Professional development networks: From transmission to co-construction

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This article offers an extract of a qualitative case study focused on collaborative professional development of science teachers in a transformative continuous professional development (TCPD) network, whose aim is the professional development of science teachers with a view to improving praxis. Teacher narratives generated through an iterative process of active interviews are analysed inductively and themes are identified. Insights shared in this article focus on teachers' ways of working with knowledge and how this was influenced. The study reveals that the ways in which the teachers are taught at times inhibit innovation, perpetuating transmissive approaches to teaching and learning. Lack of professional development and support, and tensions between policy formulation and implementation, also exacerbated the problem. The study, however, reveals a shift in ways of working with knowledge – a shift from the transmission of knowledge to the co-construction of knowledge.

Context

Triggered by the demands of South African post-apartheid curriculum transformation, this study was underpinned by socially critical-emancipatory principles in conjunction with a participatory action research approach. It was further located within an interpretive qualitative research paradigm. It focused on doing research in democratic and egalitarian ways through working *with,* rather than *on* teachers. Central to the study was the development of both participatory and emancipatory approaches to teacher professional development, premised on mutual and collaborative support (Southwood, 2000). At its heart was the assumption that teachers are capable agents

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who, if provided with opportunities, are capable of taking responsibility for their *own* professional development.

This research was located geographically in the Eastern Cape of South Africa, and ideologically in relation to curriculum transformation, focusing on the improvement in pedagogical practice. It is recognised, and should be borne in mind, that South Africa's contextual, historical and social factors such as educational and socio-political conditions substantially influenced the direction of the research. It is contextually characterised by intense debates on the importance of teacher support, and most importantly, the nature of the support and the context. The macro-context of South Africa and the micro-context of the schools involved in the study are all the more important in a country riddled by the tragic legacies of the apartheid education system.

Despite the curriculum ambitions, however, the post-apartheid era of transformation has been a period of turbulent political change replete with many challenges (Scholtz, Watson & Amosun, 2004). For example, the new curriculum catering for the transformation of teachers' pedagogical practices has proved to be a challenge to the teaching fraternity. Serious tensions between policy formulation and implementation have exacerbated such challenges. As Rogan, Grayson, Van der Akker, Ndlalane, Dlamini and Aldous (2002) note, the details on how to implement the curriculum at school level are often neglected. Instead, the emphasis is on the development of the curriculum at the expense of the implementation process.

Concept

This research focused on the development of a professional network of science teachers. In this instance, the concept of 'network' is used in the sense of a learning community, where professionals participate in their own development, rather than being 'developed' by outside 'experts'.

> *Networks are organized around the interests and needs of their participants, building agendas sensitive to their individual and collective development as educators (Lieberman, 2000: 221).*

Similar to the characteristics identified by Parker (1977) in relation to school improvement networks, this network was characterised by commitment, shared purpose, the sharing of information and emotional support, voluntary participation and an egalitarian ethos. As Lieberman (2000: 222) points out, through the mobilisation and motivation of teachers to engage in their own learning, such mechanisms have, in both the US and the UK, become a significant force for teacher development. In South Africa, however, the notion of 'clusters' (Jita & Ndlalane, 2009; De Clercq & Phiri, 2013) is more widely used than 'networks', but, as Mitchell and Jonker (2013) point out, the research remains limited. Whether 'networks' or 'clusters', the activities are very importantly school based. As Spanneberg and Brown (2003) note, one of the potential values for engaging teachers in school-based support is that they can learn

from one another in a relaxed and non-threatening environment, and in this way learn to believe in themselves.

This study focused on what was referred to as a transformative continuous professional development (TCPD) network, with the emphasis on collaborative professional development with the view to improving praxis. Professional development is regarded, in this instance, as being transformative and continuous, as ongoing capacity and knowledge-building, with a view to bringing about change in praxis, are central to it. As a process of transformative learning (Kreber, 2006), it is regarded as the co-construction of knowledge focused on the ultimate goal of improving praxis and, ultimately, learners' learning (Loucks-Horsley, Love, Stiles, Mundry & Hewson, 2003). The approach highlighted in the study was based on three fundamental principles of professional development, namely responsibility, reciprocity and reflexivity, 'the 3Rs'.

Responsibility requires viewing the individual within a broader social, institutional or structural context (Nickel, 2007). That is, responsibility results from being part of a group and members need to be assigned agency and be made aware of their responsibilities. The locus of agency has implications for transformative approaches, which require genuine participation (Babikwa, 2004). It is recognised that, within such contexts, different people take on responsibility in different ways and participate to different extents.

Experience of those in the TCPD network suggested a sense of reciprocity, characterised by a style of negotiation where the teachers were encouraged to view themselves as co-learners throughout the collaborative process. This does not mean that conflicts and contradictions would be reduced; but negotiation might help to put the teachers on an equal footing so that they are comfortable in expressing their disagreements. This is ideally based on relationships of mutual respect and appreciation (Southwood, 2000; Southwood & Ngcoza, 2009).

Reflexive practice means that the practical knowledge and action of teachers are vital. Bleakley (1999) explains that reflexivity entails dimensions of informed action or praxis. Embedded in reflexivity is informed action and a level of self-awareness in order to extend and further their understanding of their situations. Reflexivity can be a process for both the inexperienced and the experienced practitioners, whereby practitioners are afforded an opportunity to stand back from the demands of the classroom and be open to available support from their peers or colleagues. To be reflexive "not only contributes to producing knowledge that aids understanding and gaining insight into the workings of our social world, but also provides insights on how this knowledge is produced" (Pillow, 2003: 178).

Design

Aim of the research

The aim of this research was to explore how a participatory approach to professional development such as the TCPD network, which positions the educators at the centre of their own development, could help facilitate and enhance processes of development, with the view to improving the teaching and learning of science.

Methodology

This research study was located within the qualitative interpretive research paradigm, and based on an understanding that individuals are subject to a

> *confluence of personal, historical and cultural influences that ensure that each has an individualised and distinctive experience and outcome when confronted with the task of interpreting and making sense of what is required of them and their teaching/learning arrangements (Nikkel, 2007: 549).*

Within this paradigm, the broader study was situated within the socially critical-emancipatory (SCE) orientation in conjunction with the participatory action research (PAR) approach. According to Carr and Kemmis (1986), an SCE orientation has empowerment and emancipation of actors at its heart, while PAR helps to transform actors' lives by having them play an integral role in their own research (Kemmis & Wilkinson, 1998; Bhana, 1999). Nickel (2007) suggests that working with other teachers could influence teachers' perceptions of their responsibility and agency. As Kemmis and Wilkinson (1998) argue, PAR attempts to help people investigate and change their social and educational realities by changing some of the practices that constitute their lived realities. In this respect, blending of the SCE orientation and the PAR approach was realistic, since they both have an emancipatory and empowering focus embedded in their principles.

Participants

The study investigated the benefits of engaging science teachers in a TCPD network with the view to improving their practice at a particular time and situation, during the transformation in curriculum in South Africa. The study participants included six senior science teachers from four schools, whose teaching experience ranged from 13 to 28 years. They were identified and approached to reflect distribution of gender, grades taught, as well as teaching experience. The purposive sample reflected diverse personal, professional and subject-content knowledge backgrounds. These science teachers could be regarded as pioneers in a TCPD network, as they had never been exposed to such an experience.

Ethical considerations

The methodological approach had to be designed to be sensitive to the individual needs of the participants, acknowledging the potentially diverse ways in which

they would value the TCPD network. For instance, activities were designed to work with the participants' diverse levels of content knowledge. For ethical reasons, the participants were further given an opportunity to choose their own pseudonyms, and the schools where they worked were not identified.

Data generation, analysis and validation

Given the espoused emancipatory goal and framework for this study, from the start participants were involved in the generation, analysis and validation of the data. For the purposes of this study, data was generated using active interviews and follow-up informal active interviews. Active interviews are conversational in style allowing interaction between the interviewer and the interviewee (Holstein & Gubrium, 1995; Dupuis, 1999). Holstein and Gubrium (1995: 37) point out that "treating the interview as active allows the interviewer to encourage the respondent to shift positions in the interview so as to explore alternate perspectives and stocks of knowledge". This process resulted in rich descriptive accounts in the form of narratives (Clandinin & Connelly, 1998) of individual understandings. Techniques to help validation and trustworthiness of data included following up on interviews for clarification and extension and member checks or face validity (Cohen, Manion & Morrison, 2011). The participants, for example, had an opportunity to comment on the interview transcripts. Data was analysed inductively and themes were identified in relation to the research focus.

Insights and issues: Implications for development

The analysed data suggested that the TCPD network was an effective and meaningful space for development. In the broader study, many issues emerged from the data, offering insights into aspects affecting such spaces. For the purpose of this article, however, the focus is on knowledge and ways of working with it.

Transmission

> When I was asked to teach biology, I told my HoD that I did not major in it, but she said that I should use my method skills, which I did. I used to believe that one has to prepare so that you can be able to give the information to your learners. And that it was very important that you were fully prepared before you could go to class … (Nomfundo).
>
> During tests or examinations, what I wanted from my learners was for them to give me back what I taught them. So, I would say the emphasis was on writing notes and the learners would be required to reproduce those notes as they were … (Ngwenya).

It could be argued that the science teachers in this study saw their role and responsibility in the past as being transmitters of information, while their learners were viewed as receivers. It emerged from the analysed data that the teachers'

assumptions about teaching and learning were heavily influenced by the way in which they were taught at the teachers' colleges. This was characterised by transmission of information from the textbook to their passive learners, for them to regurgitate during tests and examinations.

Smyth (1996) reminds us that teachers' professional knowledge is shaped by how they have been socialised in the teaching profession. Teachers who have been socialised into transmission and rote learning will tend to teach that way. This suggests that the ways in which teachers were 'trained' cannot be downplayed during any transformation process; it is bound to affect their world view. Ironically, even in the workshops where teachers were being 'trained' for the new curriculum, it appears that the methods used were somewhat transmissive themselves, thus encouraging the perpetuation of such approaches:

> Teachers were shown how they should prepare lessons, how they should assess … They do not worry about the actual implementation … but what they want is the end product, that is, how assessment is done. Exactly the same notion of the old curriculum, that the end result is most important (Zapholo).
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> The problem is that we were trained for a certain period of years at the teachers' college, and we were taught to teach in certain ways. In this new system, however, we were just trained for two days and shown how to do the new curriculum … (Neon).

Subject-content knowledge

In my school some of the teachers who teach in Grade 8 and 9, for example, are teachers who … have limited science knowledge … Thus they tend to concentrate on the topics they are comfortable with, only neglecting other sections of the work. As a result of this, learners struggle to grasp science concepts in Grade 10 (Khwezi).

Although in this new curriculum learners should be actively involved and take responsibility for their learning, but you as a teacher you should be in a position to explain things to them, that is, you should be knowledgeable in your subject content knowledge (Ngwenya).

It is still my belief that if as educators we are not clear about the subject content knowledge we will struggle to put it across to our learners. In my case, ever since I improved my subject content knowledge many things began to dawn to me. I could see things with a new set of lenses … I feel that my science content knowledge has rendered me invaluable in our research team … (Zapholo).

When I first joined our research team … I was reluctant thinking that it was a waste of time. But as the time went by, through attending our workshops, I obtained useful information and I thus felt motivated because each and every time I found that I was enriched and improving in my science content knowledge and conceptual understanding … but I feel the level at which I was teaching in the past has deprived me of opportunities to participate fully in our network as tended to have a limit in terms of science-content knowledge. I think if I was given an opportunity to teach senior classes in the past I could have gained more knowledge and that could have enhanced my level of participation (Leo).

Some of the challenges facing the science teachers in this study have been addressed in studies that examined the link between teachers' subject-content knowledge and pedagogical-content knowledge (Shulman, 1986; Schoultz & Hultman, 2004). Such studies have shown that teachers' subject-content knowledge influences aspects of their pedagogical-content knowledge. Insufficient subject-content knowledge might lead to science being taught in superficial and uninteresting ways, the teachers' subject-knowledge base needing to be greater than that of their learners. The teachers also mentioned that their lack of understanding was exacerbated by the fact that some of the curriculum facilitators themselves were not confident about the fundamental principles. Instead of acting as catalysts and providing a positive influence on the teaching and learning of science in new ways, many of the facilitators seemed to add to the confusion.

Teachers who are not knowledgeable in their subject-content were likely to embed misconceptions in their lesson plans, passing these on to their learners. It is thus vital for teachers' misconceptions to be cleared; and all the more so, taking into account the point in Osborne and Simon (1996) that a teacher with inadequate

science knowledge may not be aware of learners' misconceptions. However, as many teachers know, they may find it difficult to provide clear explanations to the learners. This confirms that ongoing professional development should target teachers' subject-content knowledge and pedagogical-content knowledge as well as other skills. As Edwards (2002) emphasises, knowledge-capacity-building is essential for teachers to be effective in their classrooms.

Co-construction

[W]e are supporting one another because we come with our problems and share our teaching experiences of the lessons we've taught in our schools … In the past I used to plan on my own. That is, I now have a variety of sources of information rather than relying only on the textbook as I did in the past. Planning and discussing with colleagues also helps to answer some of the learners' challenging questions (Ngwenya).

In the network some of my misconceptions have been cleared. I feel that being exposed in this network is an empowering experience for me; as a result the idea of allowing learners to brainstorm, which I learnt from the network, is very helpful. Initially, I thought brainstorming was intended just to while away time so that you could hear the learners' ideas, and not taking seriously the things they have mentioned during the process. Also, I never bothered to link what is taught at school with my learners' everyday life experiences. It was only my information that I regarded as important … (Neon).

My involvement in our team has helped me to explain things to my colleagues better than I would have done three years ago. Also, my teaching and learning approaches have improved; as a result, I am changing all my old worksheets and my old notes to suit the present style of teaching and learning … (Zapholo).

Being involved in our network has been useful since my background to teaching was the old one from the teachers' college, that is, 'chalk and talk'. That is, I used to read the textbook only and teach all that information as it is to my learners. But now, through being involved in our research network, I started to grow and then I was exposed to finding more information rather than only relying on the textbook … (Leo).

It is evident that these teachers benefited in many ways from their experience of the TCPD network. Jita and Ndlanane (2009) found that engagement in the network proved to be a space wherein both teachers' subject-content and pedagogical-content knowledge were improved through sharing. It was not only experienced as motivating and conceptually enriching, but also afforded opportunities to improve practice, planning and potential responses.

Regarding pedagogy, one of the aspects which teachers also found useful from the network was the idea of mobilising and incorporating learners' prior knowledge in

class, linking knowledge to their everyday lives. The teachers mentioned that, in the past, they used to explain everything to the learners themselves, but now, as a result of being involved in the network, they also afforded the learners an opportunity to share their ideas, taking into consideration their everyday life experiences, and be actively involved in constructing an understanding of the knowledge. The teachers' knowledge was constructed in collaboration with colleagues, enabling them to view themselves as both co- and lifelong learners. Knowledge was viewed more as something to work with, share and build on rather than merely transmit. This was echoed both in the way in which the teachers worked with each other in the network and in the ways in which they were now reporting to work with their learners.

Concluding remarks

The study focused on particular ways in which a TCPD network developed science teachers' praxis. The design of the network was based on three fundamental principles underlying and running through a collaboratively based experience of professional development: responsibility, reciprocity and reflexivity, 'the 3Rs'. These three interrelated concepts are regarded as fundamental dimensions to the development of a TCPD network.

Insights from the study suggest that the TCPD played an important role in the professional development of the science teachers in this study. It became evident from this study that the science teachers saw the need for change and demonstrated change in their practice as a result of being involved in the TCPD network. Through a process of mutual and reciprocal empowerment (Babikwa, 2004), the science teachers interacted with colleagues, expanded their science-content knowledge as well as their pedagogical-content knowledge, and knowledge of how learners learn, demonstrating a shift from, among other things, a pedagogy based on the transmission of knowledge to one based more on knowledge construction. This was demonstrated both in the way in which they learned together in the network and how they talked about their teaching of science in the classroom.

While this study was restricted to a small pilot group, it led to insights into and understandings of some of the complexities of teachers' professional development. It also highlighted some of the potential of TCPD networks. The engagement of teachers collaboratively in participatory methods demonstrates the potential to generate remarkable results, despite the many contextual problems. Networking is viewed as a useful strategy for teachers and curriculum developers to collaborate in constructive and supportive ways.

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