

Do Teachers' Beliefs Matter? Lessons from the South African Education Transformation

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ABSTRACT Background: The dawn of democracy in South African in 1994 brought about a wide array of educational policies that aimed to transform education. Main trends in policy development were outcomes based education (OBE) and Curriculum Assessment Policy Statements (CAPS). These two models were distinct, with each having a unique focus and emphasis. However, both were characterised by the focus on student centred learning (SCL). The transformation involved re-definition of teachers' and learners' roles, changes in curriculum, pedagogy and assessment. The curriculum was to be grounded within a social constructivist framework where all curriculum activities centred around the learners. This paper reports on teachers' responses to these changes with special reference to their conceptualisations and beliefs regarding student-centred learning and teaching. The aim was to examine the strategies teachers employ in their classrooms in response to their beliefs. Teachers' beliefs were explored and linked to SCL pedagogical frameworks and their classroom management practices. 19 teachers participated in the study. The findings confirmed that there are multiple beliefs that constitute a personal epistemology. The teachers' meanings and conceptualisations of SCL were diverse but tended to converge to the practicability of the learning model. There was incompatibility between what the department of education envisaged and what teachers practised and believed to be the best instructional practices. This paper provides empirical evidence in support of the

significance of teachers' beliefs, and insights into how teachers articulated new meanings and translated those meanings into critical decisions to enhance student outcomes.

INTRODUCTION

The South African Schools Act of 1996 created an enabling framework for the provision of access and quality education in the country. After the first democratic elections in 1994, the need for South Africa to introduce changes at the systemic level became urgent. There was a need to review the structure of the curriculum, delivery methods and assessment (SAQA, 2000). The department of education recognised the need to prepare graduates who are creative, problem solvers, critical thinkers and lifelong learners (Department of Education 2010). In an effort to achieve these aim, educational transformation in South Africa went through different stages, from outcomes based education (OBE) to Curriculum Assessment Policy Statements (CAPS). CAPS was designed to repackaging the existing curriculum, with each subject having specific aims, clearly delineated topics and number of assessments (Department of Education 2011).

A closer evaluation of the CAPS reveals that the fundamental student-centred learning approach had not changed; only the concept 'OBE' was no longer used. The major change is that the curriculum will no longer be framed in terms of learning outcomes and assessment standards, so as to strengthen knowledge within the subject. Over- assessment and associated administration has been abolished. Outcomes and assessment standards are now called topics and themes and learning areas are now called subjects (Department of Basic Education 2012).

The assumption of the education reform process in South Africa was that learners will be at the centre of teaching/learning activities. Learners will take an active role in learning, bring their experiences and existing knowledge to the classroom and that will support assimilation of new content. Change in the teaching/learning model requires change to content, delivery and duration (Seng 2014). This would invariably change what teachers do in the classroom. The learning model demanded that teachers change their teaching and assessment practices and align them with the principles of student-centre learning, based on the belief that what was taught, and the way it was taught in the classroom influenced the quality of education at school level (Zain 2012). Teachers were expected to integrate into their teaching practice an understanding that all learners can learn, albeit at different rates and in different ways (Killen 2000). They were

expected to understand the need to respond to difference by creating multiple paths to learning for individuals and groups of learners, including learners with special needs (Department of Education 2006).

STUDENT CENTRED LEARNING AND CONSTRUCTIVIST PEDAGOGY

The notion that knowledge and understanding are developed from one's own construction of meaning has contributed largely to changes in contemporary teaching practices and the learning processes of today's learners (Seng 2014; Zain 2012). The South African educational approach seemed to find relevance in a constructivist approach. One of the basic assumptions of constructivism is that people are active learners and must construct knowledge or meaning for themselves, and that knowledge evolves through negotiation and discourse (Zain 2012). The creation of knowledge from experience and the use of that knowledge to support new learning represent fundamental principles of any constructivist instructional model. From this approach, teachers are also viewed as learners who are engaged in the construction of meanings including that of their role as facilitators of knowledge acquisition (Prickel 2000).

Student centred learning is a theoretical approach that reflects views about teaching, knowledge and learning. The starting point is learning, teaching and curriculum should be built on it (Cukukcu 2012). The design of the curriculum and the delivery methods need to acknowledge that learners become autonomous, they question more, reflect on content all the time. Students anticipate, seek, assess relevance, based on own needs and goals (Kuipa et al 2005, cited in Hannafin et al 2009). The new role for teachers is they become active learners in that they engage students in the learning processes (Cukukcu 2012). According to Zain (2012:320), teachers 'cannot offload information into the student's brain and expect them to process and apply it'. At the core of this approach are empowerment of students and the mandate of teachers to teach them how to learn.

Teachers were invariably placed at the centre of curriculum transformation processes. They were expected to translate educational policy into classroom practices, to make and remake their role in a new dispensation. This would involve interpretive thinking, revealing what they knew and did not know about student-centred related pedagogies. Consequently, there might be a need to investigate the complexities of deeply entrenched beliefs, values and assumptions of teachers, and how they articulated their new role and created adequate opportunities for learners to be

active participants and take responsibility for their own learning. It is normally assumed that teachers will be more effective if they maintain their own personal identity and belief systems whilst being guided by the tenets of pedagogy (Wilén *et al.*, 2000).

The view of teaching taken in this paper is that it is largely an intellectual activity whereby practitioners make complex decisions and adopt the role of transformative intellectuals. The term 'transformative intellectual' was coined by Giroux (in Darder, Baltodano & Torres, 2003), in this view, teachers are positioned as professionals who have the capacity to engage critically with social realities. The assumption is that teachers strive to do better in what they do; they examine the assumptions underlying their actions; and they critically question what they do and why they are doing it. Therefore, the student-centred learning model advocated by the department of education was seen as the basis on which teachers reflected, analysed, appraised, made strategic decisions and adopted the role of transformative intellectuals.

TEACHERS' BELIEFS

Theories of epistemological beliefs focus on the individual's perception of what knowledge is; where knowledge comes from and the degree of certainty with which knowledge can be held. These beliefs are part of, and may direct processes involved in teaching (McNiff & Whitehead, 2005). It has been widely documented in literature that beliefs and practices are important for improving educational processes; and that they are closely linked to teachers' strategies for coping with the challenges in their daily professional lives (Pajares, 1992). Bartolome (in Darder *et al.*, 2003) argues that in a classroom, where social identity is central to the context, teachers' beliefs about knowledge, learning and learners often take centre stage. Their views or beliefs about teaching and learning create a learning environment.

Levin & Wadmany (2006) define beliefs as 'an implicit set of often unconsciously held assumptions regarding educational issues such as knowledge, teaching, learning and curriculum'. The difficulty of defining teachers' beliefs may be complicated by the fact that their thoughts are unobservable; therefore, they are not as easily measured and evaluated as actions and their perceivable effects. Beliefs also have a very covert nature; they might not be observable and even the teachers holding them may not recognise them (Prawat, 1992). However, this is disputed by Hofer & Pintrich (1997) who view personal beliefs as elements of cognitive structure to which individuals can have conscious, articulate access.

Hofer & Pintrich (1997) assert that teachers have implicit theories of teaching, learning, knowing and that their beliefs are formulated from experiences and mediated by socio-cultural factors in a given society. Therefore, interpretations of new experiences such as facilitation, reasoning, critical thinking and knowledge acquisition would be mediated by those beliefs. Therefore, the success of any educational reform is based on recognising the complexities of interrelationships between instructional practice and deeply entrenched beliefs, values and assumptions of teachers (Manson & Mwakapenda, 2007).

METHODOLOGY

Conceptualisation of student centred learning

The study set out to answer the following questions:

- What meanings do teachers attach to student-centred learning?
- Do teachers' personal beliefs affect their adoption of facilitator role in student-centred learning?

This study is aimed at understanding the interplay between these meanings and implementation of the proposed learning model, where learner needs take centre stage and the teacher becomes coach or facilitator.

Research design

The focus of this study was on analysis of patterns, values, worldviews, meanings and beliefs about SCL. Therefore, a holistic approach to capture all aspects related to SCL processes was required. The triangulation of ethnography and phenomenology enabled the researcher to highlight the interpretations of SCL and the translation of those meaning to instructional practice. It was assumed that the meanings of SCL will evolve as the researcher conducted dialogical discussions with participants, and that the themes that emerge will form the basis for further data collection especially the classroom observations.

Participants

Key informants were purposively selected from Grade 10 mathematics teachers. The reason for selecting mathematics teachers is that mathematics is generally viewed as a communication tool, therefore in times of educational reforms the rules about what constitutes mathematics knowledge and how it should be taught will also change (Darling-Hammond, 2000). Nineteen

teachers were selected from five secondary schools from different locations within the province of Gauteng.

The teachers had varied qualifications that ranged from a basic diploma in teaching (two-year post-high school qualification) to postgraduate qualifications. Experience in teaching mathematics ranged from three weeks to 20 years. There were seven females and 12 males in the sample, and their ages ranged from 28 to 52.

Data collection

Data were collected through unstructured observation and in-depth individual interviews. The interview guide focused on individual meanings and experiences. Student-centred learning features were used as enablers for discussions which gave an overview of their thoughts on the learning model. All interview sessions were audio-taped for transcription; an initial round of data analysis was conducted after each interview and interview questions were revised to further examine emerging issues.

Classroom observations were conducted in three stages: pre-observation informal interview – to discuss the topic, lesson plan and the intended outcomes; observation of the lesson and unstructured interviews to gain clarity on the observed teacher behaviour and for the teacher to either confirm or reject the interpretation. The description of observations was guided by a set of questions that highlighted the dimensions of the lesson; the degree to which the teacher focused on rules and procedures; showing and telling versus the learners' interpretation and meaning creation; group work, reference to real-life situations; and assessment of learning.

Each teacher was observed on four different occasions, generating almost 40 hours of teaching data. The main aim was to seek consistency between what teachers claimed during interviews and how those claims were integrated into the instructional practice. Observation guides were developed to capture the narrative flow of each lesson. Instances of features of the classroom environment consistent with the teacher's beliefs were sought. Inferences on teachers' beliefs were made on the basis of the complete data set.

Data analysis

Qualitative content analysis produced four main themes, (1) The authoritarian and transformative beliefs (2) Students' readiness for active learning; (3) The unique nature of mathematics (4) Curriculum mandates

RESULTS

In the following text, themes along with some quotations are presented.

Theme 1: Authoritarian and transformative beliefs

Various meanings of SCL were advanced. Most teachers seemed to approach their new role based on their experiences of what worked before the learning model was introduced. They used this experience to assimilate the new identity and responded to the expectations with mixed emotions. A few had progressive beliefs and seemed to embrace their role as facilitators not transmitters of knowledge. Authoritarian responses represented strong and fixed beliefs in the old traditional teaching methods and pessimism about SCL. These beliefs were found to be inconsistent with new learning paradigm. On the other hand, transformative responses viewed SCL as necessary, inevitable and empowering.

‘My role as teacher is to make sure learners understand the concepts of math. We have a large number of students in our classrooms, where is the time to wait for them to generate knowledge’?

‘I am not saying OBE as a teaching/learning system is bad, all what I mean is it is badly implemented, we are not yet ready, we are definitely not masters of everything as they expect’.

‘It is all about engaging learners more effectively and giving context to enhance understanding. It can be done if we set our mind to teaching learners to learn, to figure things out for themselves’

‘I believe that independent learning refers to giving learners time to apply knowledge and using different strategies to facilitate learning. The students need to be active and engage with content to be able to develop reasoning and critical thinking’.

Theme 2: Beliefs regarding students’ readiness for active learning

SCL encourages a good teacher-learners relationship based on mutual respect and healthy dialogue, where both teacher and learner engage in a learning discourse to create new meanings. Flores (2000:234) supports this view and posits that a belief that all learners have capacity to learn encourages teachers to react to learners needs and these teachers develop high expectations of their learners. Rigid views of the student or of the curriculum, if given credence by a teacher, constrain teacher action in the classroom (Prawat & 1997: 252). The majority of teachers believed that learners were not ready for participatory learning. They believed that learners’ background in mathematics, among other things, made it impossible for them to fully

comprehend the demands of grade 10 mathematics; and to take accountability for learning. It appeared that teachers' perception of the nature of the subject led many to believe that students could not cope. However, the majority seemed to be clinging to power and control.

'Math demands the teacher to lead learners in the right direction; they cannot just discover new knowledge themselves. Our students are not ready for anything, Grade 9 math was a disaster, how can they be in control of learning when they don't know the basics?'

'Student-centred learning encourages co-learning and group work. For our students, that means taking someone's work. The majority of learners are not motivated to learn, we cannot expect them to be active'

'Our students have a good sense of autonomy which is good for student-centred learning. But, that's where it ends. All what they do is argue, and argue. They bring nothing new, there is no respect. Deep learning is not possible'.

'I know what is expected of us, but, our learners come to us with limited maths background, what do you do in that case? 'You kind of fill up the gap by taking control of learning to enable them to understand new content.'

'Group work is very useful for these learners, they come from different backgrounds and bring very little to class, grouping them is beneficial for less capable ones.'

Theme 3: The unique nature of mathematics knowledge

Teachers presented various interpretations of what constituted mathematics knowledge; this understanding appeared to be influenced by their general view and understanding of knowledge. Some presented a more traditional belief while others were somewhat in the middle showing a mixed type that included both traditional and reformed beliefs herein referred to as evolving. A few presented more reformed beliefs.

Mathematics was regarded as an elite subject knowledge that opens doors to sophisticated careers such as engineering, finance, and physics. Teachers believed that a teacher with rich mathematics knowledge will be able to transfer it to his/her learners. The majority portrayed mathematics as a practical activity that is carried out in a procedural way; and mathematical competence was directly related to what learners knew – facts, procedures and conceptual understanding.

The problem-solving aspect of mathematics was understood to be learners memorizing the necessary steps to arrive at a solution. They also envisioned mathematics as a fixed subject of

absolute truths (absolutist view). A few had a constructivist view of mathematics. However, they all believed in the importance of disciplinary content. Some had a content-focused view of mathematics. These teachers viewed performance as a key goal, the attainment of which depended on the mastery of rules and procedures.

'I stress to them to develop the number sense and properties of operations, this will help them do the computation quicker. They need to practice, practice, and practice to understand math content'

'Math is a problem-solving subject, it has its own language that learners need to know and use, the symbols, rules, and they have to memorize these rules in order to solve problems.'

'Math is not for everybody. It involves very complex reasoning. The majority of our learners just don't get it. Therefore, I need to make sure that they learn the basic rules quickly to understand complex problems later'

Theme 4: Curriculum mandates

All teachers indicated and understood the need to adapt teaching to learning needs of students. They however, believed that it is not possible to provide extended opportunities for all learners. The context within which constructivist teaching and learning operate was cited as being too rigid and controlling. The teachers felt that the organization of classes, external assessments, resources, and support from the department of education have an impact in how they implement the SCL activities. They seemed to imply that one cannot deliver SCL in resource-constrained environment or where timing of external exams is determined centrally. Inadequate training seemed to foster feelings of insecurity which in turn influenced how they conceptualised SCL. The school system was found to be rigid and time scheduled, this would prevent teachers to do much in terms of providing expanded learning opportunities

'There is too much emphasis on exams, at the same time we are expected to respond to the learning needs of individual learners. How do you get that right when you have content to cover?'

'What is required of us and what happens in the classroom are two different things. We have lesson plans and topics scheduled for each term, how do I allow learners to pace themselves?'

‘Groupwork seems to help those who are weak, but look around the classroom. How possible is that? The classes are full you do not even have adequate space to walk around’

Beliefs and teaching practice

Descriptions of what took place in the classroom together with explanations of the incidents in the observed lessons provided insightful evidence of teachers’ beliefs about student-centred learning and their role as facilitators.

The data from the classroom observation indicated strong links between teachers’ beliefs and teaching practices. Teachers who held traditional/ authoritarian beliefs about teaching manifested more traditional practices and emphasised performance-based behaviours. This practice concurred with their belief that learners learn best when teachers demonstrate the steps for a mathematical problem and show them the ‘shortcuts’ to arrive at solutions. Their stated preference for drills was also reflected in the actual type of activities they designed for learners, as demonstrated in the lesson observations. Assessment of learning seemed to ‘reproduced’ content without evidence of higher order thinking. The main drive appeared to be ‘content coverage’ and external assessments. The teacher and the textbook were the main sources of information. The majority of teachers did not vary their instructional strategies; they were all inclined to use one approach which was more or less traditional in nature. This involved 'students solving problems on the board', and seemed to believe that there are unquestionable criteria for differentiating right from wrong.

Teachers’ experience, reasoning processes and judgment of learning processes provided the opportunities to seek answers and make pedagogical decisions; these provided them with a sense of strength and the convictions about what should be taught and how it should be taught as this statement reveals: *Teachers ground their professional practices within analysis of their ontological values, live their professional practice in terms of how they realise these values as lived practices* (McNiff and Whitehead, 2005: 6).

Teachers who demonstrated transformative views of teaching and learning used innovative ways of teaching. They seemed to measure understanding by wanting to know how students arrived at a solution. One repeatedly asked the question: ‘Can someone tell me how we came to this conclusion?’ Learners responded with all kinds of explanations, correct and incorrect. Here is

how one teacher addressed the incorrect answers: 'Tell me why you think that way, or give reasons for your answer' and 'Do you all agree with the answer?' these teachers believed that their role was to provide conceptual maps to allow learners to figure out the connections, and then they will be able to work at their own level of understanding. They actually asked the learners to give a summary of the lesson, identify links, and draw conclusions. These teachers showed confidence in what they were doing and were clearly in control, but not dominating. Learners were encouraged to think by frequently asking process questions. Prickel (2000:12) contends that teachers are continually contributing to new knowledge and insights to the science of teaching and learning, and that their teaching strategies are adapted and applied from tested and non-scientific theories, and their personal beliefs.

Practices not related to beliefs

Inconsistencies between beliefs and practices were found in a very small number of teachers, 3 out of 19. These teachers adopted mainly traditional teaching strategies whereas they supported the student-centred approaches and believed the new learning model made more sense. Post observation interviews revealed that they knew what they needed to do, however, the school environment, lack of resources, and big classes prevented them from 'doing the right thing'. Secondly, the perceived inconsistency may have been due to teachers intentionally or unintentionally stating beliefs they did not practice. The complexity of beliefs research is documented in other studies that showed inconsistencies between professed beliefs and observed practices. Karaagac and Threlfall (2004), Chen (2008), Levin and Wadmany (2006), and Barkatsas and Malone (2005) concluded that classrooms were complex environments and found a widespread contrast between teachers' expressed beliefs and observed practice. Other factors such as perceived support, availability of resources, attitude of learners and the teachers' personality were found to influence beliefs.

DISCUSSION

A fundamental assumption of research on teacher beliefs has been that an individual's behavior is ultimately a product of his/her beliefs; consequently any attempt to change the practice of teachers must of necessity involve change in the beliefs of teachers (Pajares 1992:308). This study showed that teachers had adequate access to their beliefs systems contrary to findings from

a broad array of literature (Prawat, 1992), that beliefs are implicit and covert. Teachers articulated their beliefs with great clarity. Various subsets of beliefs were also found to exert different degrees of influence on the teachers' definitions of student-centred learning, for example, when teachers discussed teaching and learning, they often made connections to mathematics knowledge, and the purpose of education. Matured and experienced teachers demonstrated well-established beliefs that appeared to be central. Younger and more qualified teachers appeared to have peripheral beliefs that were likely to change. Teachers were found to have strong beliefs about pupil's ability to learn mathematics. These beliefs revealed how they viewed knowledge and suggested how they may enact their classroom practices. Hannafin et al (2012) contend that the educational environment have psychological, cultural, and pragmatic principles. The cultural principle might be the reason older teachers hold onto power and authority. The majority of teachers created ideal images of teaching mathematics and themselves as masters of the subject; hence they perceived their role as experts and in control of the knowledge production in the classroom. Their experience, reasoning processes and judgment of learning processes provided the opportunities to seek answers and make pedagogical decisions which, in turn, provided them with a sense of strength and convictions about what should be taught and how it should be taught.

The study found that in a period of transformation, with teachers facing new educational ideology, they might nurture feelings of insecurity. In this instance, they appeared to be reluctant to engage with the pedagogical principles espoused by the learning model, their conceptualisation of students' readiness for active engagement might have also influenced their definition of their role. Elevating the learners to creators of mathematical knowledge appeared to be a challenge to content-oriented teachers. Most used traditional approaches in the classroom, based on their beliefs that mathematics instruction is about showing learners how to solve problems, and giving them drills.

Teachers believed that policy makers should have made a considerable effort to prepare learners for their new role and not expect them to grapple with their new identities and at the same time fostering the culture of learning in schools. Teachers who put more value in the power, authority, and control appeared to experience strong feelings around the issue of mathematics content. They were reluctant to create environments that allowed development of links and framework for new knowledge to emerge. Their beliefs regarding what constitutes knowledge appeared to be at odds

with student-centred learning principles. Research has shown that when the teachers' beliefs are not consistent with the aims or objects of the educational systems, there will be strains in the system (Handal 2003). This belief is supported by Prawat (1992:358) that failure of implementation of educational reform can be the result of teachers' instructional beliefs not matching the original goals of a particular innovation; if teachers' beliefs do not match those goals, it is likely that resistance will be generated resulting in high resistance. Conversely, if teachers' beliefs are more compatible with educational reform, it is probably that new ideas will be accepted and adopted in the classroom. Teachers therefore can be either obstacles or conveyances of change (Prawat, 1992:358).

Teachers hold assumptions about knowledge and how it is gained and also about teaching. Their views on teaching were inter-connected with beliefs about mathematics knowledge and ranged from imparting knowledge to allowing learners opportunity to make sense of mathematics and to figure out how they arrived at answers. Those with teacher centered views conceived learning as a process of memorizing and reproducing learned material, and those with learners centered views defined learning as dialogue, exploration and meaning creation. The conceptualization of ideal math teaching was mostly content and performance focused, hence these teachers felt they had an obligation to make learners develop good mathematical skills and that learning math cannot be left to learners to discover knowledge. Math knowledge was viewed as a complex entity to be understood only with the direct intervention of teachers. The belief that learners were incapable of making informed choices about learning mathematics appeared to be the major influence of teachers' beliefs about mathematics pedagogy.

CONCLUSION

The following conclusion can be drawn for the findings of this study. Teachers' beliefs about learning provide the foundation upon which they make choices about how to teach and how your pupils should learn. The study's theoretical importance lies in the finding that real change in educational practice can be effected if teachers' beliefs are acknowledged and addressed. The present results may also mean that during a transformation period caution must be taken against enforcing an ideology on teachers.

Policy makers need to provide sufficient time for teachers to reflect on their existing assumptions about several pedagogical issues and to compare those beliefs with the proposed new learning

models. According to McNiff and Whitehead 2005: 6), 'teachers ground their professional practices within analysis of their ontological values, live their professional practice in terms of how they realise these values as lived practices'. Teachers, as transformative intellectuals need to be supported to leverage what they know already and what is being proposed in order for any educational system to flourish. This study generated in-depth contextualised knowledge that could contribute to the literature on educational transformation by providing evidence regarding relations among beliefs and teaching practice. It also reveals the need for the Department of Education to make teachers' personal theories about educational systems an integral part of the transformation agenda so as to improve the quality of teaching.

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