

2. CHAPTER 2: EXPLORING THE CURRICULUM-BEHAVIOUR TRANSFORMATION RELATIONSHIP

“The aim of education should be to teach us rather how to think, than what to think - rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with thoughts of other men.” – Bill Beattie⁶

2.1 Introduction

Bill Beattie’s quote constitutes a central question to this study of whether curriculum can inform behaviour transformation. In the current chapter the researcher therefore argues that, education and socialization are not always aligned. This misalignment could limit the ability of the curriculum to affect behaviour. Reasons for this misalignment are explored. In this regard the researcher will present literature demonstrating that curricula have intended outcomes or objectives, which may include behaviour transformation. However these objectives are not always achieved because of various curriculum-related complexities. These complexities include school and classroom dynamics, textbook compilation and use, social contexts, the role of research and interdisciplinarity, as well as the academic and social needs of students. Put together, these factors affect education’s ability to influence socialization.

To address the scope of the study, the researcher also presents an argument that curriculum-specific challenges exist, that may limit attainment of intended objectives. These challenges emanate from inconsistencies with regard to curriculum theory, the rationale for curricula, curriculum ideology as well as selection of content knowledge. Given the above, the researcher then explores some documented philosophical strategies that have been shown to strengthen a curriculum-behaviour transformation relationship. In particular the researcher argues that experimentalism, transformative citizenship education and critical pedagogy could lead to behaviour transformation. At the end of the chapter the researcher poses a

⁶ <http://www.brainyquote.com>

question of how Life Sciences could address curriculum challenges in order to effectively affect behaviour transformation of students in the context of HIV and AIDS.

2.2 Curriculum challenges can be resolved

While there are various challenges that may be hindering the effectiveness of curricula to influence socialization, the researcher argues that these challenges can be resolved. Even though Hodson (2004: 2) indicates that “regrettably, science is often regarded as a body of knowledge that can be transmitted by teachers, memorized by students, and reproduced on demand in examinations. Regrettably, too, science is often portrayed as the de-personalized and disinterested pursuit of objective truth, independent of the society in which it is practised and untouched by ordinary human emotions, values, and conventions.” From Hodson’s (2004) perspective, it appears that if education follows the traditional scholar academic ideology, chances are that it will fail to transform students’ behavioural practices.

George (2006) mentions that another challenge for socialization through education is the attitude of teachers towards education that clashes with social norms. For example “too often, teachers avoid confronting the ... social values underlying the scientific and technological practices they teach about, and seek to avoid making judgements about them or influencing students’ views” (Hodson, 2004: 2). In South Africa, a country where freedom of choice is cherished, teachers are sceptical to be seen as trying to impose their views on students (Bantwini, 2010). Consequently education fails to address social issues.

Another challenge that education may face is that a number of its fields, including biotechnology and evolutionary studies, are associated with cultural and public policy controversies (Klop, Severiens, Knippels, Van Mil, Marc, Ten & Geert, 2010; Sadler, 2004). To this end there are numerous reports of negative attitudes towards biology because it tends to conflict directly with social norms and cultures. At least three areas have been identified as responsible for the resentment shown towards biology by society and students. These elements are *i*) a lack of a solid knowledge base of basic biology constructs, *ii*) unclear or poorly developed personal values, and *iii*) an inability to make informed decisions (Klop *et al.*, 2010). This means scientific literacy or lack of it plays a significant role in shaping

attitudes toward science (Sadler, 2004), and by extension, decision-making and behaviour (Ajzen, 1991).

Dewey, a popular advocate of behaviour transformation through education, however “failed to resolve the dualism between the school and society that he fought to overcome because he failed to account for the many institutions in society which provide education” (Zuga, 1992: 5). The argument is that school is not the only agent of socialization and in order for education to effectively address social issues, there has to be a synergy between all agents of socialization including the school. Integrating social issues into a curriculum however remains a challenge for researchers. For example Ekborg (2010) indicates that if the scientific component (formal curriculum) goes against a normative system of values which students subscribe to, their affect-based responses are hindered, jeopardizing even their critical reasoning. As a result students may revert back to defending socio-cultural views instead of the socio-scientific ones.

However optimists such as Klop *et al.* (2010) argue that science subjects such as Life Sciences can lead to transformation of behaviours. They argue that transformation of behaviours can happen if these subjects (e.g. Life Sciences) could incorporate “scientific literate competences that students need, to be able to live and participate with reasonable comfort, confidence, and responsibility in a society that is deeply influenced and shaped by the applications, ideas and values of science” (Klop *et al.*, 2010: 1128). This would however require an evaluation of the extent to which society (such as the South African) is influenced by science. Furthermore science curricula would have to be evaluated in order to determine their limitations as far as social needs are concerned. (The current study intended to address this area). Thereafter scientific literate competences that students need could be incorporated into curricula. Alternatively science curricula would be developed further to ensure that they are relevant to the needs of the students and society. Until then Klop *et al.*’s (2010) submission may be limited.

Furthermore Hodson (2004) states that students need to be taught and encouraged to look critically and objectively at social norms and values and explore strategies that can be used to further social transformation. In addition students’ active participation in socio-scientific and political discourses should be encouraged because it is through practice that values and habits can be instilled (Zuga, 1992). Linked to this Dewey (1916: 79) concludes that science

education should strive “to shape the experiences of the young so that instead of reproducing current habits, better habits shall be formed, and thus the future adult society be an improvement on their own.”

Other researchers have presented empirical evidence supporting the view that education can lead to social emancipation, including behaviour transformation. Esakov (2009) reports that in South Africa education has been used to produce, sustain and challenge racial discourses. Goldberg (1996) also reports that education can be used to create social structures. Other researchers however indicate that the effectiveness of education as an agent of socialization depends on a number of factors. For example Aristotle argued that “there are opposing views about the practice of education. There is no general agreement about what the young should learn, either in relation to virtue or in relation to the best of life; nor is it clear whether their education ought to be directed more towards the intellect than towards the character of the soul” (Cohen, 1999).

The researcher therefore acknowledges that there are challenges to the curriculum-behaviour transformation relationship. However the researcher argues that it is possible to resolve these challenges in order to have a better and relevant education. The researcher believes that identifying challenges that hinder the curriculum-behaviour transformation relationship is the first step in providing ideas to address the overarching quandary.

2.3 Curriculum challenges

Before engaging into the role of curriculum to address behaviour transformation, it is important to first discuss the nature of the curriculum. According to Goodlad and Associates (1979), there is curriculum practice and curriculum inquiry. Curriculum practice is, according to Goodlad and Associates (1979: 17), what curriculum makers work at.” The study of the curriculum practice is therefore termed curriculum inquiry. This includes for example, an investigation to the context, problems and outcomes of curriculum practice. The current study therefore focused on curriculum enquiry.

Within curriculum inquiry, the study focused on the substantive phenomenon. Goodlad and Associates (1979) indicate that there are two other phenomena that make up curriculum inquiry, namely, the political-social and the technical-professional phenomena. The substantive phenomenon deals with investigating and studying the goals, subject matter and study material of a curriculum. Consequently, by exploring the above elements of the Life Sciences curriculum, the study explored the substantive phenomenon. According to Goodlad and Associates (1979), the “substantive takes us to all those matters of goals – what is taught, how what is taught is arranged or evaluated, what evaluation procedures are used and so on.”

There are at least five different kinds of curricula that Goodlad and Associates (1979) propose which are discussed below, namely, the ideological, formal, perceived, operational and the experienced curriculum (the hidden curriculum is not included in this list it is discussed in the following section). The ideological curriculum is that which “emerges from ideastic planning processes” (Goodlad & Associates, 1979: 60). It is the idealistic views that curriculum designers have for a particular curriculum. It is important to note that “one determines the contents of ideological curricula by examining textbooks, workbooks, teachers’ guides, and the like” (Goodlad & Associates, 1979: 60). Formal curricula are those which are prepared by curriculum designers and approved by authorities for adoption to their institutions. This formal curriculum is documented in curriculum guides and curriculum statements and is a collection of ideal curricula that has been adapted or modified by authorities. Formal curricula have statements of goals which are subject to various interpretations by teachers and others who work with them. Bantwini (2010) presents evidence showing that what is intended in the formal curricula is not always what students receive. The perceived curriculum is what teachers, students, parents and various interested persons perceive in their mind as the curriculum. Goodlad and Associates (1979) posit that persons working with curricula (for example, teachers and parents) have different perceived curricula even if they work from the same formal curriculum. The operational curriculum is what teachers actually teach in class. This according to Goodlad and Associates (1979) also differs from the perceived curriculum. Furthermore, the operational curriculum differs to the experiential curriculum, which is what students actually experience.

Overall, it appears that there is an evolution of the curriculum from where it is first conceived to where it is actually experienced. Therefore what the curriculum designer may intend may not be what actually happens in the classroom. The current study however explored the

formal curriculum and used it to make inferences about the ideological curriculum. Furthermore the researcher explored students' behavioural preferences with the intent of determining the relationship between the experiential curriculum and the formal curriculum. To further contextualize this in the following subsections the researcher will explore challenges to the curriculum-behaviour transformation relationship, namely the role of the hidden curriculum on socialization, the lack of prioritization of students' social needs and the intricacies of curriculum.

2.3.1 Challenge 1: The role of the hidden curriculum on socialization

Kentli (2009: 83) quotes Emile Durkheim as stating that:

“There is a whole system of rules in the school that predetermine the child's conduct. He must come to class regularly; he must arrive at a specified time and with an appropriate bearing and attitude. He must not disrupt things in class. He must have learned his lessons, done his homework, and have done so reasonably well. There are, therefore, a host of obligations that the child is required to shoulder. Together they constitute the discipline of the school. It is through the practice of school discipline that we can inculcate the spirit of discipline in the child.”

The above idea of student enculturation through schooling outside the formally articulated parameters was also studied by Jackson (1968) who termed it the hidden curriculum. The central idea behind the hidden curriculum is that the learning outcomes achieved in the classroom (based on a formally written curriculum statement) may sometimes differ to behavioural patterns of students outside the classroom because of indirect instructions transmitted to the students by teachers and other students within the organization and structure of the school. In fact life outside the classroom requires a different set of rules, norms and standards which to some extent, are only achieved through a hidden curriculum.

Jackson (1968) suggests that through the hidden curriculum, students learn various interpersonal and intrapersonal skills such as cooperation, independence and personal identity. Through the hidden curriculum students learn and/or develop values, norms and belief systems (Kentli, 2009; Margolis, 2001). Accepting that the hidden curriculum teaches values and norms also led to the view that the hidden curriculum may also be influenced by social contexts (including undocumented social norms) within which students are. As a

consequence of the hidden curriculum students may lose their original idealism, adopt a ritualized identity, become emotionally flexible, change their ethical integrity and even accept context specific hierarchy (Lempp & Seale, 2004). Overall, the hidden curriculum leads to enculturation of students by defining values, social expectations, behaviour, identity, social functioning and self-efficacy.

Based on what is known about the hidden curriculum, the researcher argues that it is students themselves who define what acceptable behaviour in their local setting is. This argument is also based on the ontology of constructivism that there are multiple and locally constructed realities (Thompson, 1995). Therefore students are designers and executors of the hidden curriculum. Because students themselves are agents of socialization through the hidden curriculum, one would expect students to accept the teaching of the hidden curriculum more than some of the views of the formal curriculum. In fact Martin (1976) argued that the formal curriculum is failing while the hidden curriculum is thriving to foster behaviour transformation because “students do not learn to read, they do not learn math or science or any of the other subjects and skills endorsed by all parties to the educational enterprise; what they do learn is to be docile and obedient, to value competition over cooperation and to stifle their creative impulses.” While Martin may be extreme in his views, one cannot ignore the fact that perhaps, within the formal curricula settings, students have mastered the art of acquiring knowledge and answering assessment questions. Perhaps all they know is a set of rules and they learn but not what they are taught. Some researchers have taken the argument even further by suggesting that the formal curriculum contributes only 10% to socialization. The rest of it is due to the hidden curriculum (Massialas, 1996)

Based on the role of the hidden curriculum to socialization, it appears that the first challenge that education (and by extension Life Sciences) may have, is aligning itself to the hidden curriculum. However as far as the researcher is concerned, there is a dearth of knowledge regarding the extent to which the hidden curriculum and the Life Sciences curriculum talk to the same issues, particularly in the context of HIV and AIDS. The researcher believes that responses to these questions could inform the realignment of education and socialization.

2.3.2 Challenge 2: Students' needs are not prioritized in formal education

Since the dawn of human kind, people pass on their values and traditions from one generation to the next: a phenomenon known as enculturation (Kendall, Murray & Linden, 2004). Here skills, knowledge and beliefs are taught to children by those in society or culture who are regarded as experts and have certain standing within society (Kendall *et al.*, 2004). This was done to ensure that children are well equipped with skills and knowledge that are required to ensure their survival and prosperity (Adeyemi & Adeyinka, 2002; Hughes & More, 1997).

The researcher therefore believes that the most important person in education is the student. Without him/her, there is no curriculum, school or teacher. However the researcher also believes that this order of things has changed over the years. The student no longer seems to be the priority, even though curricula claim otherwise. Education has been invaded by various other “persons”, who have imposed themselves on the student. No wonder then, that students' social needs (such as behaviour) receive the least attention in education. Instead it is the needs of curriculum designers, textbook authors, teachers, disciplines and researchers that are prioritized.

Broemmel and Lucas (2010) indicate that education departments and curriculum experts design curricula with specific intended outcomes. Textbook writers and those who formulate assessment tools use these intended outcomes to outline content knowledge and assessment strategies that will be used. However “it seems deceptively logical that teachers will follow the textbooks and teach their students everything therein and that students will in turn, record strong performances on the correlated standardized tests” (Broemmel & Lucas, 2010: 1). Instead there are numerous complexities within the education system, school, and the classroom that alter the intended curriculum. In fact there are reports of misalignments between textbooks and curriculum standards (Jitendra, Griffin & Xin, 2010). To this effect there are a numerous debates about the relationship between curricula and textbooks (Jitendra, Griffin, Deatline-Buchman, DiPipi, Sczesniak, Sokol & Xin, 2005), student achievement (Xin, 2007; Woodward & Brown, 2006) and teacher practices (Harwell, Post, Maeda, Davis, Cutler, Anderson & Kahan, 2007). Therefore, what the curriculum may be

intending is not necessarily the outcome of education. Furthermore the student is not necessarily the objective of the curriculum.

Another malady in curriculum studies is with regard to the objectives of curricula. Scholars often look to taxonomies of educational objectives, such as Bloom's taxonomy, as a guide for developing learning outcomes (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths & Wittrock, 2001). The problem however is that while curricula should be context-specific, the context might be as broad as the world itself. This means that curricula should attend to multiculturalism and diversity and how these trends affect curriculum development in order to accommodate students' needs (Schlein, 2009). In this regard there are calls for culturally responsive and relevant curricula (Ladson-Billings, 1992) so that student development can be accomplished.

Furthermore there are complexities with regard to bridging the gap between classroom (particularly, secondary school classroom) and research (Anderson & Rogan, 2011). The challenge is the complex relationship between various factors that influence schooling, for example policy, local context, social expectations, research trends and technology (Anderson & Rogan, 2011). Furthermore curricula have to have purpose, be operationalized, be delivered and evaluated (Anderson & Rogan, 2011). The interrelationship between each of the above components makes curriculum a complex subject, such that curriculum objectives, selection of content knowledge, administration (teaching and learning) as well as assessment are relative to local complexities.

Other researchers also suggest that curricula's intended outcomes must incorporate a needs assessment which includes present-situation analysis and target-situation analysis (Kırkgöz, 2009; Songhori, 2008). This means curriculum should respond to the needs of students and relevant societies (Long & Crookes, 1992). Important to note in this regard is that researchers should be able to distinguish (where necessary) between needs identified by analysts and those expressed by students (Songhori, 2008). Scholars indicate that there is a need to determine students' current cognitive and behavioural status, that is present situation analysis. Thereafter there is a need to understand how students are expected to be like at the end of the course, that is target-situation analysis (Kırkgöz, 2009; Songhori, 2008). However in reality most curriculum designs lack needs assessment (Songhori, 2008).

Another complication in curriculum studies is multidisciplinary. There is an increased need for collaboration and overlap between various subject areas (O'Connell Rust, 2007), which means that any one subject can no longer be viewed independently. This also means the entire curriculum orientation and the intended outcomes should shift towards academic globalization. Besides being time-consuming, there is the challenge of varying paradigms related to ontology and epistemology rendering an interdisciplinary collaboration in curriculum design much more challenging (Holley, 2009). When paradigms are different, curriculum designers will most probably disagree on which content knowledge is important, the suitable teaching approach, the assessment strategy and intended outcomes (Holley, 2009).

Clearly there are various educational challenges that render behaviour transformation among students negligible. The researcher however does not imply that other issues such as research, student achievement and teacher practices are not significant. The point is, as far as the researcher is concerned, particularly in the context of HIV and AIDS, behaviour transformation requires greater attention. (This argument is furthered in Chapter 3).

2.3.3 Challenge 3: The intricacy of curriculum

While the above two challenges are significant the researcher believes that the biggest impediment to socialization is the curriculum itself. For instance if the curriculum does not prioritize students' social needs, then those outside the curricula will find it easy to suggest and impose other objectives. Therefore, for the scope of the current study, the researcher wanted to understand the curriculum, in relation to its role in shaping social norms, which the researcher believes should remain a priority for education. The researcher identified four main areas that need to be understood in order to inform the curriculum-behaviour transformation relationship. These areas are curriculum theory, rationale for curriculum, curriculum ideology as well as content knowledge.

2.3.3.1 Curriculum theory

The researcher argues that the use of inappropriate curriculum theory may be partly responsible for the curriculum not prioritizing students' social needs such as behaviour

transformation. This is because there is a view that suggests that any one subject needs to have a specific curriculum theory (or theories) that guide the course of curriculum development (Pinar, 2004). Such a theory could be used as a guide to shape both research and development for the curriculum with respect to what should be taught and how it should be taught.

A question however is what is curriculum theory? According to Schiro (2008) curriculum theory is a way of analyzing curriculum from a historical perspective and providing ways of viewing it in a present context. Theorizing, which is the process of developing curriculum theory, assists theorists with curriculum research and development as well as ways of conceptualizing the curriculum (Schiro, 2008). Overall curriculum theory provides guidelines for practical curriculum activity as required by educational systems.

Schiro's definition suggests that curriculum theory is a subfield of a discipline for the development of a curriculum. However other researchers argue that curriculum theory is a field in its own right. For example Pinar (2004) argues that curriculum theory is an interdisciplinary field that specializes in describing the educational experience. He argues that curriculum theory is not a subfield of a single academic discipline because it is influenced by various other fields.

While curriculum theory exists in many contexts (fields and subfields), it appears that there is no agreement regarding what should be included in theorizing (Schiro, 2008; Donnelly, 2006; Pinar, 2004; Kliebard, 1996; MacDonald, 1971). For example the extent to which historical views of curriculum should inform current curriculum is not agreed on, especially given the dynamics of education. Furthermore the purpose of theorizing depends on the interests of the theorists as guided by the need for curriculum reform (MacDonald, 1971). In fact, some curricula do not have evidence of the founding curriculum theory used in its development and some even have multiple theories guiding them (Schiro, 2008; Donnelly, 2006).

Compounding these challenges for curriculum theory is the continued rise of interdisciplinary scholarship, such as psychology's influence in a traditionally philosophical field (Reid, 1979). For example psychologists may argue that learning should be done in a manner that supports the cognitive needs of students (that is student-centred constructivism) (Schiro,

2008). Meanwhile, philosophers may argue that learning should shape students to become academics within their specific disciplines (that is scholar academic ideology) (Schiro, 2008).

The argument here therefore is that curriculum theory holds the key to behaviour transformation through curriculum. However this will require an agreement among researchers as to what curriculum theory should entail. Once a broad curriculum theory has been agreed on, each subject (such as Life Sciences) can then have its unique curriculum theory or theories. Such a subject-specific curriculum theory could guide what should be included in the curriculum, how it should be taught and who should teach.

2.3.3.2 Rationale for curricula

The rationale for curricula is yet another area that could be adapted to ensure that students' social needs are addressed. According to Þórólfsson and Lárusson (2010), the rationale for a curriculum is significant as it provides an orientation for various components of the curriculum. For instance Davis (1998) suggests that curriculum rationale explains why students are taught particular content knowledge, in a particular way in a specific sequence in time. Other researchers who concur with this general view include Schiro (2008), Van den Akker (2003), Kliebard (1996) and MacDonald (1971).

The rationale for a curriculum is embedded in the definition of a curriculum (Waks, 2003). As a consequence there are various definitions given to the curriculum. Smith *et al.* (1957) define the curriculum as a “sequence of potential learning experiences ... set up in the school for ... disciplining children and youth in group ways of thinking and acting.” Emerging from this definition is the issue of learning as an experiential act which is aimed at shaping cognitive functioning of the child. Good (1959) however takes a slightly different view. He argues that curriculum is an instructional strategy for shaping students' intellectual capacity in preparation for entrance to a profession. Tanner and Tanner (1987) on the other hand suggest that curriculum is “planned and guided learning experiences and related learning outcomes ... under the auspices of the school.”

While there is no universally accepted definition of curriculum, there are elements that researchers generally agree should form part of the curriculum. These include *i*) predetermined subject matter, *ii*) a planned sequence of learning experiences *iii*) certifiable

completion *iv*) the institution of learning *v*) socialization and *vi*) social benefits (Waks, 2003; Tanner & Tanner, 1987; Good, 1959; Smith *et al.*, 1957). Scholars however argue that curricula often do not attend to the social benefits and socialization components of the curriculum, and leave these to the hidden curriculum (Waks, 2003). John Dewey is a popular proponent of socialization through curricula (Schiro, 2008; Warde, 1960; Dewey, 1897). However researchers criticize Dewey's views because in reality, socialization is not explicitly incorporated into curricula (Zuga, 1992). Instead, curricula only contain subject matter content, sequence of the learning experience as well as learning outcomes (Waks, 2003).

The rationale for a curriculum also emerges as the orientation (focal point) of the curriculum, which is another area of great contention among researchers. Some researchers argue for the partitioning of different fields of knowledge so that specific knowledge and skills are taught and developed only in particular disciplines (MacDonald, 1971). The influence of discipline partitioning appears significantly in most natural sciences such as mathematics, physics and biology. In these disciplines emphasis is placed on the ontological argument that there is a reality out there that can be studied using objective empirical methods of a discipline (Healy & Perry, 2000). As a result students are trained to master founding knowledge and modes of enquiry that form the basis of the discipline. MacDonald (1971) calls this form of curriculum the knowledge-oriented curriculum. Nevertheless, the knowledge-oriented curriculum has been criticised for not being student-centred or context-specific because of the top-down approach of teaching predetermined content and skills (Van Manen, 1978). Furthermore some researchers feel that epistemology alone is not broad enough to inform curriculum theory (MacDonald, 1971).

Opposing the views of knowledge-oriented curriculum, Van Manen (1978) and Warde (1960) argue that curriculum should be informed by the social, cultural and personal contexts of those learning instead of the discipline (MacDonald, 1971). This view suggests that education must strive to develop students' capabilities, interests and habits as developed in social structures so that better empowered citizens can be produced. One of the most recognized names behind this "reality"-oriented curriculum is John Dewey. Dewey's ideal theory for curriculum is also known as student-centred theory which promotes the idea of hands-on experiential learning (Warde, 1960; Dewey, 1897). Dewey believed that education and learning are social processes and schools are social institutions in which social reform can occur as people share social consciousness (Dewey, 1897). For effective and meaningful

learning to occur, students should actively take part in learning. Dewey also argued that learning should not only be about knowledge acquisition (as suggested by knowledge-oriented ideology), but also about learning to live; a phenomenon also called citizenship education (Warde, 1960; Waghid, 2002). “To prepare him for the future life means to give him command of himself” stated Dewey, explaining his views about a need for citizenship education (Dewey, 1897). Dewey stated that learning should not be about the acquisition of a predetermined set of skills but also about students exploring their own potential and their ability to use and develop skills they already have (Dewey, 1897). Reality-oriented curriculum also implies that content knowledge should be presented in such a way that students can relate their experiences to it. This form of knowledge presentation will foster behaviour transformation through the adjustment of individual learning activity on the basis of social consciousness. Simply put, a reality-oriented curriculum argues that learning should shape the experiences of students so that better habits and behaviours can be produced.

Other researchers however argue against both the knowledge and reality-oriented curricula by suggesting that learning should take an enquiry format. Kong and So (2008) as well as Hover and Horne (2005) believe that during learning, students must engage in problem-solving as a way of constructing knowledge. This inductive approach means students use their experiences to develop a theory. Simsek and Kabapinar (2010) also indicate that during learning, students must be given activities in which they will ask questions, formulate and test their own hypotheses by describing phenomena. Wilkie (2000: 11) refers to this type of learning as enquiry-based learning, which is “an instructional method in which students work in small groups to gain knowledge and acquire problem-solving skills.” Nonetheless, Hughes and More (1997) caution that for enquiry-oriented teaching to be effective, teachers need to ensure that students are able to set up problems and develop argumentation skills. Teachers also need to be able to identify knowledge deficits among students which may hinder progress in problem-solving. Donovan and Bransford (2005) further point out that an “inquiry”-oriented curriculum requires students to have a deep understanding of factual knowledge as well as information retrieval and application skills. Therefore Donovan and Bransford conclude that enquiry-oriented learning may not be feasible for students who lack prior knowledge and relevant skills.

The above discussion highlights the fact that there is no universal rationale for the curriculum. Consequently there is neither a global orientation nor objective for the

curriculum. Because of this, it is not clear which elements should constitute a curriculum. In the context of the study, the researcher believes that the mystified nature of curriculum rationale could make it difficult for curricula to prioritize students' behaviour transformation.

2.3.3.3 Curriculum ideologies

Related to curriculum rationale is curriculum ideology. Curriculum ideology can be defined as beliefs about what should be taught, what should be the outcomes and what should be the purpose for teaching as such. The ideology provides a direction for the practices of a school, classroom and subject areas. The researcher therefore believes that curriculum ideology is another basis on which behaviour transformation could be based. However discourses in this area are limiting curricula's ability to foster socialization through education.

In the 1880s Lester Frank Ward argued that transmitting cultural knowledge should be the main objective of education (Cotti & Schiro, 2004). Ward further suggested that this cultural knowledge should lead to the betterment of individuals by making all members of society equal and promote democracy leading to social progress (Schiro, 2008). Charles Eliot attested to this by suggesting that in order for social progress to occur, the intelligence of students must be empowered allowing for greater power to think (Ravitch, 2000). Eliot further indicated that there needs to be a "plurality and autonomy of academic disciplines and the associated knowledge" (Schiro, 2008: 33). William Harris added that education should provide students with accumulated knowledge which is classified into various disciplines (Ravitch, 2000). Around the 1900s, researchers merged the views of Harris and Eliot and agreed that students should acquire scholarly academic knowledge, develop a discipline-specific thinking ability and therefore reflect disciplines they specialized in (Schiro, 2008; Cotti & Schiro, 2004). This view was later variously termed scholar academic ideology (Schiro, 2008), humanist disciplinarian (Kliebard, 1996) or intellectual traditionalist (Schubert, 1996). In the 1900s however the scholar academic ideology faced a lot of opposition, with researchers such as William Bagley being prominent defenders. For example other researchers argued that education should promote utilitarian education but Bagley opposed this view suggesting that education should focus on developing the intellect (Schiro, 2008).

Those who opposed the scholar academic curriculum include Franklin Bobbitt who argued that students should learn to use knowledge and techniques of production developed by industries. Bobbitt (1918: 42) further argued:

“Education that prepares for life is one that prepares for the specific activities. However numerous and diverse they may be, they can be discovered. This requires only that one go out into the world of affairs and discover the particulars of which these affairs consist. These will show the abilities, attitudes, habits, appreciations, and forms of knowledge that men need. These will be the objectives of the curriculum. The curriculum will then be that series of experiences which children and youth must have by way of attaining those objectives...that series of things which children and youths must do and experience by way of developing abilities to do the things well that make up the affairs of adult life; and to be in all respects what adults should be.”

Bobbitt’s views were later classified as education that prepares students for their roles in society as adults (Schiro, 2008). Kliebard (1996) terms this line of thinking social efficiency ideology while Schubert (1996) and Posner (1992) refer to it as social behaviourist education.

Other researchers however oppose both the scholar academic and social efficiency ideologies. For example John Amos Comenius states that “artisans learn to forge by forging, to carve by carving, to paint by painting...let children learn to write by writing, to sing by singing, and to reason by reasoning” (Schiro, 2008: 112). Building on this discourse, Jean-Jacques Rousseau believed that education should facilitate the growth of students by helping them develop their skills and abilities further (Schiro, 2008). Other researchers added to this ideology by arguing that students should have a role in directing their own education (Kliebard, 1996). This discourse led to the formation of the child study movement which “encouraged educators to study children as they actually were – to watch them carefully, to listen to them intently, and to collect data about them so that instruction could be designed based on observations of children’s nature, needs and interests” (Schiro, 2008: 113). These views led to the birth of what is now known as student-centred ideology (Schiro, 2008; Kliebard, 1996; Schubert, 1996).

Like other ideologies, student-centred ideology faced opposition from researchers who disagree with its principles. One such scholar is Lester Frank Ward who believes humans have the ability to influence their world by using intelligence and knowledge to solve social problems (Cotti & Schiro, 2004). This ability, Ward continued, should be enhanced through

education because education can enhance intelligence and development of problem-solving skills (Schiro, 2008). Based on these views John Dewey defines education as that which can reconstruct experiences thereby invoking new perspectives and meaning to life (Dewey, 1897). This social reconstruction ideology (also known as social meliorism and critical reconstruction) gained popularity in the 1900s with researchers calling for the use of education to reconstruct social norms and values in order to enhance human civilization (Kliebard, 1996; Schubert, 1996; McNeil, 1977).

When one looks at each ideal individually, unique features appear with regard to the aims, the nature of knowledge, the learning process, how the student is viewed, the teaching process and assessment (Table 2.1). These distinct features of curriculum ideologies determine content knowledge selected, the instructional process as well as the assessment process for a particular curriculum. In the following subsection the researcher presents contrasting views of the curriculum ideologies regarding the aim of education, the nature of knowledge, the learning process, how the student is viewed, the teaching process and assessment.

Table 2.1 A comparison of curriculum ideologies (adapted from Schiro, 2008)

Curriculum features		Scholar academic ideology	Social efficiency ideology	Student-centred ideology	Social reconstruction ideology
Knowledge	Nature of knowledge	Didactic statements	Capabilities for action	Personal meanings	Intelligence and a moral stance
	Purpose for knowledge	Understanding	Doing / action	Actualizing oneself	Interpret and reconstruct society
	Source of knowledge	Objective reality as interpreted by academic disciplines	Normative objective reality as socially interpreted	Individuals' personal creative response to experience	Individuals' interpretation of society's past, present and future
Learning	Learning viewed from	Transmitter	Transmitter	Receiver	Transmitter
	Primary function of learning	Social transmission	Social transmission	Growth	Social transmission
	Result of learning	Changed mindset	Changed behaviour	Changed mindset	Changed behaviour
	Primary actor during learning	Agent	Agent/student	Student	Agent/student
	Student readiness	Simplification of difficult topics	Providing prerequisite behavioural capabilities	Stages of growth	Gestalt of prior experience
The student	Role during learning	Passive	Active	Active	Active
	Teachers	Child's mind	Child's	Child's mind	Child's behaviour

	focuses on		behaviour		
	Teachers concerned with children	As they ought to be	As they ought to be	As they are	As they ought to be
	Viewing children	In relation to standardized norms	In relation to standardized norms	As individuals	In relation to standardized norms
Teaching	Role of teacher	Transmitter	Supervisor	Facilitator	Colleague
	Standards used to measure teacher effectiveness	Accurate presentation of discipline	Efficiency of student learning	Facilitation of growth	Effective transference of the vision
	Teachers stimulate	Uniformity	Uniformity	Diversity	Uniformity
	Teachers	Directly implement curriculum	Directly implement curriculum	Adapt curriculum (according to children's needs)	Adapt curriculum (according to social concerns)
	Media used during learning	Didactic discourse	Programmed instruction	Child-environment interaction	Group dynamics
	Intent of teaching	To advance students in a discipline	To prepare students to perform skills	To stimulate child growth	To acculturate students into educators' vision
Assessment	Purpose of evaluation to the evaluator	Rank students for a future in the discipline	Certify that students have the skills	Diagnose students' abilities to facilitate growth	Measure student progress with respect to ability
	Nature of assessment tools	Norm reinforced	Criterion reinforced	Informal subjective diagnosis	Informal subjective diagnosis
	Assessments are	Objective	Objective	Subjective	Subjective
	Point of assessment	After instruction	After instruction	During instruction	During instruction

a) Scholar academic ideology

Scholars who support the scholar academic ideology claim that the aim of education should be to ensure a continued existence of the discipline (Schiro, 2008; Kliebard, 1996). This means students must be taught content knowledge that is regarded as important to the discipline. Students must also be trained to become future members of the discipline by understanding fundamental principles of that discipline (Cotti & Schiro, 2004). During learning, students must be transformed to reflect the discipline. An application of scholar academic ideology is seen in most natural sciences such as medicine, physics and mathematics. For example Gregg, Eisenberg, Duffy and Longo (2008) indicate that in the

surgical profession, students are trained within a hospital setting. This setting ensures that students learn the fundamental principles of the profession within the discipline's parameters.

Because of its interest in advancing the discipline, scholar academic ideology projects knowledge as didactic statements that sum up the intellectual traditions of a discipline (Schiro, 2008; Table 2.1). Scholars of this ideology believe that through these didactic statements students gain an understanding of an objective reality as interpreted within that particular discipline (Schubert, 1996). Gregg *et al.* (2008: 37) argue that in their institution, they designed a “curriculum that is didactic, comprehensive, and stimulating to work-restricted residents both inside and outside the” institution. To do this, they identified topics from popular textbooks and taught these topics. This indicates that only those topics that are viewed as basic and fundamental to their discipline were taught.

In scholar academic ideology, learning is viewed from the perspective of the transmitter (that is the teacher) of knowledge (Schiro, 2008; Cotti & Schiro, 2004; Kliebard, 1996; Posner, 1992; Table 2.1). While the role of the student is important, teachers remain the primary source of knowledge and are also responsible for giving direction to the learning experience (Priest, 2006; Biley, 2005; Paterson, Crawford, Saydak, Venkatesh, Tshikota & Aronowitz, 1995). Because learning is viewed from the perspective of the transmitter, learners in the scholar academic ideology play a passive role. For example the knowledge to be learnt is defined by teachers within a discipline into which students are initiated (Schiro, 2008, Cotti & Schiro, 2004). Consequently students can only act as passive recipients of already set concepts that are defined within a discipline.

Furthermore scholar academic ideology students are assessed using what is regarded as objective quantitative instruments (Cotti & Schiro, 2004). These instruments measure the extent to which students can reproduce what they have been taught. From assessments, students can be ranked according to their abilities in the discipline's hierarchy. Other researchers believe that this assessment strategy is valid for assessing availability knowledge however it may have limitations when assessing the ability of students to use knowledge (Schubert, 1996). The problem may arise particularly if knowledge ought to be actionable and applied in unpredictable real life situations.

b) Social efficiency ideology

Social efficiency proponents argue that the aim of education should be to prepare students for their responsibilities as adults (Labaree, 2010). For instance Chen (2002) argues that the purpose of education should be promoting cultural competence so that once they have graduated, students will be able to effectively play their roles in society. To this effect, social efficiency ideologists state that there are an infinite number of performances that students must be prepared for as adults (Schubert, 1996). Teachers therefore should pay much attention to defining specific objectives that must be achieved in relation to adulthood and social efficiency. These objectives should be stated as observable behavioural skills. Because of a high number of possible objectives, students should be divided by schools into various groups according to their intellectual abilities in which specific training takes place (Schiro, 2008). This division of abilities and training would ensure that each student has a specific role to efficiently play in the society as an adult. Social efficiency ideologists believe that students must demonstrate certain behaviours as a result of being educated (Kliebard, 1996; Labaree, 2010).

Social efficacy ideologists argue further that knowledge is that which enables students to do things (Kliebard, 1996; Posner, 1992). This means knowledge is viewed as capabilities for action (Table 2.1). When students are able to perform certain social functions, they are viewed as knowledgeable. In other words having knowledge is associated with the ability to use that knowledge to perform particular functions. Furthermore because of the need to prepare students for their responsibilities as adults, knowledge is viewed from a normative objective reality that is interpreted by members of the society (Cotti & Schiro, 2004).

Similarly to scholar academic ideologists, social efficiency ideologists view learning from the perspective of the transmitter (Schiro, 2008; Cotti & Schiro, 2004; Kliebard, 1996; Posner, 1992; Table 2.1). The role of the teacher, in social efficiency ideology, is to supervise students as they encounter learning materials (Thompson, 1995). Proponents of this ideology argue that students (who have limited knowledge and skills) require the assistance and guidance of teachers as they search for new knowledge. Teachers as supervisors are expected to adhere strictly to the guidelines of the curriculum to ensure that learning objectives are met during the learning process (Schiro, 2008). This is important given that all students are

guided to perform specific tasks according to present abilities as they prepare for a future as adults.

During the instructional process, teachers' main focus is the behavioural aspect of the student because learning is aimed at changing students' behaviour instead of students' mindsets (Schiro, 2008; Kliebard, 1996; Schubert, 1996; Table 2.1). Consequently during their teaching, teachers may focus on the current status of students, that is students as they are, as well as on the future potential of the students, that is students as they ought to be (Schiro, 2008; Thompson, 1995).

In social efficiency ideology the purpose of assessment is to determine whether students have the skills required to function efficiently in a society based on pre-determined binary criteria of normative values (Schiro, 2008; Table 2.1). In this instance students can either have or not have the required skills as defined in the curriculum.

c) Social reconstruction ideology

Related to social efficiency is the social reconstruction ideology. Social reconstruction ideologists argue that knowledge should be viewed as expressing both truth and value (Schiro, 2008; Cotti & Schiro, 2004; Posner, 1992; Table 2.1). Instead of focusing on the intellectual perspective only, social reconstruction ideologists attempt to integrate both scientific knowledge (an element of the scholar academic ideology) and the social moral context (an element of the social efficiency ideology). Knowledge in this regard is derived from the experiences of both the teachers and the students and can be used to reconstruct the future of the society. Priest (2006) indicates that education should promote both the understanding and application of concepts as an integral. Referring to nursing education, Priest (2006) argues that there are elements of nursing that cannot be taught but students can be prepared for through a holistic view of knowledge. These elements include attitudes, cultures and beliefs. Therefore, learning guided by social reconstruction, results in the use of knowledge and skills to change behaviours.

Because in social reconstruction the primary aim is to reconstruct the society, teachers tend to focus on transforming the students to what they ought to be, in relation to how the society ought to be. However teachers are not the only determinants of the instructional process.

Instead teachers and students are viewed as colleagues. According to social reconstruction ideologists teachers' experiences are as important as those of students who are members of a society (Schiro, 2008). It is because of this ideal that teachers and students are viewed as colleagues who share their experiences as they interpret the social conditions and formulate strategies to reconstruct society. However even though teachers and students are regarded as colleagues, teachers are expected to successfully transfer the vision of reconstructing the society to the student.

Killen (2004) also supports the views of social reconstruction by arguing that assessment must have "clarity of focus." Clarity of focus basically means curriculum designers need to specify what students need to learn and why. Killen (2004: 67) argues that clarity of focus will help teachers develop a workable set of "statements of knowledge and understanding, skills, and attitudes and values" that students should attain through learning. Once these learning outcomes have been set, teachers will be able to use teaching and assessment strategies that will foster and monitor the attainment of the learning outcomes, so that the learning process is able to achieve social reconstruction.

Through the specification of learning outcomes, Killen (2004) believes that teachers need to clearly define what behavioural outcomes students should demonstrate at the end of their learning experience. Furthermore there needs to be clarity regarding activities that students should be asked to perform, so that their learning can be gauged. Because of unique students' abilities and interests, teachers need to be aware of the various ways that students' performance of a particular outcome may vary. To this end teachers ought to be able to distinguish between these varying levels of performance. Overall social reconstruction acknowledges the individuality of students and the learning contexts, the significance of knowledge and skills as well as the need for schooling to be relevant to society.

d) Student-centred ideology

While the above curriculum ideologies focus on preparing students to be members of a particular group of people, the student-centred ideology takes a slightly different direction. Scholars who promote student-centred ideology argue that the aim of education should be to stimulate growth and development of students through education (Schiro, 2008; Posner, 1992). In this ideology students are exposed to experiences through which their needs can be

fulfilled by stimulating students to pursue their interests. Therefore the main contrast between student-centred ideology and the other ideologies is that the student-centred ideology addresses the needs and interests of students instead of those of the society or a discipline.

In the student-centred ideology the student is the objective of education when every other element of the curriculum is adapted to meet the needs of the student. For example knowledge is viewed as personal meanings as constructed by students themselves (Schiro, 2008; Cotti & Schiro, 2004; Table 2.1). Knowledge therefore is derived from students' personal and creative response to experience. Through this self-discovered knowledge, students have the chance of self-discovery as they grow and develop. Therefore in the student-centred ideology, learning is viewed from the perspective of the receiver (the student) (Cotti & Schiro, 2004; Kliebard, 1996). For example Tsai (2008) states that health education curricula should promote self-learning and team work ethos. Good (1994) attests to this by suggesting that students can better learn humanitarian values related to health education if they take ownership of their learning.

Furthermore student-centred ideologists believe that the focus of teachers should be the student as he is in order to allow him to develop and grow according to his abilities and interests. Teachers should therefore be facilitators of student development by presenting relevant conditions to inspire meaning-making and growth among student (Posner, 1992). To this end a number for curriculum designers (for example Lea, Stephenson & Troy, 2003; McEwen & Brown, 2002; Weimer, 2002; McCombs & Whisler, 1997) argue that education should privilege the student in the learning process. Therefore the purpose of assessment in student-centred curriculum ideologies is to determine abilities of students in order to facilitate growth. As a result assessment is student-oriented and subjective (Thompson, 1995).

What emerges from the above presentation of curriculum ideologies is an ideological war that results in the polarization of academic fields. This polarization can be seen in the curriculum formats of natural sciences compared with social sciences. While this may be seen as insignificant, it has serious repercussions for subjects that seek to incorporate socio-scientific issues. For example biology is a field that traditionally uses a scholar academic ideology to teach about life and living organisms (Dimmock *et al.*, 2007; Audesirk *et al.*, 2004). Also taught in biology is the concept of HIV and AIDS, which to a great extent affects (at least in theory) social issues such as safe behaviour to prevent HIV infection. However the ability of

this previously natural science to address social issues is not clear. In fact, the ability of natural science teachers to incorporate a social studies concept is not well documented. The researcher therefore argues that if curriculum ideologies remain distinct, the ability of education to effectively use scientific knowledge to address social issues will remain a challenge. Nonetheless other researchers argue that curriculum ideologies are only ideals. In reality there exists a *mélange* of ideologies, slightly favouring one view over others in particular aspects (Þórólfsson & Lárússon, 2010; Kliebard, 1996).

2.4 Selection of content knowledge

One of the significant observations that the researcher has made is that curriculum theorists, textbook authors and teachers are different people with varying educational philosophies. This therefore means it is not judicious to assume that curricula and textbooks advocate the same ideology. To this end the researcher argues that it is possible to have a curriculum with a founding theory, rationale, and ideology that seek to address social issues such as behaviour transformation. However that does not mean content knowledge taught within the same curriculum is relevant and suitable to achieve the intended outcomes. Consequently selection of content knowledge to be taught provides yet another challenge toward education's ability to address behaviour transformation.

With regard to selection of content knowledge, Beauchamp (1981: 2) believes that “the basic curriculum question is, and always has been that of what shall be taught in schools, and a major function of a curriculum is to translate the answer to that question into such forms that schools can fulfil their commitment and demonstrate that they have done so.” Regarding “what shall be taught in schools” Veness (2010: 1002) states that “everything should be made as simple as possible, but not simpler.” Conversely, Fraser (1993) suggests that various institutions tend to select content and tasks that are relevant to the task and function of the institution. Fraser (1993) points out however that for primary and secondary education, the emphasis is usually on orientating students towards a wide variety of subjects, skills and abilities. This diversity is intended to avoid early specialization. However as students progress to senior grades, a gradual shift towards specialisation occurs. This specialization prepares students for their future professions (Fraser, 1993). Other researchers however argue

that in selecting content, the main issue is ensuring that key principles and concepts are included in order to ensure that students have a good understanding of the discipline (Shulman, 1986). Shulman's philosophy is well understood in mathematics (Lampert, 1986) and physics (Chi, Feltovich & Glaser, 1981).

In advancing the discourse regarding the selection of content knowledge, Veness (2010) and Chi *et al.* (1981) suggest that designers need to ask the following questions, *i*) what are the objectives of the curriculum, that is the rationale, *ii*) which discipline-specific knowledge and skills would be suitable to achieve these objectives, and *iii*) how should content and skills be balanced (depth/breadth) in order for students to learn effectively? Beauchamp (1981) also indicates that curriculum designers have to define "a body of culture content selected and organized with the expectancy that if the culture content is judiciously implemented in classrooms through the instructional programme, the goals or purposes for the schools will be achieved." In addition to these views Fraser (1993) suggests that there needs to be clarity on whether to teach content or the process. By "processes" Fraser (1993) refers to a scientific process such as "observation, measurement, calculation, classification, ordering, communication, prediction, manipulation of variables, interpretation of data, experimenting and verification" (Fraser, 1993: 128). Furthermore he argues that perhaps there needs to be a clear balance between the content and process.

According to Fraser (1993), some of the criteria that should be used for selecting subject content include applicability, validity and significance, learnability, durability, variability and balance between superficiality and depth. On *applicability* Fraser argues that the learning content should be applicable to the needs and interests of the student. This means the learning content should foster the development of skills needed by the student to perform tasks in his own environment. *Validity* and *significance* suggests that the learning content must be able to foster the development of skills that students acquire as a result of learning. *Validity* and *significance* also means learning content should be directed towards behaviour transformation. In other words besides the development of a student as an individual, subject content should also lead to the transformation of society. Fraser argues that subject content will only be significant to the students provided it caters for their needs and aspirations. Given the variations in learning styles of students, Fraser suggests that what is *learnable* for one student may not be learnable for the other. *Learnability* means subject content that is easily mastered by one group of students will not necessarily be mastered by another group of

students in a similar fashion. As a result it is important that curriculum designers make provision for meaningful learning to occur for all students. This also means subject content should be relevant and coincide with the intellectual capacity of the students. Fraser also points out that subject content should be *durable*. For instance scientific knowledge is dynamic so that what was accepted to be true ten years ago may not necessarily be accepted in a similar fashion today. As a result it is important for curriculum designers to ensure that subject content is adapted with the changing times so that knowledge taught is durable. Another selection criterion for content knowledge is *variability*. By *variability* Fraser argues that subject content should not be selected and incorporated into the curriculum simply for the sake of knowledge. But subject content should be selected because it will contribute in the development of the student. Furthermore while it is important to ensure that students have a broad background to a variety of issues affecting society, superficiality should be minimal. This means a greater *depth* of concept understanding should be desired through learning and teaching. Once specific subject content has been selected, learning outcomes and assessment strategies should be employed to evaluate the effectiveness of the learning process.

Other researchers have however provided different views regarding the selection of content. Beauchamp (1981) states that content itself needs to be broken down into identifiable components, such as the cognitive, inquiry and skill, as well as the affective (value, moral, attitudinal). Thereafter, content knowledge that will allow for the development of these components must be selected. This view suggests that content knowledge selected for curricula should reflect the usability of such knowledge. To this end Beauchamp (1981) suggests that knowledge should be adaptable for associative use, replicative use, applicative use, and interpretive use. By associative use of knowledge, Beauchamp (1981) believes that students should be able to use learnt knowledge to respond to novel situations without prior exposure to similar situations. The applicative use means students use knowledge and skills that respond to problems similar to those they have been exposed to during schooling. The replicative use means students are able to use their acquired skills and knowledge in their everyday life experiences such as reading a newspaper or even choosing food with a good balance of nutrients. The interpretive use of knowledge means students are able to use knowledge and skills to conceptualize and classify new experiences in order to devise response mechanisms.

Biggs and Tang (2007) bring in yet another perspective to the issue of selection of content knowledge. These researchers suggest that there are two types of knowledge that have to be considered. Firstly there is declarative knowledge, which is derived from research and not from personal experiences of students or teachers. Declarative knowledge is “verifiable, replicable, and logically consistent” (Biggs & Tang, 2007: 72). Secondly there is actionable knowledge which is derived from performing certain activities and therefore is experiential. Scholars therefore argue that in any curriculum, there needs to be a balance between declarative and functioning knowledge (Veness, 2010). Biggs and Tang (2007) however indicate that in many academic curricula, declarative knowledge often takes precedence while functioning knowledge is less prioritized by educational designers. Overall the decision is left to those in authority to decide which knowledge should be part of the curriculum in line with the rationale for such a curriculum.

What emerges from the above discourse is that selection of content can significantly affect the curriculum-behaviour transformation relationship. The strength of this relationship depends on the framework used to select content. It is not clear though as to whether selection of content knowledge should precede adoption of a curriculum ideology or vice versa. Evidently a lack of a suitable framework has the potential to negatively affect the achievement of intended curriculum objectives, such as behaviour transformation.

Regarding the three challenges for education as discussed above, the researcher chose not to pre-empt an ideal strategy, but rather intended investigating the effectiveness of the Life Sciences curriculum in addressing behaviour transformation. To this end the researcher wanted to inductively determine how the curriculum-behaviour transformation relationship could be understood when comparing Life Sciences students with non-Life Sciences students on HIV and AIDS knowledge and behavioural preferences. Specifically the researcher investigated how did the Life Sciences curriculum addresses HIV and AIDS for behaviour transformation among students. In the following section the researcher presents some philosophical strategies that could ensure that the curriculum-behaviour transformation challenge is resolved for effective social reconstruction.

2.5 Resolving the curriculum-behaviour transformation dilemma

As shown above, researchers have widely debated the ability of education to influence behaviour as a consequence of its rationale for behaviour transformation. The researcher notes that in most curricula behaviour transformation as an attainable learning outcome is barely observed (Zuga, 1992). As stated earlier, the researcher acknowledges that forging a strong interaction between curriculum and behaviour transformation has a number of hurdles. However the researcher argues that there are philosophical approaches that can be used to frame a better curriculum and behaviour transformation relationship. Experientialism, transformative citizenship education and critical pedagogy are three philosophies that are significant to the study and are engaged below. These are significant to the study because literature survey suggests that biology is an experimentalist subject that was born out of empirical studies to understand life. Furthermore transformative citizenship and critical pedagogy are relevant because according to researchers, biology has evolved to contain attributes of socialization and there is an increasing obligation for biologists (such as health scientists) to use knowledge to better humanity.

2.5.1 Experimentalism

One of the founders of experimentalism is Edgar A. Singer, Jr. who vehemently argued that “nothing can be more important to any man than to do all he can to assure the soundness of his reasons for the faith that is in him; that is, to test the weight of evidence supporting the working hypotheses on which he is willing to act” (Krikorian, 1962: 81). This argument Singer put forward against the influence of rationalism, empiricism, and criticism as philosophical backbones of curricula for socialization. His argument here was that knowledge is fundamental to socialization and behaviour transformation. However the question arises regarding what is acceptable (and not acceptable) knowledge? Furthermore given the information explosion of the twentieth century, what knowledge should be used for behaviour transformation, and how should such knowledge be selected for curricula?

Singer believed that in order to accept information as scientific truth, and thus useful for behaviour transformation, there ought to be accompanying evidence that can be used to test claims. According to Krikorian (1962) Singer believed that humans learn by experience.

Another scholar who shared Singer's views is Dewey who promoted the philosophy of experimentalism, which is sometimes called progressivism or reconstructivism (Hlebowitsh, 2006; Tanner & Tanner, 1987). Dewey believed that the basis of education is the "reconstruction or reorganization of experience which adds to the meaning of experience and which increases the ability to direct the course of subsequent experiences" (Dewey, 1916: 89-90). He argued that all individuals and the environment they live in are unique. Therefore, reconstructing and reorganizing experience may require a transformation of the individuals' cognition and/or their environment in order to invoke new meanings to life.

Furthermore Dewey highly regarded change as a significant contributor to learning. Hlebowitsh (2006) indicates that change is the one constant truth about the universe and could be directed by human intelligence. As a consequence experimentalism should support free thinkers because this could allow for the reconstruction or reorganization of experience which brings about positive change to society (Hlebowitsh, 2006). Furthermore the concept of change refers to the dynamic nature of situations in society. Consequently there is a constant need to develop new strategies with which current problems can be solved. In addition to this Hlebowitsh (2006) argues that to solve change-generated problems, scholars have to collect data with which to test hypotheses. Students therefore have to develop experimental skills that can be used to explore and use knowledge when solving change-generated problems. Because of the change factor, researchers caution that knowledge itself is tentative in terms of relevancy, accuracy and usefulness. Experimentalists therefore call for a constant production of knowledge through evidence-based means. This will ensure that knowledge is contemporary enough to address new change-generated problems. One wonders however if curricula are oriented to the future (that is, to address new change-generated problems) or the past.

Experimentalists also argue that for behaviour transformation to occur, schools and curricula should be integrated into society (Dewey 1968). The argument here is that, in schools, students (who are part of the greater society) are grouped into smaller communities known as grades or classes. In these communities students are expected to solve specific problems using learned skills and knowledge (Morris & Pai, 1975). Furthermore students need to rely on evidence to properly negotiate and formulate their argumentation. This evidence-based approach means students must rely on an experimentalist approach to select information and solve relevant problems. However there is evidence to suggest that curriculum and classroom

dynamics (particularly in relation to learning and teaching) tend to be disconnected from social dynamics (Broemmel & Lucas, 2010; Jitendra *et al.*, 2010; Harwell *et al.*, 2007; Xin, 2007; Woodward & Brown, 2006; Jitendra *et al.*, 2005). As a result even if students have knowledge and skills, these are often not applicable to life outside the school.

Experimentalists therefore argue that knowledge is acquired and increased through application of prior knowledge and skills to solving new problems (Cohen, 1999). This knowledge and skills are used to solve problems that students can directly relate with through their everyday experiences. As a result the experimentalists' curriculum for behaviour transformation is centred on experiences, interests and abilities. Students are allowed to learn through doing rather than hearing and seeing alone. In essence experimentalism contends that education should be a “perpetually enriching process of ongoing growth and not a mere preparation for adult lives” (Cohen, 1999).

While experimentalism is widely accepted in science (including biology) other researchers reject this philosophy on an epistemological basis. Howe (2004: 42) argues that traditional experimentalists tend to adopt quantitative experimental methods as the most credible and “relegate qualitative methods to an auxiliary role.” Experimentalists also claim that “experiments are the only means for settling disputes regarding educational practice, as the only way of verifying educational improvements, and as the only way of establishing a cumulative tradition” (Campbell & Stanley, 1963: 2). However opponents of this view argue that experimentalists ignore the evolution of qualitative methods that can yield superior results to quantitative methods if used appropriately (Howe, 2004; Libarkin & Kurdziel, 2002; Zucker, 2001; Hoepfl, 1997; Creswell, 1994; Strauss & Corbin, 1990). Experimentalists are also accused of trading external validity for internal validity (Howe, 2004). This is because, for experimentalists to obtain valid results, they have to restrict variables thereby increasing internal validity. However this approach tends to decrease external validity.

To address the epistemological limitations, experimentalists have further developed their philosophy to include constructivism. Constructivism is based on the articulations of various researchers including Vygotsky, Piaget, Dewey, Vico and Bruner. As an extension of experimentalism (which deals with the discovery of knowledge), constructivism focuses on how students construct their own understanding of the world. Constructivists argue that

learning is an active process which involves the construction of knowledge rather than acquiring it. It must be noted though that construction of knowledge by students does not mean students must create “new” knowledge, but instead student through a constructivist form of learning, discover an understanding of scientifically established knowledge. Constructivists argue that during the learning process, students construct their own understanding of existing knowledge by relying on experience as shaped by the environment. Furthermore it is believed that students are not blank slates, but they have prior knowledge which they use actively when constructing new knowledge. However this knowledge may be erroneous (Magnani *et al.*, 2005; Pakaslahti, 2000) and therefore requires correction through exposure to accurate experimentalists scientific information.

Researchers in constructivism suggest that when new information is given to students, they cognitively process this information by selecting and transforming it, construct hypotheses, and make decisions, based on prior knowledge (Magnani *et al.*, 2005). According to Thompson (1995) when selecting information, students will tend to select information that is easily comprehended and mentally manageable. Furthermore students generally avoid exploring information that seems complex (Thompson, 1995). As a consequence, some students may lose critical information just because they find it difficult to comprehend.

Scholars further suggest that students will then store segments (not all) of information into their long-term memory (Pakaslahti, 2000). This requires them to construct hypotheses, make judgements and decisions concerning the validity of what they had selected (Pakaslahti, 2000; Thompson, 1995). In this way students create new forms of information based on already existing knowledge. This knowledge is represented in the form of schema and mental models (Thompson, 1995).

In the above discourse the researcher implies that experimentalism is ideal for the construction and use of scientific knowledge to address social issues. While this is the case, the researcher takes note of some doubts raised about experimentalism. For example there are researchers who have cautioned against an isolated reliance on constructivism. For example Schönborn and Anderson (2008) warn that the variation in the language, symbols and models used to communicate scientific information to students may be a threat to effective learning, particularly in cases where students use isolated and individualistic processes to construct knowledge. In fact, other researchers contend with the very essence of the constructivist-

experimentalist argument regarding discovery and use of knowledge. For example experimentalists believe that knowledge can be discovered through empirical means. These experimental means will only be valid within the parameters of the methodology which is individualistic in the sense of constructivism. Consequently knowledge cannot be objective and the tentative nature of knowledge reduces experimentalism to a relativistic narrative (Matthews, 2003; Matthews, 1998; Gross & Levitt, 1994).

Given the apparent subjectivity of knowledge, the researcher argues that social problems, their contexts and behavioural solutions are also relative. Consequently it is plausible that solutions to social challenges will be unique to each individual. Therefore, for curriculum to effectively promote behaviour transformation will require relative narratives that rely on up-to-date knowledge produced through constructivism and experimentalization.

2.5.2 Transformative citizenship education

Other researchers have suggested citizenship education as a preferred form to promote behaviour transformation (Waghid, 2005; Waghid, 2002; Kerr, 1999). Citizenship education broadly speaks about using education to prepare students for their roles in society and globally as citizens (Kerr, 1999; Cherryholmes, 1980). Such a preparation occurs through formal education when students develop skills and construct knowledge that can be used to better understand social constructs in preparation for citizenship. Ichilov (1998) believes that citizenship education is even more necessary in contexts where students are facing an uncertain future with a wide variety of challenges. To this end Waghid (2002: 457) argues for citizenship education by stating that knowledge can become useful for shaping the future of societies through the “idea of a reflexive praxis.”

Borrowing from Aristotle, Waghid argues for a “praxis” in education, that is learning through which (and during which) desired outcomes will be achieved (Waghid, 2002). The praxis, Waghid (2002: 463) argues, has to be reflexive in that it should foster the use of knowledge and skills to “critically examine how one’s personal and theoretical commitments serve as resources for generating particular constructions of meaning in particular contexts, meanings one would probably not have thought about.” Through the reflexive praxis, it is argued that patterns of critical educational discourse could be transformed to integrate behaviour

transformation. This viewpoint means knowledge production (and construction) should be in the context of its application to address social problems (Waghid, 2005). Citizenship education therefore occurs through a continuous reflection on the *status quo* which leads to a deconstruction and reconstruction of attitudes and behaviours (Waghid, 2005). Furthermore citizenship education promotes empowerment of students to develop the ability to be self-determined and reflexive (Waghid, 2005). Citizenship education also means students develop an ability to engage critically in social dialogue by making reasoned arguments based on scientifically acceptable knowledge.

To strengthen the curriculum-behaviour transformation relationship therefore, Waghid (2005) states that disciplinary knowledge should be merged with socially distributed knowledge. This merger could ensure that schooling is relevant to society and knowledge applicable to everyday life.

Critiques of citizenship education however argue that it imposes tension between “individual freedom and choice and constraints imposed on the individual by the society or government for the sake of order and survival” (Cherryholmes, 1980: 116). The argument here is who decides on the roles of an individual in society, particularly in the context of “freedom of choice”? Consequently Kerr (1999) and Newmann (1975) suggest that citizenship education should rather be defined around decision-making and not role-playing. To this end Cherryholmes (1980: 116) re-defines citizenship education as “a set of learning experiences that promote effective and responsible individual decision-making and behaviour within the constraints of democratic values and processes.”

Scholars provide reasons why citizenship education as defined by Cherryholmes (1980) is vital for behaviour transformation. First, decision-making forms a fundamental part of socialization and behaviour transformation (Kerr, 1999). Second, decision-making is associated with reflective thinking (Hunt and Metcalf 1968) and reflective inquiry (Barr, Barth, and Shermis 1978). The argument therefore is that through education, students should be equipped with relevant skills and knowledge that will shape their decision-making, reflective thinking and inquiry skills required for behaviour transformation.

2.5.3 Critical pedagogy

Scholars such as Paulo Freire and Henry Giroux provide a different angle to the issue of behaviour transformation through education. Their views form the foundation to critical pedagogy, where they argued that education should not be dehumanized but should lead to transformation of students' lives. In this regard Freire indicated that there are a number of social, health and intellectual challenges that students face and therefore there is a need to provide solutions to these challenges through education (Freire, 1993). For this to occur however education should facilitate a non-hierarchical dialogue between students and teachers through which experiences are shared.

Critical pedagogy remains a generally accepted ideology for citizenship education (Baumgartner, 2001; Christopher *et al.*, 2001). Critical pedagogues suggest that there are at least four learning strategies, namely *i*) the banking method of learning, *ii*) conscientization, *iii*) informational learning and *iv*) transformational learning. In the banking method of learning (Christopher *et al.*, 2001; Freire, 1993), teachers are viewed as sources of knowledge. Because teachers are regarded as experts from whom knowledge comes, students passively accept information as factual (Christopher *et al.*, 2001). Giroux (2001) criticizes this method of learning because it disconnects classroom activities and the everyday lives of particular students from marginalized backgrounds. In conscientization type of learning, students use what is being learnt to discuss and reflect on their life issues (Baumgartner, 2001). According to Kegan (2000), informational learning is when the student's already existing cognitive structures and capacities are extended by modifying what is already known. Transformational learning focuses on changing the student's perspectives about himself and his world (Christopher *et al.*, 2001). In this regard the current form of understanding and response is put at risk of being changed through exposure to new alternatives (Kegan, 2000). Transformational learning can be gradual or rapid, depending on the context and depth of perceptions. Of the learning approaches presented above, transformational learning is one favoured by critical pedagogues for behaviour transformation (Christopher *et al.*, 2001; Freire, 1993). Scholars argue that transformational learning can be used as a guiding framework to transform students' attitudes, beliefs and behavioural practices.

Brookfield (2003) however argues that postulates of critical pedagogy are unrealistic. For example Brookfield (2003) believes that classroom-generated transformation will remain ineffectual unless it can impact on the conditions of society. He further argues that the classroom is a small segment of the society which cannot radically alter the fundamental social norms, values and beliefs. Hardin (2001) also argued that critical pedagogy is politically motivated to promote views of liberalism. This view suggests that the critical academic discourse will be compromised by attending excessively to social dialogues. To this end Brookfield (2003: 141) refers to critical pedagogy as a “domestication” of academia.

To qualify critical pedagogy in the light of the criticism it has endured, proponents have proposed three logical approaches that will ensure that education is not merely domesticated but preserves its rigour and academic scholarship. These approaches are discussed below.

2.5.3.1 Cognitive-rational approach to transformative learning

Scholars (for example Baumgartner, 2001; Freire, 2000; Mezirow, 2000) agree that learning should provide students with life skills, a phenomenon known as the cognitive-rational approach to transformative learning. In this form of learning, learned skills can be used by students to deal with known and novel real-life challenges. Because of this, education should lead to the empowerment of students (Baumgartner, 2001). In this way learned people should be able to comprehend, understand, and respond adequately to life issues, regardless of such issues being within or outside the context of any subject matter.

2.5.3.2 Constructivist learning

Following the constructivist epistemology of development, researchers agree that knowledge is not out there to be discovered but is created from interpretations and re-interpretations (Baumgartner, 2001). Knowledge production therefore follows cognitive processes that lead to the formation of new knowledge (Thompson, 1995; Von Glasersfeld, 1995). According to Mezirow (1996), constructivist learning follows a four-step process.

Firstly the individual may have a personal crisis when they feel a need to change their perspectives based on the new knowledge (Baumgartner, 2001). This stage can be long and accumulative and is termed the disorienting dilemma (Mezirow, 1991). Secondly the person

re-evaluates his/her assumptions about him/herself and his/her world (Baumgartner, 2001). This stage is called critical reflection and may include realizing that one's perspectives are not consistent with the new knowledge (Taylor-Powell, 1998). Thirdly the person will enter a reflective discourse stage where he/she talks to others about the new perspectives with the aim of obtaining consensual validation (Baumgartner, 2001). Such a consultative approach will provide a new direction which the person may follow. Finally, once certain about what needs to be done as informed by changing perspectives, the person will be confident and therefore will live according to the new perspectives (Baumgartner, 2001). However it must be mentioned that meaning is also influenced by other factors such as affective, emotional and social context. In this regard it is the most dominant factors that will influence the overall learning process (Mezirow, 2000).

2.5.3.3 Student development

Because learning has the potential to affect behavioural patterns, Daloz (1999) suggests that learning should lead to development. Here students use education as their developmental guide when they use what is learnt to help them make sense of their lives and their future (Baumgartner, 2001). In this way students may ask questions, discuss and negotiate developmental transitions based on what is being learnt. Because of this students' social environment such as family dynamics and social class may also be transformed (Baumgartner, 2001).

Development may also include the extra-rational soul-based aspect of the student which deals with feelings and imaginations (Baumgartner, 2001). Learning should not only deal with matters outside the "learning being", but also on intrapersonal matters. This leads to self-awareness, deeper self-understanding and mindfulness (Healy, 2000).

Based on the above discourse, the researcher believes that education has the potential to affect behaviour transformation. As argued, this would require an acknowledgement of various challenges to curriculum philosophies and adapting them to each particular context.

2.6 Implications for the current study

What emerges strongly in the above discussion is that serious challenges exist potentially hindering the ability of curricula to affect social issues (Sections 2.3 and 2.4). However it also emerges that these challenges could be addressed by strategies related to curriculum development and implementation (Section 2.5). A question however is how do science curricula respond to such challenges, (i.e. the role of the hidden curriculum on socialization, influence of other educational and social elements on education as well as various curriculum complexities)? While the above question is not within the scope of the current study, the researcher specifically investigated the Life Sciences curriculum to determine its approach to the curriculum-behaviour transformation relationship, particularly in the context of HIV and AIDS.

Literature has shown that there are at least four elements of curriculum that can be used to determine whether a curriculum will or will not be able to affect behaviour transformation (Section 2.3.3). These are curriculum theory, curriculum rationale, curriculum ideologies and content knowledge. Consequently the researcher decided to investigate the curriculum-behaviour transformation relationship in Life Sciences by examining the relevant curriculum statement and textbooks from which inferences were made about the curriculum theory, rationale, ideologies and content knowledge of Life Sciences.

The researcher noted the various suggestions regarding the strengthening of the curriculum-behaviour transformation relationship (Sections 2.2 and 2.5). However he preferred an inductive approach to the matter, by simply determining the approach of Life Sciences and thereafter investigating whether it was a useful approach. In this way the study would contribute to the body of knowledge of curriculum design and development, by providing insight into the strategy used in Life Sciences and its effectiveness on behaviour transformation. Furthermore this knowledge would be useful to Life Sciences curriculum designers as it would indicate the significance of the subject in relation to socialization.

To further contextualize the argument presented here, the researcher discusses HIV and AIDS education in the next chapter. As stated in Chapter 1 this context was the focus of the study.