that you must successfully run a business. Lots of numbers and details mean you have to be able to use maths in your thinking. Oops, I completely forgot. Kevin the Chef asked me to take a couple of pictures of a cake he made. That is also part of my job. Let me quickly get my camera and go to his kitchen. Maybe I can help him eat the cake, he he he. Let's hope so. See you later, in the meantime, see if you can remember all the things I use in my photography studio.

Career Coding

Artistic

APPENDIX 24: CAREER CHARACTER SUMMARY - 7

Introduction

Hi there. My name is Jacky and I am a nurse. You all know what a nurse does hey? You don't, well, let me tell you. As a nurse I have to assist people who are ill, injured, or weak and to relieve patients of pain and discomfort. It also involves curing and preventing illnesses in families, communities and individuals. I am responsible for taking patients' blood pressure and temperatures; apply medication and give injections; putting in and removing stitches; and applying and changing dressings on wounds to mention just a few things.

About my work…

To be a Nurse there are a few things that you must know.

A nurse should:

- have a strong desire to help others
- be responsible, dependable, and hard working
- be able to work as part of a team
- work well under pressure (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Medical Equipment: This includes things like a blood pressure monitor, a thermometer, a stethoscope, and the like. These things are used by nurses to collect information on a patient's health status. With the blood pressure monitor we can find out exactly what your blood pressure is. The thermometer is used to determine body temperature and the stethoscope is used to listen to patient's heartbeat and breathing.

Medication : As a nurse I am responsible to make sure that the medication prescribed by the doctor is given exactly as it is intended.

Antiseptic Swabs : In a hospital it is so important to make sure that we prevent bacteria from infecting wounds and or patients. As a precaution I use antiseptic swabs before I give a patient an injection. This cleans the skin and prevents infections from taking place.

Wound dressings : After operations, nurses are responsible to make sure that the wounds are covered and cleaned on a regular basis. Wound dressings can be as simple as a normal plaster but can be very delicate as in the case of someone who suffered a big injury.

Syringe : Don't be scared. Most people are scared of needles but there is no need to be. I give quite a few injections on a daily basis and I use a syringe like this one to do this. Sometimes special medication is needed that cannot be swallowed like pills and then the best way is by means of an injection.

Ointment : This is another form of medicine that we put on the skin and this can also be used to make sure that bacteria don't infect wounds.

Linking school activities with work

Did you know that many of the things I learned at school helped me to become a Nurse? Two subjects that really helped me were Mathematics and Science. There are a few different types of nurses out there. Some go to university and others not. If you want to go to University you need Mathematics and Science. You know, when I think about it, maths helps me on a daily basis because I constantly work with numbers. I have to work out blood pressure, heart rate, weight, and lots more. Science helps me understand how the medication works. Sounds interesting hey? What's that, can you hear the ambulance? Let me run and see if I can help my friend Fran. She is a doctor here at the hospital and we work together. I have to run, in the meantime, see if you can remember all the things I use here at the hospital.

Career Coding

Social

APPENDIX 25: CAREER CHARACTER SUMMARY - 8

Introduction

Hi there. My name is Ron and I am a Teacher. You all must know what a Teacher does hey? You do? O well, I'm going to tell you in any case! A primary school teacher, like me, plays an important role in the lives of young people. What children learn and experience during their early years can determine success or failure in school and work. So to give kids the best possible start to life I teach them how to use mathematics and also how to read and write. Here in my classroom I often use games, music, artwork, books, computers and other tools to teach basic skills.

About my work…

To be a Teacher there are a few things that you must know.

A primary school teacher should:

- have an interest in children;
- be patient, caring and understanding
- set a good example for others to follow;
- be able to speak and write well (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Books : Everything we teach come from books. Books hold a wealth of information and we are so privileged to have all these books. So books are very important to me here at school.

Triangle : A simple triangle like this is used primarily in my maths class. I use tools like this to teach children about geometry. Ha ha ha. Don't worry if you haven't heard about geometry before. When you are older you'll learn more about this.

Backpack : I teach quite a few classes here at school and I often have to travel between classes. My trusty old backpack protects my books and makes it very easy for me to move between my classes.

Prizes and Rewards: Children have to be encouraged and rewarded for work well done. I have a whole bunch of little rewards that I use on a daily basis but once a year we have a big prize giving where children's hard work is recognised and rewarded.

Pencils : If an Artist uses a brush to make Art, a teacher uses his pen/pencil to accomplish his/her teaching goals. We constantly have to practice our writing skills. The more we practice, the more we learn, and the better we get. Pens and pencils are very important.

Experiments : Teachers can use class demonstrations and experiments to help children understand the lessons. This is one of the instruments I use in my science class.

Linking school activities with work

Did you know that many of the things I learned when I was at school helped me to become a Teacher? Two subjects that really helped me were Mathematics and Languages. Although, when you decide that you want to become a teacher you can use any subject at school and you can become a teacher in that field. The reason why I said Maths and Languages helped me was that I use maths and languages on a daily basis. I have to add and subtract marks, I have to calculate percentages and I have to communicate with children and parents all the time. And on that subject of talking to parents, my friend Martin the restaurant manager is bringing his daughter to enrol her for her first year at school. I have to go and meet him. In the meantime, see if you can remember all the things I use here at school.

Career Coding

Social

APPENDIX 26: CAREER CHARACTER SUMMARY - 9

Introduction

Hi there. My name is Sue-Anne and I am an Entrepreneur. You all must know what an Entrepreneur does hey? You don't, well, let me tell you.

Entrepreneurs are people who identify business opportunities and decide to be their own bosses. Entrepreneurs, like me, are found all over the world, from the hawker on the side of the road to the owner of a large corporation who started from a small business in a back room. What all entrepreneurs have in common is that they are making a living through a business over which they have direct control.

About my work…

To be an Entrepreneur there are a few things that you must know.

Entrepreneurs should:

- enjoy a challenge
- have an interest in and knowledge of business
- have good communication skills and understand how people think
- be hard-working, dedicated and determined (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Current News : As an entrepreneur you have to have access to financial news and you also need to know what is happening in your community. This helps you to identify opportunities for business. I read newspapers, listen to the radio, and talk shows to keep me informed on current issues.

Briefcase : Entrepreneurs often travel a lot and to keep my business documents neatly organised I keep them in my briefcase. My briefcase holds my diary, important notes, information on meetings and much much more.

Time : Have you ever heard the saying that 'time is money'? Well, in my case it most certainly is. Because I work for myself I have to be mindful as to how I use my time. Unlike a job where you work for someone else, I have to earn money on a daily basis. The amount of work and effort that I invest in a business will determine how successful that business is. So time cannot be wasted.

Money : In my business I have to work with money on a daily basis. It is important for me to make good business decisions because a bad decision will often cost me a lot of money.

Files : Any business has to keep a record of important documents and I keep these in my files that I store here in my office. This, I would say, is one of the most important things that I do because I can go back to my files and determine if my business is doing well or if I need to do something different.

Telephone : Remember when I said that I am often on the road, my trusty cell phone always accompanies me because even if I am not in my office, I can still do business with a client.

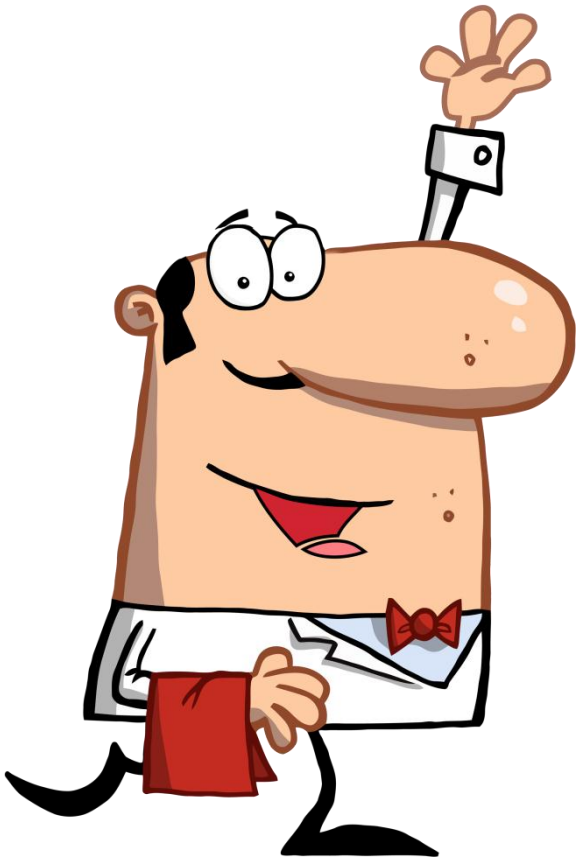
Linking school activities with work

Did you know that many of the things I learned when I was at school helped me to become an Entrepreneur. Two subjects that really helped me were Mathematics and Business Studies. Maths helps me with almost everything that I do in my business. I often have to plan where to spend my money, I have to calculate the risks of starting a new business, and so forth. Business studies, a subject that you will learn about when you are older, helped me to understand the business world better. There are many things that I did in school that helped me create belief in my abilities to start my own business. I was always good at selling things during our flea market days and for some reason children wanted to know what I felt was a 'good deal'. Ha ha ha. The good old days. Oops, look at the time. I have to meet with Trevor, our IT guy here on the island. He has to help me with my computer. In the meantime, see if you can remember all the things I use here in my office.

Career Coding

Enterprising

APPENDIX 27: CAREER CHARACTER SUMMARY - 10



Introduction

Hi there. My name is Martin and I am a Restaurant Manager. You all must know what a Restaurant Manager does hey? You don't, well, let me tell you. Restaurant managers, or general managers, make sure their restaurants make a profit. To make a profit a restaurant must offer food, drinks, and service at prices the public is willing to pay. All restaurant activities are the manager's responsibility. In some small restaurants, like mine, the managers are also the owners and handle the business end of the operation. They buy food and beverages, advertise, and hire staff. They may also greet guests and seat them, serve as cashier, and even cook. This is especially typical of small, family-run restaurants.

About my work…

To be a Restaurant Manager there are a few things that you must know.

A restaurant manager should:

- be able to work well under pressure;
- be able to work with people
- be able to manage staff and motivate employees

- be able to make good business decisions (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Menu : As the owner and manager of this restaurant I have to constantly make decisions as to what items I should put on my menu. It is not as easy as it sounds because as you might know, you cannot please everyone and sometimes customers are difficult.

Customers : Well, if I didn't have customers I would not be able to make a living. And in a small town like ours we have to be very careful in the way we deal with our customers. We must always be friendly and be able to advise them what to order on any particular day if they require our assistance.

Inventory : An inventory is a list of items that I have at my restaurant. I must make sure that I have enough food and beverages all the time and if I see that something is running low I must order in advance.

Money : I work with money all the time here at the restaurant. Firstly, the customers pay for their food with money and then I have to pay our bills and staff with this money. You must be good with numbers.

Food : My speciality! People just love our pizzas and we are extremely proud of the food that we serve.

Beverages : A restaurant requires two things, good food and good drinks. We serve both here and it is my responsibility to select the right beverages for my restaurant.

Linking school activities with work

Did you know that many of the things I learned when I was at school helped me to become a Restaurant Manager? Two subjects that really helped me were Mathematics and Business Studies. In a restaurant it is important to understand how the business of a restaurant works. I have to purchase food, employ staff, pay bills, and all the time collect money from clients who have paid for their meals. Can you see how the subjects helped me? I hope so. O my goodness, I have forgotten. I have a meeting with our accountant, Eugene, here on the island. He will help me with this new financial system that I want to set up here at the restaurant. In the meantime, see if you can remember all the things I use here at my restaurant.

Career Coding

Enterprising

APPENDIX 28: CAREER CHARACTER SUMMARY - 11

Introduction

Hi there. My name is Eugene and I am an Accountant. You all must know what an Accountant does hey? You don't, well, let me tell you. Accountants help to ensure that businesses are run more efficiently, particularly from a financial point of view; and that taxes are paid properly and on time. An accountant's job is to evaluate financial information.

About my work…

To be an Accountant there are a few things that you must know.

An accountant should:

- be very honest
- be good in Mathematics
- be intelligent and able to make sound judgements
- be able to work accurately (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Tax Forms : All businesses have to submit tax forms every single year. But not everyone have the expert knowledge we have and that is why people employ accountants to make sure that everything is submitted correctly.

Authorization : Accountants work with large sums of money and therefore it is important to talk to your client and get authorization or approval for the transaction needed. Our clients must trust us with their money so it is important to be honest.

List of Assets : An inventory is a list of things or equipment that people have at their businesses. These things are called assets. It is good practice for every business to know what they have in their offices and store rooms and we can get an idea by compiling a list of assets.

Calculator : I am quite good with numbers but some of the numbers that I work with is very large and the calculations can be very complex. To do all these calculations I use a calculator.

Case file : Most of my clients come back every single year for assistance and I found it very helpful to have a file for each client. In this file I keep al the information about tax returns and important information on my clients and their businesses. Apart from the information kept on the computer, accountants also keep files with work that they have done for clients.

Diary : A diary like this one helps me stay in control and reminds me of important meetings I have.

Linking school activities with work

Did you know that many of the things I learned when I was at school helped me to become an Accountant? Two subjects that really helped me were Mathematics and Accountancy. You'll learn more about this subject when you are older but just in brief. Mathematics is so important because an Accountant needs a good understanding of numbers and has to make complicated transactions. Maths helps with the numbers and accountancy with the process. Can you see how the subjects helped me? Well, I'm off to see Sue-Anne. She wants to talk to me about a business idea of hers. Hopefully I can help her. It sounded really exciting. In the meantime, see if you can remember all the things I use here in my office.

Career Coding

Conventional

APPENDIX 29: CAREER CHARACTER SUMMARY - 12

Introduction

Hi there. My name is Trevor and I am an IT Technician. IT stands for *Information Technology* and it deals mostly with computers. You all must know what an IT Technician does hey? You don't, well, let me tell you. IT Technicians or computer service technicians are workers who install, diagnose problems, repair, maintain and upgrade a wide variety of computers and equipment.

About my work…

To be an IT Technicians there are a few things that you must know.

An IT Technician should:

- be able to concentrate for long periods;
- be patient and enjoy working with computers
- be able to work accurately
- Have problem solving skills (information adapted from Pace Career Centre, 2009).

Tools of the trade

Now I can show you some of the things that I use here at work. See if you can remember all of them.

Data storage : Computers are wonderful machines that can do a lot of things. But just like humans, computers must be taken care of. To make sure that all the important information never gets lost I often save the information to things like CDs and DVDs.

Networks : IT Technicians are often responsible for creating and maintaining networks at an office. A network is a number of different computers all linked together. This makes it so much easier to communicate with each other. An IT Technician will make sure that all this is in place.

Software installation: Software is also called programmes. Every computer needs a number of programmes so that we can work efficiently. I am responsible to install these programs on all the computers at my client's office**.**

Internet : You must have heard of the Internet before. This is what I use if I need to find out new information or if I want to update software I installed.

Computer : These days there are a number of different computers. You get desktop computers, laptops, notebooks, and you even get cell phones with the capabilities of computers. I use this computer to do most of my work.

Consultant : This is not something that I use but more something that I do. Many people don't have an IT Technicians like me working at their office but they might have many computers. And computers might have problems so they call me here at the office and I try my best to help them.

Linking school activities with work

Did you know that many of the things I learned when I was at school helped me to become an IT Technician. Two subjects that really helped me were Mathematics and Science. Other subjects like Information Technology and Computer Application Technology was also very helpful. You'll learn more about these subjects when you are older but just in brief. Even though you might not believe it, if you want to understand how computers work you must understand mathematics. Science is also quite important because if you want to go and study IT at University you need Science. Can you see how the subjects helped me? Oh oh, I almost forgot. I have to set up a computer network at Cameron's photography studio. He's got a couple of computers he wants to link and I said I would do it for him. Let me run, in the meantime, see if you can remember all the things I use here in my office.

Career Coding

Conventional

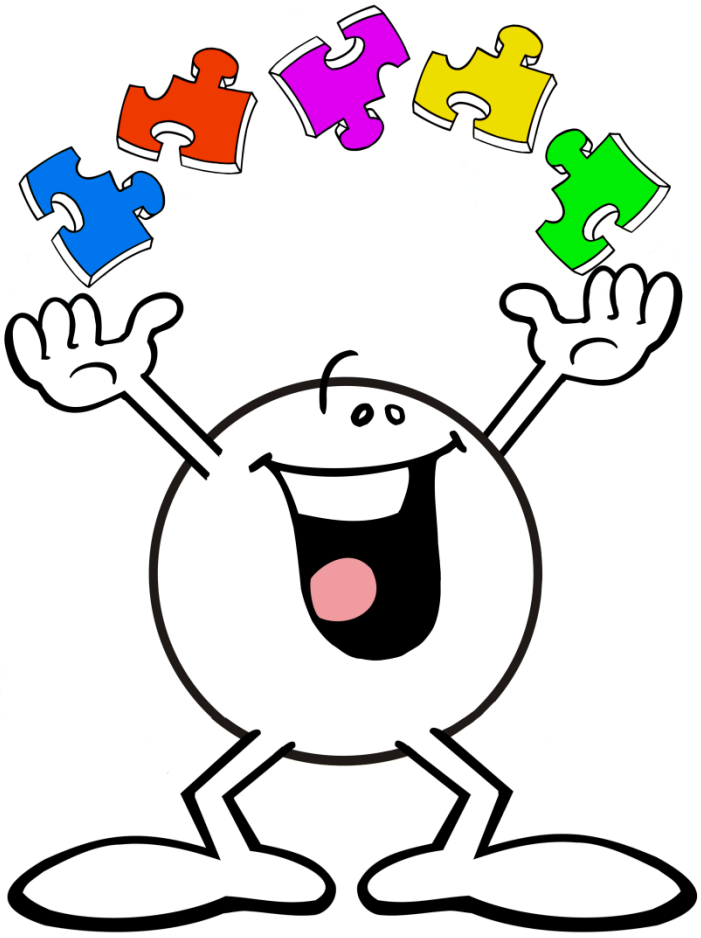
Based on the following career classification

Computer Operator (coded from the O-net database as **C**-R)

Computer User Support Specialists (coded from the O-net database as R-I-**C**)

Network and Computer Systems Administrators (coded from the O-net database as I-R-**C**)

APPENDIX 30: CHARACTER SUMMARY: DOTTY THE MASCOT



Introduction of Dotty

Hi there. I am so excited to meet you. My name is Dotty and I am looking forward to getting to know you better.

It is my *job* to help you and your friends have fun while learning more about yourself. Well, it is a little more than a job. This is my career!

Career? Yes, this is what I do for a living. When we grow up we all have to decide what we want to do or who we want to be. But did you know that there are thousands of jobs out there?

When I think of all the careers out there my head feels a little dizzy because there are just so many. Have you thought about what you want to be when you grow up? ***Put up your hand and tell me what you want to be when you grow up!*** (3min)

That is great. But you know, even if you have no idea that is okay. That makes it exciting because I can help you learn more about yourself and the jobs out there. We can do this together. And can I tell you a secret……I am also learning more about myself and what makes me unique.

So why do you have to learn more about yourself? (Kids get an opportunity to answer this question 5min)

Yes that is right, the better we know ourselves the better we can make decisions. And the better we make decision, the happier we can be. That sounds exciting. Come on, let me show you what we will do together…

Introduction to the Activities

There are 5 activities that we will do. Each of them plays an important part in getting to know more about whom we are and what we enjoy.

Just like pieces of a puzzle fit together to complete a picture, each of these activities will help us better understand who we are!

Let's see if we can collect these 5 pieces before we start building our puzzle…

1. Puzzle Piece 1 will introduce four special kids to you. They live on Notuyoung Island (Pronounced Not-Too-Young Island) and have many stories they want to share with you.

2. When we look for Puzzle Piece 2 we will meet twelve people that have very interesting careers. They will also show you where they work and what they do

3. Puzzle Piece 3 is where we find out more about ourselves and what makes us unique. Here we can also learn about the things that are important to us when making decisions.

4. Puzzle Piece 4 we will find near Practise Mountain and here we will be able to practise what we have learned.

5. And finally, Puzzle Piece 5 is located somewhere on Treasure Island. I do not know why this Island is called Treasure Island but I am sure that with your help we will be able to figure this out.

These puzzle pieces are hidden on 5 different Islands and we will travel to each island to search for them. We have to listen very carefully and pay close attention so that we have the best chance to find each piece

Are you ready to begin…I certainly am!

Follow me and let's find *Puzzle Piece 1*.

I hope you are not scared of water…we will travel between the Islands on my friend's boat.

Let's set the sails and off to sea we go!!!

APPENDIX 31: TEST- RETEST CORRELATION FOR THE CCDS

Control Group: Grade 3 and 4 Subsamples

Table 21

Test- Retest Correlation for the CCDS: Control Group Grade 3 Subsample

	CCDS1b	**CCDS2b**	**CCDS3b**	**CCDS4b**	**CCDS5b**	**CCDS6b**	**CCDS7b**	**CCDS8b**	**CCDSTb**
CCDS1a	0.64								
CCDS2a		0.48							
CCDS3a			0.48						
CCDS4a				0.72					
CCDS5a					0.40				
CCDS6a						0.42			
CCDS7a							0.65		
CCDS8a								0.45	
CCDSTa									0.69

Table 22

Test -Retest Correlation for the CCDS: Control Group Grade 4 Subsample

	CCDS1b	**CCDS2b**	**CCDS3b**	**CCDS4b**	**CCDS5b**	**CCDS6b**	**CCDS7b**	**CCDS8b**	**CCDSTb**
CCDS1a	0.64								
CCDS2a		0.54							
CCDS3a			0.32						
CCDS4a				0.61					
CCDS5a					0.69				
CCDS6a						0.67			
CCDS7a							0.52		
CCDS8a								0.55	
CCDSTa									0.74

APPENDIX 32: CONTROL AND EXPERIMENTAL GROUP COMPARISON: PRE-TEST

Table 23

Pre-Test Differences between Control and Experimental Groups

	Mean	**Mean**	**t-value**	**df**	**p**	**Valid N**	**Valid N**	**SD**	**SD**
	Control	**Exp**				**Control**	**Exp**	**Control**	**Exp**
CCDS1	2.28	2.29	-0.16	144	0.8750	72	74	0.59	0.52
CCDS2	1.71	1.86	-1.38	144	0.1696	72	74	0.63	0.66
CCDS3	1.89	2.07	-1.45	144	0.1484	72	74	0.64	0.80
CCDS4	1.74	1.75	-0.05	144	0.9633	72	74	0.47	0.47
CCDS5	2.06	2.24	-1.44	144	0.1530	72	74	0.71	0.78
CCDS6	1.57	1.66	-0.93	144	0.3537	72	74	0.54	0.57
CCDS7	1.61	1.55	0.81	144	0.4216	72	74	0.38	0.45
CCDS8	1.70	1.75	-0.76	144	0.4471	72	74	0.41	0.48

APPENDIX 33: CONTROL AND EXPERIMENTAL GROUP COMPARISON: POST-TEST

Table 24

Post-Test Differences between Control and Experimental Groups

	Mean Control	Mean Exp	t-value	df	p	Valid N Control	Valid N Exp	SD Control	SD Exp
CCDS1	2.01	2.05	-0.43	144	0.6702	72	74	0.59	0.55
CCDS2	1.70	1.72	-0.17	144	0.8648	72	74	0.53	0.67
CCDS3	1.77	1.76	0.07	144	0.9442	72	74	0.59	0.65
CCDS4	1.67	1.65	0.29	144	0.7718	72	74	0.46	0.43
CCDS5	1.89	2.03	-1.22	144	0.2250	72	74	0.68	0.78
CCDS6	1.70	1.70	-0.04	144	0.9650	72	74	0.67	0.64
CCDS7	1.56	1.52	0.58	144	0.5604	72	74	0.46	0.45
CCDS8	1.66	1.69	-0.45	144	0.6537	72	74	0.45	0.57

APPENDIX 34: GRADE 3 CONTROL AND EXPERIMENTAL GROUP COMPARISON: PRE- AND POST-TEST

Table 25

T-Test Score Summary for Grade 3 Control and Experimental Groups: Pre- and Post-Test

T-tests Grade 3: Pre- and Post-Test									
	Mean Control	**Mean Exp**	**t-value**	**df**	**p**	**Valid N Control**	**Valid N Exp**	**SD Control**	**SD Exp**
PRE									
CCDS1	2.35	2.34	0.04	68	0.9695	34	36	0.65	0.50
CCDS2	1.79	1.71	0.52	68	0.6073	34	36	0.73	0.58
CCDS3	1.93	1.99	-0.39	68	0.6997	34	36	0.58	0.83
CCDS4	1.79	1.82	-0.24	68	0.8086	34	36	0.48	0.51
CCDS5	2.03	2.28	-1.37	68	0.1745	34	36	0.60	0.88
CCDS6	1.52	1.64	-0.95	68	0.3437	34	36	0.45	0.57
CCDS7	1.61	1.59	0.17	68	0.8652	34	36	0.33	0.49
CCDS8	1.69	1.73	-0.32	68	0.7505	34	36	0.36	0.49
POST									
CCDS1	2.15	2.07	0.54	68	0.5878	34	36	0.62	0.57
CCDS2	1.77	1.68	0.69	68	0.4945	34	36	0.59	0.61
CCDS3	1.65	1.75	-0.76	68	0.4477	34	36	0.47	0.57
CCDS4	1.67	1.64	0.35	68	0.7245	34	36	0.44	0.45
CCDS5	1.85	1.92	-0.45	68	0.6551	34	36	0.62	0.69
CCDS6	1.71	1.60	0.82	68	0.4126	34	36	0.69	0.48
CCDS7	1.61	1.56	0.42	68	0.6745	34	36	0.44	0.50
CCDS8	1.70	1.64	0.48	68	0.6297	34	36	0.49	0.52

APPENDIX 35: GRADE 4 CONTROL AND EXPERIMENTAL GROUP COMPARISON: PRE- AND POST-TEST

Table 26

T-Test Score Summary for Grade 4 Control and Experimental Groups: Pre- and Post-Test

T-tests Grade 4: Pre- and Post-Test									
	Mean Control	**Mean Exp**	**t-value**	**df**	**p**	**Valid N Control**	**Valid N Exp**	**SD Control**	**SD Exp**
PRE									
CCDS1	2.21	2.24	-0.24	74	0.8106	38	38	0.54	0.53
CCDS2	1.63	1.99	-2.52	74	0.0140	38	38	0.51	0.72
CCDS3	1.86	2.14	-1.62	74	0.1090	38	38	0.70	0.78
CCDS4	1.70	1.68	0.23	74	0.8186	38	38	0.45	0.42
CCDS5	2.09	2.20	-0.65	74	0.5148	38	38	0.81	0.68
CCDS6	1.62	1.68	-0.43	74	0.6687	38	38	0.61	0.59
CCDS7	1.61	1.52	0.96	74	0.3396	38	38	0.43	0.41
CCDS8	1.70	1.78	-0.74	74	0.4636	38	38	0.46	0.47
POST									
CCDS1	1.88	2.03	-1.17	74	0.2460	38	38	0.55	0.53
CCDS2	1.63	1.75	-0.87	74	0.3879	38	38	0.48	0.73
CCDS3	1.87	1.77	0.61	74	0.5415	38	38	0.67	0.73
CCDS4	1.66	1.66	0.06	74	0.9499	38	38	0.48	0.42
CCDS5	1.91	2.14	-1.22	74	0.2275	38	38	0.74	0.86
CCDS6	1.68	1.80	-0.72	74	0.4728	38	38	0.67	0.76
CCDS7	1.52	1.48	0.43	74	0.6717	38	38	0.47	0.38
CCDS8	1.62	1.75	-1.06	74	0.2906	38	38	0.43	0.61

APPENDIX 36: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 1

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 27

RCAS Question 1 Score Summary: Control and Experimental Groups

	Pre-Test			**Post-Test**		
RCAS01	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	2	9	**11**	4	5	**9**
	2.78%	12.16%	**7.53%**	5.56%	6.76%	**6.16%**
Mentioned 1 career	21	24	**45**	23	17	**40**
	29.17%	32.43%	**30.82%**	31.94%	22.97%	**27.40%**
Mentioned 2 careers	33	32	**65**	33	33	**66**
	45.83%	43.24%	**44.52%**	45.83%	44.59%	**45.21%**
Mentioned 3+ careers	16	9	**25**	12	19	**31**
	22.22%	12.16%	**17.12%**	16.67%	25.68%	**21.23%**
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**6.786664**	**df=4**	**p=.14760**	**Not statistically significant**		
Post-Test	**2.799054**	**df=4**	**p=.59200**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 28

Chi Square Test of Independence for RCAS01 Single Category (i.e., Mentioned 3+ Careers)

Chi-square Test of Independence

	Observed Contingency Table											
Group	Mentioned 3+		Other							Total		
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%
Control	4	6%	68	94%	na		na		na		72	100%
Experimental	12	16%	62	84%	na		na		na		74	100%
Total	16	11%	130	89%							146	100%

α	.05	significance level

Chi-square	4.25	
d.f.	1	
p-value	.039	Statistically significant
Cramer's V	0.12	Large practical significance

Result	(Chi2(1) = 4.25, p = .039, V = 0.12).

APPENDIX 37: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 2

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 29

RCAS Question 2 Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS02	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
High Level Workers	48	42	**90**	46	48	**94**
	66.67%	56.76%	61.64%	63.89%	64.86%	64.38%
Middle-Level Workers	18	18	**36**	15	15	**30**
	25.00%	24.32%	24.66%	20.83%	20.27%	20.55%
Skilled Workers	4	2	**6**	7	4	**11**
	5.56%	2.70%	4.11%	9.72%	5.41%	7.53%
Semi-Skilled Workers	0	1	**1**	0	0	**0**
	0.00%	1.35%	0.68%	0.00%	0.00%	0.00%
No response	2	11	**13**	4	7	**11**
	2.78%	14.86%	8.90%	5.56%	9.46%	7.53%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**8.271591**	**df=4**	**p=.08212**	**Not statistically significant**		
Post-Test	**1.651829**	**df=3**	**p=.64770**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Chi Square Test of Independence Not Performed

Reason : No single response identified as requiring further analysis.

APPENDIX 38: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 3

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 30

RCAS Question 3 Score Summary: Control and Experimental Groups

	Pre-Test			**Post-Test**		
RCAS03	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	13	25	**38**	20	22	**42**
	18.06%	33.78%	26.03%	27.78%	29.73%	28.77%
Related to the career identified	17	20	**37**	39	32	**71**
	23.61%	27.03%	25.34%	54.17%	43.24%	48.63%
Unrelated to the career identified	42	29	**71**	13	20	**33**
	58.33%	39.19%	48.63%	18.06%	27.03%	22.60%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**6.3868**	**df=2**	**p=.04103**	**Statistically significant**		
Post-Test	**2.243251**	**df=2**	**p=.32575**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 31

Chi Square Test of Independence for RCAS03 Single Category (i.e., Related to Career Identified)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Related to career identified		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	39	54%	33	46%	na		na		72	100%
Experimental	32	43%	42	57%	na		na		74	100%
Total	71	49%	75	51%					146	100%

α	.05	significance level

Chi-square	1.74	
d.f.	1	
p-value	.187	Not statistically significant
Cramer's V	n.a.	Not applicable, p > .050

Result	(Chi2(1) = 1.74, p = .187).

APPENDIX 39: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 4

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 32

RCAS Question 4 Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS04	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	25	38	**63**	29	25	**54**
	34.72%	51.35%	43.15%	40.28%	33.78%	36.99%
Parents	26	26	**52**	29	32	**61**
	36.11%	35.14%	35.62%	40.28%	43.24%	41.78%
Interpersonal/Social	10	6	**16**	9	12	**21**
	13.89%	8.11%	10.96%	12.50%	16.22%	14.38%
Intrapersonal	2	3	**5**	3	3	**6**
	2.78%	4.05%	3.42%	4.17%	4.05%	4.11%
Other	9	1	**10**	2	2	**4**
	12.50%	1.35%	6.85%	2.78%	2.70%	2.74%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**10.25707**	**df=4**	**p=.03631**	**Statistically significant**		
Post-Test	**0.84517**	**df=4**	**p=.93229**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Chi Square Test of Independence Not Performed

Reason : No single response identified as requiring further analysis at post-test stage.

APPENDIX 40: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 5

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 33

RCAS Question 5 Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS05	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	48	40	**88**	60	46	**106**
	66.67%	54.05%	60.27%	83.33%	62.16%	72.60%
Interpersonal/Social	6	14	**20**	3	6	**9**
	8.33%	18.92%	13.70%	4.17%	8.11%	6.16%
Intrapersonal	2	4	**6**	1	2	**3**
	2.78%	5.41%	4.11%	1.39%	2.70%	2.05%
Environmental	11	6	**17**	4	12	**16**
	15.28%	8.11%	11.64%	5.56%	16.22%	10.96%
Media Influence	0	2	**2**	1	2	**3**
	0.00%	2.70%	1.37%	1.39%	2.70%	2.05%
Other	5	8	**13**	3	6	**9**
	6.94%	10.81%	8.90%	4.17%	8.11%	6.16%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**10.37241**	**df=6**	**p=.10982**	**Not statistically significant**		
Post-Test	**8.489919**	**df=5**	**p=.13122**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 34

Chi Square Test of Independence for RCAS05 Single Category (i.e., Environmental)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Environmental		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	4	6%	68	94%	na		na		72	100%
Experimental	12	16%	62	84%	na		na		74	100%
Total	16	11%	130	89%					146	100%

α	.05	significance level

Chi-square	4.25	
d.f.	1	
p-value	.039	Statistically significant
Cramer's V	0.12	Large practical significance

Result	(Chi2(1) = 4.25, p = .039, V = 0.12).

APPENDIX 41: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 6

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 35

RCAS Question 6 Score Summary: Control and Experimental Groups

	Pre-Test			**Post-Test**		
RCAS06	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
Interpersonal/Social	12	11	**23**	9	8	**17**
	16.67%	14.86%	15.75%	12.50%	10.81%	11.64%
Media Influence	15	22	**37**	28	22	**50**
	20.83%	29.73%	25.34%	38.89%	29.73%	34.25%
Environmental	14	12	**26**	14	25	**39**
	19.44%	16.22%	17.81%	19.44%	33.78%	26.71%
Other	31	29	**60**	21	19	**40**
	43.06%	39.19%	41.10%	29.17%	25.68%	27.40%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**1.561211**	**df=3**	**p=.66822**	**Not statistically significant**		
Post-Test	**3.954732**	**df=3**	**p=.26639**	**Not statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 36

Chi Square Test of Independence for RCAS06 Single Category (i.e., Environmental)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Environmental		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	14	19%	58	81%	na		na		72	100%
Experimental	25	33%	51	67%	na		na		76	100%
Total	39	26%	109	74%					148	100%

α	.05	significance level

Chi-square	3.45	
d.f.	1	
p-value	.063	Not statistically significant
Cramer's V	n.a.	Not applicable, p > .050

Result	(Chi2(1) = 3.45, p = .063).

APPENDIX 42: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 7

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 37

RCAS Question 7 Score Summary: Control and Experimental Groups

	Pre-Test			**Post-Test**		
RCAS07	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No Response	20	26	**46**	23	13	**36**
	27.78%	35.14%	31.51%	31.94%	17.57%	24.66%
Interpersonal/Social	8	5	**13**	12	5	**17**
	11.11%	6.76%	8.90%	16.67%	6.76%	11.64%
Intrapersonal	2	1	**3**	3	1	**4**
	2.78%	1.35%	2.05%	4.17%	1.35%	2.74%
Media Influence	24	26	**50**	26	45	**71**
	33.33%	35.14%	34.25%	36.11%	60.81%	48.63%
Environmental	11	8	**19**	2	2	**4**
	15.28%	10.81%	13.01%	2.78%	2.70%	2.74%
Other	7	8	**15**	6	8	**14**
	9.72%	10.81%	10.27%	8.33%	10.81%	9.59%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**2.401654**	**df=5**	**p=.79123**	**Not statistically significant**		
Post-Test	**12.00521**	**df=5**	**p=.03472**	**Statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 38

Chi Square Test of Independence for RCAS07 Single Category (i.e., Media Influence)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Media Influence		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	26	36%	46	64%	na		na		72	100%
Experimental	45	61%	29	39%	na		na		74	100%
Total	71	49%	75	51%					146	100%

α	.05	significance level

Chi-square	8.91	
d.f.	1	
p-value	.003	Statistically significant
Cramer's V	0.17	Large practical significance

Result	(Chi2(1) = 8.91, p = .003, V = 0.17).

APPENDIX 43: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 8

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 39

RCAS Question 8 Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS08	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	23	28	**51**	35	37	**72**
	31.94%	37.84%	34.93%	48.61%	50.00%	49.32%
Nature of Work	40	37	**77**	32	30	**62**
	55.56%	50.00%	52.74%	44.44%	40.54%	42.47%
Conditions of Employment	1	1	**2**	0	2	**2**
	1.39%	1.35%	1.37%	0.00%	2.70%	1.37%
Implications/ Application Steps	1	6	**7**	1	2	**3**
	1.39%	8.11%	4.79%	1.39%	2.70%	2.05%
Lifestyle	1	0	**1**	0	1	**1**
	1.39%	0.00%	0.68%	0.00%	1.35%	0.68%
Other	6	2	**8**	4	2	**6**
	8.33%	2.70%	5.48%	5.56%	2.70%	4.11%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**7.152452**	**df=5**	**p=.20955**	**Not statistically significant**		
Post-Test	**4.093442**	**df=5**	**p=.53604**	**Not statistically significant**		

Chi Square Test of Independence Not Performed

Reason : No single response identified as requiring further analysis.

APPENDIX 44: STATISTICAL ANALYSIS OF RCAS FORM 1 QUESTION 9

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 40

RCAS Question 9 Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS09	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No answer	16	22	**38**	22	16	**38**
	22.22%	29.73%	26.03%	30.56%	21.62%	26.03%
A school activity unrelated to the career	33	30	**63**	29	12	**41**
	45.83%	40.54%	43.15%	40.28%	16.22%	28.08%
A school activity related to the career	13	13	**26**	6	11	**17**
	18.06%	17.57%	17.81%	8.33%	14.86%	11.64%
Specific subject unrelated to the career	0	5	**5**	1	5	**6**
	0.00%	6.76%	3.42%	1.39%	6.76%	4.11%
Specific subject related to the career	9	3	**12**	9	27	**36**
	12.50%	4.05%	8.22%	12.50%	36.49%	24.66%
Other	1	1	**2**	5	3	**8**
	1.39%	1.35%	1.37%	6.94%	4.05%	5.48%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**
Chi-square comparison for question ($\alpha = 0.5$)						
Assessment	**Chi-Square**	**df**	**p-value**	**Description**		
Pre-Test	**9.064529**	**df=5**	**p=.10652**	**Not statistically significant**		
Post-Test	**21.61006**	**df=5**	**p=.00062**	**Statistically significant**		

Percentages may not add up to 100% due to rounding of final numbers

Table 41

Chi Square Test of Independence for RCAS09 Single Category (i.e., Specific subject related to career)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Specific subject related to career		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	9	13%	63	88%	na		na		72	100%
Experimental	27	36%	47	64%	na		na		74	100%
Total	36	25%	110	75%					146	100%

α	.05	significance level

Chi-square	11.30	
d.f.	1	
p-value	.001	Statistically significant
Cramer's V	0.20	Large practical significance

Result	(Chi2(1) = 11.30, p = .001, V = 0.20).

APPENDIX 45: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 10

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 42

RCAS Question 10 (Realistic Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS10	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	32	40	**72**	19	28	**47**
	44.44%	54.05%	49.32%	26.39%	37.84%	32.19%
Realistic	36	31	**67**	50	41	**91**
	50.00%	41.89%	45.89%	69.44%	55.41%	62.33%
Investigative	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Artistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Social	0	0	0	3	3	**6**
	0.00%	0.00%	0.00%	4.17%	4.05%	4.11%
Enterprising	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Conventional	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	4	3	**7**	0	2	**2**
	5.56%	4.05%	4.79%	0.00%	2.70%	1.37%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	Chi-Square	df	p-value	Description
Pre-Test	**1.377742**	**df=2**	**p=.50214**	**Not statistically significant**
Post-Test	**4.586977**	**df=3**	**p=.20466**	**Not statistically significant**

Table 43

Chi Square Test of Independence for RCAS10 Single Category (i.e., Realistic)

Chi-square Test of Independence

	Observed Contingency Table											
Group	Realistic		Other							Total		
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%
Control	50	69%	22	31%	na		na		na		72	100%
Experimental	41	55%	33	45%	na		na		na		74	100%
Total	91	62%	55	38%							146	100%

α	.05	significance level

Chi-square	3.06	
d.f.	1	
p-value	.080	Not statistically significant
Cramer's V	n.a.	Not applicable, p > .050

Result	(Chi2(1) = 3.06, p = .080).	

APPENDIX 46: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 11

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 44

RCAS Question 11 (Investigative Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS11	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	21	22	**43**	19	17	**36**
	29.17%	29.73%	29.45%	26.39%	22.97%	24.66%
Realistic	0	1	**1**	2	4	**6**
	0.00%	1.35%	0.68%	2.78%	5.41%	4.11%
Investigative	17	20	**37**	15	31	**46**
	23.61%	27.03%	25.34%	20.83%	41.89%	31.51%
Artistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Social	21	20	**41**	15	11	**26**
	29.17%	27.03%	28.08%	20.83%	14.86%	17.81%
Enterprising	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Conventional	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	13	11	**24**	21	11	**32**
	18.06%	14.86%	16.44%	29.17%	14.86%	21.92%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	Chi-Square	df	p-value	Description
Pre-Test	**1.430427**	**df=4**	**p=.83889**	**Not statistically significant**
Post-Test	**10.05787**	**df=4**	**p=.03946**	**Statistically significant**

Percentages may not add up to 100% due to rounding of final numbers

Table 45

Chi Square Test of Independence for RCAS11 Single Category (i.e., Investigative)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Investigative		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	15	21%	57	79%	na		na		72	100%
Experimental	31	42%	43	58%	na		na		74	100%
Total	46	32%	100	68%					146	100%

α	.05	significance level

Chi-square	7.50	
d.f.	1	
p-value	.006	Statistically significant
Cramer's V	0.16	Large practical significance

Result	(Chi2(1) = 7.50, p = .006, V = 0.16).

APPENDIX 47: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 12

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 46

RCAS Question 12 (Artistic Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS12	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	29	34	**63**	39	35	**74**
	40.28%	45.95%	43.15%	54.17%	47.30%	50.68%
Realistic	0	0	0	0	1	**1**
	0.00%	0.00%	0.00%	0.00%	1.35%	0.68%
Investigative	0	0	0	0	0	**0**
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Artistic	19	24	**43**	26	36	**62**
	26.39%	32.43%	29.45%	36.11%	48.65%	42.47%
Social	2	3	**5**	2	0	**2**
	2.78%	4.05%	3.42%	2.78%	0.00%	1.37%
Enterprising	0	0	0	1	0	**1**
	0.00%	0.00%	0.00%	1.39%	0.00%	0.68%
Conventional	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	22	13	**35**	4	2	**6**
	30.56%	17.57%	23.97%	5.56%	2.70%	4.11%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	Chi-Square	df	p-value	Description
Pre-Test	**3.46576**	**df=3**	**p=.32523**	**Not statistically significant**
Post-Test	**6.469603**	**df=5**	**p=.26317**	**Not statistically significant**

Table 47

Chi Square Test of Independence for RCAS12 Single Category (i.e., Artistic)

Chi-square Test of Independence

	Observed Contingency Table											
Group	Artistic		Other								Total	
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%
Control	26	36%	46	64%	na		na		na		72	100%
Experimental	36	49%	38	51%	na		na		na		74	100%
Total	62	42%	84	58%							146	100%

α	.05	significance level

Chi-square	2.35	
d.f.	1	
p-value	.125	Not statistically significant
Cramer's V	n.a.	Not applicable, p > .050

Result	(Chi2(1) = 2.35, p = .125).	

Table 48

Chi Square Test of Independence for RCAS12 Single Category (i.e., Artistic): Experimental Group Comparison between Pre-and Post-Test

Chi-square Test of Independence

	Observed Contingency Table											
Group	Artistic		Other								Total	
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%
Experimental Pre	24	32%	50	68%							74	100%
Experimental Post	36	49%	38	51%							74	100%
Total	60	41%	88	59%							148	100%

α	.05	significance level

Chi-square	4.04	
d.f.	1	
p-value	.045	Statistically significant
Cramer's V	0.12	Large practical significance
Result	(Chi2(1) = 4.04, p = .045, V = 0.12).	

APPENDIX 48: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 13

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 49

RCAS Question 13 (Social Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS13	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	31	40	**71**	30	28	**58**
	43.06%	54.05%	48.63%	41.67%	37.84%	39.73%
Realistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investigative	0	0	0	0	0	**0**
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Artistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Social	31	27	**58**	28	42	**70**
	43.06%	36.49%	39.73%	38.89%	56.76%	47.95%
Enterprising	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Conventional	0	0	0	3	1	**4**
	0.00%	0.00%	0.00%	4.17%	1.35%	2.74%
Other	10	7	**17**	11	3	**14**
	13.89%	9.46%	11.64%	15.28%	4.05%	9.59%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	**Chi-Square**	**df**	**p-value**	**Description**
Pre-Test	**1.919082**	**df=2**	**p=.38307**	**Not statistically significant**
Post-Test	**8.414576**	**df=3**	**p=.03818**	**Statistically significant**

Table 50

Chi Square Test of Independence for RCAS13 Single Category (i.e., Social)

Chi-square Test of Independence

	Observed Contingency Table											
Group	Social		Other							Total		
	fo	%	fo	%	fo	%	fo	%	fo	%	fo	%
Control	28	39%	44	61%	na		na		na		72	100%
Experimental	42	57%	32	43%	na		na		na		74	100%
Total	70	48%	76	52%							146	100%

α	.05	significance level

Chi-square	4.67	
d.f.	1	
p-value	.031	Statistically significant
Cramer's V	0.13	Large practical significance

Result	(Chi2(1) = 4.67, p = .031, V = 0.13).

APPENDIX 49: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 14

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 51

RCAS Question 14 (Enterprising Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS14	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	35	41	**76**	35	30	**65**
	48.61%	55.41%	52.05%	48.61%	40.54%	44.52%
Realistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investigative	0	0	0	0	0	**0**
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Artistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Social	12	11	**23**	12	9	**21**
	16.67%	14.86%	15.75%	16.67%	12.16%	14.38%
Enterprising	12	15	**27**	10	27	**37**
	16.67%	20.27%	18.49%	13.89%	36.49%	25.34%
Conventional	0	0	0	3	1	**4**
	0.00%	0.00%	0.00%	4.17%	1.35%	2.74%
Other	13	7	**20**	12	7	**19**
	18.06%	9.46%	13.70%	16.67%	9.46%	13.01%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	Chi-Square	df	p-value	Description
Pre-Test	**2.623591**	**df=3**	**p=.45337**	**Not statistically significant**
Post-Test	**10.91444**	**df=4**	**p=.02754**	**Statistically significant**

Table 52

Chi Square Test of Independence for RCAS14 Single Category (i.e., Enterprising)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Enterprising		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	10	14%	62	86%	na		na		72	100%
Experimental	27	36%	47	64%	na		na		74	100%
Total	37	25%	109	75%					146	100%

α	.05	significance level

Chi-square	9.85	
d.f.	1	
p-value	.002	Statistically significant
Cramer's V	0.18	Large practical significance

Result	(Chi2(1) = 9.85, p = .002, V = 0.18).

APPENDIX 50: STATISTICAL ANALYSIS OF RCAS FORM 2 QUESTION 15

A comparison of Total Sample Scores between Control and Experimental Groups: Pre- and Post-Test

Table 53

RCAS Question 15 (Conventional Careers) Score Summary: Control and Experimental Groups

	Pre-Test			Post-Test		
RCAS15	**Control**	**Experimental**	**Totals**	**Control**	**Experimental**	**Totals**
No response	33	43	**76**	31	43	**74**
	45.83%	58.11%	52.05%	43.06%	58.11%	50.68%
Realistic	0	0	0	0	1	**1**
	0.00%	0.00%	0.00%	0.00%	1.35%	0.68%
Investigative	0	0	0	0	0	**0**
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Artistic	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Social	6	7	**13**	6	6	**12**
	8.33%	9.46%	8.90%	8.33%	8.11%	8.22%
Enterprising	14	7	**21**	11	13	**24**
	19.44%	9.46%	14.38%	15.28%	17.57%	16.44%
Conventional	12	8	**20**	11	6	**17**
	16.67%	10.81%	13.70%	15.28%	8.11%	11.64%
Other	7	9	**16**	13	5	**18**
	9.72%	12.16%	10.96%	18.06%	6.76%	12.33%
All Groups	**72**	**74**	**146**	**72**	**74**	**146**

Chi-square comparison for question ($\alpha = 0.5$)

Assessment	Chi-Square	df	p-value	Description
Pre-Test	**4.74954**	**df=4**	**p=.31397**	**Not statistically significant**
Post-Test	**8.112882**	**df=5**	**p=.15012**	**Not statistically significant**

Percentages may not add up to 100% due to rounding of final numbers

Table 54

Chi Square Test of Independence for RCAS15 Single Category (i.e., Conventional)

Chi-square Test of Independence

	Observed Contingency Table									
Group	Conventional		Other						Total	
	fo	%	fo	%	fo	%	fo	%	fo	%
Control	11	15%	61	85%	na		na		72	100%
Experimental	6	8%	68	92%	na		na		74	100%
Total	17	12%	129	88%					146	100%

α	.05	significance level

Chi-square	1.82	
d.f.	1	
p-value	.177	Not statistically significant
Cramer's V	n.a.	Not applicable, p > .050

Result	(Chi2(1) = 1.82, p = .177).	

APPENDIX 51: RCAS CODING FOR FORM 2 RESPONSES

Table 55

RCAS Coding for Form 2 Responses

Coded as:	Type:	Description	RCAS Careers
0	No response	The responses were allocated this code if children failed to provide an answer or if they suggested that they did not know the answer.	Not Applicable
1	Realistic	*The Realistic* individual prefers activities that involve systematic manipulation of machinery, tools or animals. Such an individual may lack social skills and may prefer to work with things and ideas rather than people. The Realistic work environment includes concrete tasks involving mechanical skills and physical strength. Typical occupations include engineering, trades, wildlife management, and navy and air force personnel.	Motor mechanic Hairdresser Pilot
2	Investigative	*The Investigative* individual tends to be analytical, curious, methodical and precise. These individuals enjoy thinking, manipulating words or symbols and using their intelligence. The Investigative work environment requires the use of abstract and creative abilities in solving abstract and ambiguous problems that are typical of scientific and research based work. Occupations include researchers, zoologists, biologists and some engineering specialists.	Vet Doctor Scientist
3	Artistic	*The Artistic* individual tends to be expressive, non-conforming, original and introspective. The Artistic work environment encourages the use of art forms in the areas of design, drama and music. Typical occupations include artist, musician, actress and interior design.	Actor Fashion designer Singer
4	Social	*The Social* individual enjoys working with and helping others. They view themselves as social, tactful and self-accepting, and they tend to avoid physical activities involving tools and machines.	Teacher Nurse Receptionist

		The Social work environment reinforces social skills and requires individuals to interpret and change human behaviour. Occupations include those of teacher, social worker, counsellor and nurse.	
5	Enterprising	*The Enterprising* individual enjoys activities that entail persuading and managing others in order to attain organisational goals or economic gain. They are generally adventurous, enthusiastic, confident and verbal. The Enterprising work environment involves controlling and directing others, and typical occupations include politician, sales work, managers and lawyers.	Lawyer Sales assistant Bank manager
6	Conventional	*The Conventional* individual relates to the systematic manipulation of data in a structured environment. They tend to be highly ordered, dependable, accurate and neat. They value a structured work environment which requires the routine processing of verbal and numerical data. Typical occupations include banking, accounting and clerical work.	Secretary Accountant Bank worker
7	A closely related response	*This would depend on the question asked*	