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A constructivist critique of outcomes-based education

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A CONSTRUCTIVIST CRITIQUE OF OUTCOMES-BASED EDUCATION

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A Research Report submitted to the Faculty of Education, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Education by Coursework

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Abstract and Keywords

Responses to South African outcomes-based Education (OBE) indicates that much of the criticism focuses on the implementation problems of this new approach. The aim of this research report is to initiate a debate concerning the fundamental psychological assumptions of an outcomes-based approach to education. To this end, I critique, from a Piagetian psychological perspective, the notions of "pre-determined outcomes", "transference" and "prior knowledge" which I believe are derived from particular assumptions about the nature of teaching and learning within OBE. This report concludes that these notions as they are understood within OBE have not been considered in sufficient depth by the policy makers. Consequently, the educational efficacy of these notions is questionable.

Keywords

Outcomes-based education
Teaching
Prior knowledge
Transference
Piaget
Constructivism
Equilibration
Compensatory behaviours/reactions
Development
Learning
Competence

Declaration

I declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Education by Coursework in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.



(Name of candidate)

26/02/1999

(Date)

Dedication

For Lesley James Armstrong whose generosity will never cease to warm my heart.

Acknowledgements

There are few achievements in life which can be completed in isolation. This research report is not one of them. Therefore, I wish to acknowledge with gratitude the encouragement, support, guidance and patience that I have received from my mentor, colleagues and family. In particular:

- Rashad Bagus, my supervisor.
  "Kindness in words creates confidence
  kindness in thinking creates profoundness". (Loa-Tza)
  And kindness in giving creates gratitude.
  You gave unstintingly to me of your time and knowledge.
  Thank you.

- My parents, Corrie and Douglas, for their sustained and generous support over many years. Because they believed in me, they helped me to believe in myself.

- My brother, Brendan who cheerfully came to my rescue with his computer expertise when my computer broke down or my research report vanished into cyberspace – as it often did, usually in the early hours of the morning.

- Lastly, to my uncle, Leslie James Armstrong, a man I greatly admire, to whom this work is dedicated.

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Introduction

On the 24 March 1997 the Minister of Education, Sibusiso Bengu, launched Curriculum 2005 which, in the opinion of the minister, was going to bring about a fundamental change in education in South Africa. This proposed new educational approach in Curriculum 2005 called outcomes-based education (OBE) immediately sparked off intense debate and controversy which continues unabated.

An interesting feature of these debates is the focus on the implementation problems of the new approach, that is, most criticisms focus on the lack of adequate bureaucratic structures to implement the policy; the financial constraints on implementation and the inadequacy of the South African teaching corps to implement OBE in their classrooms.

As such, there has been very little critical discussion (see for example Jansen, 1997 and Cortie and Cortie, 1997) on the underlying philosophy on which the implementation of outcomes-based education rests. It appears that many of the critics of outcomes-based education, whilst appearing to be uncritically supportive of the philosophy of an outcomes-based approach, reject it on the grounds that it cannot be successfully implemented in a third-world country such as South Africa. Although they are indeed correct, I contend that they are rejecting outcomes-based education for the wrong, and least important, reason. It is my contention that it is the underlying philosophy of outcomes-based education that is flawed and it is my aim in this research report to initiate a debate concerning the basic, fundamental psychological assumptions of an outcomes-based educational approach[1].

To achieve this end, I will provide an extensive review of the extant literature on outcomes-based education. In particular, I will review the conceptions of teaching and learning within outcomes-based education with special reference to the notions of "pre-determined outcomes", "transference" and "prior knowledge". I believe that these notions are derived from particular assumptions about the nature of learning and teaching. To critique these notions, I will provide a general exposition of Piaget's theory of cognitive development focusing on those aspects of his theory which are directly pertinent for my purposes. In the third section of the report, I use Piaget's theoretical framework to

[1] Through out the research report, I make extensive use of footnotes. The reader is asked to note that the footnotes in this report are informational and elaborate the main text and are not used as bibliographic references. Specific references and quotations appear within the text.

interrogate the assumptions on which these notions are based in order to establish their psychological "validity" and consequent educational efficacy. Specifically, I show that Piaget's theory of cognitive development challenges the assumptions of learning and teaching within outcomes-based education and raises interesting questions about the educational efficacy of OBE in general and its specific instantiation in the South African context.

Literature review

In this literature review, I shall clarify what is understood by Outcome-based Education (OBE). Specifically, I will review the conceptions of teaching and learning within OBE with special reference to the notions of "pre-determined outcomes", "transference" and "prior knowledge" on which OBE is predicated. The review will look at these issues from an *international* perspective and thereafter focus on the *South African* situation.

1. OBE: An International Perspective

Brady (1997) reports that "while the term OBE has currency in Australia and the USA, it is a term that is rarely applied to the national curriculum in England and Wales" (p58). Brady (1997) continues to explain that "the relative recency and tentativeness of implementing OBE in Australia and the consequent paucity of empirical data, explain the predominance of American literature in this field" (p58). Notwithstanding the Americans being the primary researchers in this area, even they acknowledge the insufficiency of research documenting the effects of OBE (see for example Baron and Boschee, 1996; Boschee and Baron, 1994, Brogan and Brogan, 1994; Evans and King, 1992/1994; Kearney, 1994; Schlafly, 1994; Simonds, 1994; Slavin, 1987/1994 and Terry, 1996). Nevertheless, Spady (1992/1994a/1994b) and Spady and Marshall (1991) argue that existing research is more than sufficient to substantiate the claims of the OBE proponents – the problem is not the absence of research but rather the reluctance presently to acknowledge it. Evans and King (1992/1994) and Kearney (1994) report that the evidence for the efficacy of OBE tends to be largely perceptual, anecdotal and small-scale. To the critics, this type of evidence has no merit because it has not been "nationally validated through controlled experimental research" (Spady, Marshall and Rogers, 1994 and Spady, Marshall and Rogers, undated).

(a) OBE: What Is It?

McNeir (1993b) states that "there is no single, authoritative model of OBE" (p.1). Consequently, one reason why OBE has generated differences of opinion is that many people – even among the supporters – define the term differently (Dykman, 1994; Kearney, 1994 and O'Niel, 1993/1994). Professional journals contain a variety of definitions for OBE (Brady, 1997). However, there appears to be some consensus on the definitions of OBE provided by Artis (1994); Baron and Boschee (1996); Boschee and Baron (1991/1994); Brogan and Brogan (1994); Evans and King (1992/1994); Kearney (1994); Killen (1996); Kudlas (1994); McNeir (1993b); Patterson et al. (1995); Spady (1992/1994a); Spady and Marshall (1991); Spady, Marshall and Rogers (1994) and Spady, Marshall and Rogers

(undated). This apparent consensus understanding of OBE will form the lynchpin of my review of the literature insofar as a clarification of its basic assumptions will provide the basis for the discussion /debate later in this report.

According to the researchers mentioned above, OBE is learner-centered, results-orientated and founded on the belief that *all* students can learn. As such, OBE calls for shifting from the traditional approach where the emphasis is on inputs (i.e., time, resources, teacher-student ratios, etc.) to an outcome-based system where emphasis is on performance standards for all students (i.e., what students really know and can do). Furthermore, OBE is an approach that requires teachers and pupils to focus their attention and efforts on the desired *end* results of education. It encourages teachers to use this focus as a guide to all their instructional decision-making. This contention is endorsed by Killen (1996) who maintains that

> "...statements of intent or statements of desired educational outcomes focus attention on the purpose of instruction rather than on the content or learning experiences that are the vehicles for that instruction" (p1).

Therefore, OBE models begin by asking which student *outcomes* are desirable, and then work backwards to determine the curriculum, materials, activities and teaching methods required to achieve those outcomes. In Spady's (1988) words "OBE is a means of organizing for results, basing what we do instructionally on the outcomes we want to achieve" (p5).

It is generally agreed that an *outcome* is a demonstration of learning that occurs at the end of a learning experience. Therefore, an outcome is a result of learning and an actual observable demonstration or performance of *three* things, that is, *knowledge, competence* and *orientations* - the attitudinal, motivational and relational elements that make up a performance (Spady, 1992 and Spady, Marshall and Rogers, 1994). Typically, these demonstrations, or performances, reflect what the learner knows; what the learner can actually do with what he or she knows; and the learner's confidence and motivation in carrying out the demonstration (ibid, 1992 and 1994). Consequently, learners must show how they can use knowledge rather than merely possessing knowledge for its own sake (Artis, 1994). Spady and Marshall (1991) further argue that it is necessary to identify *substantial* "significant outcomes" through *processes* of significance in *settings* of significance. The substantial nature of these outcomes can range from very specific content details to broad, complex concepts and their interrelations, while the *processes* can range from relatively simple cognitive or psychomotor skills to complex, higher-order syntheses and applications. *Settings* are both the places where learning is to occur (such as the classroom) and where it is applied and demonstrated (i.e., real life) (Ibid, 1991).

Consequently, OBE practitioners begin by determining the knowledge, skills and habits of mind that learners should be able to demonstrate in order to prepare for life after graduation and then adapt the curriculum and instruction so that all learners attain those desired outcomes[2] (Boschee and Baron, 1994 and O'Niel, 1994). Therefore, Spady (1988) states that "OBE is not a programme but a way of designing, delivering and documenting instruction in terms of its intended goals and outcomes" (p5). Similarly, Killen (1996) states that "outcomes is simply organizing teaching to achieve predetermined results" (p.4).

Spady, Marshall and Rogers (1994) also suggest that OBE is founded on *three* basic premises, viz., all children can learn (but not all in the same time or in the same way), successful learning promotes more successful learning, and schools control the conditions that directly affect successful school learning (p.30). OBE implementers put these purposes and premises into practice by deliberately and consistently guiding what they do around *four* key principles, i.e., clarity of focus on culminating outcomes; expanded opportunity and support for learning; high expectations for all to succeed and designing down from your ultimate outcomes. These *"four OBE operational principles"* work together to alter and improve the opportunities that teachers and students have for being successful (Spady, Marshall and Rogers, 1994, pp.30-31 and Spady, Marshall, and Rogers, undated, p.5).

The past history of general educational reforms has shown that, with *implementation*, educational reform sometimes takes on a different connotation (Kearney, 1994). In the implementation of OBE specifically, researchers have identified three forms of OBE namely, *traditional, transitional and transformational* OBE (See Kearney, 1994; Simonds, 1994; Spady, 1988/1992 and Spady and Marshall, 1991). It still needs to be determined whether the three forms currently being implemented by schools in the USA are a natural maturation process or if OBE will succumb to the fate of so many other educational reforms.

In the traditional OBE model, efforts to change traditional education have been based on the utilization of the existing curriculum. Thus, this approach is synonymous with curriculum-based objectives where curriculum design comes before the outcomes (Kearney, 1994, Spady, 1988). Spady (1992) states that "micro-instructional outcomes are derived from the existing curriculum programs, courses and units and their focus is on subject-matter content-mastery" (p.10). It is important to note that in traditional OBE the performance

[2] When viewed from this future-orientated life-role perspective, success in school is of limited importance unless learners are equipped to transfer that success to life in a complex, challenging and advanced technological future. Therefore, OBE's intent is to solidify the link between academic learning and the real-world challenges and opportunities learners face (Brogan and Brogan, 1994). Spady, Marshall and Rogers (1994) argue that if one wants the lessons of school to translate as lessons in life, one needs to make the learner's community their classroom. Thus, learners are expected to apply what they have learnt to a variety of real-life situations. Consequently, skills obtained become more important than content learnt.

context is still the individual classroom, and curriculum organization and delivery are still defined and constrained by the calendar (Spady, 1992). Transitional OBE lies between traditional and transformational OBE in scope and purpose. Exit outcomes,[3] of higher-order competences (i.e., critical thinking, problem solving, etc.), replace subject-matter mastery, as the definition of outcomes. Consequently, subject content takes on the role of being a vehicle to assist in the cultivation and integration of these higher-order competences (Spady, 1992 and Spady and Marshall, 1991). In transitional OBE schools postpone the challenges of restructuring, adopt significant exit outcomes, and finally, design the existing curriculum around these (Terry, 1996).

Transformational OBE is the *ideal* model of OBE (Kearney, 1994). Transformational OBE fully embraces and embodies the spirit and substance of the four OBE operational principles mentioned earlier (Spady and Marshall, 1991). For Spady (1992), transformational OBE represents *authentic* OBE. It should be noted that while traditional OBE could operate within an existing school system, transformational OBE requires the creation of a whole new school system (Evans and King, 1994). Consequently, Spady (1992) maintains that authentic OBE cannot be time or curriculum-based and should adopt the use of criterion standards[4] of performance as opposed to *norm-referenced assessment.*

(b) Conceptions of teaching and learning within OBE

To explicate the conceptions of teaching and learning within OBE it is necessary to examine the theoretical foundations of OBE with specific reference to the learner; the task or object of learning (knowledge, skills, dispositions etc.); the teacher's or mediator's engagement with the task demands; the learner's engagement with the task; the relationship between the teacher/mediator and the learner and the context and practices in which these relationships are constituted and realized.

Baron and Boschee (1996), Brogan and Brogan (1994), Rodgers and Dana (1995) and Spady, Mashall and Rogers (undated), contend that OBE cannot be defined as strategies, content, curricula, facilities, staffing or budget. Rather, OBE is a philosophical umbrella over these operational aspects of education. Therefore, these researchers insist that what specific districts, schools or programs actually resemble or do as the result of pursuing

[3] Exit outcomes denote the culminating outcomes for learners as they graduate and exit the system (Spady, 1992 and Spady and Marshall, 1991).

[4] Criterion standards of performance define the substance of what is to be learnt and demonstrated (Spady, 1992). In OBE, teachers are more concerned with *all* student outcome completion than with sorting out students according to ability (Kudlas, 1994). In OBE the learner's progress is measured against the outcomes rather than against his or her performance. Thus, OBE as an instructional model, represents a rejection of the traditional bell-curve view of student performance (Kearney, 1994).

OBE's premises and applying its four key operational principles, can vary enormously. Thus, Spady, Marshall, Rogers (undated) argue that there is no absolute uniformity in OBE implementation. These authors continue to say that "since there are many ways that these principles can be defined and implemented, it makes little sense to talk about implementing the one model of OBE" (ibid, undated, p.5). Nevertheless, Brogan and Brogan (1994), argue that OBE requires a change in expectations for student learning; in the practice of teaching; and in the organization and management of schools.

Concerning the object of student learning Kearney (1994), Killen (1996), and Spady (1992/1994b) concur that an *outcome* is of paramount importance to the new curriculum. Boschee and Baron (1991/1994), describe outcomes as "future-orientated, publicly defined, learner-centered, focused on life-skills and context, characterized by high expectations of and for all learners and are the sources from which all other educational decisions follow" (p.194). OBE calls for educational agencies to determine the knowledge, competence/skills, and ways of thinking that a person needs to function in the world and then to adapt the curriculum and instruction so that learners attain these desired outcomes (Killen, 1996 and Spady, 1988). Therefore, an outcome-based approach emphasizes knowledge and how it is applied in real-life settings, rather than concentrating simply on abstract bits of information (Kearney, 1994). As a result, Killen (1996) insists that "content needs to be seen as a support base for addressing and facilitating students' achievement of the outcomes rather than as an end in itself" (p.9). Evans and King (1994) and Terry (1996) state that three levels of difficulty are specifically required to be attained by the learner, namely, to relate the knowledge base to the outcome; to demonstrate its practical application and to transfer learning. This allows the student to apply knowledge in a new situation, i.e., to apply concepts and skills to new material. Level one indicates direct instruction and levels two and three show a shift towards coaching and facilitating. Accordingly, the goal of OBE is not only the mastering and application of information, but also the attainment of greater independence in learning on the part of the learner.

With regard to the content of learning, i.e., the curriculum, Spady (1988) advocates a "design down" approach to curriculum development. This approach involves moving from exit outcomes to lesson outcomes in a carefully structured manner (see Spady (1988) for a more detailed discussion). It should be noted that Spady (cited in Brandt, 1993) believes that the curriculum programme should not be subject-based. He argues for a transformational curriculum in which the "complex role performance outcomes" become the organizing center, not a given subject (p.69). Furthermore, Baron and Boshee (1996), Boshee and Baron (1994) and Spady, Marshall and Rogers (undated) contend that teachers should have a

degree of freedom to select the content and method to help their learners achieve the specified outcomes.

In the extant literature the teacher/mediator's specific role is not made explicit, i.e., the primary dynamics for implementing OBE in the classroom is ambiguous and ill-defined. This shortcoming, not withstanding, Boshee and Baron (1994) argue that teaching for thinking, problem solving and understanding has more positive effects on student achievement than traditional teaching. Brogan and Brogan (1994) concur that learning can be achieved more effectively and economically using creative ways rather than by authority. Furthermore, these researchers maintain that to deny learners a multiplicity of teaching strategies ignores the individuality of learners. Therefore, Boschee and Baron (1991) argue that "the types of instructional strategies that effectively engage learners in using their minds must reflect higher-order thinking, depth of knowledge, connectedness to the world, substantive conversation, and social support for student achievement" (p.83).

Baron and Boschee (1996), and Boschee and Baron (1991/1994) explain that the OBE philosophy can be implemented in many different ways. To connect the learner with the subject matter, OBE does not necessitate the use of any specific teaching method, though some are typically incorporated in OBE reforms (Evans and King, 1994; Kearney, 1994; Kudlas, 1994 and Terry, 1996). These typical teaching methods include mastery learning,[5] co-operative learning and peer tutoring (Kudlas, 1994 and Evans and King, 1994). Although OBE does not require mastery learning as an exclusive instructional model, many people consider mastery learning to be an integral part of OBE's beliefs and practices[6] (Brandt, 1993; Schleisman and King, 1990 and Spady, 1992). Killen (1996) concurs by way of explanation and says that "outcomes-based programming has some useful side benefits for

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[5] An elementary definition of mastery learning is: a process whereby a learning task is broken into its component parts (Kearney, 1994). Learners need to master each part before proceeding onto the next level. Consequently, Kearney (1994) explains that mastery learning models hold achievement constant and treat time as a variable. In group-based mastery learning (frequently used in elementary and secondary classrooms in the USA) teachers instruct the entire class at the same pace. Learners who do not achieve mastery on subsequent tests are remediated through tutoring, peer-mentoring, small groups sessions, etc.

[6] Spady in his conversation with Ron Brandt (1993) explains that mastery learning (ML) was what OBE was called at the time. However, Spady claims that the agenda of ML was more success-based than outcome-based; that is, the focus was on creating more success for learners learning traditional materials, rather than on creating successful outcomes for more learners (Kearney, 1994). However, Iserbyt (1994) who provides a powerful critique of ML, explains that ML is based on Pavlov's animal experimentation and the late Harvard Professor B F.Skinner's behaviour modification techniques. He further argues that the US Department of Education's research suggests that most well-known OBE/ML schools do not deserve emulation. Iserbyt (1994) states that had school-board members, teachers or parents been aware of the research documenting the colossal failures of ML then OBE indoctrination would not have swept the nation as it unfortunately has. Iserbyt (1994) further states that the OBE educrats will grudgingly concede to temporarily change the content – as long as the process, the method and system are not affected. He concludes that unfortunately, most OBE opponents see only the obviously objectionable content and ignore the more subtle sinister Skinnerian processes. Therefore it does not matter that ML is not a requirement of OBE implementation but rather that it is an integral part of it.

students, particularly when a mastery approach to learning is emphasized"(p.5). He also insists that mastery learning and outcome-based programming make all instruction purposeful for learners. Other OBE teaching strategies, according to Boschee and Baron (1991), can include production-driven learning; problem-based learning, authentic research and learning, off-the-page learning and re-enactment learning (pp. 80-84).

A careful reading of OBE literature (Evans and King, 1994; Killen, 1996; Kudlas, 1994 and Spady, 1988) reveals the following *instructional model*: mastery learning, individualized strategy and promotion based on achievement[7]. This approach can be highly successful and is described by Kudlas (1994) and Vickery (1988/1990). In this approach the instructional procedure consists of:

- assessing the learner's *prerequisite* knowledge and *if it is not adequate teachers are expected to provide instruction on the prerequisites.*
- specifying the unit's *objectives* and explaining what the learners will be able to do when they have completed the unit satisfactorily.
- provide guided practice for the learners so that they can be evaluated informally and provided with feedback to enhance their learning
- *administer* a formative test to asses the learners mastery.
- *remediate where necessary in order to ensure that learning objectives are achieved.*
- Administer a summative test to establish the success of the remediation provided.

To sum up, it can be seen that the strategy (Baron and Boschee, 1991/1994, p.194) for OBE implies that first, *learning* is facilitated carefully towards achievement of the outcome; learning is characterized by its appropriateness to each learner's needs, interest and developmental level and learning is active and experienced based for maximum application of the knowledge, skills and orientations necessary for learner success in the present and

[7] One current working model of an OBE programme at the district level is the Outcomes Driven Developmental Model (ODDM) begun in 1972 in the Johnson City, New York, School District under superintendent Albert Mamary (Evans and King, 1994). Albert Mamary's ODDM echoes Spady's 'success for all' philosophy, but it focuses much more on structural reorganization (Killen, 1996; Kearney, 1994 and McNeir, 1993b). Evans and King (1994) report that the Johnson City's ODDM uses an instructional model similar to *learning for mastery*. Furthermore, these authors report that districts using ODDM seem to be experiencing the most successful implementation. Refer also to footnote number 5 concerning Iserbyt's (1994) objections to ML. However, it must be conceded that inspite of its shortcomings, ML continues to be practical and pragmatic.

the future. Secondly, each learner's progress is based on his/her demonstrated achievement. Therefore, the emphasis is on achievement of the outcome and application of learning rather than completion of a body of material. Furthermore, assessment of learning is *appropriate* to the learning, its life context and the learner. In addition, advancement is based on achievement of the outcome rather than on seat time in the classroom or comparative data, and progress is demonstrated and recorded using criterion-referenced, rather than norm-referenced assessment. Thirdly, each learner's needs are accommodated through multiple instructional strategies (i.e., problem-based learning, group work, etc.) and multiple assessment tools (i.e., presentations, debates, interviews, portfolios, self and peer assessments, etc.). Lastly, each learner is provided with *time and assistance* to realize their potential.

(c) Reponses to OBE

There have been numerous *endorsements* of OBE, most of which refer to improved student performance (Brady, 1997). Other cited benefits include a focus on learning rather than time served (Brady, 1997; Kudlas, 1994; McNeir, 1993a/1993b and Spady, 1992); raised expectations (Kudlas, 1994; Spady, 1992 and Terry, 1996); flexibility which allows for mastery learning (Kearney, 1994 and Terry, 1996); a variety of teaching approaches (Glatthorn, 1993 and Kudlas, 1994); learners assuming responsibility for learning (Glatthorn, 1993; McKernan, 1993 and Patterson et al., 1995); commitment from staff (Glatthorn, 1993 and Kudlas, 1994); the elimination of permanent failure and compromised standards (Spady, 1992/1994a; Spady, Marshall and Rogers, 1994); and, the involvement of the educational community (Brady, 1997; Brogan and Brogan, 1994 and Terry, 1996).

However, Brady (1997) argues that the *criticisms* of OBE arguably outweigh the cited benefits. The main criticisms include: an interpretation of OBE as behaviouristic, mechanistic and fragmented (Glatthorn, 1993; Iserbyt, 1994; McKernan, 1993; McNeir, 1993a and Schwarz, 1994); the 'means-end' OBE stance treats knowledge as instrumental, (McKernan, 1993; Brogan and Brogan, 1994); OBE constrains creativity and inquiry (McKernan, 1993 and Brady, 1997); outcomes are state or district edicts (Lewis, 1994 and Terry, 1996); the legitimacy of requiring some of the outcomes (Brogan and Brogan, 1994); a consensus on the outcomes (O'Neil, 1994 and Simonds, 1994); whether one set of outcomes will fit the needs of all students (Battistini, 1995 and Holt, 1994); OBE 'dumbs down' the curriculum so that all students can master objectives (Kearney, 1994; Schlalfy, 1994; Simonds, 1994 and Rogers and Dana, 1995); OBE teaches learners values rather than basic skills and knowledge (Kearney, 1994; Schlalfy, 1994 and Simonds, 1994); learners are required to demonstrate ambiguous and subjective outcomes that cannot be measured objectively

(Terry, 1996); OBE ignores the self-evident truth that it is impossible to employ higher-order thinking without a base of factual knowledge (Schlafly,1994); increasing teacher's work in individualizing teaching and assessment, record keeping and planning enrichment and re-mediation (Brady, 1997; Kudlas, 1994 and Terry, 1996); and, disadvantaging the capable students (Brady, 1997; Evans and King, 1994).

Other objections include the fact that the implementation of OBE takes a significant period of time, effort and training (Battistini, 1995; Kearney, 1994 and McNeir, 1993b) while co-operative learning is stressed by organizing virtually all learning activities into group activities. Learners are asked to work co-operatively, compromise and reach a consensus (Schlafly, 1994 and Terry, 1996); the curriculum is tilted heavily towards the affective domain in order to manipulate and change feelings, attitudes and values (Schlafly, 1994; Simonds, 1994). Traditionalist and fundamentalist Christians adamantly state that OBE contradicts their values. Their objections also include the feeling that OBE promotes the indoctrination of social, political and economic values (Brogan and Brogan, 1994; Schlafly, 1994 and Simonds, 1994); training for global citizenship is established as the primary purpose of all education (Brogan and Brogan, 1994 and Iserbyt, 1994); a linear OBE model is non-reflexive (Terry, 1996); tracking may be a result (Kearney, 1994 and Terry, 1996); and finally, that there is no convincing empirical evidence that it works (Evans and King, 1992/1994; Kearney, 1994; Schlafly, 1994 and Simonds, 1994).

These criticisms may be due to a general resistance to change and a misunderstanding and confusion about the new approach (Kearney, 1994 and Terry, 1996). Also, it is argued that some criticisms are based on emotionalism (Kearney, 1994 and Terry, 1996).

2. OBE: A South African Perspective

Within the context of South Africa, Jansen (1997) and Van Schalkwyk (1998) amongst others, concur that apartheid education failed learners in many different ways. The National Qualifications Framework (NQF) was born out of a recognition that there was a need to change the education system in order to meet the economic and social needs of South Africa and its people (EIC, 1996). The development and implementation of a NQF in South Africa is aimed at reconstructing and developing the current education and training systems into one that reflects an *integrated* approach which addresses the learner's and nation's needs (ibid, 1996). It follows that for the NQF to be effective there will need to be a change in the education system where "emphasis is placed on the necessity for a shift from the traditional aims and objectives approach to an outcomes-based approach" (Government Gazette no.18051, June, 1997). This paradigm shift, which the NQF document suggests, is a

necessary prerequisite for the achievement of its vision for South Africa. They anticipate "a prosperous, truly united, democratic and internationally competitive country with literate, creative and critical citizens leading productive, self-fulfilled lives in a country free of violence, discrimination and prejudice" (ibid, p5). At the centre of this change in schools is the new curriculum – *Curriculum 2005* launched in Cape Town on April 24th 1997 and the educational approach underpinning this new curriculum is OBE (Jansen, 1997).

Therefore, the introduction of OBE in South Africa flows from the government's blueprint for learning and development - the NQF (Anonymous, 1997a, Perspective 3). According to Samson and Vally (1996), the fundamental theoretical underpinnings of the NQF can be identified as 'human capital theory[8], post fordism[9] and OBE'[10] (p.132).

It is important to note that the move towards OBE takes place in a context of transforming South African society from one based on major inequities to one which is fundamentally egalitarian (Report of the Consultative Forum on Curriculum, 1996). Consequently, OBE (as in the USA and Australia) is also viewed as a solution for the problematic conditions confronting contemporary education[11]. Furthermore, it is argued that Curriculum 2005 is based on a system that has already been researched (National Department of Education, 1997, Booklet A and Mkhatshwa, 1997). However, as mentioned earlier, some researchers argue that there is insufficient research documenting the effects of OBE (Evans and King, 1992/1994 and Kearney, 1994).

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8 Human capital theory is based on the belief that there is a direct link between education and economic growth (Samson and Vally, 1996).

9 Post-fordism involves smaller production units, relying on a multi-skilled, flexible and problem-solving workforce capable of producing smaller runs for specialized international markets (Samson and Vally, 1996).

10 Jansen (1997) reports that "in South Africa, the most immediate origins of OBE is in the competency debates followed in Australia and New Zealand which animated training and development discussions in COSATU, which eventually appeared in documents of the National Training Board (such as the National Training Board Strategy Initiative) and , subsequently, crystallized in the (NQF)" (pp117-118). Jansen (1997) argues that it was "largely the result of deliberations within the NQF to integrate education and training that the debate on competencies was extended to education."(p118) More recently, according to Jansen (1997), 'competencies' was reframed as 'outcomes' in the Department of Education. Thus, according to Samson and Vally, (1996) while COSATU's proposals were largely based on concerns for equity, they also dovetailed with increasing concern about the efficiency and competitiveness of South Africa industry. Furthermore, The New Zealand model which greatly influences the S.A. model, is the only one which combines vocational and general education (Anonymous, 1997a, Perspective 1).

11 Schollar (1997) states that two core justifications have been advanced for the adoption of Curriculum 2005 and OBE. First, there is a need for a more relevant and effective education system. The previous system was based on an outdated model of education in an era of advanced technology, global communications and rapidly expanding information systems. This has led to the endemic under-performance of the majority of schoolchildren. Schollar (1997) argues that one significant consequence of this under-performance has been an inadequate flow of properly prepared pupils into the vocational, commercial, technical and industrial sectors of the education and training continuum. Secondly, there was the need to equalize educational opportunities. The previous system was developed in the interest of minority sectors of the population and produced an elitist and class/cultural barrier to the educational advance of the majority.

Curriculum developers acknowledged the different approaches to OBE (i.e., traditional OBE, transitional OBE and transformational OBE). Of these three approaches, the Minister of Education is committed to transformational OBE. According to the National Department of Education (undated, Booklet B), it was acknowledged that much of the present change may be described as 'transitional'. In other words, while policy goals point toward a transformed South Africa and educators should aim for this – it must be practically implemented subject to historical and economic constraints. It may be over-idealistic to opt for transformational OBE given the admission that for historical reasons the foundations on which to build an OBE policy are inadequate. Again, it is important to note that states and districts (in the USA) that use the OBE label but ignore the authentic implementation of the principles, have become the critics' prime focus (Spady, 1992).

(a) OBE and Curriculum 2005: What Is It?

South African OBE as documented in the Report on the Consultative Forum on Curriculum (1996), the Curriculum Framework for General and Further Education and Training (Draft Document, 1996); the Government Gazette no. 18051 (1997); the Foundation Phase, Draft Policy/Phase Document (June, 1997); documents from the National Department of Education (Booklets A, B, C, D, E) and the Education Information Center display the following *common* elements with the international OBE approach discussed earlier.

First, the *outcome* is of paramount importance to the new curriculum[12]. In OBE, curriculum developers work backwards from agreed desired outcomes within a particular context. These outcomes clearly state what the learner should be able to demonstrate an understanding of, and/or, an ability to apply appropriately. Programs of learning are then designed to help the learners to achieve these outcomes. Therefore, learning is facilitated carefully towards the achievement of the outcome. An examination of South Africa's outcomes shows that Curriculum 2005 is driven by the acquisition of skills[13] (Gibson et al., 1997). Content is seen as a tool whereby life-skills and "competencies" (sic) can be enhanced, in other words, learners will be taught how to think, rather than being exposed to what (i.e., content) needs to be learned. According to the various policy documents, this is in contrast to the knowledge-based and content-driven education of the past. Therefore,

[12] According to the Report of the Consultative Forum on Curriculum (1996) various definitions of an outcome have been developed and as yet there is no consensus around a South African definition of an outcome.

[13] Wallace (1997) argues that the acquisition of useful skills is the main criterion even to the detriment of the acquisition of relevant knowledge and meaningful values. This is evident in South Africa's 'critical outcomes' and is the source of much debate. Wallace also maintains that the spotlight has moved away from educational values such as the importance of individual achievement to the value of group involvement.

content alone cannot be an outcome as it is inherently inert and must be manifested through a process of demonstration.

Secondly, the notion of *transference* is emphasized. It is argued that success in school is considered to be of limited benefit unless learners are equipped to transfer that success to life beyond school, i.e., to apply what they have learnt to their everyday and future lives. Therefore, the outcomes (desired end results of education) should reflect a "package of abilities" that a person has to have to be a competent citizen.[14] The need to demonstrate a number of abilities/skills in different situations means that learners must be given opportunities (and be taught) to develop abilities that they can use in a variety of situations. It follows that competence is not the ability to carry out exactly the same actions learners have been taught in exactly the same context[15]. For outcome-based policy makers, what matters is the achievement of a broad outcome, not the mastery of specific bits of isolated information or skills.

Thirdly, learning is characterized by its appropriateness to each learner's needs, interest and developmental level; and learning is active and experienced-based for maximum application of the knowledge, skills and orientations necessary for learner success in the present and the future. Therefore, a variety of integrated learning experiences, as well as multiple instructional strategies and assessment tools are encouraged and each learner's progress is based on demonstrated achievement. Lastly, the four operational principles mentioned earlier are also adhered to, namely: clarity of focus, expanded opportunity, a "design-down process" and high expectations. In addition, attention is paid to criterion referenced assessment and assessment of higher-level learning objectives and accountability.

Although it appears that South African policy makers are generally in agreement with their international colleagues on the basic tenets of OBE, South African OBE has a number of unique features. According to the Curriculum Framework for General and Further Education and Training, (Draft Document, 1996) the principles which informed curriculum design included: human-resource development, learner-centeredness, relevance, integration,

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[14] South Africa's outcomes have been chosen because they reflect current views of the abilities (i.e., to collect and analyze information, to think critically, to organize and manage oneself...) a person needs in order to function well in society - regardless of the type of work or the particular activity he/she may be involved in (National Department of Education, undated, Booklet B). In terms of the National Department's objectives, there seems to be a clear focus on meeting economic needs (see critical outcomes) while social needs seem to be an after-thought.

[15] According to the Foundation Phase Draft Policy Document (1997), competence is defined as "the capacity for continuing performance within specified ranges and contexts resulting from the integration of a number of specific outcomes" (p4). The recognition of competence in this sense is the awarding of a qualification.

differentiation, redress and learner support, national building and non-discrimination, critical and creative thinking, flexibility and credibility, progress and quality assurance (pp.11-16).

With the above in mind, the South African OBE approach to curriculum development entailed identifying the following: a curriculum rationale, critical outcomes, specific outcomes, learning areas, learning programmes, learning and teaching strategies and assessment methods. (Report of the Consultative Forum on Curriculum, 1996). Each of these elements will be discussed separately below.

In agreement with the international perspective on OBE, outcomes in South Africa are the results of learning processes (whether formal, non-formal or informal) and refer to the knowledge, skills, attitudes and values within particular contexts. The decision to make the paradigm shift from a content-based curriculum to an outcomes-based learning programme necessitated identifying a set of broad, cross-curricular outcomes which would form the core of planning and assessment. The following generic, cross-curricular outcomes, designated the "Critical Outcomes", were adopted by the South African Qualifications Authority (SAQA). They reflect an ability to:

> identify and solve problems and make decisions using critical and creative thinking; work effectively with others as members of a team, group, organization and community; organize and manage themselves and their activities responsibly; communicate effectively using visual, symbolic and/or language skills in various modes; use science and technology effectively and critically showing responsibility towards the environment and health of others; and, demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation (Government Gazette, No.18051, 1997, p.13)

In addition to these critical outcomes which focus strongly on knowledge and skills and which according to Jansen (1997) neglect values and attitudes[16] it was subsequently agreed that all learners should become aware of the importance of:

> reflecting on and exploring a variety of strategies to learn more effectively; participating as a responsible citizen in the life of local, national and global communities; being culturally and aesthetically sensitive across a range of social contexts; exploring education and career opportunities; and,

[16] In His aricle on "Why OBE Will Fail" states that OBE's focus on instrumentalism side-steps the important issue of values in the curriculum. Jansen (1997) maintains that in the Human and Sosial Science's (HSS) Learning Area that core values would be more readily evident. He states that of the learning area outcomes identified for HHS, the closest approximation of a value statement is the phrase "participate actively in promoting a sustainable, just and equitable society" (p.6). He maintains that these outcomes are broad, bland and decontextualized global statements which will make very little difference in a society emerging from apartheid and colonialism. Jansen (1997) makes this point by using the example of a society which produces top rugby coaches (highly skilled in outcomes associated with rugby training and yet generates the kinds of values embodied in an Andre Maarkgraaf).

developing entrepreneurial opportunities (Government Gazette, No. 18051, 1997, pp.13-14).[17]

Therefore, there are seven critical outcomes adopted by the SAQA with an additional five outcomes which support development. Once again, it is important to note that the inclusion of values as opposed to only knowledge and skills attracted much criticism in the USA – especially from Christian groups. Interestingly, Spady, Marshall and Rogers (undated) in their later work omit the word 'values'. Instead, they maintain that it is up to the local educators, parents and other community members to adopt attitudinal outcomes.

These critical outcomes are underpinned by the South African constitution and express in a broad sense the intended results of education; they are universal for all areas of study and are reflected in the specific outcomes which will be related to specific subject areas, i.e., they underpin the learning process in all its facets. Therefore, the purpose of the critical outcomes is to 'lead to the development of conceptual skills and understanding which transcend the specific, gradually developing the learner's capacity to transfer learning from one context to another (NQF, 1996, p. 26). Brodie (1997) states that South Africa's critical outcomes reflect the following. First, these critical outcomes reflect a view of the kind of society that we hope to develop in SA (i.e., a culturally-diverse democratic society) and secondly, the skills and competencies that learners will need in order to develop, contribute to, and function effectively in such a society (i.e., characterized by rapid change, an interconnected world, and a world dominated by information and communication[18]) (Brodie, 1997).

Specific outcomes are content specific. They are informed by the essential outcomes but formulated within the context in which they are to be demonstrated. Therefore, a specific outcome relates to a specific learning area. In this regard it is important to note that the progress of the learner is based on measuring the actual achievement of the learner. Consequently, an outcome is not a score or a grade, but the end product of a clearly defined learning process that learners carry out (Government Gazette no 18051 and The Draft Policy Document for the Foundation Phase, 1997). Furthermore, each specific outcome is expanded into *assessment* criteria and *range statements.* These are further expanded into performance indicators. Assessment *criteria* are used to gather evidence that the learner has achieved the specific outcome. The assessment criteria are derived directly from the specific outcome and form a logical set of statements of what achievement could or should look like. Assessment criteria are explained in more detail in the range statement. That is, range statements indicate the scope, depth, level of complexity and parameters of the

[17] These outcomes also raise the question concerning who decides what society values more highly (i.e., is entrepreneurship embraced and valued by all citizens?).
[18] It seems that more emphasis is placed on meeting economic needs.

achievement. They include indications of the critical areas of content, processes and context which the learner should engage with in order to reach an acceptable level of achievement.

However, the assessment criteria and the range statement give only broad indications of what evidence learners need to present before they are seen as having achieved the specific outcome. It is the *performance indicators* which provide more detail of the content and processes that learners should master, as well as the learning contexts in which the learner will be engaged. Therefore, assessment criteria, range statements and performance indicators can provide the information needed for lesson planning. (Government Gazette no 18051 and the Draft Policy Document for Foundation Phase, 1997). Concerning assessment, it is important to note that OBE assessment must be continuous. Continuous assessment is about recording observations of a learner's progress and using the information to guide teaching and learning in future lessons. The National Department of Education insists that all assessment, even examinations, should be designed to form a part of active learning and not be treated as a separate activity. Furthermore, the most appropriate assessment tool for the outcome must be chosen (The National Department of Education, undated, Booklet C, and Hallendorf, 1997).

In the Draft Statement on the National Curriculum for grades 1- 9 in the Government Gazette no 18051, (1997) each learning area has a set of specific outcomes which describes what learners will be able to do at all levels of learning. This document refers to *eight learning* areas adopted by SAQA. These are Language, Literacy and Communication; Technology; Mathematical Literacy, Mathematics and Mathematical Sciences; Natural Sciences[19]; Arts and Culture; Economics and Management Sciences; and Life-Orientation. Thus, the subjects as we know them will not be retained in their present form. They have been absorbed into eight learning areas. In addition, these learning areas include aspects of knowledge previously ignored in the curriculum (such as Technology), and emphasize the importance of other areas that were previously marginalized (such as Arts and Culture and Life Orientation), or ignored in the primary and junior secondary phases (such as Economic and Management Sciences) (Taylor, 1997). The organization of previously discrete subjects into learning areas reflects the emphasis on the need to prepare learners for the real world and

[19] Cortie and Cortie (1997) argue that the Natural Sciences Learning Area is based upon a somewhat controversial view of science (i.e., the post-modernist interpretation of science). Furthermore, Cortie and Cortie (1997) highlight the fact that "the discussion document notes that whoever ends up developing the actual learning programme should make sure that the content in them is reduced in order that there is place for imparting competencies, attitudes and values" (p.132). However, Cortie and Cortie (1997) maintain that a knowledge base is needed before one can use higher-order skills. They further argue that too many of the assessment criteria relate to contemporary, social and political issues and too few to science.

to equip them to apply what they have learnt to real situations (Potenza, 1998). The idea is for the learning areas to begin to break down the strict boundaries between disciplines and to pace the way for integrated approaches to learning[20] (Brodie, 1997). In addition, each area of learning description should demonstrate that it is informed by the commonalties it shares with other areas of learning. Cronje (cited in Brodie, 1997) maintains that these generic, cross-curricula phenomena should facilitate the development of a broad and balanced curriculum, not a fragmented, scattered and meaningless collection of experiences for learners.

The *content* of education in the General Education and Training Band (GET) is outlined in the eight-areas of learning (Anonymous, 1997b). The syllabus as it was previously known is now replaced by learning programmes and these learning programmes become the vehicles through which the curriculum is implemented (Government Gazette, No. 18051, 1997). A Learning programme is a set of learning and teaching activities and ways of assessing a learner's achievements. Teachers are free to develop their own learning programmes as long as they take into account the various kinds of outcomes and complement the needs of the learners (National Department of Education, undated, Booklet B). A learning programme includes the following: critical outcomes, specific outcomes, assessment criteria, range statements, performance indicators, sample assessment criteria[21] and notional time[22]. These guide the choice of methodologies and the teaching and learning strategies (Draft Policy Document for the Foundation Phase, 1997). The teaching and learning strategies will be discussed in more detail later.

In the past, the syllabus and textbook have been the key classroom resources (Taylor, 1997). However, the proposed role of materials in Curriculum 2005 is unclear. Official policy on the development of detailed learning programmes and the production and deployment of

[20] With the amalgamation of disparate subjects, Taylor and Muller (1997) wonder where the new discourse will come from. They maintain that all learning requires a specific conceptual language, with its specific objects and styles (i.e., an extra-disciplinary outcomes set cannot and does not exist, and a trans-disciplinary one is extremely difficult to construct coherently). In addition, Van Schalkwyk (1998) reports that this aspect of the curriculum has been criticized for the 'impossible burden' which the attempted amalgamation of disparate disciplines will cast upon teachers (i.e., how will teachers acquire the additional knowledge). Van Schalkwyk (1998) further argues that History requires specific skills, such as evaluation of evidence, which is qualitatively different form the spatial skills required by Geography.

[21] Sample assessment activities are the learner's actions which will provide evidence against what the performance indicators can be judge (Draft Policy Document for the Foundation Phase 1997).

[22] According to the Draft Policy Document for the foundation Phase (1997) notional time is not teaching time. It is a guide for weighting (i.e., 25% for the Literacy, Numeracy and the Life-skills learning programme in addition to 25% allocated to flexible time).

teaching and learning materials has not yet been spelled out (Vinjevold, 1997). Proponents of Curriculum 2005 argue that once a set of learning outcomes has been produced, it is possible and even desirable for teachers to develop their own learning programmes and materials (Vinjevold, 1997). Therefore, Potenza (1998) states that instead of being forced to use one prescribed textbook, teachers are now being asked to select appropriate material form a wide range of approved books and kits. Consequently, Potenza (1998) maintains that OBE is beginning to restore to teachers their roles as professionals and intellectuals. However, a recent article by Pretorius, Govender, Ismail and Ludski (1998) in the Sunday Times (May 17, 1998) indicates that teachers are not yet up to this challenge.

According to Garson's (1998) report on pady's recent visit to South Africa, Spady acknowledged that South African teachers are now using more activity-based and group work teaching methods. However, Spady stressed that while these developments are good, they are not in themselves OBE (i.e., there seems to be a tendency to equate group work with OBE). Garson (1998) further reports that Spady is somewhat critical of the way OBE is being implemented in this country (p.5). Garson (1998) reports that Spady believes that OBE should be phased-in, in a far more gradual and whole-school way, rather than grade by grade and that implementation should start from "top down' rather than 'bottom up', or in grade one as has happened here. Spady also suggested that teachers focus on the 12 critical outcomes rather than the 66 specific outcomes as guidelines as these are more important and less intimidating. It seems that because the specific outcomes are related to specific learning areas and are expanded into assessment criteria, range statements are performance indicators (which help to plan the learning process) that teachers have focused on these specific outcomes as apposed to the 12 critical outcomes.

(b) Conceptions of Teaching and Learning Within South African OBE

I will now examine more closely the conceptions of teaching and learning within the outcomes-based approach adopted in South Africa. Specifically, I will focus on the learner and the teacher's/mediator's engagement with the task demands, the learner's engagement with the task and the relationship between the mediator and the learner.

According to the Report of the Consultative Forum on Curriculum (1996), education in the past placed the teacher in a particular role. The *teacher* was seen to be in a position of authority to the learner and an authority in terms of the content to be transmitted.[23] These relations were embedded in the nature of the system, which controlled the learning process.

[23] This can also be seen in aspects of the hidden curriculum, for example, classroom organization. Typically, desks are arranged in rows with the teacher assuming her rightful place in the front of the classroom.

Ultimately, this led to the creation of institutionalized power relations. In the old education system, only the content of the courses and what the teacher and the textbook had to say were important. Accordingly, South African education proceeded on the assumption that the teacher is the dispenser of knowledge (Potenza, 1998 and Tema, 1997). Consequently, teachers were responsible for learning, and motivation for learning was dependent on the personality of the teacher. On the other hand, learners in the old education system, according to the Report of the Consultative Forum on Curriculum (1996) and the Education Information Centre (1996), received information from the teacher and did not play a very active role in the learning situation. Most of their learning was memory-based. Consequently, learners were seldom given the opportunity to show what they had learnt and how to use their knowledge. In outcomes-based education, what you understand and your ability to use and *transfer* your knowledge, skills and understanding to different situations, is important.

In the Report of the Consultative Forum on Curriculum (1996), it is argued that these power relations need to be transformed and consequently the role and function of the teacher needs to change. Departmental documents are equally ambitious with respect to the changing demands made on the teacher under OBE. Perceptions of teachers as dispensers of knowledge change (Curriculum framework for Further and General Education and Training, Draft Document, 1996, p.51). Consequently Potenza (1998) states that in an outcome-based approach, one focuses less on what the teacher teaches and more on what the learner learns (i.e., the central question about the learning processes has shifted). Potenza (1998) argues that the teacher should no longer ask 'what have I taught' but 'what has each one of my learners learnt?' (p.52). Teachers and learners are now valued as equal and active participants (Draft Document: Curriculum framework for General and Further Education and Training Draft Document, July 1996). Therefore, the teacher as opposed to being the repository of all knowledge and wisdom, must now *facilitate* and mediate the educational experience[24]. This approach requires teachers - facilitators in OBE language-to assist learners in acquiring the skills that will enable them to search for information without getting it from the teacher (Potenza, 1998). Tema (1997) argues that the development of questioning techniques will be central to the process of teaching. Therefore, teachers guide learning as compared to transmitting knowledge. Their role is that of a nurturer and supporter (Lubisi et al., 1997 and the National Department of Education, undated, Booklet E).

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[24] Jansen (1997) insists that the changing demands made on the teacher under OBE are clearly ridiculous. He argues that they represent a "conceptual leap of staggering proportions from outcomes to dramatic changes in social relations in the classroom"(p4). Jansen sees this as unlikely to happen (i.e., how will under-qualified teachers be transformed into the facilitators outcomes-based education demands ?).

An educational encounter, from the perspective of the learner, now becomes one of self-discovery and *knowledge construction* (Curriculum Framework for Further and General Education and Training, Draft Document, 1996, p.53). The teacher, now a facilitator of learning, will create relations between learner and facilitator which engender values based on co-operative learning. Teaching and learning are therefore not sharply divided (The National Department of Education, undated, Booklet B). In this approach, it is argued that learners take responsibility for their learning and are motivated by constant feedback and affirmation of their worth. Critical thinking, reasoning, reflection and *action* will be emphasized in the learning experience (Curriculum Framework for Further and General Education and Training, Draft Document, 1996, pp53-54). Consequently, learners are not seen as empty vessels, compared with one another, or viewed as "clever" or "stupid". The teaching and learning strategies, which will mediate the learning, are the responsibility of the teacher and must reflect the outcome. OBE requires teachers and trainers to focus on the outcomes of education rather than merely teaching information (The National Department of Education, undated, Booklet E). This means that learning will have to be directed towards acquiring abilities and skills, rather than the memorisation of information. As such, the teacher will plan all activities around the critical outcomes and assessment will be an integral part of learning. Watkins (1997) argues that with today's electronic information technology, combined with the existing storage of facts, the need to retain information in memory is not as important as knowing where to find the information. Therefore, the *processes* (i.e., the how) of learning becomes more important then the *what* (i.e., the content) of learning. Consequently, there will be a shift away from content-based programmes where teachers aim to cover the curriculum in a predetermined time.

In Curriculum 2005 *what* is taught and *how* it is taught is not strictly specified. Teachers have the freedom to make choices about content as long as the outcomes are achieved (Tema, 1997)[25]. Teachers are encouraged to develop learning programmes that cut across the various learning areas as this provides a more integrated approach to learning. It is important to note that the Curriculum Framework for General and Further Education and Training (Draft document, 1996) necessitates that "curriculum development, especially the development of learning programmes and materials should put learners first, recognizing

[25] Scholfar (1997) argues that, in the absence of a prescribed course of study and required text, teachers will tend to fall back on the familiar or on what they find personally interesting. Consequently, Jansen (1997) argues that OBE marginalizes curriculum content. Jansen insists that content matters as it is a "crucial vehicle for giving meaning to a particular set of outcomes" (p7). He further maintains that selecting content implies choice, and that this is where the politics of curriculum reform coincide with the broader politics of transition. Similarly, I believe that curriculum is not determined by the intrinsic value of the knowledge. Rather, OBE begins with the outcomes and then proceeds to determine what knowledge will bring about that outcome. Therefore, what is used does not need to have intrinsic value and it does not need to rely on an established body of knowledge. However, certain forms of knowledge have greater worth than other forms of knowledge.

and building on their knowledge and experience, and responding to each learner's needs" (p.11). The Curriculum Framework further suggests that "curriculum development processes and delivery of learning content (knowledge, skills, attitudes and values) should take account of the general characteristics, developmental and otherwise of different groups of learners" (p.11).[26] Therefore, learning is characterised by its appropriateness to each learner's interest and developmental level and each learner's needs are accommodated through multiple instructional strategies and assessment tools (p 47). Furthermore, in OBE, teachers and trainers are encouraged to find ways of providing conditions of success in the classroom. A positive learning environment is seen as essential to education and learner motivation (Report of the Consultative Forum on Curriculum, 1996).

From the foregoing it is evident that OBE requires a shift away from the empty vessel paradigm. However, Tema (1997), maintains that this proposed shift has resulted in a number of misconceptions about the types of classroom practice promoted by OBE. It is commonly held that OBE prescribes teaching through collaborative work or group work and child-centered discovery approaches. However, Tema (1997) explains that the methodology that will be used in any learning programme is suggested by the specific outcomes to be achieved. Thus, an OBE approach recommends the provision of a variety of learning opportunities or teaching methods which include group work[27]. Tema (1997) argues that teachers need to use any approach with discernment and discretion. This approach to teaching and learning has a number of implications for classroom teaching[28]. The following section considers some of these in more detail.

According to the Curriculum Framework For General and Further Education and Training (Draft Document, 1996 and the National Department of Education, 1997), the approaches to learning could be "that the curriculum is seen as a matrix of ideas to be explored over time; curriculum content and process are complex and interactive; knowledge construction and

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[26] OBE's emphasis on the need to take cognizance of different learners' needs has not accounted for practical considerations i.e., more teachers and increased costs. In addition, Jansen (1977) states that OBE is supposed to create learner-centered classrooms, substitute understanding for memory learning, and develop learners who critically apply and demonstrate what they have learnt in different contexts. However, he maintains that in reality S.A.
has underqualified teachers who lack the resource materials required to teach 60 pupils and he asks how can this happen in those urban township schools in which more than 30% of learning time is lost to non-school activities and how can the system be put into practice without sustained training of teaching staff.

[27] It is important to note that group work is emphasized in the new curriculum (Myburgh, 1997). Janish (1997) maintains that the spotlight has moved away from educational values such as the importance of individual achievement to the value of group involvement.

[28] It is important to note that in the international OBE approach, mastery learning as an instructional model is considered to be an integral part of OBE's beliefs and practices. This does not seem to be the case in South Africa. Time will be required to measure the evolutionary development of this aspect in South Africa as to whether it overtly embraces mastery learning or whether it takes on another direction.

production rather than mere knowledge consumption is in the foreground; the focus is on student thinking and 'sense making and the teacher's role is to make connections between the subject-matter knowledge and the learner's prior experience" (pp.53-54). This suggests that there will be *inter alia*, a need for the following:

- An emphasis on activity-based learning, with an opportunity for learners to explore ideas and approaches to learning and to practice skills. Development takes place through learning experiences that are multi-faceted and are based on concrete, 'hands-on' experiences. It is maintained that learners learn best when they do things, discover, have fun, communicate, are not afraid of failing and feel good about themselves;

- Co-operative as well as individual learning contexts so that learners can develop skills of working collaboratively in a group, and individually, and the ability to recognize when each mode is appropriate;

- An emphasis on formative assessment, so that the processes and developmental nature of learning, as well as the products, are seen as important; and,

- The setting of tasks that integrate theory and practice, and learning which links classroom learning to the broader society in which it is located (p.37).

Ultimately, the teaching-learning processes should be "active, participative, investigative, varied, co-operative, supportive, learner-centered and differentiated" (p.54),

It is evident that teaching and learning will change. According to Brodie (1997) and Taylor (1977) there are two ways in which this change is conceived. First, a shift from drill teaching and rote-learning to more meaningful pupil participation, discussion, groupwork, investigations and other relatively recent methodological innovations. Secondly, a shift from abstract, formal concepts to relevant concepts, or concepts in context, particularly social, political and economic contexts.

To summarize, teachers and trainers will become facilitators rather than transmitters of knowledge. They will use a variety of methods of instruction and every learner will be assisted to succeed but at his/her own pace. Teachers and trainers will no longer feel the pressure of having to be the 'source of all knowledge' as learners will be trained to take responsibility for their own learning (National Department of Education, 1997, Booklet A).

(c) Responses to South African OBE

Various groups in the institutional, public and private sector, through both the professional and popular media, have either criticized or supported the Government's decision to

implement curriculum 2005 (Mkhatshwa, 1997). However, given that research on OBE in South Africa is still in its infancy there is currently a shortage of in-depth published research.

Proponents have suggested some of the following advantages of using an OBE approach in South Africa. These advantages include the fact that OBE is learner-centered (Brodie, 1997 and the Report of the Consultative Forum on Curriculum, 1996); OBE moves away from rote learning and a content-driven curriculum (Mkhatshwa, 1997; National Department of Education, 1997, Booklet A); OBE is focused on the acquisition of life skills and the raised expectations of learners (Anonymous, 1997a, Perspective 3, Gibson, et al., 1997 and Taylor, 1997); and, OBE attempts to provide an integrated approach to the acquisition of knowledge (National Department of Education, 1997, Booklet A and Taylor, 1997). Accoding to the proponents there are also the following practical advantages. Schools have wide scope in determining the contents of lessons and appropriate assessment procedures (Anonymous, 1997a, Perspective 3, Taylor, 1997 and Vinjevold, 1997); learners know exactly what is expected of them as specific goals are identified (Anonymous, 1997a, Perspective 3, and Taylor, 1997); learners become acquainted on an ongoing basis with the level of their achievements (ibid, 1997); and, they are encouraged to discover a wide range of concepts in an area of learning (Anonymous, 1997a, Perspective 3, The National Department of Education, undated, Booklet B and Van der Host and McDonald, 1997).

South African criticisms of OBE have been forceful. According to the critics, Curriculum 2005 is inappropriate for conditions in South Africa as the success of Curriculum 2005 will depend primarily upon the skills and sophistication of the teachers. However, the vast majority of teachers in SA are unqualified, under-qualified or otherwise ill-equipped for the demanding task of successfully implementing an OBE system.[29] It is contended that the relatively poor quality of many of the teachers must be an insurmountable obstacle to the success of curriculum 2005 (Garson, 1998; Jansen, 1997; Myburgh, 1997 and Pretorius et al., 1998). Other objections include lack of teacher preparedness (Jansen, 1997 and Schollar, 1997); OBE is too loose a system and will be implemented in many different ways, depending on the skills of the teacher and the availability of resources (Garson, 1998 and Jansen, 1997); it is unrealistic to expect teachers to develop their own learning programmes (Tema, 1997 and

[29]In 1995 the Department of Education undertook a programme known as 'right-sizing'. Responding to this programme the reporter, Alister Sparks (cited in Van Schalkwyk, 1994) stated that "the Education Department's policy of encouraging the retrenchment of school teachers is one of the most bizarre acts of self-immolation that is possible to imagine. Here is a country which desperately needs teachers, perhaps more urgently than anything else, yet it has just retrenched 120,000 of the best of them – and is set to lay off thousands more in the course of this year. This is sheer madness. It is rather like a man in the desert dumping his water bottles to lighten his load"(p121). Van Schalkwyk (1998) argues that the reason for such an obviously destructive course of action is that for purposes of ideology the accomplishment of sound education is less important than the perceived accomplishment of equality (p122).

Vinjevold, 1997); it is naïve to believe that teaching can succeed without learning programmes, and teachers will consequently be forced to make up their own disguised learning programmes which are likely to be ideologically partisan (Jansen, 1997 and Olsen, 1997). Furthermore, the critics believe that OBE requires a change in the relationship between teachers and learners (Jansen, 1997); a facilitator's role is not adequately defined and there is consequent role confusion (Schollar, 1997); there is also the danger that shifting the responsibility for learning onto the learners might lead to an abdication of responsibility on the part of teachers (Anonymous, 1997a, Perspective 3); it is naïve to expect that most learners are self-motivated (Wits EPU, June, 1997); the management of OBE will multiply the administrative burden placed on teachers and administrators (Anonymous, 1997a, Perspective 3; Hallendorf, 1997 and Jansen, 1997); a lack of human resources and materials and overcrowded classrooms makes OBE difficult to implement (Anonymous, 1997a, Perspective 3; Garson, 1998; Jansen, 1997; Pretorius et al., 1998 and Wits EPU, June, 1997); the implementation of OBE will undermine the already fragile culture of teaching the learning (Jansen, 1997); elitist aspects of education will not be addressed because of the existing unequal distribution of resources in communities (The Educational Journal, 1997a, perspective 3 and Wits EPU, June, 1997).

Further objections relate to the jargon associated with OBE. In this regard the critics contend that OBE it is too complex, confusing and at times contradictory (Anonymous, 1997a, Perspective 3 and Jansen, 1997); the emphasis on outcomes is bound to undermine the acquisition of a broad general education (Ibid, 1997); the extension of such advanced learning techniques to the very youngest of school goers (Cortie and Cortie, 1997); fears concerning the lowering of standards (Van Schalkwyk, 1997); basic education fundamentals (the 3 R's) will be diminished (Anonymous, 1997a, Perspective 3); the mechanistic formulation of outcomes will lead to the stultification of learner creativity (Lubisi et al., 1997 and Jansen, 1997); the Government's inordinate haste to introduce OBE is driven by short-term economic and political motivation rather than long-term educational goals (Anonymous, 1997a, Perspective 3 and Van Schalkwyk, 1998); the ministry has promoted the system as a radical change in teaching and learning and the marketing strategies adopted so far, will have a negative impact on the implementation of the new system (Anonymous, 1997a, Perspective 3). Jansen (1997) also refutes the idea that OBE is a prerequisite for economic growth; OBE views knowledge as instrumentalist (Ibid., 1997); and as education is intrinsically moral, OBE policy makers have failed to define such goals (Ibid., 1997).

It is apparent that the debate on OBE in the country has been polarized. On the one hand, supporters of curriculum 2005 label those who raise questions as unpatriotic. On the other hand, many of the opponents of the new initiative have not always provided constructive criticism (Mkhatshwa, 1997).

What these responses to South African OBE indicate, is that much of the criticism focuses on the implementation problems of this new approach. However, it is my contention that it is the underlying philosophy of outcomes-based education that is flawed. Unfortunately, there seems to be little critical discussion on the underling philosophy of OBE. To initiate such a debate in the next part of my research report I look at the assumptions about teaching and learning which underpins the OBE conceptions of "predetermined outcomes", "prior knowledge" and "transference".

Theoretical Framework

In the literature review, I examined the conceptions of teaching and learning within OBE with special reference to the notions of pre-determined outcomes, transference, and prior knowledge on which OBE is predicated. It seems that these three notions are derived from particular assumptions concerning the nature of learning and teaching. Furthermore, it is important to note that in the various documents on OBE, the conceptions of teaching and learning do not appear to be predicated on a clearly defined psychological theory as these documents are essentially policy documents and therefore they have a particular teleology. In the light of this, it must be asked whether the policy has validity from a psychological perspective – in particular from a Piagetian perspective.

I contend that OBE makes specific psychological assumptions (concerning the nature of teaching and learning) which are not sustainable from a Piagetian perspective. In order to establish the accuracy of my assertion I will first provide a general exposition of Piaget's theory of cognitive development. Secondly, within this exposition, I will isolate and discuss in detail those aspects of Piaget's theory (for example, equilibration, compensatory behaviours, development and learning and competence and performance) which are directly pertinent to the claims of OBE. I will use Piaget's theoretical framework to interrogate the presuppositions on which these notions are based in order to establish their educational efficacy in the next section of this research report.

(a) Piaget's Theory of Cognitive Development

In the continuing debate among philosophers and psychologists over the roles of nature and nurture in the development of knowledge, Piaget has been classified by most writers as an interactionist and certainly he considered himself to be one (Boden, 1979; Bringuier, 1982; Chapman, 1988; Ernest, 1993; Hamlyn, 1978; Langer, 1969 and Kitchener, 1986a). Boden (1979) states that Piaget's characteristic method of argument is dialectical in form, and he sometimes refers to his position as "dialectic constructivism" (p.15). Accordingly, Piaget argues dialectically in dealing with questions about knowledge and his dialectical synthesis of empiricism and rationalism claims to be a scientific epistemology, one that is able on scientific grounds to settle the age-old disputes between rationalism and empiricism (Boden, 1979 and Kitchener, 1986a). Following this dialetical form of argument, Piaget argues that 'knowledge' is neither completely innate (as rationalists would have it) nor is it solely derived form experience (as empiricists contend). Rather, knowledge is constructed through an *interaction* between the organism/individual and his/her environment. According to Piaget,

we are born with very elementary schemes and functions (not knowledge ready-made) given to us by our biology which makes the construction of knowledge possible. (Piaget, 1964/1968/1972). From this position of constructivism/interactionism, Piaget (1964/1972) proposes a psychological theory of development. Before I look at this theory it is important to look at an important distinction in Piaget's theorizing and the role psychological research assumed in his research programme.

Piaget believes that underlying the manifold differences in human action there is a common universal rationality which develops. It is in this regard that Piaget introduces a distinction between the epistemic subject (i.e., an abstract, ideal knower) and the psychological/individual subject (i.e. the concrete, real, individual person) (Kitchener, 1986a/1981; Niaz, 1991 and Voneche and Bovet, 1982). Piaget's (cited in Niaz, 1967) epistemic subject is 'that which is common to all subjects at the same level of development independent of individual difference...' (p571). The assumption is that under ideal conditions, every actual member (i.e., psychological subject) would obtain the level of competence, exemplified by the epistemic subject (Kitchener, 1986a). Therefore, Piaget's theory "is concerned with the identification of universals in cognition and cognitive development, and its content reflects the classical Kantian categories – space, time, number, causality, etc" (Beilin, 1992, p263 and Kitchener, 1986a).

Based on the above assumptions, Piaget engaged in psychological research to establish how human thought changes[30] and to understand this process of transformation, Piaget looked looked at the ontogenesis of logical structures in children i.e., the psychological subject. However, Kitchener (1986a) makes an important point when he cautions that "this research is not, however an end in itself but is intended to provide answers to questions about genetic epistemology" (p.27).

For Piaget (1968), the development of cognition in the individual takes place from point A to point B, where points A and B are structures. It is important to note, that structure B is more complex in comparison to structure A. Furthermore, structure A is incorporated within structure B, thus making structure B completely different from its preceding structures. Finally, structure A, like structure B, is under a state of mobile equilibrium. Piaget (1968) refers to these states of structures as stages of development. Piaget (1964) sees development as progressing through a series of stages which he describes as being the

[30] In particular, Piaget (1970) was interested in the study of both the transitions "from a lower level of knowledge that is judged to be hibher" (Piaget, 1970, p.13) and "the mechanisms of the increase in knowledge" (Piaget, 1957, cited in Kitchener, 1981, p.400).

sensori-motor stage, the pre-operational stage, the stage of concrete operations and the stage of formal operations.

Piaget (1968) insists that they are not stages which can be given a constant chronological date. For Piaget, the significance of the stages is that their order is *invariant as* each stage develops from, rather than merely adding to the one before.[31] Boden (1979) explains that for Piaget, "structural alterations are not simple or random changes, but orderly transformations, whereby one structural form or set of relations is succeeded by another. It is only by way of active transformations that knowledge is possible" (pp.18-19). Therefore, the subject in the process of constructing his or her own knowledge passes through an invariant sequence of stages of development.

In each stage of development, a general *competence* is developed. For example, sensori-motor abilities constitutes the general competence level attained within that stage. It is important to note that for Piaget (1964) competence precedes performance, i.e., the competence makes performance possible. Accordingly, Piaget (1964/1977), contends that a wide range of superficially distinct behaviors appear roughly simultaneously at each stage, because they are all generated by the same recently developed structure (competence). I shall now briefly review each stage.

The *sensori-motor* stage is a preverbal stage, lasting approximately the first 19 months of life. In this stage, children's early interactions with the environment are strictly sensori-motor; that is, they respond directly to environmental stimuli with reflex-motor reactions. Therefore, children's early experiences involve the use and elaboration of their innate schemata such as grasping, sucking and reaching. During this stage the construction of the permanence of objects is developed along with the construction of practical, or sensory-motor, space. There is similarly the construction of temporal succession and of elementary sensory causal relations (Piaget, 1964).

In the second stage – *pre-operational representation* – there is the beginning of language, of the symbolic function, and of thought or representation (Piaget, 1964). The pre-operational stage can be divided into two sub-stages. The first sub-stage extends from age two to about four and is characterized by egocentric use of language and strong dependence on perception in problem solving. The second sub-stage lasts from about age five to around

[31] However, Kitchener, (1986a/1986b) explains that "the structures of knowledge do indeed achieve necessity: but at the end of their development, without having it from the start, and do not involve any antecedent programming" (p81).

seven and is marked by more social or communicative speech and greater dependence on intuitive thinking (Thomas, 1996). However, it is important to note that at the level of representational thought, Piaget (1964) explains that "there must be a reconstruction of all that was developed on the sensori-motor level" (i.e., the sensori-motor actions are not immediately translated into operations) (p.9). Therefore, during this second period of pre-operational representations, there are as yet no operations based on how this term is defined[32] (Piaget, 1964).

As we have seen, at first the child's adjustment to the environment is direct and involves no operations. The early use of operations will depend on those events the child can experience directly. Piaget (1964) called these *concrete operations* since children become capable of forming operations that are directly related to objects and "not yet on verbally expressed hypothesis" (p.9). Therefore, in this stage which lasts from about age seven to age eleven, the first operations appear. For example, there are "operations of classification, ordering, spacial and temporal operations, and all the fundamental operations of elementary logic of classes and relations, of elementary mathematics, of elementary geometry and even elementary physics" (ibid, p9).

Finally, in the fourth stage, Piaget (1964) explains that these operations become completely independent of physical experience and they therefore allow the child to solve hypothetical questions. In other words, "when concrete operations are transported into verbal propositions about the relationships that exist or might exist among objects, and these propositions are mentally manipulated, the intellectual actions are called formal operations" (Piaget, 1969, cited in Thomas, 1996, p245). Therefore, the older child's knowledge increasingly becomes mental activity. She/he 'thinks about' things by carrying out interiorized actions on symbolic objects. Furthermore, the subject constructs new operations, operations of prepositional logic and not simply the operation of classes and numbers (ibid, 1964). Therefore, psychological structures develop from infancy to adulthood in a stage-like manner until formal operations is attained.

Piaget (1964/1972) sees four factors as contributing to development (i.e., the development of one set of structures to another). Therefore, the kinds of knowledge the child acquires in terms of mental schemes, and the time at which they are acquired depend upon the

[32] Piaget (cited in Thomas, 1996) explains "operations as actions, since they are carried out on objects before being performed on symbols. They are internalizable, since they can also be carried out in thought without losing their original character of actions. They are reversible ... Finally, since operations do not exist in isolation, they are connected in the form of structured wholes" (p245).

following four factors: biological *maturation*[33] *experience* (influences of the environment); *social transmission* (linguistic transmission, education, etc.); and, *equilibration* (1964,1977). For Piaget, all these factors are necessary for development. None by itself, however, is sufficient to explain the development of cognition (See Piaget, 1964). I will now explain each of these factors.

Piaget (1964) maintains that not only does biology/heredity provide the new born with the initial equipment to cope with problems she or he will meet in the world, but biology/heredity also establishes a time schedule for new developmental possibilities to open up at periodic points thoughout the child's growing years. Therefore, maturational change creates possibilities for new schemes to be created that could not have been generated earlier, but this action neither requires nor guarantees that the potential schemes will materialize. The extent to which the potentialities are actually realized is determined by other factors (e.g. the sorts of experiences the child has with his or her environment).

Furthermore, Piaget (1964) does not deny the significance of social factors in the development of cognition as is commonly assumed. He acknowledges the importance of linguistic transmission and social interaction in challenging amongst others the centered nature of children's thinking.

In addition, Piaget contends that there are two kinds of experience "perhaps always joined in fact but easily separable by analysis: the experience which we call empirical (physical experience), and logicio-mathematical experience" (1972, p50). It is the latter which Piaget focused the greater part of his attention. Piaget (1964) explains that physical experience "consists of acting upon objects and drawing some knowledge about the objects by abstraction from the objects" (p.11). Logico-mathematical experience, on the other hand, consists of "acting upon objects, but knowledge is not drawn from the objects, but it is drawn by the actions effected upon the objects" (ibid, p12).

The last factor, equilibration, is the one that maintains a balance among the other three. This fits the maturational, direct-experience, and social-transmission influences harmoniously together (Piaget, 1964). Piaget (cited in Thomas, 1973) felt the need for such a factor because "a whole play of regulation and of compensation is required to result in a coherence" (p240). In addition, *this factor allows for an explanation of development in terms of the subject's activity – the active construction of knowledge within the subject.* Piaget (1964) describes equilibration as an "active process, ... a process of self-regulation" (p.14).

[33] This factor should not be understood in the biological reductionist way. Furthermore, this biology (programme) determines the parametes, but it does not determine the end point to development (Kicthener, 1986a/1996b).

Furthermore, Piaget (1964) sees equilibration as the fundamental factor in development as equilibration is the *generative mechanism* responsible for the development of structures (i.e., for the passage from less adequate ways of knowing to more adequate ways of knowing). I will now examine Piaget's conception of equilibration and its role in the construction of new knowledge.

(b) Equilibration and the Construction of Knowledge

Piaget believed that all organisms have an innate tendency to create an harmonious relationship between themselves and their environment. In other words, all aspects of the organism are geared toward optimal adaptation (Boden, 1979). Equilibration, is this innate tendency to organise one's experiences to assure maximal adaptation. Piaget (1985) defines equilibration as "a way of multiple disequilibria and re-equilibrations". (Piaget, 1985, p3). Therefore, equilibration is not a simple move towards a predetermined equilibrium, but is rather a process of successive equilibrations, which, rather than returning the system to its previous state of equilibrium, raises it to new and better forms of equilibrium. In general, equilibration seems to mean "a process of movement toward a state of equilibrium or of balance, a state in which an organism remains until conditions upset the balance" (Thomas, 1996, p257). Therefore, "a state of equilibrium is not a state of final rest, but constitutes a new point of departure" (Piaget in Battro, 1973, cited in Thomas, 1996, p257).

Equilibration occurs in two primary ways. These are assimilation and accomodation. Assimilation can be defined as "the integration of any sort of reality into a cognitive structure" (Piaget, 1964, p18). This integration of the external reality may be external to the subject itself, i.e., environmental, or it may be internal to the subject, but external to the scheme concerned. Thus, assimilation may occur internally between two of the subject's schemes or subsystems (i.e., "reciprocal assimilation", Piaget, 1985). Von Glaserfeld (1980) makes an important point when he explains that the directionality that this assimilation takes is important; it *is* the activity of the assimilatory scheme itself which is responsible for the incorporation of compatible external factors and not the external factors themselves which cause assimilation. As Piaget (1972) states "experience is always a process of active assimilation to structures" (p.4).

It is important to note that the cognitive structure that exists at any given moment sets bounds on what can be assimilated by the organism (Piaget, 1964). Thomas (1996) explains that this process of actively matching environmental stimuli to existing mental structures is not simply a matter of ingesting objective reality from the world. Rather, the child *reshapes* the events/stimuli of the world somewhat to fit the pattern of his or her existing schemes. As

Piaget puts it, "to assimilate an object to a schema means conferring to that object one or several meanings" (Piaget, Jonckheere and Mandelbrot, 1958, cited in Thomas, 1996, p237 and Boden, 1979). Accordingly, Piaget and Inhelder (1969) state, more specifically, that "the filtering or modification of the input by the activity of a pre-existent structure' is called assimilation" (p.6).

The second process of equilibration is that of accommodation which is defined as the "modification of internal schemes to fit reality" (Piaget and Inhelder, 1969, p6). This happens because the perceived structure of external events does not readily fit the child's available schemes, even with some perceptual bending of that structure. Therefore, Piaget used the term accommodation to identify this process of altering existing schemes to permit the assimilation of events that otherwise would be incomprehensible. Thus, unlike the assimilation process, the accommodation process is capable of modifying existing structures so that they can operate at a level higher than the previous one (Boden, 1979). Accordingly, for assimilation to proceed accommodation is necessary because these processes represent two inseparable poles and not two different types of behaviour (ibid, 1979). As Piaget (1985) explains "the new assimilation resulting from accommodation involves construction in the sense of extending the domain of a scheme, introducing new articulations into a cycle, and so forth" (p.33).

It is important to note that accommodation always results from an irregularity or disturbance, and what causes this irregularity or disturbance must always be related to the organism's current cognitive structure (Boden, 1979 and Von Glasersfeld, 1980)). These irregularities or disequilibria are in the form of contradictions (between affirmations and negations) or lacunae (gaps in knowledge). These "disequilibria alone force the subject to go beyond his or her current state and strikeout in new directions" (Piaget cited in Chapman, 1988, p292). However, development results not from the disequilibria themselves, but rather from the process of re-equilibration. Furthermore, accommodation, like assimilation, refers not only to modification of a scheme as a result of the assimilation of an external element, but refers also to accommodation between schemes and between schemes and larger structures (i.e., "reciprocal accommodation") (Piaget, 1985, p6).

To elucidate the process of equilibration, Piaget posits a number of compensatory behaviours/reactions and to understand the specific processes internal to the general equilibratory processes it is necessary to look at these compensatory reactions/behaviours in detail.

(c) Compensatory Behaviours[34]

When an organism is confronted with perturbations, either assimilation or accommodation (i.e., the two fundamental processes by means of which equilibration occurs) could "be activated" in order to handle the situation. This however depends on what kind of reaction that takes place between the individual and the perturbation (Piaget cited in Moessinger, 1978, p262). Piaget (1985) distinguishes between three types of reactions namely Alpha, Beta and Gamma reactions[35]. In an Alpha reaction assimilation occurs whereas in the Beta and Gamma reaction accomodation occurs. Therefore, within the process of equilibration a series of responses – compensatory constructions – are produced in sequence. Piaget's view is that the compensatory behaviours are the mechanisms that ensure the passage of information from the environment outside the individual into the cognitive structures of the individual, resulting in the transformation of these structures. This, in short, implies the development of a new cognitive structures (Sebego, 1996).

In an *Alpha reaction,* assimilation occurs and as such the scheme itself is not modified. This could be due to two reasons. First, the schemata itself is not modified as the schemata are developmentally ready (i.e., competent) and the external factor can be assimilated to it. Secondly, the scheme itself is not modified as the new concepts are either ignored (i.e., the subject does not possess the developmentally ready assimilation schemata for a particular concept and therefore the subject will not respond to that concept); or the subject invents a separate theory to account for it; or the new concepts are deformed in an attempt to fit these concepts into existing schemes. This "inappropriate" assimilation occurs as the schemes are insufficiently mature or are not developmentally ready (Piaget, 1985 and Tamburrini, 1982). Lawson (1982) explains that this reaction

> corresponds to a situation in which the individual with assimilation schemata H simply will not respond to pressures imposed by experience and will not develop a new mental structure. Interaction with the environment does not produce disequilibrium or subsequent mental accommodation. The individual is not developmentally ready because the assimilation schemata available to the individual are not adequate to assimilate the new experience (p.402).

It was noted that compensatory reactions are produced in sequence and as such the kind of equilibrium obtained though Alpha compensatory behaviour is partial and unstable and is

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[34] Piaget tends to use the words "behaviours" and "reactions" interchangeably. My discussion adopts this usuage.

[35] For Piaget (1985), "ideas of perturbation and compensatory reaction are entirely relative to the level of the system considered and therefore relative to the instrument of assimilation available" (p58). Furthermore, the available 'instruments of assimilation' are dependent upon the level of development of the subject (Piaget, 1964).

therefore likely to be disturbed (Piaget, 1985). Consequently, Alpha compensatory behaviour progressively blends into Beta compensatory behaviour.

Beta reactions "occur when there is a tendency towards modification of the equilibrium in order to integrate the perturbation. Beta reactions are therefore reorganizations" (cited in Moessinger, 1978, p262). Therefore, in a Beta reaction, the subject is aware of contradictions and the structure itself is modified in order to integrate the perturbing element (i.e., in a Beta reaction accomodation occurs) (Piaget, 1985). However, Sebego explains that "many of the original features of the novelty are retained. Following the re-organisation of the structures, the disturbance is integrated into these structures as a new variation. The new phenomenon is therefore experienced as a new variation and no longer as a disturbance" (Sebego, 1996, p22). Therefore, according to Lawson (1982) in this second phase, a subject is aware of some contradiction but is only capable of inventing as hoc solutions and exceptions in order to neutralise the disturbance. Lawson (1982) explains that in this situation

> the individual with assimilation schemata L is able to respond to environmental pressures and acquire a new behaviour. But the newly acquired behaviour has not yet been (fully) assimilated into his mental structure (or between schemes or between schemes and larger structures). The new behaviour and the person's previous ways of thinking have not been integrated. The result is mental disequilibrium. With removal of environmental pressures, the individual is apt to revert to previous inappropriate behaviours. This can be said to represent a state of disequilibrium because a mismatch exists between the poorly adapted mental structure and the sometimes successful behaviour (p.402, *brackets my addition*)

Consequently, the Beta compensatory behaviour shades into the Gamma compensatory behaviour (Piaget, 1985). As a consequence of the Gamma compensatory behaviour, the reorganisation of structures begun by the Beta compensatory behaviour is completed when a new structure characterized by a system of reversible operations emerges. With the establishment of structures of this nature, the disturbances loose their disturbing power by becoming foreseeable and deducible transformations, that are now anticipated but not eliminated (Sebego, 1996). Lawson (1982), explains that in this situation there is "'the restoration of equilibrium through a spontaneous, internal, yet directional, reorganisation of mental structure which allows the complete assimilation of the new behaviour pattern into the accommodated mental structure of the individual" (p.402).

Handling disturbances in this third way is thus crucial for development. According to Piaget a new transcending point of view is constructed in this way, and a new stage of development can thus be attained (cited in Juckes, 1991).

(c) Development and Learning

Now that Piaget's understanding of the development of knowledge has been outlined, the role of learning within development can be discussed.

A distinction between development and learning is fundemental in any theory of development (Juckes, 1991). However, there has been a long and continuing debate regarding the relation between the processes of development and learning (Lerner, 1995).

For Piaget (1964), the universal processes of knowledge formation constitute development rather than learning. Piaget (1964) draws an important distinction between learning and development:

> The development of knowledge is a spontaneous process, tied to the whole process of embryogenesis. Embryogenesis concerns the development of the body, but it concerns as well the development of the nervous system, and the development of mental functions... It is a total developmental process which we must re-situate in its general biological and psychological context. In other words, development is a process which concerns the totality of the structures of knowledge (p.8).

By contrast to development, learning, for Piaget (1964)

> .... is a process provoked by situations – provoked by a psychological experimenter; or by a teacher, with some respect to some didactic point; or by an external situation. It is provoked in general, as opposed to spontaneous. In addition, it is a limited process – limited to a single problem, or to a single structure (p.8).

In his view, development is the essential process and each element of learning occurs as a function of total development, rather than being an element which explains development (Piaget, 1964). Learning can be characterized as an assimilation of external factors into cognitive structures. In his view, "learning is subordinated to development" (p.7). Development makes learning possible (i.e., the development of mental structures precedes the learning of logically or systematically gained concepts). Piaget (1964/1977) insists that the fundamental relation in all development and all learning is not the relation of association but rather one of assimilation.

Piaget believes that the stimulus response scheme is inadequate in its approach to understanding learning. As we have seen, for Piaget (1972), every incorporation of external factors into the cognitive structures of the individual is an act of construction. Piaget insists that experience is "always a process of active assimilation to existing structures" (p.4). It is not simply a response by the individual to the environmental factor as empricists would have

it (i.e., the direction of this assimilation is important) (Voneche and Bovet, 1982). According to Piaget (1964), "A stimulus is a stimulus only to the extent that it is significant and it becomes significant only to the extent that there is a structure which permits its assimilation - a structure which can integrate the stimulus but which at the same time sets of the reponse" (p.15). And he continues "every newly established connection is integrated into an existing schemata for the subject becomes aware of these connections only to the degree that he can assimilate them by means of his existing structures" (Piaget, 1972, p15).

Piaget proposed that the stimulus-response schema be written in a 'circular form' (Piaget 1964, p15). Thus, Piaget (1964) explains that between the stimulus and the response there is the organism, the organism and its structures. Therefore, the stimulus is really a stimulus only when it is assimilated into a structure and it is "this structure which sets off the response" (p.15). Adapting a Kantian remark, one may say that for Piaget "structures without experience are empty, but experience without structures is blind" (Boden, 1979, p18). Therefore, It can be said that for Piaget (1968/1977) the fundamental starting point is the capacity (i.e., competence) of providing certain responses. Consequently, learning is not the same at different levels of development as it depends essentially on the evolution of competence's.

In the foregoing discussion, I have provided a general exposition of Piaget's psychological theory of development and I have isolated those aspects of his theory which I believe challenges the assumptions or preconceptions of learning and teaching within OBE. In the next part of this discussion I will interrogate entirely these pre-conceptions.

Critique of Aspects of OBE

In the previous section, I provided a general exposition of Piaget's theory of cognitive development. Within this exposition, I focused on particular aspects of Piaget's theory which are directly pertinent to some of the ideas/notions of OBE; in particular, the notions of "pre-determined outcomes", "transference" and "prior knowledge". It seems that these three notions are the consequence of particular assumptions concerning the nature of learning and teaching. In this section, I will use Piaget's theoretical framework to interrogate the assumptions on which these notions are based in order to establish their psycological "validity" and consequent educational efficacy. I will show that Piaget's theory of cognitive development challenges the assumptions/preconceptions of learning and teaching within OBE.

At the outset, it should be reiterated that in the various documents on OBE, the conceptions of teaching and learning do not appear to be predicated on a clearly defined psychological theory as these documents are essentially policy documents and therefore they have a particular teleology. Consequently, these documents advance ideas without considering their deeper psychological implications. Therefore, I will argue that the policy lacks validity from a psychological perspective in particular, a Piagetian perspective.

(a) Pre-determined Outcomes and the Notion of "Competence"

In this section I interrogate the notion of "pre-determined outcomes" and in the process I look at OBE's notion of "competence" and its claim to be constructivist.

In an earlier part of this research report I showed that OBE is predicated on the notion of pre-determined outcomes (see for example, Baron and Boschee, 1991/1994; Boschee and Baron, 1996; Brogan and Brogan, 1994; Kearney, 1994; Spady, 1992/1994a; Spady and Marshall, 1991; Spady, Marshall and Rogers, 1994 and Spady, Marshall and Rogers, undated). This is semantically evident in its name – *Outcome*-Based Education. Furthermore, pre-determined outcomes are core elements in an outcome-based educational approach (i.e., an approach that requires teachers and pupils to focus their attention and efforts on the desired end results of education - see for example, the 'four OBE operational principles' mentioned in part one.

Concerning outcomes, the following three points need to be made explicit. First, for outcome-based policy makers an outcome (performance) is the result of learning and a visible, observable demonstration or performance of three things, that is, knowledge,

competence and orientations. Secondly, and closely related to the first point, outcomes should reflect a 'package of abilities' that a person has to acquire to be a competent citizen. Thirdly, outcomes are specified in advance and all students are to attain these outcomes. That the outcomes are specified in advance and the belief that all students can achieve these incorporates the notion of predictability (Brogan and Brogan, 1994: and Kearney, 1994; Spady, Marshall and Rogers, 1994; Spady and Marshall, 1991; Curriculum Framework For General and Further Education and Training, Draft document, 1996; The Report on the Consultative Forum on Curriculum, June, 1997 and the Foundation Phase Draft Policy Document, June, 1997). In proceeding to interrogate the notion of "pre-determined outcomes", each one of these points will be examined.

I will begin by looking at the belief that an outcome (performance) is the result of learning and an observable demonstration or performance of three things, that is, knowledge, competence and orientations. Before I can proceed, it is necessary to look at the concept of "competence". I contend that OBE's concept of "competence" is problematic. First, it is not clear what the policy makers understand by competence. Secondly, it appears that the policy makers treat knowledge of a skill and competence interchangeably (see the Curriculum Framework for further Education and training, Draft Document, July, 1996, p16/21; the National Department of Education, 1997, Booklet A; pp1/17 and Booklet E, pp18/19/24; Spady, 1988; Spady, 1992 and Spady, Marshall and Rogers, undated). However, in the psychological literature, although the idea of competence is understood differently, it is not used interchangeably with skills. For example, Chomsky (1957) maintains that performance is what a speaker actually says when talking, while competence, on the other hand, is what a person actually knows (abeit unconsciously) about a language.

On the other hand, Piaget (1977) distinguishes between competence and performance as follows:

> The organism is sensitive to a given stimulus only when it possesses a certain competence. I am borrowing this word from embryology in the sense in which Waddington has used it. He has referred to the influence of an inductor. Waddington has shown that an inductor that modifies the structure of the embryo does not act in the same way at all levels of development. If the inductor is present before the embryo has the competence to respond to it, the inductor has no effect at all; it does not modify the structure. The embryo must be at a point of being competent to respond to the inductor before the inductor can have its effect (p.5).

Piaget (1977) continues to explain that

> [t]he phenomenon is the same in cognition. Stimulus-response is not a one-way road, a unilateral scheme. A subject is sensitive to a stimulus only when he possesses a scheme that permits the capacity for response, and this capacity for response supposes a scheme of assimilation. We again have to create an equilibrium between assimilation, on the one hand, and accommodation to a given or an external stimulus, on the other hand. The stimulus-response scheme must be understood as reciprocal. The stimulus unleashes the response, and the possibility of the response is necessary for the sensitivity to the stimulus. The relationship can also be described as circular, which again poses the problem of equilibrium, as equilibrium between external information serving as the stimulus and the subject's schemes or the internal structure of his activities (p.5).

Consequently, from a Piagetian perspective, it can be argued that outcome-based policy makers have not understood the relationship between learning and development. For Piaget (1964), the outcome (performance) is not the result of learning. Rather, the outcome (performance) is a function of development. In his view, learning is 'sub-ordinate to development' (p.17). It is development which makes learning possible. As mentioned in part two, in each stage of development a general competence is developed and it is this competence which allows the organism to be sensitive to a given stimulus. As Piaget (cited in Evans, 1973) explains "learning depends upon the stage of development, or on the competence, as the embryologists put it. And development is not simply the sum total of what the individual has learnt" (p.67). Therefore, Piaget (1964) insists that the fundamental relation involved in all development and all learning is not the relation of association, but one of assimilation. Consequently, for Piaget, learning can be characterised as assimilation of external factors to cognitive structures. Therefore, the ability to internalise what is transmitted is dependent on the developmental stage, on the competence developed within that stage. Accordingly, the structures which exist at any given moment set bounds on what can be assimilated. Therefore, development must reach a certain stage, certain functions must mature before one can embark upon teaching certain types of knowledge to children. As Boyle (1957) states "assimilation of a particular concept is not possible until the child has obtained a certain level of development" (p. 297). Therefore, learning is a function associated with a particular 'level of organisation' in development (Lerner, 1995). Consequently, for Piaget (1964/1977), competence precedes performance i.e., competence makes performance possible.

In, response to this, some outcome-based policy makers may argue that the learning is characterised by its appropriateness to each learner's needs, interest and developmental level. Therefore, teachers should consider their learner's developmental level which influences the rate at which they can learn (Curriculum Framework For Further and General

Education and Training, Draft Document, 1996, p11/4). Therefore, these policy makers would contend that they have taken developmental levels into account and that it is only a matter of semantics which has led to the confusion. I will argue that this is still not the case i.e., that OBE has not taken development into account. This argument will deal with the second point concerning outcomes namely, that outcomes should reflect a 'package of abilities' that a person needs to have acquired to be a competent citizen.

For the purposes of this argument two points need to be noted concerning outcomes which need to reflect a 'package of abilities'. First, the outcomes are 'complex'- i.e., they integrate a number of abilities/skills. The outcomes for Curriculum 2005 reflect a 'package of abilities' (i.e., to collect and analyze information, to think critically, to organise and manage [illegible], etc) (Government Gazette, no. 18051, 1997, p13). Secondly, the same set of broad [illegible] specific outcomes apply to *all* learners. I will begin with the latter. In the Economic and Management Sciences Learning Area for example, the first specific outcome - to engage in entrepreneurial activities - is required for the foundation, intermediate and senior phases (ibid, 1997, p210). Furthermore, the assessment criteria and range statements, which provide the information for lesson planning, are also the same (i.e., to the extent that they have used the exact wording in each of these phases, see p 210). It is here that the National Curriculum for grades one to nine (Government Gazette, No. 18051, June, 1997) appears contradictory. The curriculum suggests that teachers adjust their content to suit the various phases but, the curriculum has failed to do this in its assessment criteria and range statements which provide information/guidelines necessary for lesson planning. Furthermore, in the use of phases in the curriculum, policy makers could again claim to take account of development. However, this apparent cognisance of development does not seem to have been applied to the content directed at these stages (i.e., its content, abstracted from the assessment criteria and range statements, does not appear to take the phases into account).

I will now argue that these outcomes which incorporate advanced (complex) outcomes that apply to all learners cannot take development into account. For example, for Piaget (1964), the range and variety of the specific outcomes would require the competence of formal operations (see especially the specific outcomes for the Human and Social Sciences Learning Area, Government Gazette, no 18051, June, 1997, p51-83). How can one extend such advanced outcomes to the youngest of school goers? As mentioned earlier, performance is dependent on capacity (competence), on the development of structures. Furthermore, certain competences are developed at certain times as biological maturation establishes a time schedule for new developmental possibilities to open up at periodic points

throughout the child's growing years. Therefore, as mentioned previously, maturational change creates possibilities for new schemes to be created that could not have been generated earlier, but this action neither requires nor guarantees that the potential schemes will materialise (Piaget, 1964).

Therefore, in Piaget's stages (each representing a general competence which is developed), there is a *transition* from less adequate ways of knowing to more adequate ways of knowing. In advancing such advanced outcomes, curriculum developers do not seem to have taken this transition into account. That is, learners in the foundation phase have not developed the competence that is required to produce the advanced outcomes specified for this phase. For example, in the Curriculum, it appears that the foundation learner is expected to formulate hypotheses, analyse, evaluate and interpret the facts. This seems to be a difficult task for children who in many cases do not yet know their left from their right arm and whose reasoning is usually restricted to rather immediate concerns and experiences (Cortie and Cortie, 1997). The point to be made here is that, according to Piaget (1964/1972), younger children reason in a concrete fashion and would be incapable of working with abstractions and formulating hypotheses. Furthermore, and this is even a stronger claim, even 'within' a stage, development is not homogeneous and uniform (Montangero, 1985). An illustrative example is the concept of conservation that appears at the beginning of concrete operations. In the constructions, the conservation of substance is attained before either weight or volume. For Piaget (1964), the conservation of substance is simply a logical necessity for the conservation of weight or volume. This is an example of transition from less adequate ways of knowing to more adequate ways of knowing. Therefore, these advanced outcomes which are required for all students lack validity from a psychological perspective as the ability for children to learn passes though a series of necessary maturational and developmental stages.

The third point concerning outcomes is that outcomes are specified in advance and the belief that all learners can achieve these outcomes and hence, the incorporation of predictability will now be interrogated. Before one can proceed, one needs to understand Piaget's understanding and use of 'prediction' before one can critique OBE for its propensity to predict.

According to Kitchener (1986a) Piaget uses the notion of 'prediction' in two ways. First, one needs to understand Piaget's 'prediction' of stages (i.e., that development progresses through an invariant sequence of stages of development). Secondly, one needs to understand Piaget's 'prediction' of the *nature* of these structures (within the stages) of development.

I will begin with the former, i.e., with Piaget's understanding of the 'prediction' of stages. As mentioned previously, through the mechanisms of assimilation, accommodation, equilibrium and equilibration, the knowing subject actively constructs its own knowledge and passes through an invariant sequence of stages of development. Therefore, the emergence of stages (i.e., that development progresses through a series of stages) is 'predicted' by Piaget's theory as there is a logical and biological necessity that each stage develops from, rather than merely adding to the one before (Boden, 1979). However, this prediction is retrodictable, it can be rationally constructed only after the fact. Therefore, it is important to note that development is not predictable before it occurs[36] (Kitchener, 1986a). Some would, however argue that Piaget 'predicts' a culminating outcome, namely, formal operations[37].

Piaget's 'prediction' concerning the *nature* of these structures (within the stages of development) will now be discussed. As mentioned earlier, in each stage, a general competence is developed and there are four broad/general competence's (structures) that Piaget 'predicts' – namely sensori-motor, pre-operational, operational and formal operations Piaget, 1964). For Piaget, the parts (i.e., specific/particular structures) that make up a whole (i.e., general structure that comes about at the closure of the stage) cannot be predicted. This is further emphasised by Piaget's notion of vertical and horizontal decalage. For Piaget, the different decalages signify the time dependency of the development of specific structures. In other words, Piaget believes that not all structures develop simultaneously and that there may be significant time lags between the development of the individual structures which make up a larger structure. If we take the notion of time lags seriously it would follow that the general outcomes predicted by OBE cannot be attained. I acknowledge that OBE also predicts general outcomes. However, the problem with their conception is the belief that the specific outcomes will coalesce into a general critical outcome and it is in this regard that one could criticize OBE for subscribing to a cumulative notion of competence.

On the basis of Piaget's understanding of "prediction", it can be said that the subject will develop along the four stages but this is a *terminus ad quem* (the outcome of development)

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[36] However, as Kitchener (1986a) exxplains "to say that a succeeding stage of intellectual development is not predictable is not to say however that it is carpricious or irrational" as there is an orthogenesis in development (p59).

[37] However, Piaget (cied in Kitchener, 1986a) writes "though gradual progress towards equilibrium involves a direction, it never involves finality ... neither is orthogenesis due to an a priori entity controlling development from the front"(p.81). .Consequently, developmental explanations are teleological in the rule-directed sense i.e. there is a lawfulness to development – in contrast to an end-directed, finalistic sense. Mayr (1992) refers to this interpretation of teleology as a teleonomic process. A telenomic process or behavior "is one that owes its goal-directedness to the operation of a program. The term telenomic thus implies goal-direction of a process or activity. Truly telenomic activities depend on the possession of a program" (p127). Piaget adopts the concept of Mayr's teleonomy

not a *terminus a quo* (the initial starting point of development) (Kitchener, 1986a, p81). Kitchener (1986a) continues to explain that Piaget has little to say about predicting the subject's behaviour or the *particular* cognitive structure it will construct as he considers this process a constructive one. Furthermore, if this constructive element is expected then how can the outcome be predicted?

In this regard it appears that OBE also wants to embrace the notion of constructivism. This is evident in policy documents when they contrast Curriculum 2005 to the education system of the past. According to the various policy documents, within Curriculum 2005, the educational encounter from the perspective of the learner now becomes one of self-discovery and knowledge construction (as opposed to perceptions of teachers as dispensers of knowledge). (Report of the Consultative Forum on Curriculum, 1996). OBE policy makers insist on knowledge construction and production (in terms of information, concepts, skills, attitudes and values) rather than mere knowledge consumption being in the foreground (Curriculum Framework For further Education and Training, Draft document, July 1996, p 53/54). In addition, it is also stated elsewhere that the "ways in which different cultural values and lifestyles effect the construction of knowledge should also be acknowledged and incorporated in the development and implementation of learning programmes" (ibid, p11). This claim to be constructivist is further emphasised when the policy documents use words such as "critical thinking", "reasoning", "reflection" and "action" to characterise the learning experience (ibid, p53–54 and the various documents from the Department of Education and the Education Information Centre).

I contend that OBE cannot claim to embrace the notion of constructivism. Furthermore, I maintain that the policy documents have used the word constructivism arbitrarily (it has lost its precise meaning in OBE). Therefore, their apparent claim to be constructive is problematic for two reasons (i.e., from a psychological and methodological/instructional perspective). I will now explain these two reasons.

The first reason why OBE cannot claim to be constructive centres on psychology and concerns the notion of pre-determined outcomes – i.e., the idea that outcomes can be specified in advanced and that these outcomes can be attained by all students. As Jansen (1996) points out "'in Curriculum 2005 there is a fundamental contradiction in insisting that students use knowledge creatively (i.e. knowledge construction and self-discovery only to inform them that the desired learning outcomes are already specified" (p.4). I will argue that the act of construction cannot be pre-determined and uniform (and hence, their claim to be constructive is problematic).

For Piaget (1964), the mind does not passively record a copy of reality. Similarly, the child does not simply learn what the adult tells him. Rather, our minds actively interpret reality and reconstruct/reinvent a representation of it. This has to be unique as the interpretation or reconstruction of reality is initiated by the present organisation of our existing knowledge that we bring to a situation. And this knowledge is itself unique as it has been constructed from our own experiences which are themselves unique.

Therefore, this process of actively matching environmental stimuli to existing mental structures is not simply a matter of ingesting objective reality form the world. Rather, the child reshapes the events of the world somewhat to fit the pattern of his or her existing schemes. Therefore, we bend reality to the way we have organised our understandings to receive it. This is the first type of compensatory reaction to occur – namely Alpha compensatory reactions (this will be discussed in more detail in the next section on prior knowledge). During this reaction, the individual recreates reality though deduction and endogenous construction. Consequently, the act of construction is idiosyncratic. This is a consequence of the compensatory behaviours. In the subsequent phases of compensatory reaction (see part two for detailed discussion) the subject continues to construct his or her own understandings and meanings. This understanding is unanticipated and unpredictable.

On the basis of the above, I contend that because OBE has pre-determined outcomes, it cannot claim to be constructive because the act of knowing is an act of construction and this construction is idiosyncratic and therefore cannot be pre-determined.

I will now examine their claim of constructivism from a classroom teaching-learning perspective. What problems does this present?

OBE wants to embrace the notion of constructivism yet, as Darling-Hammond (1993) explains, its instructional model (in the USA) is influenced by the positivist behaviourist approach. In part one, it was shown that mastery learning is considered to be an integral part of OBE's beliefs and practices. Furthermore, Spady in his conversation with Ron Brardt (1993) explains that mastery learning was what OBE was called at the time (see Iserbyt, 1994 for a powerful critique on mastery-learning as well as the kind of stimulus-response conditioning that is outlined in the OBE manual entitled "Effective Schooling Practices"). In addition, Spady's (1988) curriculum process (i.e., the 'design down' approach which moves from exit outcomes to lesson outcomes in a carefully constructed manner) appears to encourage a behaviouristic/mastery learning approach. This has led Jansen (1996) to wonder whether OBE, when implemented will be able to outlive its roots in behaviourism (p.1).

Therefore, OBE tries to absorb two different philosophies of educational reform (i.e., behaviorism and constructivism). This creates what Darling-Hammond (cited in Schwarz and Cavener, 1994) calls "a kind of Alice in Wonderland world in which people ultimately begin to nod blithely at the inevitability of incompatible event" (p.337). For example, mastery learning and authentic assessment, which demand student creativity or original problem solving, do not connect well. Furthermore, mastery learning requires prespecified and measurable objectives, while creativity may not be clearly defined beforehand except in the broadest, least quantifiable terms. Darling-Hammond insists that "to think that students can leap from mastery learning of fragmented chunks of information to performance outcomes, such as finding real-life problems and creating justifiable solutions, is to nod blithely at the inevitability of incompatible events" (ibid, p337). I contend that these deep incompatibilities need to be reconsidered.

Therefore, it appears that learning in OBE is no different to the old Skinnerian idea of "input-black box-output". In OBE, the output is specified in advance yet, the input (i.e., the capacity) and the processes within the box (i.e., equilibration/the constructive element) is not clearly explained and as such this leads one to conclude that OBE is behaviouristic.

(b) Prior Knowledge

I will now examine the notion of prior knowledge in OBE. It is evident form the literature reviewed that the learner's prior knowledge is considered indispensable in the development of learning programmes and materials as well as in the instructional process. Furthermore, it appears that for outcome-based educationalists the recognition and use of prior knowledge necessarily leads to more effective learning. This is evident in the various policy documents where it is stated that:

> The development of learning programmes and materials should put learners first, recognising and building on their knowledge and experience and responding to each learner's needs. (*Curriculum Framework for further and* General Education and training, Draft Document, p11);
>
> The teacher's role is to make connections between subject matter knowledge and the learner's prior experience ..... Therefore, teachers would need to connect to what the learner already knows, feels and understands – thus, connect to preciously integrated memories in the brain. Consequently, instruction must be at the right level, not too easy-yet challenging enough (ibid, p46 and 49);
>
> ... learning is characterised by its appropriateness to each learner's interest and developmental level (ibid, p 47); and

> Teachers are to assess learner's pre-requisite knowledge, if it is not adequate, teachers should provide instruction on the prerequisites (in order to proceed) (Kudlas 1994 and Vickery, 1990).

In the preceding part of this discussion, I argued that OBE had not taken 'development' into account. However, with regard to prior knowledge, outcome-based policy makers could claim that they have taken development into account. Their argument could proceed as follows. Teachers base their instruction on the learner's prior experience and knowledge and therefore instruction is at the 'right' level and hence, development has been taken into account (Curriculum framework for General and further Education and Training, Draft Document, July 1996, pp 46-47, 52).

This contention is problematic for the following two reasons. Firstly, within OBE the terms "experience" and "knowledge" have not been clearly defined. Secondly, OBE has used these terms (in certain relationships) without considering their deeper implications. This leads to ideas or statements which are questionable (especially from a psychological perspective). Let me justify my contention.

Is "prior knowledge" and "prior experience" the same thing? Within OBE, it appears that these two terms are used interchangeably (see the Curriculum Framework for Further and General Education and Training, Draft Document, 1996, pp11,46,49). For Piaget (1964), this assumed similarity between these two terms is highly questionable. In the preceeding part of this discussion it was shown that for Piaget (1964/1977) one does not simply learn on the basis of experience. The child does not simply learn what the adult tells him. There is not a simple response by the individual to the environmental factor. Rather, the individual needs a structure which permits assimilation of a stimulus. This structure constitutes the knowledge and sensitivity (competence) to a given stimulus. Thus, the individual has an ability or competence to respond to external factors.

Therefore, it is the structure which allows certain stimuli to be assimilated and this active assimilation enables the subject to construct *operations (knowledge structures).* (Piaget, 1964). For Piaget (1964), these operational structures are what constitute the basis of knowledge and knowing. As Hamlyn (1978) further explains "as the subject develops and engages in actions on objects, these actions become operations, and operations in turn are abstracted (via reflective abstraction) to form increasingly complex structures" (p.49). This illustrates that knowledge and experience cannot be used interchangeably. Although it appears that OBE uses these two terms ('prior knowledge' and 'prior experience') interchangeably, one can not be sure of this (as the policy documents have not provided enough detail). Therefore, let us look at these two terms as separate entities i.e., (a) OBE's

emphasis to connect to the learner's prior experience and (b) OBE's emphasis to connect to the learner's prior knowledge. What problems does this present?

First, there are many experiences available to a person. Which one do you choose to connect to and how exactly is this done? Secondly, the suggestion to link to the learner's prior knowledge (structure) presents its own problems. For example, would you connect to the structures at the beginning, middle or end of a stage? And once again, how would you do this? How can one know where a person is within a particular stage of development i.e., what structures have been constructed at a given time? Piaget's concept of horizontal and vertical decalage helps to illustrate this point. For example, in horizontal decalage, aspects of a competence ('range of abilities') of a particular stage do not emerge at the same time (i.e., concepts develop at different speeds) (Montangero, 1985 and Thomas, 1996). Therefore, this makes it difficult to determine what specific structures have already been constructed by the individual.

Furthermore, OBE's belief that experience produces knowledge is problematic. In OBE, the nature of these experiences are not clear. Are these experiences empirical or logico-mathematical? It appears that OBE holds to an empirical conception of experience. viz. an implicit belief in the adequacy of prior knowledge to facilitate new learning. That is, they appear to accept a view that when such prior knowledge is inadequate, it can quiet easily be rectified by simple instruction (a particular type of experience) (Kudlas, 1994 and Vickery, 1988). Once again, this illustrates the belief that experience produces knowledge.

From a Piagetian perspective, I contend that simple instruction (i.e., the simple experience of the transmission of information) is not sufficient to make the learner's pre-requisite knowledge, capable of dealing with the new subject matter. From a Piagetian perspective, it is questionable whether the idea that if the pre-existing structure is 'inadequate' then simple instruction can correct this and the teacher will be able to proceed as she can now connect the subject matter to this 'improved' cognitive structure. Lawson (1982), in support of Piaget, also helps to explain why this simple instruction cannot be sufficient. He contends that this idea incorporates the empiricists notion that knowledge comes from outside the individual to the inside through the senses. This belief contradicts OBE's claim to be constructivist because it is not in keeping with the view that knowledge is constructed within the individual by his actions. Lawson (1982) insists that it is the student himself who must undergo a mental reorganisation to appreciate suggestions and assimilate the new strategy (p.402). Therefore, one does not 'build on' previous knowledge – as OBE would have it. Rather, there is a mental reorganisation.

Besides the fact that OBE has failed to define its terms clearly, an additional point concerning prior knowledge needs to be addressed. This concerns OBE's emphasis on the role of prior knowledge and the learning of new knowledge. I contend that prior knowledge has some value in the learning of new knowledge but, as Piaget (1985) has shown, it can also be an obstacle to the learning of new knowledge. This is because, in the act of construction, human beings necessarily engage in compensatory behaviours in which they initially transform what is new to suit their existing cognitive structures. This is the first compensatory behaviour/reaction to occur – namely the Alpha compensatory behaviour/reaction. In an Alpha reaction, assimilation occurs and the scheme itself is not modified as the new concepts are *deformed* in an attempt to fit these concepts into *existing* schemes. This "inappropriate" assimilation occurs as the schemes are insufficiently mature or are not developmentally ready/competent. I will use an example, provided by Labinowicz (1980, p.5-6) to help illustrate the Alpha compensatory behaviours/reactions (although this example is simple it is not simplistic – it illustrates this point).

A learner has a pre-existing structure about cats as four-legged, fury animals. This structure is built on cats' similarities despite their feline differences. When the learner notices a squirrel for the first time (i.e., a new stimulus) she will, having focused only on the squirrel's similarities with cats, mentally place this new information from the environment into her category for cats (i.e., the subject equates a squirrel with a cat). Therefore, this new information has been deformed in an attempt to fit it into the learner's pre-existing structure. It is this *pre-existing structure* that does not allow for "appropriate" assimilation to take place. Therefore, the Alpha compensatory behaviour ensures that the pre-existing structures remain intact i.e., the new stimulus is deformed in order to fit it into one of the existing classes/categories that the learner knows or has constructed. This "inappropriate" assimilation will consequently dictate what the structure will do with the new stimulus (and this action helps to initiate the constructive process).

As this example illustrates, it is the pre-existing structure (prior knowledge) that is an obstacle in the learning of something new. Accordingly, it is the cognitive structure which needs to *change* before learning can occur. I contend that OBE policy makers have not considered this possibility. Miller (1989) agrees and expands on this by arguing that. "to change his/her cognitive structures the young child must not only acquire new structures or ways of understanding but also *unlearn* the rules or unseat the cognitive structures that govern his or her existing understanding" (p.155). He continues to say that "pupils may need help in learning to unlearn – to untie the knots of previous learning – in order to create space for new kinds of learning" (p.155).

How does this unlearning occur so that the cognitive structure can change in order to allow for new types of learning to occur? It will be shown that for Piaget (1985) this unlearning is a constructive process and not a matter of simply providing information.

This necessary unlearning occurs through disequilibrium (Wadsworth, 1996). For example, in the illustration example mentioned above, the learner through her natural observations will begin to notice contradictions and these contradictions will cause disequilibrium, i.e., these contradictions will disequilibrate the cognitive structures that govern her existing understanding. For instance, the learner may notice that the squirrel sits on its hind legs and has a bushy tail – which cats do not. As a result of this disequilibrium, Beta compensatory behaviour/reaction is activated. In a Beta compensatory reaction, the learner is aware of contradictions and the structure itself is modified in order to integrate the perturbing element (Piaget, 1985). However, many of the original features of the novelty are retained. Therefore, following the re-organisation of the structures, the disturbance is integrated into these structures as a new variation. The new phenomenon is therefore experienced as a new variation and no longer as a disturbance (Sebego, 1996). Consequently, the learner in the example above will refer to the squirrel as a 'funny kitty' (i.e., some features of the structure are retained, and some features of the novelty are retained).

Linking this notion of 'unlearning' through disequilibrium to instruction, Lawson (1982) explains that the teacher can help to provide disequilibrium.

> The teacher ... can produce the environmental pressure which places students into the position of being able to spontaneously reorganise their thinking along the path toward more complex and better adapted thought processes. The teacher can be an instigator of disequilibrium and can provide the pieces of the intellectual puzzle for the students to put together (p. 403).

Similarily, Karplus (1982) believes that there are two steps in the process of producing disequilibrium (i.e., helping the pupils to 'unlearn' the rules that govern their existing cognitive structure). These two steps include: (1) learners must be prompted to engage their previous ways of thinking about the situation to discover how they are inadequate to assimilate the new situation, and (2) learners must then be given ample opportunity to think through the situation to allow the appropriate mental reorganisation (accommodation), which in turn allows the successful assimilation of the new situation (cited in Lawson, 1982, p 403).

Finally, through the Gamma compensatory behaviour, the reorganisation of structures begun by the Beta compensatory behaviour is completed when a new structure characterised by a system of reversible operations emerges. Further re-equilibration will come about 'through a spontaneous, internal, yet directional re-organisation of mental structure which allows for

complete assimilation of the new behaviour pattern into the accommodated mental structure of the individual' (Lawson, 1982, p402). Very importantly, it is only through Gamma compensation that an individual's existing cognitive structures (prior knowledge) are sufficiently transformed to allow her to make sense of the original novelty in its own right. Consequently, the idea of using prior knowledge as the basis for instruction cannot be accepted uncritically.

In summary, two points need to be noted. First, prior knowledge can be an obstacle to learning new knowledge. Secondly, if the pre-existing structure is 'inadequate', simple instruction is not enough to make the learner's pre-requisite knowledge capable of dealing with the new subject matter. Rather, the learner must undergo a mental reorganisation to assimilate the new information.

(c) Transference

Outcome-based policy makers maintain that the learner's future life-role requires the learner to be competent, i.e., the learner will need to carry out complex role performances in various situations meeting real demands (National Department of Education, 1997, Booklet A; Spady, 1994 and Spady in Brandt, 1993). As mentioned earlier, the critical outcomes in South African OBE have been chosen because they reflect the current views of the abilities needed in order to function as a competent citizen (National Department of Education, undated, Booklet B, Taylor, 1997 and Schollar, 1997). Consequently, in the South African outcomes-based approach what you understand and your ability to use and transfer your knowledge, skills and understanding to different situations, is important (Report of the Consultative Forum on Curriculum, 1996).

Outcome-based policy makers acknowledge that the mastering of outcomes is of limited importance unless the students are equipped to transfer these critical outcomes to life (Education Information Centre, 1996). Therefore, these policy makers are at pains to ensure that this transfer occurs. Also, they suggest that transference could be attained in the following ways:

- encourage teachers to solidify the link between academic learning and the real-world challenges and opportunities learners face,
- make the learner's community their classroom;
- encourage learner's to apply what they have learnt in a variety of real-life situations (i.e., to apply concepts and skills to new materials);

- provide learners with the opportunity to develop the required abilities and to practice them in different situations and combinations (Department of Education, Booklet B and Potenza, 1989);

- emphasize activity-based learning, with an opportunity for learners to explore ideas and approaches to learning and to practice skills (Curriculum Framework for General and further Education and Training, Draft Document, 1996 and the National Department of Education, 1997, Booklet A) and

- Integrate traditional subjects into learning areas in order to reflect reality more closely.

In addition, the curriculum developers believe that the outcomes can be transferred to other domains as the purpose of the critical outcomes is to 'lead to the development of conceptual skills and understanding which transcend the specific, gradually developing the learners capacity to transfer learning from one context to another' (NQF, 1996, p.26). Furthermore, these curriculum developers believe that their method of integration, application, practice and activity/action will ensure that this transfer occurs.

It is important to note that within the psychological literature, the notion of transference is a complex issue and remains unresolved. My discussion will be less detailed than the previous sections because the issue of transference inevitably leads to too many tangential problems which would detract from my central task of demonstrating that transference is not a necessary outcome of learning.

I have identified two dimensions concerning the problem of transference. The first dimension deals with the types of transference and the second concerns the kinds of skills that can be transferred. I will begin with the former.

Salomon and Perkins (1987) concur with Pea and Kurland (1984) that transfer often fails to occur. Soloman and Perkins (1987/1984) argue that this contention gains all the more weight if put in the context of an all encompassing view of transfer. This is a view that maps two distinct cognitive routes to transfer and the different transfer results associated with them

Salomon and Perkins (1987) label the first type of transference as "low road" transfer. This transference results from extensive and varied practice and automatization (p.149) and would be predicated on relatively concrete performances (i.e., the transference of physical/concrete skills). The other type of transference is 'high road' transfer. 'High road' transfer by contrast to 'low road' transfer results form mindful abstraction and generalisation

(p.152) and would tend to depend on mental performances/abstract skills. Salomon and Perkins (1987) state that "high road transfer entails re-representing knowledge in a symbol form that affords ready abstraction, such as language, at a greater level of generality that subsumes a greater range of cases" (p.52). These authors further contend that 'high road transfer is natural for explicit strategies and principles, such as general strategies of problem solving, decision making, communication (p.57).

In addition to these types of transference, we also need to distinguish between two types of skills, namely domain-specific skills and domain-neutral/ independent skills (Fischer and Bidell,1991). Domain-specific skills are skills that do not necessarily transfer to other domains because they are domain specific. On the other hand, domain-neutral or independent skills are not linked to any specific domain and could therefore apply/transfer to a whole range of domains (Fischer and Bidell, 1991).

However, even though the distinction between these skills appears to be simple from a theoretical perspective, it is difficult to determine whether a skill is domain-specific or domain neutral at a psychological level. For example, the ability to abstract could be considered to be a domain-neutral skill. However, abstraction in mathematics is different to abstraction in language. Thus, whether these skills assume a domain-specific or domain-neutral character is often determined by the nature of the task to which the skill is applied. Consequently, the belief that skills are *easily* transferable is questionable.

These two approaches to transference have important implications for transference as it is understood within OBE. I contend that OBE's undefined notion of transference and its belief that transference necessarily happens is problematic. I will examine the two aspects of this contention below.

Taking cognizance of the distinct types of transfer identified by Solamon and Perkins (1984/1987), I contend that transference would not automatically happen simply because the outcome-based education teacher encourages learners to apply what they have learnt in a variety of real-life settings. Also, transference does not automatically happen because the teacher provides the learners with the opportunities to develop the required abilities and to practice them in different situations and combinations. Consequently, it can be argued that OBE's method of practice and varied experience may lead to the transfer of physical/concrete skills or performances but not necessarily to the transference of mental-abstract skills. The point to be made is that outcome-based policy makers want skills such as decision-making, critical thinking and communication (see critical outcomes, Government Gazette, no. 18051, June 1997, p13) to be transferred. However, as Salomon

and Perkins (1984/1987) have shown the possible route to this transference is metacognition and not varied practice/action. Secondly, as Fischer and Bidell (1991) have shown it is difficult to identify skills as domain-neutral or domain-specific. Consequently, outcome-based policy makers can not just assume that certain skills such as problem solving and critical thinking are domain-neutral skills (because of its implied generality) and could therefore transfer to a whole range of domains in a simple manner.

An illustrated example of the above contentions, from the perspective of Piaget, is the development of conservation. Wadsworth (1996, p.75) explains that the structures permiting conservation are typically acquired in the following sequence and at the following ages on average:

Conservation	Age
number	5 – 6
substance (mass)	7 –8
area	7 –8
liquid volume	7 –8
weight	9 –10
volume (solids)	1 -12

Given the sequential development of these individual skills it is obvious that the development of a particular skill such as number does not necessarily transfer to other related domains of conservation without some developmental time lag. It can be seen that there is an internal necessity to the sequence to be developed of these skills which constitute conservation (i.e., each new kind of conservation always implies that previous levels in the sequence have been attained). Therefore one needs all of these skills before genuine 'high road' transfer is possible. In a similar way one could have used other aspects of Piaget's research such as object permanence, causality, etc. to further illustrate the problematic nature of transfernce.

Consequently, it can be seen that the issue of transference is a difficult one, and OBE's belief that transference necessarily happens is problematic.

From the forgoing discussion it will be evident that the notions of "pre-determined outcomes", "prior knowledge" and "transference" (as it is understood in OBE) have not been considered in sufficient depth by the policy makers and consequently their understanding of these notions cannot be sustained from a psychological perspective such as Piaget's.

Conclusion:

In this research report I have attempted to show that Piaget's theory of cognitive development challenges the fundamental assumptions of teaching and learning within OBE. In particular, it challenges the assumptions upon which "pre-determined outcomes", "prior knowledge" and "transference" are based.

Concerning "pre-determined" outcomes, I have shown that for Piaget, the outcome (performance), is not the result of learning. Rather, the outcome is a function of development. Therefore, the ability to internalize what is transmitted is dependent on the developmental stage of the learner, on the competence developed within that stage. Also with regard to pre-determined outcomes I have shown that from a constructivist perspective, the act of knowing is an act of construction and cannot therefore be pre-determined. The idea of predictable outcomes as a central feature of the educational system appears not to have adequate psychological support.

With regard to "prior knowledge", I have argued that simple instruction is not sufficient to make the learner's pre-requisite knowledge capable of dealing with the new subject matter. I argued that this incorporates an empiricist view of teaching and learning. I have shown that this view of learning does not recognize the active participation of the learner in the construction of his or her understanding. I have also shown that while prior knowledge may have some value in the learning of new knowledge, it can be an obstacle to the learning of new knowledge. This is because in the act of construction, human beings necessarily transform what is new to suit their existing cognitive structures. Consequently, this research report challenges the belief that prior knowledge necessarily leads to more effective learning.

Lastly, the issue of transference was shown to be equally problematic. Here, it was shown that the possible route to "nigh-road' transference is metacognition and not varied practice/action. Furthermore, I argued that it is difficult to identify skills as domain-neutral or domain-specific.

I have interrogated these three notions from a purely conceptual perspective. These three notions could be investigated empirically to establish the relationship between policy proposals and educational reality. Although my critical interrogation has only focused on these ideas in OBE, a host of other assumptions within OBE could be interrogated in a similar way. For example, the understanding of the notion of "group work" and its particular use in the teaching learning situation can be investigated empirically to see whether such group work is possible among ego-centric learners.

This research report therefore raises serious questions about the educational efficacy of OBE from a psychological perspective. Consequently, it shows that the question educationalists should be asking is not whether OBE can be practically and successfully implemented but rather, whether it should be implemented at all.

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