

1. CHAPTER 1: PRELUDE TO THE STUDY

“If we only said safe sex, use a condom, we won't stop the spread of AIDS in this country.”

Thabo Mbeki¹

1.1 Challenges for HIV and AIDS education in South Africa: A problem statement

Large amounts of money have been used to counter the spread of HIV and AIDS in South Africa. A large portion of this money is used to promote safe sex. Thabo Mbeki, the former President of South Africa, however argued that if all efforts are championed towards safe sex, then HIV and AIDS would not be eradicated. The current study therefore explored the role played by education in counteracting the spread of HIV and AIDS by changing the behaviours of students.

Much research and prevention work has been done, yet it remains a great concern that the HIV and AIDS prevalence, particularly in South Africa remains high (UNAIDS, 2010; UNAIDS, 2009; Bennett, Boerma & Brugha, 2006; Page, Ebersöhn & Rogan, 2006; UNAIDS, 2006; Kinsler & Sneed, 2004). Worldwide some 33.3 million people are living with HIV and AIDS, with 2.9 million new infections in 2009, and 1.8 million HIV and AIDS related deaths in the same year (UNAIDS, 2010). In 2009 reports suggest that 67% of people living with HIV and AIDS lived in sub-Saharan Africa, a 4% increase from 2006 (UNAIDS, 2010; UNAIDS, 2009; Dorrington, Johnson, Bradshaw & Daniel, 2006; UNAIDS, 2006). UNAIDS (2009; 2006) also reports that other continents make a noteworthy contribution to the worldwide figures, that is North America 4%, South America and the Caribbean 7%, Europe 2% and Asia and Oceania 20%.

Looking at South Africa alone, statistics show that in 2009 about 5.6 million South Africans were living with HIV (UNAIDS, 2010). Furthermore it is suggested that in South Africa a 15-year-old has a 56% probability of dying before the age of 60 due to HIV and AIDS related

¹ <http://www.brainyquote.com>

illnesses (Dorrington *et al.*, 2006). This high HIV and AIDS prevalence in South Africa is one of the major health education challenges facing the country.

Dorrington *et al.* (2006) report that about 24% of those infected with HIV and AIDS in South Africa are aged under 25. This age group is therefore one of the groups that raise concern for fighting the spread of HIV. There are a number of factors leading to high HIV and AIDS prevalence of which risk behaviour due to inadequate information is one (Anderson & Beutel, 2007). In this regard Anderson and Beutel (2007) suggest that more depth of HIV and AIDS knowledge is needed by South African youths. This sentiment is also echoed by a number of researchers who say while less attention is being paid to the way the education system addresses HIV and AIDS, it has a great potential of reducing the HIV and AIDS pandemic (Anderson & Beutel, 2007; Baumgartner, 2001; Christopher, Dunnagan, Duncan & Paul, 2001).

Concerning the use of the education system to fight the spread of HIV and AIDS, some researchers have questioned the accuracy of information that is available to youths through various HIV and AIDS awareness programmes. Anderson (2007) reports a limited transfer of scientific knowledge from research to secondary schools. At times this limited transfer of scientific knowledge is perpetuated by a narrow communication approach, which tends to focus on teaching students more about AIDS and less about the cause of AIDS which is HIV (Bertrand, O'Reilly, Denison, Anhang & Sweat, 2006; Kinsler & Sneed, 2004; Myhre & Flora, 2000; Kuhn & Steinberg, 1994). Compounding this is the high number of misconceptions that exist about HIV and AIDS (for example Fawole, Asuzu, Oduntan & Brieger, 1999). Because of these educational factors, a number of uninformed and poorly coordinated HIV and AIDS awareness programmes have been used, particularly in schools (as reported by Bertrand *et al.*, 2006; Page *et al.*, 2006; Myrhe & Flora, 2000; Kuhn & Steinberg, 1994).

Besides awareness programmes, school subjects have been modified to provide students with the necessary knowledge of HIV and AIDS. In South Africa these modules include Life Orientation and Life Sciences. In Life Sciences HIV and AIDS education usually deals with teaching students about scientific knowledge of HIV and AIDS such as the existence of HIV and AIDS, characteristics of HIV and AIDS, modes of HIV transmission and means of prevention and treatment (for example Anderson & Beutel, 2007; Bertrand *et al.*, 2006;

Department of Education, 2003a; Myhre & Flora, 2000; Kuhn & Steinberg, 1994). Knowledge which deals with life skills, stigma and discrimination related to HIV and AIDS, sexuality education, testing and management of AIDS is taught mainly in other subjects such as Life Orientation (Department of Education, 2003b).

Although some researchers (for example Page *et al.*, 2006) have explored Life Sciences as a vehicle to integrate HIV and AIDS-related scientific knowledge into, no analysis of the Life Sciences curriculum documents has been correlated with relevant knowledge and behaviour among students. Specifically there is no indication whether knowledge currently taught in Life Sciences is able to promote *i)* students' understanding of HIV and AIDS knowledge, and *ii)* the applicability of this knowledge in daily lives. It also appears that there is a dearth of knowledge regarding Life Sciences concepts that are necessary as prior knowledge to understand, for instance how HIV is transmitted. Overall the role and impact of Life Sciences in potentially minimizing the spread of HIV and AIDS through behavioural change is not clear. As a result to simply teach the characteristics of HIV and AIDS may be futile (Anderson & Beutel, 2007; Bertrand *et al.*, 2006; Page *et al.*, 2006). To this, Bertrand *et al.* (2006: 593), attest having found “no statistically significant impact” of some awareness programmes (including school-based modules) in reducing the spread and effects of HIV and AIDS through behavioural change.

While the debate on socialization through the formal curriculum continues, the Department of Education² in South Africa adopted the incorporation of HIV and AIDS education into Life Sciences (Anderson & Beutel, 2007; Department of Education, 2003a). One of the Learning Outcomes stipulated in the Life Sciences Curriculum Statement in this regard is that students should be “able to apply scientific knowledge in their personal lives and as responsible citizens in ways that will contribute to a healthy lifestyle” (Department of Education, 2003a: 9). Life Sciences is traditionally an academic field (that is, it focuses on the construction and understanding of scientific and discipline-specific knowledge), and therefore its ability to foster behaviour-related socialization, for example behaviour transformation³, requires

² The author acknowledges that the name of the Department has been changed to the Department of Basic Education. However during the study the old name (Department of Education) was in operation and hence adopted in this thesis.

³ Behaviour transformation is defined in the study as conscious use of curriculum-based knowledge and skills to reject unsafe behaviours and adoption of safe behavioural practices in order to prevent HIV infection.

investigation. Given the debates regarding socialization through the curriculum, the study intended to determine how the Life Sciences curriculum addresses the question of socialization. It is based on this argument that the researcher compared Life Sciences and non-Life Sciences students' behavioural preferences to examine the impact of the curriculum on socialization.

Based on current work on HIV and AIDS education, there is a dearth of knowledge regarding the ability of Life Sciences to foster socialization, particularly behaviour transformation. It appears that researchers in HIV and AIDS education may not have regarded Life Sciences as one of the HIV and AIDS intervention strategies and thus have not evaluated its effectiveness. In fact there is no clarity as to which conceptual framework was used by the Department of Education in integrating HIV and AIDS education into Life Sciences. Furthermore research has shown that knowledge (especially scholar academic knowledge) has a minimal impact on (health-related) behaviour (Schiro, 2008). However it appears that Life Sciences does attempt to facilitate a knowledge/curriculum-real life interaction. The effectiveness of this stance however requires an investigation. Overall there has not been any research done to compare Life Sciences and non-Life Sciences students' HIV and AIDS knowledge and behavioural preferences in order to interrogate the effect of curricula on behaviour transformation.

Perhaps, combining different forms of HIV and AIDS knowledge in Life Sciences could mould critical thinkers who would take the responsibility for their behaviour and their contribution to society. Furthermore maybe HIV and AIDS education can prepare students to confront HIV and AIDS in a reflective manner, exposing misconceptions of reality. Possibly students may understand that they are part of an unhealthy society that needs to transform its behaviour by reconstructing values, norms, attitudes and beliefs using knowledge. To this end Shimbira, Dlamini and Dube (2007) argue that students ought to view themselves, and act as agents of change. A Life Sciences curriculum perhaps can inspire students to take ownership of their reconstruction role in society.

1.2 The research context: conceptualization

Given the above arguments, the researcher intended to compare HIV and AIDS knowledge and behavioural preferences of Life Sciences and non-Life Sciences students in order to inform Life Sciences curriculum development from a behaviour transformation perspective. The researcher also intended to provide insight into how the Life Sciences curriculum may relate to behavioural preferences of among students. In the next subsections, the researcher contextualizes various concepts that are fundamental to the study.

1.2.1 The curriculum

Curriculum is a central concept in the current study. The researcher acknowledges that curriculum refers to documents outlining content to be covered as well as planned and unplanned learning outcomes of a particular subject area. These outcomes include those observed inside and outside the classroom. Nonetheless, within the context of the study, the researcher adopted the view of the curriculum as a planned and guided sequence of learning experiences as developed by the Department of Education of South Africa and implemented by schools, that is the curriculum statement (particularly the Life Sciences curriculum statement) (Tanner & Tanner, 1987; Good, 1959; Smith, Stanley & Shores, 1957). The curriculum facilitates student development and attainment of relevant qualifications. With respect to student development, the curriculum shapes students' intellectual capacity including construction of new knowledge and using such knowledge in everyday life. The Department of Education determines content knowledge that students should be taught as well as learning outcomes that must be attained. Teachers are responsible for facilitating students' learning experiences by developing lesson plans, conducting lessons and using assessment tools. Overall, the curriculum consists of *i*) predetermined subject matter, *ii*) a planned sequence of learning experiences, *iii*) certifiable completion, *iv*) the institution of learning, and *v*) development or socialization of students (Waks, 2003; Tanner & Tanner, 1987; Good, 1959; Smith *et al.*, 1957).

In the study the researcher espouses the views that the curriculum should have a specific objective, also referred to as the curriculum ideology. At least four curriculum ideologies can be distinguished, namely scholar academic ideology, social efficiency ideology, student-

centred ideology and social reconstruction ideology (Schiro, 2008; Ravitch, 2000; Kliebard, 1996; Schubert, 1996). These ideologies are regarded by some as ideals as reality constitutes a *mélange* of ideologies (Þórólfsson & Lárusson, 2010; Kliebard, 1996). The researcher however believes that it is possible to define school subjects as representative of the ideologies. This classification of school subjects would require analysis of the curriculum particularly in relation to content knowledge and learning outcomes of such subjects.

In the *scholar academic ideology* students are taught fundamental didactic statements which are viewed by academic disciplines as objective content knowledge that defines a discipline (Kliebard, 1996). The objective of teaching scholar academic knowledge is to transform students to become members of the discipline once they have attained predetermined minimum standards (Schubert, 1996). Scholar academic ideologists seek continued existence and growth of disciplines (Schiro, 2008). The *social efficiency ideology* aims to prepare students for their responsibilities as adults by teaching programmed instruction for the development of predetermined skills. Supporters of the social efficiency ideology view knowledge as a normative objective reality that is socially interpreted and therefore students are provided with prerequisite behavioural capabilities such as social skills in relation to standardized norms (Kliebard, 1996). The main objective of the *student-centred ideology* is to facilitate growth of students by allowing students to construct knowledge through personal creative responses to experiences (Schiro, 2008). Students' growth is facilitated by diagnosing their abilities and adapting the curriculum according to students' needs and abilities in order to invoke new perspectives and meanings to life. The *social reconstruction ideology* is based on the assumption that an unhealthy society can be changed through education (Cotti & Schiro, 2004). By teaching new knowledge and skills, social reconstructors seek to transform social norms and values in order to enhance human civilization (Kliebard, 1996; Schubert, 1996; McNeil, 1977). Functional knowledge therefore is used to transform students' beliefs, attitudes, values and ultimately behaviours with a view that this transformation will in turn reconstruct entire social norms (Cotti & Schiro, 2004).

1.2.2 Socialization and behaviour transformation

At the centre of the different curriculum ideologies is the socialization of students. A commonality of curricula ideologies is that curricula seek to transmit some form of culture,

social values, traditions, knowledge and skills to students. Socialization refers to the phenomenon where students learn social knowledge, skills, values and behaviours through interaction with other members of the society such as teachers and other students (Kentli, 2009). Furthermore socialization is the process where students develop interpersonal and intrapersonal skills such as cooperation, independence, and personal identity. A product of socialization is a distinct behavioural pattern that students who share social structures such as schools and neighbourhoods have (Kentli, 2009; Margolis, 2001). Socialization may therefore lead to behaviour transformation.

Behaviour transformation is defined in the study as the conscious use of curriculum-based knowledge and skills to reject unsafe behaviours and adopt safe behavioural practices in order to prevent HIV infection, and support and care for those infected. This concept does not imply an observed change in the behavioural pattern or preference of students before and after an intervention. Instead the author refers to behaviour transformation to signify safe behavioural preferences of students against risk behavioural preferences. A theoretical assumption in this regard is that curriculum knowledge can foster behaviour transformation. The researcher refers to such knowledge as functional knowledge which is based on the social reconstruction ideology. In this study the researcher also assumed that scholar academic knowledge, social efficiency knowledge and student-centred knowledge may not lead to behaviour transformation.

1.2.3 Behavioural preferences

To measure students' behaviour transformation in terms of the Life Sciences curriculum, the researcher investigated students' self-reported behavioural preferences related to preventing HIV infection and supporting and caring for those infected. Behavioural preferences refer to students' attitudes, subjective norms and perceived behavioural control with reference to *i)* sexual practices, *ii)* HIV and AIDS protection/prevention strategies, *iii)* acceptance (of being infected and/or of those infected), and, *iv)* beliefs concerning personal susceptibility. This conceptualization of behavioural preferences is based on the theory of planned behaviour which states that attitudes, subjective norms and perceived behavioural control are proxies that can be used (collectively) to predict actual behaviour (Ajzen, 1991). In the study attitude was defined as a set of beliefs that predisposes one to respond in a particular way to HIV and

AIDS-related situations. Subjective norms are other people's (such as teachers, friends and family) perceived opinions on HIV and AIDS-related behaviour. Perceived behavioural control is the individual's subjective belief about whether or not they have the ability to perform certain HIV and AIDS-related behaviour (Hansen, Jensen & Solgaard, 2004).

1.2.4 Life Sciences knowledge and students

In the study the researcher also investigated the relationship (i.e. correlation and not causal link) between Life Sciences knowledge and behavioural preferences to determine the effect of the curriculum on socialization. Life Sciences refers to a subject taught to students in Grades 10 to 12 in South African schools (Department of Education, 2003a). (Internationally the subject may be referred to as Biology). As a field, biology originates from Greek words *bios* meaning "life" and *logia* meaning the "study of" (Mayr, 1985). Traditionally biology students are taught scholar academic knowledge of plants, animals, micro-organisms, viruses, medicine as well as other life and health sciences (Dimmock, Easton & Leppard, 2007; Audesirk, Audesirk, & Byers, 2004). Recently Life Sciences was adapted to include more health and social sciences related to HIV and AIDS (Department of Education, 2003a; Mazzarello, 1999; Mayr, 1985; Bayrakdar, 1983). Thus Life Sciences also teaches academic HIV and AIDS knowledge, which is factual knowledge about HIV and AIDS. Academic HIV and AIDS knowledge is based on the scholar academic ideology.

In the South African context students may choose to study Life Sciences in Grades 10 to 12. Non-Life Sciences students are students who do not study Life Sciences in Grades 10 to 12. Non-Life Sciences students therefore are assumed to have lesser academic HIV and AIDS knowledge compared with Life Sciences' students as this knowledge is presumably only taught in detail in Life Sciences. While it is possible for non-Life Sciences students to independently and informally acquire academic HIV and AIDS knowledge, another assumption of the study was that Life Sciences students should have a greater understanding of academic HIV and AIDS knowledge. Both groups of students however may have functional HIV and AIDS knowledge as this knowledge is presumably not restricted to Life Sciences. Functional HIV and AIDS knowledge is based on the social reconstruction ideology.

1.2.5 Health education

The idea of functional HIV and AIDS knowledge emanates from health education. Health educators believe that behavioural preferences are influenced by *i*) knowledge of health risks and benefits of various health practices, *ii*) perceived self-efficacy, *iii*) outcomes expectation, *iv*) health goals, as well as, *v*) perceived facilitators (Bandura, 2004). Therefore, health education is a multidisciplinary science that promotes prevention and treatment of diseases and minimizes premature death by fostering behaviour transformation (DeBarr, 2004).

Health education also includes HIV and AIDS education. In the study HIV and AIDS education refers to the provision of scholar academic, social efficiency, student-centred and/or social reconstruction knowledge to students to educate them about HIV and AIDS. Therefore, the Life Sciences curriculum includes content on HIV and AIDS education and health education. Health education may be taught in other health-related subjects such as Life Orientation.

Based on the above context of the study the researcher compared Life Sciences students and non-Life Sciences students' HIV and AIDS knowledge and behavioural preferences as a way of interrogating curriculum-real life interaction.

1.3 Rationale for the study

As shown in the problem statement (Section 1.1), statistics show that South Africa has a very high HIV and AIDS prevalence (UNAIDS, 2010; UNAIDS, 2009; Dimmock *et al.*, 2007; Dorrington *et al.*, 2006; UNAIDS, 2006). This is despite numerous attempts by the government and other social organisations to counteract the spread of HIV. One of the most recognized stories of HIV infection in South Africa is that of Nkosi Johnson, who, at age 12, died of AIDS-related complications. Stories of young people like Nkosi and others reflect the cruelty of HIV, which includes those infected and affected by HIV and AIDS (Anderson & Beutel, 2007). Likewise, given the high prevalence of HIV (Dorrington *et al.*, 2006) most people in South Africa have witnessed the effects of HIV and AIDS. In some persons, witnessing suffering caused by HIV and AIDS leads to serious negative psychological

effects, yet to others it results in a better understanding of its reality (Anderson & Beutel, 2007). This understanding of the reality of HIV and AIDS is further strengthened by learning about HIV and AIDS at school.

While many people are infected through vertical transmission, rape and accidental blood spills, there are reports of unsafe sexual behaviour that increases the risk of infection (Anderson & Beutel, 2007; Dorrington *et al.*, 2006). School-going youth often display unsafe behaviour even though they learn about HIV and AIDS in their school curricula including in the subject Life Sciences (Dorrington *et al.*, 2006). The question is why do young people, who are taught about HIV and AIDS in Life Sciences and arguably have knowledge regarding HIV infection and prevention strategies, voluntarily risk contracting HIV?

To respond to the above question, those who believe that there is a need for behaviour transformation argue that society is “unhealthy” (Schiro, 2008; Cotti & Schiro, 2004). While there are a number of reasons for society to be “unhealthy” and at “risk”, some scholars argue that mechanisms to curb the spread of HIV are often not effective because they do not target the correct “ailment” (Anderson & Beutel, 2007). To illustrate this point, Steinberg (2008) states:

“Sex is the most life giving of activities. That a new nation’s citizens are dying from sex seems to be an attack both on ordinary people’s and a nation’s generative capacities, an insult too ghastly to stomach. Where there is AIDS, there is blame. It is said in the villages that the virus was hatched in laboratories...the ill are accused of having murdered loved ones by their promiscuity...neighbours are blamed for using magic to infect the beautiful and the successful....”

Steinberg’s analysis provides an intriguing perspective: that perhaps while young people learn about HIV and AIDS, they still do not fully comprehend the concept of HIV and AIDS and its effects in life. This perhaps is why, irrespective of knowledge, HIV and AIDS prevalence amongst young people remains high and factors perpetuating the spread of HIV remain a subject of contention among many researchers (Bennett *et al.*, 2006; Dorrington *et al.*, 2006; Page *et al.*, 2006; UNAIDS, 2006; Kinsler & Sneed, 2004).

To facilitate behavioural change, which the researcher refers to as behaviour transformation, researchers argue that curricula could play a significant role to transform behaviour among students (Centre for the Study of AIDS, 2007). Wood (2007) argues that HIV and AIDS

education is broader than sexuality and health-oriented curriculum. In South Africa, functional HIV and AIDS knowledge focuses mainly on promoting abstinence, faithfulness to one sexual partner and condomizing, also known as ABC (UNAIDS, 2009; Bennett *et al.*, 2006; Dorrington *et al.*, 2006). Academic HIV and AIDS knowledge on the other hand facilitates students' understanding of the scientific content knowledge of HIV and AIDS. It teaches for instance the life cycle of HIV, the structure of the virus and the immune system (Department of Education, 2003a). Wood's (2007) argument therefore is that "a reductionist approach (such as scholar academic knowledge) can in fact lead to the "othering" of the pandemic and unwittingly increase stigmatisation" (Centre for the Study of AIDS, 2007: 8).

The researcher wonders if Life Sciences students, who learn academic and functional HIV and AIDS knowledge (presumably in Life Sciences and Life Orientation respectively), would display safe behavioural practices compared with non-Life Sciences students who may not have academic HIV and AIDS knowledge. In this regard researchers indicate that in order to prepare students to be agents of social reconstruction and behaviour transformation, there needs to be a balance and cohesion between community outreach and school activities (Centre for the Study of AIDS, 2007). The argument here is that there remains a gap between real-life issues and school curricula. Mohammed (2007) suggests that the problem is that institutions of education are protective of curricula. Most curricula are not designed to influence behavioural change, but construction of discipline-specific knowledge. Scholars also argue that there is a need to humanize what is taught in schools (Centre for the Study of AIDS, 2007). At the fore of this argument for a humanized curriculum is that "students must graduate alive" (Centre for the Study of AIDS, 2007: 14).

Researchers suggest that schools, in which the majority of youths spend most of their time, are well suited to be used for behaviour transformation in order to foster an adoption of safe behavioural practices (Anderson & Beutel, 2007). School curricula can therefore be used to provide leadership and action required for behaviour transformation. It is through agents of socialization, such as schools, that attitudes, beliefs, ideals and the behaviour of society are nurtured. Consequently the school (and curricula) holds a great potential to transform social behaviour in the context of HIV and AIDS through behaviour transformation-oriented curricula.

Life Sciences could also be used to introduce students to the reality of HIV and AIDS through scientific and constructivist learning and teaching (Bennett *et al.*, 2006; Page *et al.*, 2006). By developing relevant life and socio-scientific skills, students could explore for themselves the academic and functional HIV and AIDS knowledge and integrate such knowledge into their everyday life, which involves decision-making (Bennett *et al.*, 2006; Dorrington *et al.*, 2006; Cotti & Schiro, 2004; Kinsler & Sneed, 2004). The idea is that perhaps academic and functional HIV and AIDS knowledge could facilitate the transformation and reconstruction of students' views on sexual behaviour, HIV and AIDS protection/prevention strategies, acceptance (of being infected and/or of those infected), and beliefs concerning personal susceptibility. However for this behaviour transformation to occur, a behaviour transformation-oriented curriculum is required (Donnelly, 2006). Consequently, the *raison d'être* for the current study is to explore the role of a Life Sciences curriculum in behaviour transformation.

1.4 Assumptions about knowledge and behaviour

Flowing from the above rationale, the researcher held the following theoretical assumptions relating to the study:

- a) Academic HIV and AIDS knowledge is taught in Life Sciences.
- b) Functional HIV and AIDS knowledge is taught in various subjects in schools, including Life Orientation⁴ and to some extent Life Sciences.
- c) Life Sciences students have more academic HIV and AIDS knowledge compared with non-Life Sciences students.
- d) Academic and functional HIV and AIDS knowledge correlate positively with safe behavioural preferences of students.
- e) Life Sciences students will report safer behavioural preferences compared with non-Life Sciences students.

⁴ An analysis of the Life Orientation curriculum however falls outside of the scope of this study.

1.5 Locating the discourse of the study in the literature

The study can be located in the literature in two particular areas, namely curriculum studies and HIV and AIDS education. While these two can be regarded as distinct fields, the researcher integrated them by investigating the part of the Life Sciences curriculum that addresses HIV and AIDS. (A comprehensive discussion of curriculum studies and HIV and AIDS education appears in Chapters 2 and 3).

1.5.1 Curriculum studies

Research on curricula focuses on a number of areas, including the rationale, design process, implementation and assessment of learning. A general view in this regard is that the rationale for a curriculum determines content knowledge to be taught, the process of selecting such content, the sequence of the learning experience, learning outcomes as well as the assessment strategy (Schiro, 2008; Van den Akker, 2003; Davis, 1998; Kliebard, 1996; MacDonald, 1971). An element of contention in relation to learning outcomes is socialization of students, especially with regard to adoption of new values, norms, beliefs and behaviours (Van den Akker, 2003; MacDonald, 1971). For example Dewey strongly believed that curricula should explicitly outline and facilitate socialization of students (Schiro, 2008; Warde, 1960; Dewey, 1897). The controversy however is that in reality, curricula do not regard socialization but rather focus on subject matter content, sequence of the learning experience as well as learning outcomes from a knowledge construction or acquisition point of view (Waks, 2003). Consequently students are taught ontological arguments about reality as well as epistemology instead of application of knowledge in real life (Healy & Perry, 2000). This knowledge-oriented curriculum has over the years received much criticism because of its top-down approach which is closely associated with scholar academic ideology (Van Manen, 1978). Furthermore there is concern that ontology and epistemology are not enough to inform curriculum theory (MacDonald, 1971).

An opposing view suggests that education should be framed by a reality-oriented curriculum that promotes student development through hands-on experiential learning (Warde, 1960; Dewey, 1897). A reality-oriented curriculum promotes social consciousness (Dewey, 1897) and citizenship (Warde, 1960; Waghid, 2002). According to Dewey (1897) education should

prepare students for the future by giving them command of themselves and allowing them to explore their own potential and ability to use and develop those skills they may already have. A reality-oriented curriculum discourse has been further developed by researchers who argue that education should develop enquiry and problem-solving skills among students as a way of constructing knowledge (Simsek & Kabapinar, 2010; Kong & So, 2008; Hover & Horne, 2005; Wilkie, 2000).

Both knowledge and reality-oriented curriculum ideologies however fail to address the question of socialization, particularly behaviour (Simsek & Kabapinar, 2010). Knowledge and reality-oriented curriculum ideologies are viewed by most researchers as subscribing to scholar academic and student-centred ideologies, ignoring social needs (Kliebard, 1996). To address the limitation of knowledge and reality-oriented curriculum ideologies, other researchers advocate citizenship education and critical pedagogy (Waghid, 2005; Waghid, 2002; Kerr, 1999). Citizenship education refers to the use of formal education to prepare students for their roles in society as citizens (Kerr, 1999; Cherryholmes, 1980). Students in this regard are taught decision-making (Kerr, 1999), reflective thinking (Hunt & Metcalf 1968), reflective inquiry (Barr, Barth & Shermis 1978) and the application of knowledge, rendering citizenship education a proponent of socialization. To this end critical pedagogues argue that education should lead to transformation in students' lives, particularly in the areas of psychosocial and health behaviour as well as intellectual challenges (Freire, 1993).

Even though citizenship educators and critical pedagogues advocate socialization through curricula, there are a number of researchers who argue that the formal curriculum still fails to adequately promote socialization while the hidden curriculum is thriving in this regard (Zuga, 1992; Martin, 1976). These researchers argue that students' behaviours are developed through the hidden curriculum, even in the classroom. The argument here is that interpersonal and intrapersonal skills such as cooperation, independence and personal identity are not explicit in the formal curriculum, but emerge as a consequence of the hidden curriculum (Jackson, 1968).

1.5.2 HIV and AIDS education

Socialization is however a broad concept; thus, the context of HIV and AIDS was selected for investigation in the study. As stated earlier, HIV and AIDS education forms part of the Life

Sciences curriculum. Therefore socialization of students includes behaviour transformation as defined in the study. For contextualization purposes, the objective of Life Sciences can be rephrased as follows: Life Sciences “students should be able to apply scientific [HIV and AIDS] knowledge in their personal lives and as responsible citizens in ways that will contribute to a healthy lifestyle, [that is, behaviour transformation]” (Department of Education, 2003a: 9).

However HIV and AIDS education (even outside Life Sciences) and its ability to foster behaviour transformation is a complex subject on its own. For instance as health education, HIV and AIDS education aims to facilitate adoption of healthy behaviours, that is, behaviour transformation (World Health Organization, 2010). However research suggests that behaviour is dependent on a wide range of factors (Kemmm, 2003; Ajzen, 1991). Therefore, (biology or HIV and AIDS) knowledge alone may not necessarily lead to adoption of safe behaviour. Consequently researchers advise that health education should target those factors that have been shown to influence behaviour, for example life skills, self-efficacy, attitudes, beliefs, social norms (Kemmm, 2003; Koelen, Vaandrager & Colomer, 2001; Kok, Van den Borne & Mullen, 1997; Ajzen, 1991). In South Africa these factors are integrated in Life Orientation. Researchers have engaged in evaluating the effectiveness of health education programmes in order to inform future projects.

Evaluation of HIV and AIDS education has led to the view that learning and behavioural theories are effective tools through which health education can be designed, implemented and evaluated (Lloyd-Williams, 2003; Kok *et al.*, 1997). This is because behavioural theories provide a lens through which health-related behaviour can be viewed and assessed. The challenge however is that there are numerous theories that inform health education and therefore, the effectiveness of a programme can only be true within the parameters of a particular theory. It should be asked which theory was adopted for designing, implementing and evaluating Life Sciences-based health education?

There are various strategies that have been adopted for HIV and AIDS education, including non-curricular programmes⁵ that address various aspects of HIV and AIDS, particularly

⁵ Non-curricular programmes refer to those programmes that do not form part of the formal school curriculum as prescribed by the Department of Education in South Africa. These may however be presented within the schooling environment.

sexuality education and sexual health as well as HIV/AIDS education (Becker, Guenther-Grey & Raj, 1998). Sexuality education and sexual health often deal with reducing sexual risk behaviour and sexuality-related violence, improving knowledge of sexuality and reproductive health, life skills and resilience (Harrison, Newell, Imrie & Hoddinott, 2010; Ebersöhn, 2008; Jewkes, Nduna, Levin, Jama, Dunkle, Puren & Duvvury, 2008; Paul-Ebhohimhen, Poobalan & Van Teijlingen, 2008; Hallman, Govender, Roca, Pattman, Mbatha & Bhana, 2007; Ebersöhn, 2006; Jewkes, Nduna, Levin, Jama, Dunkle, Khuzwayo, Koss, Puren, Wood & Duvvury, 2006; Karnell, Cupp, Zimmerman, Feist-Price & Bennie, 2006; Gallant & Maticka-Tyndale, 2004). With respect to HIV and AIDS education, researchers have investigated knowledge of and attitudes toward HIV and AIDS, prevention strategies, social influences on infection, life skills for living with HIV as well as self-efficacy (Francis, 2010; Harrison *et al.*, 2010; Jewkes *et al.*, 2008; Gupta, Parkhurst, Ogden, Aggleton & Mahal, 2008; Kirby, Laris & Rolleri, 2007; Gallant & Maticka-Tyndale, 2004; Paul-Ebhohimhen *et al.*, 2004). One of the major findings with regard to HIV and AIDS education is that psychosocial, economic and cultural factors have a major impact on behaviour transformation (Francis, 2010). Other factors that have been found to greatly impact behaviour transformation are social practices, peer pressures, cultural beliefs and practices, hormonal urges, gender, stigma and discrimination, sexuality education, human rights violation as well as literacy (Harrison *et al.*, 2010; Jewkes *et al.*, 2008; Kirby *et al.*, 2007; Gallant & Maticka-Tyndale, 2004). These factors are discussed in detail in Chapter 3.

Another trend in HIV and AIDS education discourses is that HIV and AIDS education must be integrated into the curriculum, by following specific criteria (Van Laren, 2008; UNESCO, 2006), which is what the Department of Education attempted with Life Sciences. Common practice in this regard is integrating academic and/or functional HIV and AIDS knowledge into a curriculum. The effectiveness of this integration is a subject of much debate (Maticka-Tyndale & Barnett, 2010; Anderson & Beutel, 2007; Bertrand *et al.*, 2006; Askew, Chege, Njue, Radeny, Kenyan Ministry of Health & Kenyan Ministry of Education, Science and Technology, 2004; Bhuiya, Rob, Chowdhury, Rahman, Haque & Adamchak, 2004; Diop, Bathidja, Toure, Dieng, Mane & Rama Rao, 2004; Mathur, Malhotra & Mehta, 2004). In relation to Life Sciences, Keselman, Kaufman and Patel (2004) suggest that there is potential for behaviour transformation. They state that one of the factors that determines the effectiveness of HIV and AIDS knowledge is conceptual understanding of HIV and AIDS, which transforms misconception and myths about HIV and AIDS. Furthermore skills learnt

in scholar academic curricula, such as reasoning, problem-solving skills and argumentation skills assist students to apply knowledge in their lives and to negotiate their sexuality.

1.6 Aims of the study

Based on the above discussion, the main aim of the current study was:

To compare Life Sciences and non-Life Sciences students' HIV and AIDS knowledge and their behavioural preferences as a way of interrogating the relationship between Life Sciences curriculum and behaviour transformation.

To achieve the above aims, specific research questions were addressed.

1.7 Research question and subquestions

Emanating from the aim of the study as stated in Section 1.6 above, the following main research question was asked:

How can the curriculum-behaviour transformation relationship be understood when comparing Life Sciences students with non-Life Sciences students on HIV and AIDS knowledge and behavioural preferences?

To respond to the main research question the researcher explored the following research subquestions:

1. *How does the Life Sciences curriculum address HIV and AIDS for safe behavioural preferences among students?*
2. *How do Life Sciences students compare with non-Life Sciences students in:*
 - a) *Academic HIV and AIDS knowledge?*
 - b) *Functional HIV and AIDS knowledge?*
 - c) *Self-reported behavioural preferences related to HIV and AIDS?*
3. *To what extent does academic HIV and AIDS knowledge correlate with*
 - a) *Functional HIV and AIDS knowledge?*
 - b) *Self-reported behavioural preferences related to HIV and AIDS?*

To respond to the above research subquestions, specific methods were used (Chapter 4). In Table 1.1, an overview of how each research question is addressed is presented.

Table 1.1 Overview of how research subquestions were responded to

Research subquestion number	Method used to respond to the question	Data source	Results reported in Chapter
1	Analysis of Grade 11 Life Sciences curriculum	Grade 11 Life Sciences curriculum and selected textbooks	5
2	Comparative survey test on students' knowledge and behavioural preferences	Grade 11 Life Sciences and non-Life Sciences students	6
3	Comparative survey test on students' knowledge and behavioural preferences	Grade 11 Life Sciences and non-Life Sciences students	6

1.8 Theoretical approach of the study: a conceptual framework

The researcher used different behavioural theories to formulate a conceptual framework through which the research questions were answered. These theories include *i*) theories of reasoned action and of planned behaviour, *ii*) social cognitive theory and, *iii*) transformational learning. For the scope of the study, behavioural theories that relate to choice behaviour form the backbone of the conceptual framework of the study.

1.8.1 Determining behaviour: The theory of planned behaviour

Over the years researchers such as Ajzen (1991) have generated theories through which behavioural patterns can be predicted and measured, for example theories of reasoned action and of planned behaviour. According to Hansen *et al.*, (2004), the two theories are related but are different in terms of their individual components. While the theory of reasoned action is perceived as a good predictor of behaviour, it fails to recognise that behaviour is not always volitional (Guo, Johnson, Unger, Lee, Xie, Chou, Palmer, Sun, Gallaher & Pentz, 2007; Kuther, 2002). Furthermore this theory does not recognise that behaviour is also influenced by people's perceptions of their ability to behave in a particular way (Hansen *et al.*, 2004). Given this, the theory of reasoned action was modified by Ajzen to incorporate these

elements. This modification led to the formulation of the theory of planned behaviour (Guo *et al.*, 2007; Figure 1.1).

The theory of planned behaviour suggests that a person's behaviour is determined by his/her behavioural intentions (see Figure 1.1; Ajzen, 2006, Ajzen, 1991). In this instance the behavioural intentions can be defined as the person's attitude towards the behaviour itself and can either be for or against the behaviour in question (Kuther, 2002). Intention relates to motivational factors that influence behaviour, willingness to try as well as the amount of effort that people are willing to exert (Ajzen, 1991).

Furthermore the person's behaviour according to Ajzen (2009) is determined by subjective norms which are other people's perceived opinions about the behaviour (Figure 1.1). This means behaviour will depend on facilitating factors, context of opportunity, resources and action control (Ajzen, 1991). Hansen *et al.* (2004) argues that this theory (Figure 1.1), focuses on the influence of the person's attitude towards behaviour rather than attitude towards the stimulus itself. Because of this the theory can only be associated with behaviours that the person has control over (Hansen *et al.*, 2004).

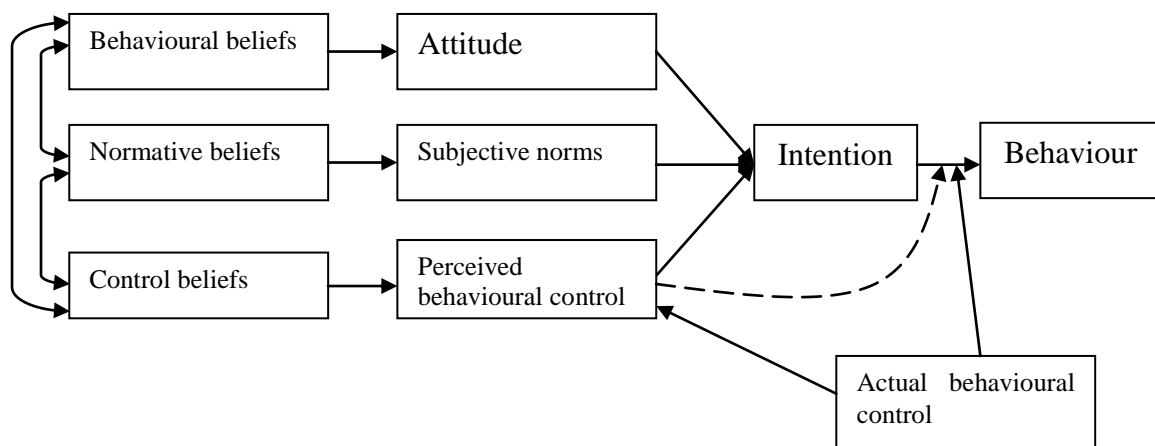


Figure 1.1 The Theory of Planned Behaviour (adapted from Ajzen, 2006)

The theory of planned behaviour suggests that in addition to attitudes and subjective norms, behaviour is influenced by perceived behavioural control (Figure 1.1; Ajzen, 1991). This is the individual's subjective belief about whether or not they have the ability to behave in a certain way (Hansen *et al.*, 2004). Other researchers have linked the perceived behavioural

controls as based on the theory of achievement motivation as well self-efficacy (Ajzen, 1991). The theory of achievement motivation defines an individual's expectancy of success as the perceived probability of succeeding at a given task (Ajzen, 1991). Self-efficacy (Bandura, 1991) refers to one's judgments on how well they can execute courses of action required to deal with prospective situations, for example that behaviour is influenced by confidence in one's ability to perform. In essence, self-efficacy influences amongst other things, the choice of activities, preparation for an activity, effort expended during activity as well as thought patterns and emotional reactions (Ajzen, 1991; Bandura, 1991)

Ajzen (2006) further argues that beliefs also affect behaviour (Figure 1.1). For example, behavioural beliefs, which are beliefs about the likely consequence of a behaviour, have been shown to affect the attitude towards a behaviour. Furthermore normative beliefs, that is, beliefs about the expectations of other people influence subjective norms. In addition, Ajzen (2006: 1) indicates that control "beliefs about the presence of factors that may facilitate or impede performance of the behaviour" as they affect perceived behavioural control. Ajzen (2006) also argues that beliefs (that is, behavioural, normative and control beliefs) influence each other. Ajzen further indicates that performance of a behaviour requires a strong actual behavioural control. The actual behavioural control refers to the skills, knowledge and other resources required to performance particular behaviour. Therefore, performance of a behaviour needs both the intention as well as a sufficient level of behavioural control.

Based on the theory of planned behaviour, the researcher accepts that people's behaviour towards any life issue such as HIV and AIDS is individualistic, voluntary, under control, deliberate, planned and is performed. In this way, while knowledge is important, people still have the right to decide on their behavioural patterns based on their individualistic beliefs, attitudes and intentions. Therefore, while the study intended exploring the effects of knowledge, the researcher acknowledges that there are other factors that influence students' behaviour.

1.8.2 Factors affecting behavioural patterns: social cognitive theory

Concerning factors that affect behaviour the study adopts the social cognitive theory as a guide. While to a certain degree the social cognitive theory resembles the theory of planned

behaviour, the social cognitive theory is based on much of Bandura's work (Schunk, 2000) and covers three domains unto which its assumptions are based. These are the reciprocal relationships between people, behaviours and the environment; enactive and the vicarious learning as well as a distinction between learning and performance (Chiu, Hsu & Wang, 2006; Crittenden, 2005; Schunk, 2000). Simply put, the social cognitive theory suggests that people's behaviour is, to some degree, influenced by the social networks as well as the person's cognition (Chiu *et al.*, 2006). In the following subsections, the researcher looks at each factor that influences behaviour according to the social cognitive theory.

1.8.2.1 The triadic reciprocal

The social cognitive theory discusses behaviour within the framework of triadic reciprocity (Figure 1.2; Crittenden, 2005; Schunk, 2000), a framework which Crittenden proposes to be the social learning theory. Crittenden (2005) and Schunk (2000) agree that behaviour is a result of reciprocal interaction between the cognitive, the behavioural and the environment. In this regard Crittenden (2005) refers to Davis and Luthans (1980: 960) comment that "the person and the environment do not function as independent." In this framework, the "person" component refers to cognitions, perspectives and beliefs about the world that an individual has (Crittenden, 2005; Schunk, 2000). "Environment" refers to the variable in which the person is living and "behaviour" is the manner in which people respond to the environment (Crittenden, 2005; Schunk, 2000).

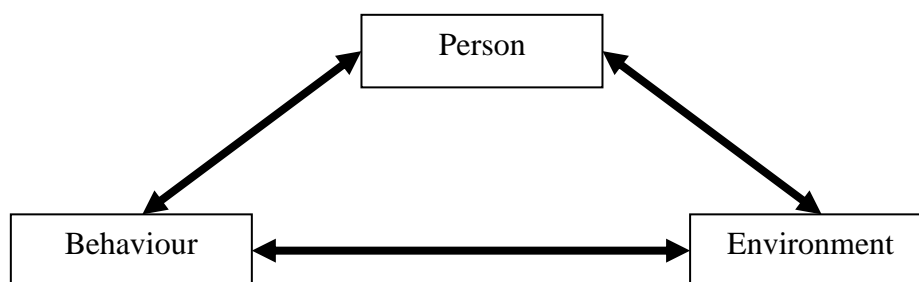


Figure 1.2 An illustration of the triadic reciprocal (adapted from Crittenden, 2005: 961)

One of the most important factors used to interpret the relationship between the person and behaviour (Figure 1.2) is self-efficacy (Schunk, 2000; Bandura, 1991). As stated before in this review, self-efficacy refers to an individual's beliefs concerning his or her capabilities to

organize and implement specific actions that are necessary for the performance of a specific behaviour (Bandura, 1991). In this way, self-efficacy determines the choice of tasks, persistence and effort expenditure toward certain behavioural patterns (Schunk, 2000).

Furthermore according to the social cognitive theory, actions modify self-efficacy (Schunk, 2000). Explaining this, Crittenden (2005) says the sequence of events in this regard is such that a person notices something in the environment, the individual remembers what was noticed (that is, processes information cognitively) then produces a certain behaviour and thereafter the environment delivers a consequence (Figure 1.2). For instance if a student who believes that he cannot contract HIV has unprotected sex, this student will not immediately know if he is HIV positive (unless a medical test is done immediately to track the presence/absence of the virus in the body). Because of this, this student's self-efficacy will remain unchanged until he learns of his possibly infected status. However if the student were to immediately learn that he is HIV positive; his self-efficacy would change as he realizes that he is capable of being infected. In this way behavioural experience has the potential of changing self-efficacy.

In addition to the above, there is also a relationship between behaviour and the environment (Crittenden, 2005; Schunk, 2000). In this case, a person's behaviour has the potential of altering the environment (Schunk, 2000). For example if a teacher talks about HIV in a Life Sciences classroom and then gives an assessment activity; if most students were to fail the assessment activity, the teacher may want to re-teach the subject matter. In this way, the instructional environment is being altered by behaviour.

1.8.2.2 Enactive and vicarious learning

The social cognitive theory also attempts to define learning according to the enactive and the vicarious learning forms (Schunk, 2000). In this way the theory suggests that learning is enactive through actual doing or vicarious by observing models perform. By models Schunk (2000) suggests that they can either be living beings (for example teachers) or external representations (symbols).

Concerning enactive learning, learning occurs from the consequences of one's actions (Schunk, 2000). For instance behaviour that results in successful or comforting consequences

is retained, but that which results in unsuccessful or unpleasant consequences is discarded (Schunk, 2000). This is in line with the Thorndike's Law of Effect and Watson's Laws of Frequency and Recency (Schunk, 2000). These basically suggest that behavioural consequences serve as sources of information and motivation.

Learning vicariously refers to learning without performance (Schunk, 2000). In other words, the student learns simply by observing models. This is one of the most common teaching practices in disadvantaged schools where resources are limited and only teachers have the liberty to perform experiments for instance (Muwanga-Zake, 2010). In such cases students are only expected to observe and learn. Another example is learning about the effects of HIV and AIDS. Most people know the effects of HIV and AIDS by observing them in other people and not through overt experience.

There is a difference between learning and performance (Schunk, 2000). Often learning may refer to the acquisition of new knowledge, whereas, performance means a person has had previous exposure to a certain phenomenon (Schunk, 2000). In this way it can be suggested that learning does not always require performance. Given this, the current researcher argues that in terms of transformational learning, learning about HIV and AIDS requires a specific teaching and learning method that will not only pass on information but will also influence behavioural patterns of students. In line with the social cognitive theory's epistemology, the current researcher adopts a view that effective learning about any subject matter for example HIV and AIDS, depends on an individual's perspective of self, the world and certain behaviours. Furthermore the researcher accepts that learning can occur through practice and/or observing. For subjects where practice is not possible, students can rely on observations to enhance their knowledge and then behaviour.

1.8.3 Role of knowledge in behavioural patterns

Before discussing the role of education in relation to behavioural patterns, it is important to first look at how knowledge is constructed. According to the theory of constructivism, knowledge is not acquired but created by each individual (Young & Collin, 2004; Thompson, 1995; Von Glasersfeld, 1995). As part of this process interaction with the environment is critical.

When students are exposed to new information, through experience and/or observation, they cognitively process this information by selecting and transforming the information, constructing hypotheses, and making decisions, based on already existing cognitive structure or prior knowledge (Young & Collin, 2004; Thompson, 1995). According to Thompson, (1995) when selecting information, students tend to select information that is easily comprehended and mentally manageable. Once certain segments of the new information have been selected, they are transformed into storable mental forms which become new knowledge (Thompson, 1995). Therefore, after mentally processing new information, students construct new forms of information based on already existing knowledge.

Following construction of mental schema, students are expected to be able to transfer knowledge from one domain to another. According to Argote and Ingram (2000) knowledge transfer is a phenomenon whereby an individual applies knowledge acquired in one situation in another (Kane, Argote & Levine, 2005). Furthermore researchers suggest that knowledge transfer can be measured by measuring changes in knowledge or changes in performance such as behaviour (Kane *et al.*, 2005; Argote & Ingram, 2000; Darr & Kurtzberg, 2000). Thus the researcher believes that once knowledge has been constructed through constructivism, such knowledge should be transferable and applicable in novel settings. A question is how does knowledge translate to safe behaviour?

Scholars suggest that concept understanding (that is, knowledge) can influence problem-solving skills and behavioural preferences (Guo *et al.*, 2007; Williams and Noyes, 2007; Chiu *et al.*, 2006; Crittenden, 2005; Magnani, MacIntyre, Karim, Brown & Hutchinson, 2005; Hansen *et al.*, 2004; Kuther, 2002; Maynard, Moss, Whitehead, Narayanan, Garay, Brannon, Kantemneni & Kustra, 2001; Pakaslahti, 2000; Schunk, 2000; Ajzen, 1991; Bandura, 1991; Clark & Paivio, 1991; James & Nelson, 1981). Constructivism argues that the external source of knowledge and how this knowledge is presented will affect the students' ability to understand the concept (Thompson, 1995). However according to researchers (for example Mayer, 2001), concept understanding depends on a number of factors. For example in the area of HIV and AIDS prevention, researchers (Coates, Richter, & Caceres, 2008) suggest that integration between various fields of expertise could produce effective teaching resources that could enhance concept understanding. Heeding this call, Kiene and Barta (2006) rejected the traditional face-to-face intervention approach (Page *et al.*, 2006) for a

computer-delivered approach. Whereas positive results were observed in Kiene and Barta's study, researchers still argue that school-based face-to-face approaches are also effective (Gallant & Maticka-Tyndale, 2004). Also defined as significant in determining success in knowledge construction is the teaching strategy or mode of presenting information (Schönborn & Anderson, 2008; Anderson, 2007; Mnguni, 2007; Mayer, 2003). For example researchers (Mnguni, Schönborn, & Anderson, 2009; Schönborn, Anderson & Mnguni, 2007; Mayer; 2003) argue that a combination of external representation (for example animations and pictures) and text is effective in fostering construction of scientific knowledge among students.

The process of solving problems remains a debated issue. However researchers report two common problem-solving procedures which include problem-solving in a creative context (Wallas, 1926) as well as generic empirical process (Polya, 1954). In the creative context, problem-solving involves defining the problem and gathering information relevant to its solution (Wang & Chiew, 2010). This process is followed by continuous thought processes seeking to understand the problem. Through this thought process the student will get a "sudden insight into the solution" (Wang & Chiew, 2010). Thereafter, the student will verify the solution and then apply the necessary means to solve the problem. In contrast, generic empirical process to problem-solving argues that problem-solving involves devising appropriate strategies and actions needed to resolve a problem (Wang & Chiew, 2010; Polya, 1954). Once these strategies are in place, appropriate measures are taken to solve the problem. Wang and Chiew (2010) suggest that all problem-solving strategies involve a number of functions including abstraction, searching, learning, inferring, analysis and synthesis.

While behaviour is not considered as an act of solving problems, some researchers suggest that there is a significant link between problem-solving and behaviour (Magnani *et al.*, 2005; Pakaslahti, 2000). Pakaslahti (2000) notes that some forms of behaviour are associated with problem-solving tasks. For example, research has shown that aggressive behaviour may be due to deficiencies in processing social information (Pakaslahti, 2000). A health study in the United States showed that people with higher problem-solving skills displayed different behavioural preferences compared with those with lower problem-solving skills (Lesley, 2007; Magnani *et al.*, 2005). Attesting to this, Crick and Dodge (1994) report that deficiencies in social-cognitive activities may lead to the production of misconceptions which

increases the likelihood of employing inappropriate problem-solving strategies and behavioural practices (Magnani *et al.*, 2005; Pakaslahti, 2000).

Flowing from the above literature review on behavioural theories, the researcher surmises that

- a) Students construct knowledge for concept understanding.
- b) Concept understanding depends on a number of factors including the format of presentation.
- c) Knowledge constructed in one situation is used to respond to another situation.
- d) Knowledge is used in problem-solving.
- e) Problem-solving depends on availability of knowledge and skills.
- f) Inability to solve problems (due to unavailability of knowledge and skills) determines response mechanisms such as behaviour.

Furthermore the researcher believes that knowledge may influence behavioural patterns, albeit not directly.

1.8.4 Summary of Conceptual Framework

In summary, the conceptual framework presented above (Sections 1.8.1 to 1.8.3) indicates how different behavioural theories informed the study. As discussed above constructivism suggests that during learning, knowledge is constructed based on prior knowledge (constructivist learning 1 in Figure 1.3).

Furthermore according to the social cognitive theory (Figure 1.3), environmental-person-behaviour interactions are some of the major factors that determine behaviour (Figure 1.3). Behaviour is also influenced by experience and observation, which is exposure to new knowledge. In other words, the theory of planned behaviour and the social cognitive theory all agree that behaviour can be changed through different factors that influence it, for example by changing experiences through exposure to new knowledge (constructivist learning 2 in Figure 1.3). This new experience through knowledge will then lead to a new transformed behaviour. Even though transformed, the behaviour remains dynamic as explained by the reasoned action theory, theory of planned behaviour and the social cognitive theory.

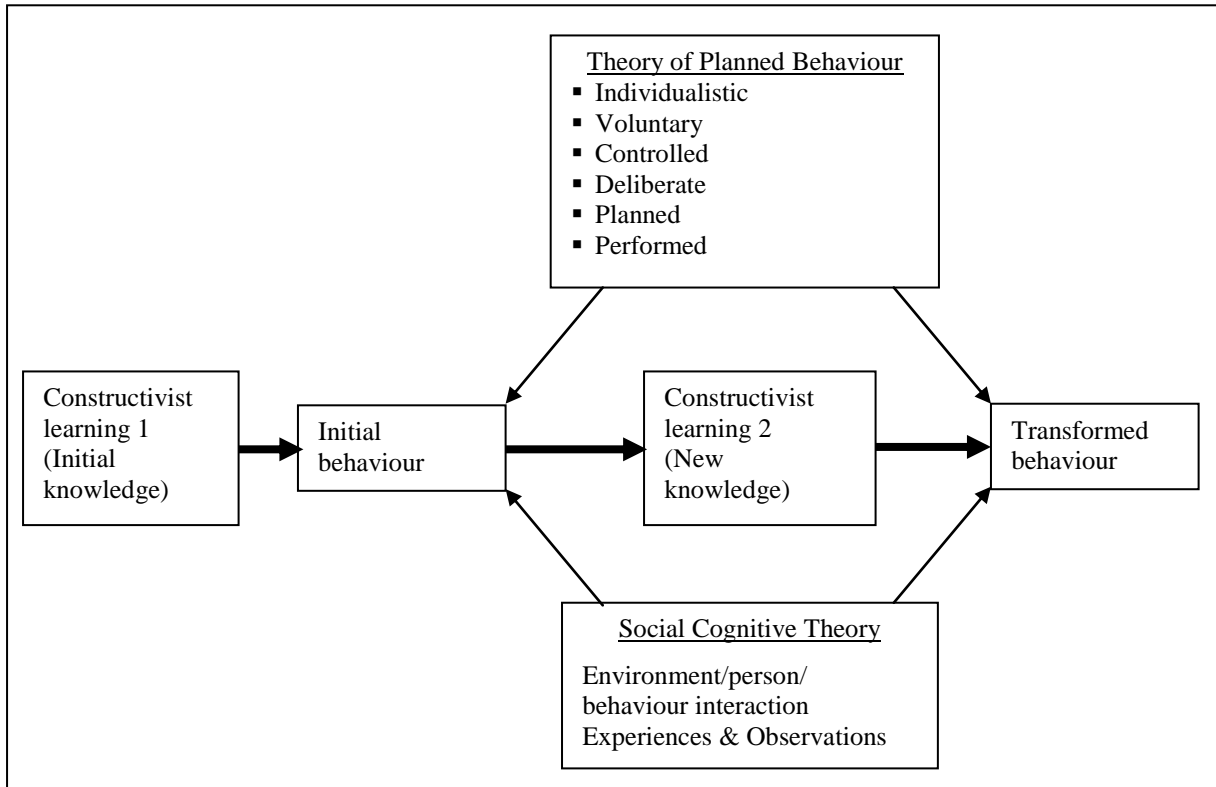


Figure 1.3 The conceptual framework of the current study

From this conceptual framework therefore the researcher intended to determine the extent and effectiveness of the Life Sciences curriculum in addressing behaviour transformation.

1.9 The researcher as a research instrument

In pursuing the current study, the researcher adopted a multiplistic realism approach for reasons described below. The researcher however takes note of the misgivings of realism as suggested in literature. For example supporters of realism proclaim realism as being objective and assuming that findings are “probably true” (Healy & Perry, 2000; Pandey, 1982). However post-modernists argue against realism in that scientific knowledge, instruments and evidence are social constructs, and therefore realists’ claim of objectivity does not hold (Wright, 1996; Harding 1986; Harding & Hintikka 1983). In fact, anti-realists argue that scientific research can never achieve objective knowledge (Boyd, 1999; Knorr Cetina, 1993). Acknowledging these views, the researcher believes that in order to compensate for the misgivings of any one paradigm, a multiplistic approach is preferred (Leahey, 2007; Page *et*

al., 2006; Tashakkori & Teddlie, 2003; Derry, Levin, Osana, Jones & Peterson, 2000; Alford, 1998). As a result, while the current study adopts a generally realist approach, some ontological and epistemological approaches of other paradigms such as constructivism were adopted as discussed below.

While adopting a varied paradigm approach, the researcher notes Johnson and Onwuegbuzie's (2004) citation of Guba (1990: 81) who state that "accommodation between paradigms is impossible...we are led to vastly diverse, disparate, and totally antithetical ends." With this in mind, in line with Johnson and Onwuegbuzie (2004), the researcher disagrees with Guba and accepts the existence of a mixed method paradigm. For instance the researcher disagrees with the independency of the subject as suggested by positivists if such a subject is a human being (Healy & Perry, 2000). This is because human beings have perspectives that are continually transformed by exposure to new phenomena, questions and views – a constructivist's epistemology (Healy & Perry, 2000).

This then leads the researcher to agree with the constructivist. However the researcher also agrees with the positivist notion that data will not change because it is being studied (Healy & Perry, 2000). However, it is people who work with the data who may bring in new interpretations to the unchanging data – a critical theorist's ontology (Healy & Perry, 2000). Because of this "paradigm war" therefore, as suggested by Johnson & Onwuegbuzie (2004), it is possible to have a mixed method approach, which accepts the realities presented by different paradigms. Because of this, the researcher approaches the current study with such an open mind that findings of the current study will "probably be true" since the reality is real but only imperfectly and probabilistically apprehensible – a realist ontology and epistemology (Healy & Perry, 2000).

In pursuing the current study therefore, the researcher followed an inclusive approach of the realist paradigm. This paradigm is based on the idea of mixed methods as related to varied or multiplistic epistemologies (Page, 2005; Brownlee, Berthelsen & Boulton-Lewis, 2004). Realism as reviewed by Krauss (2005) neither agrees nor disagrees with other paradigms, but makes use of elements of different paradigms. Because of this flexibility, realism has gained popularity among researchers who have termed it critical realism, postpositivism and neopostpositivism (Krauss, 2005; Denzin & Lincoln, 1994; Guba & Lincoln, 1994; Hunt, 1991).

Like constructivism, realism accepts a multiple concepts approach about a single reality (Healy & Perry, 2000). In this way realism acknowledges the variations in the values of each human, including the researcher. Because of this, realism accepts that research cannot be absolutely objective or subjective because there will always be differences between reality and what people perceive as reality (Krauss, 2005). Therefore, at any one time, the reality of a researcher, conditioned by his environment, may not be the reality on the ground, conditioned by socio-environmental factors. Realism further suggests that to understand reality of any society, it is imperative to grasp the social factors involved in value-generation of that particular society (Krauss, 2005).

The goal of realism-orientated research, such as the one presented here, is therefore to discover, both observable and non-observable phenomena within a social structure (Krauss, 2005). This requires the use of both theoretical and empirical means to deduce knowledge. Furthermore realist researchers tend to use both qualitative and quantitative strategies (Healy & Perry, 2000). In this way researchers will tend to identify, name and describe phenomena while acknowledging that their work may be real yet fallible (Krauss, 2005).

1.10 Conclusion and implications of the study to the body of knowledge

The researcher believes that the findings of this study will contribute to the body of HIV and AIDS prevention with emphasis on HIV and AIDS education as well as curriculum development. Firstly the researcher hopes to provide researchers and policy makers with a reflective discourse related to the philosophy of education. Based on the findings of the study, the researcher engages in a critical dialogue of theoretical underpinnings that led to the use of Life Sciences to impart knowledge of HIV and AIDS. This could imply retaining, reviewing or removing existing conceptual frameworks of curriculum design in Life Sciences. Secondly the researcher intends providing a conceptual framework based on empirical data to guide the selection of concepts for the teaching of HIV and AIDS. For example determining the effect of Life Sciences-based HIV and AIDS education on students' understanding of HIV and AIDS could necessitate curriculum designers and teachers to reflect on their preferred

pedagogical content knowledge for HIV and AIDS education. In addition findings may assist those involved in public health education to design and use effective means to provide information on HIV and AIDS. Thirdly, the study intends providing a reflective review of the role that Life Sciences can play in improving lives through dissemination and application of scientific knowledge. This will be done by describing existing relationships between Grade 11 Life Sciences curriculum and behavioural preferences of students.

The current thesis is arranged in the following manner. Chapter 1 provides an introduction to the study including the conceptualization, a problem statement the rationale, the aims and the research questions. The approach to the study (paradigm) is also presented in Chapter 1. In Chapter 2 the researcher presents a literature review that attends to behaviour transformation and curricula. In Chapter 3 the researcher addresses complexities concerning HIV and AIDS education in relation to health education, how HIV and AIDS knowledge fits into Life Sciences as well as HIV and AIDS and education. In Chapter 4 research methods are presented together with the justification of the methodological approach. Chapters 5 and 6 provide results from data collection in response to the research questions. Chapter 7 is a synthesis chapter in which the researcher provides a conclusion based on the results of the study, and how these implicate the body of Life Sciences education and HIV and AIDS education.