Beliefs that manifest through newspaper items in relation to peoples' life challenges and their potential to enhance a sustainable learning environment in school science

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Abstract

The paper documents beliefs that manifest themselves through newspaper items and elaborates on their potential to enhance a sustainable learning environment in a school science lesson. "Learning environment" is depicted from different angles and includes *virtual and real learning environments, school environments and classroom environments.* Descriptive and item analyses were conducted on sixty-eight newspaper items that were identified. The nature of problems and prescriptions/solutions was categorised for each item and the paper further provides elaboration on the types of problems and recommended solutions. The results show that the "*believed*" structure contents in their newspaper items to catch the attention of the "*believer*". Lessons on the power of belief must be learnt by school science teachers if they are to succeed in creating a sustainable learning environment with improved performance in school science.

Key words: belief, belief models, teaching, explanations

Introduction

Educational transformation and socio-political changes in South Africa have been characterised by multiple challenges. Perceptions and reactions by some of the stakeholders resulted in the need to reflect on and revisit the national agenda on the transformation of our education system. The need to overhaul the learning environment and create one that is conducive to learning has frequently featured in debates on a national agenda. Studies on elements that promote a sustainable learning environment for the implementation of the Curriculum and Assessment Policy Statement (CAPS) are attracting attention. The learning environment is being portrayed from a variety of perspectives and includes the *virtual and real learning environment, the school environment and the classroom environment*. In this paper sustainable empowering learning environment refers to " ... how best to create optimal conditions for excellence and quality in learning, irrespective of the learners' grade or academic level." (Francis, Mahlomaholo & Nkoane, 2010, p. 11). The focus in this paper is

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on the science classroom environment. The nature of problems and the solutions suggested in the newspaper items were analysed to study the nature of people's potential beliefs. Randomly selected community members were asked to comment on the articles as a means of eliciting their views and beliefs. The aim of this study was to explore beliefs that manifest through newspaper items that people attribute their challenges to. An understanding of such may create a useful foundation for exploring the dynamics of appropriate beliefs in order to enhance a sustainable learning environment in the school science classroom. Hence the research questions addressed are: what beliefs manifest through newspaper items do people attribute their challenges to and how can such beliefs be used to enhance sustainable learning environment?

Theoretical underpinnings

Beliefs play an important role in creating a sustainable, empowering learning environment (Borg, 2001; Bojuwoye, 2013; Mdunge & Wasserman, 2009) and therefore there is a need to acquire insightful understanding into how they may be incorporated in understanding the school science concept. Through a focus of this nature teachers may begin to understand their own beliefs, compile a repertoire and recognise their value in a classroom situation.

There are numerous references to the concept "belief" in the literature, where it is used interchangeably with terms like "perception", "efficacy" and "clarification" (Borg, 2001; Chemero, 2001; Ganchorre & Tomanek, 2012). Its potential and value in a teaching and learning situation has not been fully explored. According to Borg (2001), the following are some of the common features that contribute towards a "belief" by an individual: *the truth element*, *the relationship between beliefs and behaviour*, *conscious versus unconscious beliefs* and *beliefs as a value commitment*. These four features may be viewed as explanatory beliefs that interact and serve as underlying dynamics in defining the concept. Belief may be viewed as an individual or collective activity as one engages in making meaning and providing explanations of the phenomena within our world. It plays a critical role in making sense of scientific explanations.

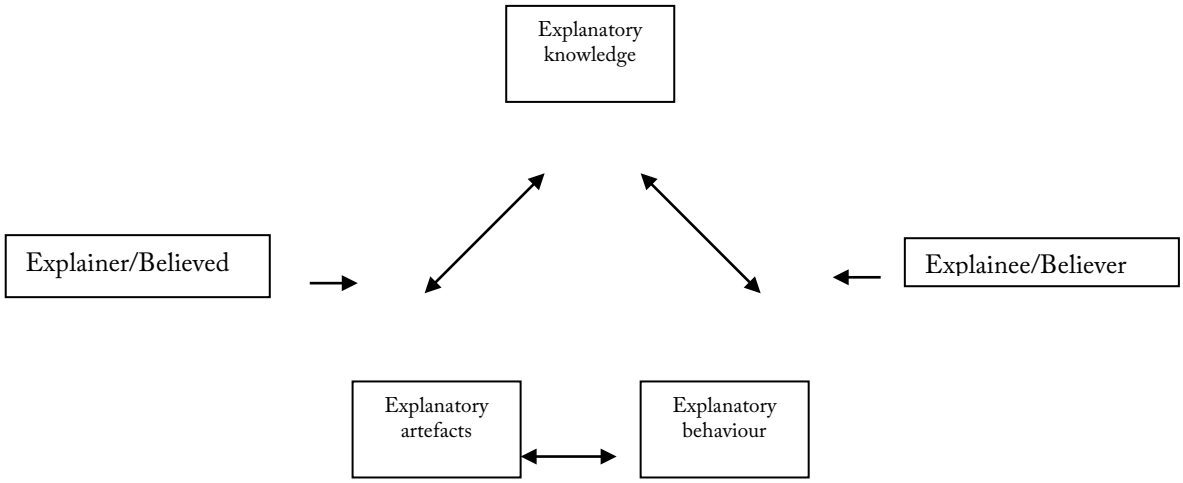

Figure 1: Components of an explanation

Horwood (1981) emphasises that for the purpose of understanding scientific explanations, in contrast to other forms of explanation, it should be noted that the "Why?" question needs to be addressed. Horwood also states that when one elaborates on the physical structure of a phenomenon that is viewed as description but includes "Why? and How?" questions then the

discussion is elevated into an explanation. This implies that various components of an explanation need to be considered before it can be regarded as an explanation, namely, explanatory knowledge, explanatory artefacts and explanatory behaviour.

The components in Figure 1 may be regarded as the pillars of any explanatory situation and also serve as underlying dynamics within an individual's belief system (Savasci & Berlin, 2012). These pillars are positioned with respect to the explainer and explainee, as shown in the figure. The first pillar, explanatory knowledge, refers to the topic/concepts that are to be explained by the teacher and at times these are within the construct of the teacher's beliefs (Horzum & Canan Gungoren, 2012). Explanatory artefacts refer to the things that a teacher uses while explaining the topic/concept (Savasci & Berlin, 2012). The third pillar, explanatory behaviour, refers to how the teacher will approach the explanation, including the extent to which he/she uses different types of explanation (Borg, 2001).

Roberts (1991) also refers to these pillars when elaborating upon the three elements that are expected to be present in an explanation. From a teaching perspective, Roberts (1991) views an explanation as "having at least three elements - crafts, intent and uptake" (p. 72); he describes how each of these elements apply to explanations within the context of classroom teaching. The explainer (teacher) makes use of various aspects of the three pillars in order to produce teaching explanations that are understandable and acceptable by the students because at the end what constitutes an explanation is dependent on "joint construction between teachers and students" (Yackel, 1997 p. 1). All these aspects further contribute to building a repertoire of beliefs to explain everyday encounters by an individual (Minogue, 2010).

Various sources provide different versions of the concept "belief". According to Borg (2001), belief is viewed as "a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and it is therefore imbued with emotive commitment, further it serves as a guide to thought and behavior" (p. 186). The way an individual makes sense of the world is partly influenced by the beliefs held (Horzum & Canan Gungoren, 2012). These beliefs influence how new information is processed and internalised (Areepattamannil & Freeman, 2011). Beliefs manifest themselves in a classroom environment on occasion. For instance, in the US concerns were raised when the concept of "creationism" instead of "evolution" was introduced in public schools (Lac, Hemovich & Himelfarb, 2010). Its inclusion was viewed by some as a direct violation by the state of the separation of church and state. Creation of life is a subject on which there are conflicting views. There are teaching situations where teachers have learnt to function within an environment with conflicting beliefs. For instance, a Christian teacher who is supposed to teach evolution in life science may find herself/himself operating within various levels of beliefs. This implies that if belief is viewed as a mental state of an individual that portrays *"the truth element"* (Borg, 2001) then the teacher does not necessarily believe what he/she is teaching. Belief is viewed as explanatory knowledge.

Common ground between the explainer/believed and the explainee/believer needs to be established if there is to be meaningful understanding of scientific explanations. From the various perspectives on explanations mentioned, what becomes apparent is the presence of three components in any explanatory situation, namely, the explainer/believed, the explainee/believer and the thing to be explained/believed (knowledge) (Savasci & Berlin, 2012). The last component manifests itself in the form of a problem that the explainer needs to explain to the explainee by using "a set of linked statements each of which are understood by the explainee and which together lead to a solution of the problem" (Brown & Hatton,

1982, p. 5), or "sense making of the world" (Borg, 2001). "The set of linked statements constitutes the explanation" (Brown & Hatton, 1982, p. 5) which has the potential to influence the beliefs of a learner (Minogue, 2010). The linked statements are the ones that facilitate understanding. Treagust and Harrison (1999) and Rushton, Lotter and Singer (2011) have also emphasised the need for teachers to use effective pedagogical content explanations in their teaching, that is, the kind of explanations that will link scientific content explanations with everyday explanations. Since beliefs are a function of the explanation of natural phenomena, the following sections elaborate further on explanation, providing a historical background to the concept and how it is used in the teaching and learning of school science.

The role and effect of explanations in science education and school science (Metz, 1991) have gained recognition and attention has now been directed to explanations within the context of teaching and learning (Knowles, 1990; Ruben, 1993). Studies of scientific explanations from various perspectives have resulted in investigations into how these scientific explanations may be transformed into effective teaching explanations. Studies that provided an insightful understanding of the nature and types of explanation and their impact on students' learning are reported by Ogborn et al. (1996). Other studies highlight the need for teachers to use types of explanation that are learner-friendly in order to enhance students' understanding of school science (Brown & Hatton, 1982; Cole & Chan, 1987; Treagust & Harrison, 1999).

Studies related to the effective use of explanations in teaching and learning to improve students' performance in school chemistry emphasise the role of explanatory artefacts such as models in helping learners make sense of science concepts (Treagust & Harrison, 1999). Some studies have shown that although students have a limited understanding of the role of these explanatory artefacts in school chemistry, teaching and learning based on these artefacts have had a positive impact on students' learning (Chittleborough et al., 1999). Recognition of the dynamics related to the creation of a sustainable empowering learning environment is essential for the creation of a meaningful learning environment (Brown, 2010; Mahlomaholo, 2009; Nkoane, 2009). In the next section the three concepts – explanatory knowledge, explanatory artefacts and explanatory behaviour – are elaborated on.

Certain studies have focused on the use of explanation to enhance the learning of school science (Chinn, 1995; Gilbert et al., 1998; Lehavi & Galili, 2003) and others have elaborated on the structure of a scientific explanation in a classroom situation (Treagust & Harrison, 1999). Although these studies have addressed important aspects related to explanations and beliefs in school science, none has focused on key patterns that are attributed to the "believed" rather than to the "believer" and the extent to which these patterns may be adopted and adapted for use in school science teaching. Other likely influences of beliefs may be related to traditional and cultural practices (Smith, 2013). For instance, initiatives are under way to integrate the principles underlying belief in ancestral spirits into counselling and psychotherapy (Bojuwoye, 2013). Understanding these dynamics as they relate to beliefs may contribute to the pedagogical planning of activities and explanations that may contribute towards the creation of a sustainable, empowering learning environment (Brown, 2010; Mahlomaholo, 2010 & 2009; Nkoane, 2009).

Methodology

Descriptive and item analyses were carried out (Cohen et al., 2000). A framework on explanations research was also incorporated (Mamiala, 2001).When compared to other Sunday papers, Sunday World was found to have a lot of items related to peoples's life challenges hence its choice. Opinions sought from the educators and learners were based on the frameworks described by Ogborn et al. (1996), Childs & McNicholl (2007) and Chi (1997). Six learners and five educators (neighbours to the researcher) were purposively selected to seek their views on the categorised newspaper items. Based on their responses to the questions and from the item analyses of the newspaper items, broad categories emerged. Another researcher, who was not involved in the study, was given the newspaper items and asked to conduct item analysis as well and classify them using the same categories. There was a high percentage of agreement between the classification of the two researchers (Altheide & Johnson, 1994). This procedure helped to enhance the interpretive validity of the study (Cohen et al., 2000; Gall et al., 1996), so that the researcher could establish whether there was any consistency in the manner in which the responses are categorised.

Results

A variety of problems and solutions were noted from the 68 newspaper items analysed. Problems that were identified from the newspaper items and from conversations with learners and educators were arranged under the following broad categories: *nature or type of problem and the solution(s) recommended for each problem*. Through item analyses of the newspaper items the category on nature or type of problem was further subdivided into the following units: *bedroom matters, body-related issues, property, business, relationships, debts and jobs.* The second category on solution(s) recommended for the problems was subdivided into the following units: *herbals/chemicals, ring/wallet, spiritual/prayers and magic/psychic*. Six items were identified where no specific solutions were mentioned. That is, they promise the prospective client/believer that they will sort out problems or provide solutions without elaborating on the type of solution.

Nature or type of peoples' challenge and the proposed solution

The following are the broad categories that emerged from the nature or type of peoples' challenges that manifest through newspapers: *bedroom matters, body-related issues, property, business, relationships and jobs*. The challenges may be viewed as indicators of some of the issues that portray the underlying beliefs of society.

Bedroom matters

The challenge appeared more frequently in most of the newspaper items and it focused on the fact that partners are sensitive about how they "perform" in bed as a way to satisfy each other. Enlargement of the male organ or tightening of the female organ was mentioned frequently. For instance, the following statement appeared in one of the newspaper items: "famous Yodi pills, botcho creams and chicken pills … C4 penis enlargement oils. Weight gaining and loss pills, … vagina tightening" (p. 30). As you will note, chemicals are recommended as part of a solution to the problem. This type of problem appeared more frequently in the newspaper items (see table below). According to one of the male interviewees, "men are under pressure to prove their manhood". Learners did not comment

on this item but this may be attributed to cultural barriers. A child may not freely engage in a conversation on such matters with an adult.

Body-related issues

The challenge in this case was more apparent with women who wanted a hip and breast enlargement. Again, these organs are part of what people would like to change. Herbal pills and oils are some of the recommended solutions to the challenge. Two female educators acknowledge that they need to exercise to address figure problems.

Property insecurity

Although technology in the form of alarms is available for our properties – houses or cars – there is still a strong belief that one needs to consult a healer and ensure that these properties are protected (p. 29). "Monna o tshwanetse go tiisa lelapa la gagwe [*A man needs to fortify his home*] (this is a direct translation of a comment by one of the male educators. He meant that, one need to keep evil forces away from their home). For instance, whenever a new property is acquired some form of protection is required so as to ensure that one does not lose it. Prof Kamau, with spiritual healing powers, claims to ensure that "you get a dream house and car" (p. 29). As highlighted by Bojuwoye (2013), "ancestral spirits consciousness has

Table 1: Frequent solutions mentioned in the items

Type of solution	No. of items	% frequency	Comments on the solution
Herbals/chemicals	33	39	It includes the use of a spray (Item 1, p. 29), creams, oils and pills. For example, Amiz oil to win lotto offered by Dr Sendagile (item 62, p. 32).
Ring/wallet	25	29	It is believed that the magic ring will bring luck to you and help you to secure tenders (items 5 &
Spiritual/prayer	10	12	It is believed that one's challenges may be resolved through prayer.
Psychic/magic	11	13	See your enemies or problems in a bowl of water or a rock.
Not indicated	6	7	There is no indication of the recommended prescription.

has always been with us since it is a way by which we affirm our identity and connect to our root" (p. 76). Ancestral spirits are still viewed as playing a pivotal role if one's property is to be protected. This practice remains common among the African communities. The belief in ancestral spirits serves as a point of reference as we make sense of the world, hence the belief in a muthi to strengthen the property. One educator went so far as to elaborate on the way a person may be subjected to hypnotism which, according to him, is part of a display of psychic powers. According to him, "there is no difference in hypnotism and psychic power mentioned by spiritual healers".

Business/tenders

Despite factors that may be associated with the economic downturn, this item indicates that people regard the need to address this challenge within the context of their beliefs. Getting a muthi, spiritual intervention or magic ring are some of the solutions that are suggested by the believed to the believer. In addition to sorting out one's business problems, Chief Chikapa guarantees you acquisition of a political position if you use his muthi. No comment from the interviewees.

Relationships

Marriage and lost lovers appeared to be some of the frequently mentioned concerns under this category. A number of suggestions to resolve the problem include herbal remedies/chemicals, magic ring, psychic or spiritual prayers. For instance, according to Professor Mussa "bring back lost lover and stop he/she from cheating" (p. 30).

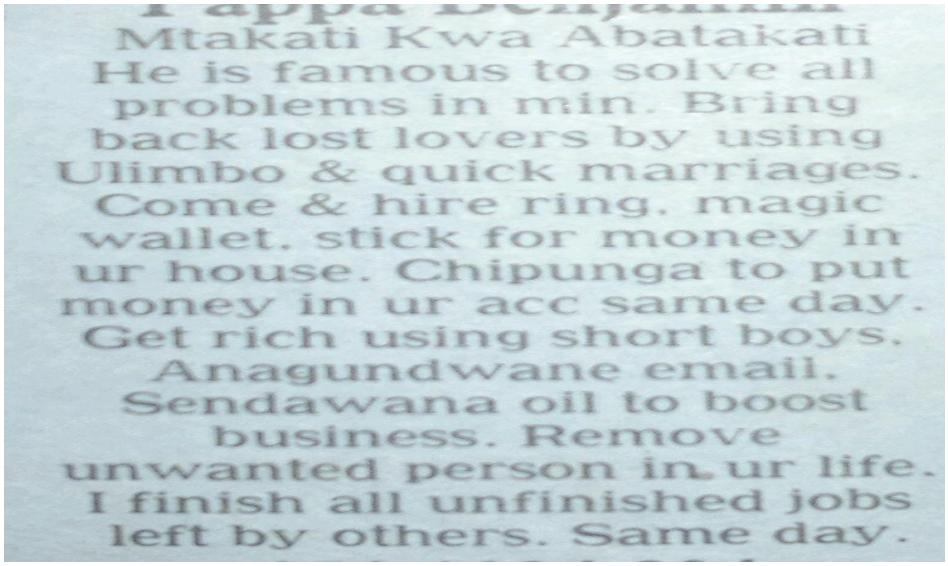

Figure: Example of the newspaper item – Sunday World, 2013

Debts

The problems are in the same category as the business problems discussed above. A magic ring is one of the recommended solutions. As indicated by Sheik Ratif , "100% guarantee in deleting loans" (p. 30). According to Dr Nikawa (p. 32)

> *"borrow stick charms then point it at Katando water then suddenly floating and won"*
> *or*
> *"hire Chitowe short men to fill more than R1 million in your safe/acc"*

Jobs

The high rate of unemployment is one of the problems facing South Africa and as a result this is frequently mentioned in the newspaper items. Various items mention how this aspect may be addressed and the solutions include the use of the magic ring or prayer. The learners believed that qualifications are key to opening the doors of opportunity. None of the adults commented.

Reflective comments on the power of belief

This paper sought to identify and categorise the nature of beliefs that manifest through newspaper items in relation to peoples' life challenges and their potential to enhance a sustainable learning environment in school science. The challenges may be perceived as portraying the everyday concerns of society as well as some of the solutions suggested by the believed. The nature or type of challenge tells a story about our society (Hidi & Renninger, 2006). Understanding of the underlying dynamics used by the believed to the believer may provide an insight into how a teacher may apply such an approach in order to give learners confidence and help them to believe in themselves and thereby improve their performance (Gentzkow & Shapiro, 2010). Out of the 68 items analysed, only one mentioned addressing the question of success in exams. According to Chief Omar, a herbalist and psychic, other than problems mentioned earlier he is able to help one to "pass exams" (p. 31). I attempted to contact the Chief for an in-depth interview on this aspect but could not get through on the contact numbers provided. I think that for further study follow-up interviews with such individuals may be of value in addressing some of the issues related to school science performance.

In addition to the item on exams, there are also two items that attempt to address problems related to church congregations (pastors are also invited). According to Chief Albert and Mlanzi (p. 31), "all races are welcome whether you are Black, White, Coloured or Indian. Even the pastors are invited." Dr Ninkawa (p. 32) also invites pastors for consultation. For R20, Ninkawa can throw bones so that one may "hear what makes your life to be stuck before you say a word". If the believed have a skill such that it also makes pastors consult this may shed further light on how school science performance could be addressed through the power of belief.

Concluding remarks

I regard the power of belief as a mental state that is characterised by multiple cognitive activities that inform the final state that an individual assumes to frame her/his understanding of the challenges faced in the world. The newspaper items demonstrated the tentative nature of truth as a result of one's beliefs. The learners interviewed agree that prayer is important before you write a test and support was expressed for this aspect by two out five educators. Most school learners in South Africa believe in praying in the morning but do not seem to extend the power of their belief in prayer to their performance in school science.

Underlying dynamics related to beliefs have the potential to result in desirable action if understood and harnessed properly. For instance, the following analogy of a soccer coach helps illustrate the power of belief in action: the role of a senior coach at a soccer club has more to do with how he/she psychs up the players into a state of mind that makes them believe in their ability to beat their opponents. Fitness counts but it is this state of mind that produces the desirable win in a game. There is evidence of soccer clubs where performance has improved because of a new coach. These are the underlying dynamics and skills that a school science teacher needs to acquire he/she is to add value to sustainable learning environment that " ... create optimal conditions for excellence and quality in learning, irrespective of the learners' grade or academic level." (Francis, Mahlomaholo & Nkoane, 2010, p. 11).

Teachers' explanations that are compatible with students' beliefs, interests and experiences may contribute towards improved performance in school science. Teachers need to reflect on their explanations in a learning situation because the key outcome of any explanatory situation is the creation of a sustainable learning environment in a school science lesson. Teachers' insightful understanding of explanatory situations for the creation of a sustainable, empowering learning environment has the potential to promote meaningful learning and explanations that are learner-friendly.

Implications to science teaching

In the light of the findings on beliefs that manifest through newspapers items in relation to peoples' life challenges and their potential enhance sustainable learning environment in a school science classroom, there are several possible implications for school science teachers if they are to succeed in promoting meaningful understanding and improved performance in the subject. Teacher programmes – both pre- and in-service, may need to incorporate aspects related to teacher and learner beliefs as they engage in school science. Teachers in a classroom environment need to be sensitive to the beliefs that learners bring to class and attempt to explain science concepts within such contexts. This approach will provide opportunities for both the learners and the teachers as they negotiate meaning in scientific explanations and the associated beliefs. Teachers may have resources, pedagogical competencies and willingness to go the extra mile but if the learners' beliefs are in conflict with what the teacher presents in a school science lesson then a sustainable learning environment may remain difficult to achieve.

As elaborated earlier by Clarke and Fredin (1978) and Miller, Goldenberg and Erbring (1979), papers do have an influence in peoples' beliefs. Furthermore, beliefs have been found to be rooted in the activities related to witchcraft (Davies, 1998). Bar-Tal (2000), categorises the beliefs into private and common ones, where private refers to internal beliefs confined to an individual and common beliefs as the ones related to a group. What is noticeable in the study is the prevalence of private beliefs. The paper posits and insightful understanding of the dynamics that informs the process of beliefs and how they may be utilized in school science.

Lastly, the teacher needs to be aware that the learners' behaviour is related to their beliefs and therefore he/she needs to play the role of a "coach" as a negotiated meaning and understanding are secured in establishing a sustainable learning environment, that is, developing belief intelligence. The discussion detailed in this paper has at its core the understanding of the underlying dynamics that inform the individual beliefs which can ultimately translate into improvement of school science performance. Simple questions such as "What are the teachers' beliefs?" and "What are the learners' beliefs?" may provide an insightful understanding into the multifaceted nature of school science performance. Acknowledging the influence of beliefs between the teaching of science and the science of teaching may further provide a platform in understanding their utility in enhancing a sustainable learning environment in school science.

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