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Professional Development as a Panacea for Lively Classrooms in South Africa: Experiences of Life Sciences Teachers in the Bojanala District (North West Province)

Florah Moleko Teane

Abstract

This chapter focuses on how the professional development of teachers influences the teaching and learning process in schools. In the chapter, the experiences of Bojanala East District (North West Province) Life Sciences teachers with regard to the professional development support they received from the Department of Education and Training are explored. Subsequent to 1994, South African Life Sciences teachers were subjected to a plethora of educational policy reforms, all of which affected the content of and the teaching approach to Life Sciences as a subject. In all these reforms, the Department of Basic Education organised professional development workshops as an in-service teacher training (ITT) to empower teachers in respect of the new policies. The study sheds light on whether or not the training (according to teachers) enhanced the teaching and learning processes in the classrooms. A qualitative research approach was used in the study and a purposeful sampling technique was employed to select participants. The researcher used one-on-one interviews and a single focus group to collect data. Drawing on the findings of this study and on support uncovered in the literature, indications are that the in-service training programmes left teachers incompetent in terms of dealing with both the new approach and the new content due to the programmes not addressing teachers' needs.

Keywords: classroom management, in-service training, life sciences, professional development, teachers, teaching and learning

1. Introduction

One of the causes of disruptive behaviours in South African schools is that these schools might be failing in their task as set out in the policy documents [1]. In a Life Sciences classroom, one of the causes of such behaviours could be the disparity between the content dictated by the science curriculum and questions that preoccupy students [2]. Of equal importance is how teachers themselves implement such a curriculum, because the way in which teachers understand and make sense of a curriculum affects enactment [3]. Thus, for the teaching and learning environment

to cater for the changing needs of a new cohort of learners, teachers are required to have specialised knowledge and skills [4] in order to impart knowledge to learners. In the South African context, a plethora of policies was issued after 1994, one after another, in an attempt to deal with the legacies left by the apartheid regime. The Life Sciences subject, in particular, fell under four consecutive policies, namely the Interim Core syllabus (ICS) in 1996, the National Curriculum Statement (NCS) in 2006, the New Content Framework (NCF) in 2009, and the Curriculum Assessment and Policy Statement (CAPS) in 2012. A top-down approach was adopted in the development of such curriculum policies and, in some instances, teacher formations were not included in the decision-making bodies dealing with the new curriculum policies [5]. The absence of teachers' voices from the educational reforms noted here disconnected teachers from everyday reality and made them the consumers of theories and approaches – this rather than allowing them to become autonomous beings able to reflect on their own teaching beliefs and practices. Thorough teacher training was, therefore, necessary to enable teachers to apply knowledge and lead activities in the classroom effectively [6]. Returning specifically to the topic of this chapter, the majority of teachers in the Bojanala District lacked the necessary know-how to fulfil their task. The above statement is in line with the assertion made by [7, 8] that, when teachers use instructional materials based on reform-oriented ideas that they are not familiar with, they can end up paying attention to superficial aspects rather than to core ideas.

The study focuses on the use of professional development in the form of ITT to capacitate teachers to enhance professional competency, which, in turn, should lead to improved learner performance. During the currency of each of the four South African educational policies named above, teachers attended a three-day workshop at which they received training in the new curriculum policy. Since many educational reforms were issued within a short period, teachers were forever being faced with the challenge of having to deal with new approaches, methodologies, and content, a state of affairs that was bound to cause them stress. For an example, a move from a content-based curriculum to an outcomes-based curriculum policy represented, according to [9], a move to the most ambitious curriculum policy since the installation of the Government of National Unity. With the implementation of an outcomes-based curriculum, no content was specified and every teacher thus taught what he/she deemed necessary to attain the desired outcomes. The study by [9] in KwaZulu-Natal indicated that different teachers taught different things in the same grade. In order to reduce confusion and to improve implementation, the Department of Basic Education planned workshops to empower teachers in respect of all the new policies. Subject advisors were the only people that presented such teacher training, which lasted for only 3 days regardless of whether the full scope was covered or not. These subject advisers now serving as trainers) they received only a three-day workshop by way of training—exactly as the teachers did. This short training period meant that the trainers had gaps in their knowledge and that these gaps were transferred to the trainees and then on to the learners [10]. Indicates that even experienced educators have incomplete and fragmented knowledge of the content they teach, signalling that they too need ITT.

Sufficient ITT is necessary if learner performance is to be improved. This is illustrated in the study conducted by [11], which showed that professionalism – the effective use of "know-how", and "know-what" according to situational requirements [12] – was lacking in teachers because they were without certain skills necessary to meet the challenges of a rapidly changing cohorts of learners. It is thus shown that a successful teaching and learning environment requires job-embedded professional development [13] which addresses the needs, concerns, and interests of teachers.

2. Theoretical framework

The paper explores teachers' views on the role of professional development in enhancing the teaching and learning process. Hein's Constructivist Learning Theory [14] therefore underpins it because this is a theory associated with pedagogic approaches that promote active learning. Hein's theory runs counter to the traditional methods of teaching and learning whereby curriculum designers and teachers, as implementers of the curriculum, dictate their pedagogic views. He propagates the idea of a teacher as a facilitator of learning who provides an environment where learners freely carry out their own mental actions. In other words, teachers must provide learners with the opportunity to construct their own world. Teachers are therefore responsible for planning learning activities and methods that engage learners' minds. Professional development programmes must address teachers' needs, such as by guiding them in planning the learning activities and empowering them in respect of different teaching methods to cater for individual learner needs. One of the methods suggested by Hein for learning is the so-called "learning by doing" – that is, hands-on activities that enable learners to be active rather than passively accepting knowledge given to them.

According to Hein, our learning is a social activity; it is intimately associated with our connection with other human beings. Social interaction with other people promotes meaningful learning, what [15] call collaborative elaboration. Social interaction can be enhanced when ITT allows teachers to discuss issues among themselves and teachers themselves can use the same technique by grouping learners and allowing free discussion to take place.

To enhance the process of teaching and learning, knowledge should be discovered as an integrated whole. Instructors are therefore required to plan learning activities by first introducing basic ideas concerning the topic or subject and then, later, revisiting and building upon them. According to Hein, it is not possible to assimilate new knowledge without having some structure developed from previous knowledge to build upon. Any new information introduced, either by curriculum designers or teachers during their teaching, must be connected to the previous information because learning should be discovered as an integrated whole [16]. Ref. [14] indicated the influence of learners' background knowledge in the teaching and learning situation by declaring that learning is contextual. Thus, every learner must be treated as an individual and any effort to teach must be connected to the state of the learner. Due to the differences between the unique cohorts of learners they are faced with yearly, teachers are expected to adapt their teaching methods and approach each time to suit a specific group of learners.

Hein also indicates that learning is not instantaneous. It takes time to learn, so in order for one to master the activities to be learned, one needs to revisit the activities concerned repeatedly, to think about them and to apply them. Therefore, a continuous professional development programme instead of a once-off activity is far more likely to make mastery of a new policy possible. In the same way, teachers must find methods to enhance learners' mastery of new content, again because this is a process that requires a measure of time.

This theory has profound implications for making South African classrooms lively because it unpacks strategies intended to enhance the teaching and learning process. What is key in education is to see learners as the centre of teaching and learning process and teachers as facilitators of learning. For teachers to be the best facilitators, professional development programmes need to address their specific needs, not merely deal with general matters.

3. Literature review

3.1 In-service teacher training and teachers' development and growth

ITT is supplementary training for teachers who are already in service [17]. Such teacher training is necessary because of educational reforms that are informed by changes in the world, as well as by the presence of different cohorts of learners, some of whom have special needs. Teachers are faced with challenges in implementing such reforms because, most of the time, they lack the knowledge and skills [18] necessary to deal with the new approaches and content required. These educational reforms warrant additional teacher training and the improved quality of instruction that follows. Professional development in the form of ITT may help teachers to deal with these changes by enhancing their professional competence and professional satisfaction [17]. The importance of professional development is widely documented in literature, as is the fact that such professional development is needed not only when a new policy is introduced – rather, it must be a continuous activity that improves and increases teachers' knowledge of the subjects they teach [18–20]. When teachers' knowledge is increased, this translates into improved learner performance [18].

Professional development activities come in the form of a number of interrelated activities such as workshops, local and national conferences, college courses, and interventions offered by special institutes. Traditional professional development programmes operated for fewer days than the current ones [21] and were criticised for not increasing teacher-reported growth in knowledge or skills, and for not bringing about changes in teaching [21]. According to these authors, because of the inappropriate duration of the professional development programmes offered to teachers, the challenges raised by the introduced reforms were not met and the programmes were ineffective because such professional development programmes focused only on teaching techniques without emphasising the content. Effective professional development activities are those that are sustained, ongoing and intensive [22]. In Riverside, Washington, for example, staff development focused on a 10-year effort to overhaul the elementary science curriculum and the district teachers attended 30-hour classes at a local university [21]. Elsewhere in the USA, professional development programmes designed included having teachers working with experts as mentors at schools and teachers attending development classes while in service [22]. Longer ITTs tend to have more content focus, more active learning activities and more coherence [21].

3.2 Professional development activities that enhance learner performance

Traditional professional development programmes dictate what teachers need to do, irrespective of the different working environments that they face. Teachers thus experience challenges in applying what they learn during ITT [17]. Professional development programmes must, therefore, provide opportunities for teachers' intellectual and professional growth [23]. Unlike traditional in-service training that is considered to be general [17] and taught in one-shot ITT interventions [24], recent literature advocates for moving away from training that is highly theoretical towards training in which teachers are actively involved [17].

Research provided evidence that active participation by teachers is an essential component of high-quality professional development [19, 21, 25]. According to [26], collaborative continuing professional development leads to greater confidence among teachers, greater commitment to changing practice, increased willingness to try new things, and an enhanced knowledge practice. Collective

participation enables teachers to discuss concepts and problems emanating from the training and contributes to a shared culture [21] as part of which teachers may plan lessons together. Effective ITT must focus on deepening teachers' content knowledge by improving and increasing their subject knowledge. In addition to empowering teachers on content, organisers of ITT must include in their plan instructional methods that will enhance the teaching and learning process. Instructional methods such as direct observation of teaching by experts or the use of online videos of lessons taught by expert teachers [27] are normally referred to as coaching and modelling. These methods have been shown to have made significantly more changes in teachers' way of imparting knowledge [28] than have other methods.

ITT programmes that put learners at the centre yield good results. Collaborative discussions that connect teachers with learners require much time for inquiry, reflection, and experimentation [21]. Thus, effective ITT interventions are those that are prolonged, continuous and intensive because. According to [24], teachers forget 90% of what is taught in a once-off ITT programme. Subject advisors, therefore, bear a responsibility to provide continuous support to teachers at schools in order to enable them to master each new policy. Each teacher's ability to master a newly implemented reform depends also on the provision of resources by school leadership, and this calls for the proper funding of ITT programmes. Since most ITT programmes are top-down initiatives, the role that teachers play in making the reforms successful is underestimated. Policy decisions that place teachers at the heart of any innovation [24] will inform well-planned ITT because teachers know their learners' needs.

4. Methodology

This study is based on the interpretivism and constructivism research philosophy which, according to [29], are multiple realities or truths based on an investigator's construction of reality. This study is interpretive because it is guided by a set of beliefs and feelings about the world and how it should be understood and studied [30]. The researcher sought information about the experiences of Life Sciences teachers in respect of the support they received from the Department of Education through professional development. Through the provision of a set of complex interpretive practices (using more than one methodological practice), the researcher set out to construct knowledge through lived experience and through the researcher's interaction with teachers [30]. In this research, a qualitative research design was employed, focusing on participants' perspectives and experiences, and utilised tacit knowledge, intuitive and felt knowledge [31]. Since the aim of the study was to discern how Life Sciences teachers experienced ITT, a case study became the best approach for this research because its main aim is to provide an in-depth description of a small number of cases [32].

4.1 Sample

The population of the study was comprised of Life Sciences teachers (about 300) in the Bojanala District in the Northwest Province. Most of the schools in the district are in rural areas and, of the 96 schools having Life Sciences as one of their subjects, only about 35 are former model C schools with facilities to provide a conducive teaching and learning environment. In this study, the researcher used a purposeful sampling method to select 33 Life Sciences teachers. Ref. [33] states that "the logic and power of purposeful sampling lies in selecting information-rich

cases for in-depth studying". Only teachers who experienced the aforementioned policy changes participated in the study. Of the 33 participants, 19 were females and 14 were males because only participants who were willing to partake in the study were used. Owing to the fact that the majority of the participants were teachers who taught in rural schools, of the 33 participants, only one was white and one was Indian. All the participants held a diploma in teaching with Life Sciences as their major subject. Eighteen of the participants held a bachelor's degree while only two held an honours degree.

The researcher applied the ethical clearance process of informed consent, as well as ensuring privacy and confidentiality. Participants were informed about the nature and consequences of the research and their confidentiality was assured as the primary safeguard against unwanted exposure [30]. All participants signed a consent form, but they were also made aware that they had the right to withdraw from the study at any given point.

4.2 Data collection strategies

Two focus groups and 20 one-to-one interviews were employed to collect data. A semi-structured interview strategy was used in the face-to-face, one-on-one interviews and in the two focus groups because this technique allows the researcher to ask probing questions to explore in more detail what participants share [34, 35]. The interview questionnaire developed consisted of a list of open-ended questions that included follow-ups. The two focus groups consisted of six and seven members respectively.

4.3 Data analysis

The researcher engaged in thematic analysis of data using the Saldana method of qualitative analysis. Firstly, data were broken down into codes. Saldaña [36] describes coding as the "critical link" between data collection and their explanation of the meaning. Coding was thus done through the identification of patterns which demonstrated habits, salience, and importance in people's daily lives. Data were then categorised by grouping, reorganising and linking the codes in order to consolidate meaning. Finally, themes emerged from such categories and were used to discuss the findings of this research.

4.4 Research questions

The aim of the research is to discuss experiences of Life Sciences teachers regarding professional development activities that enhance learner participation in classrooms. The research question was thus:

What are the experiences of the Bojanala District Life Sciences teachers regarding the role played by professional development Programmes in enhancing the teaching and learning process?

4.5 Sub-questions

- Which ITT programmes did the Department of Education provide to empower teachers?

- How did these programmes contribute towards making the classrooms lively?

- What are teachers' requirements as far as ITT is concerned?

5. Findings

5.1 Life sciences professional support forum (PSF) meetings and teacher development

All participants declared that they attended workshops and meetings called Professional Support Forums (PSF). During the PSFs, which took place bi-monthly, Life Sciences subject advisors determined issues to be discussed. Due to the number of issues that must be tackled in such meetings, there is often no room for an "any other business" (AOB) agenda item that would allow teachers to raise additional matters. Even though the PSF's provide a good platform for discussion of challenges an individual teacher faces, teachers are unable to do so because subject advisors always have much to share with the teachers.

Participant A said: *we normally receive a circular from the district office inviting us for a meeting (PSF). Very often, we are denied the opportunity to add some crucial issues that affect the teaching and learning process in the agenda, e.g. my school has no laboratory and library so it is impossible for me to perform Life -Sciences experiments.*

The PSF's were used for various purposes – for example, they were used to find out how far individual teachers' were in their work schedules and in respect of the pacesetter for Life Sciences in different grades (Grade 10–12). They were also used to report on learners' performance. In such cases, a subject advisor would use a data projector to display the quarterly analysis of Life Sciences results in Grade 10–12. From there, subject advisors would request teachers to come up with intervention mechanisms and it would be these mechanisms, that the subject advisors would then use as a yardstick against which to measure individual teacher's performance during later school visits.

Participant B commented that, during the PSF's: *Subject advisors allow teachers to come up with ways to improve the implementation of policy and learner performance. During their normal routine of a school visit, subject advisors use those interventions to measure teacher implementation of policy.*

Once per quarter, PSF's were used for moderation of term tasks, namely a practical task and term test where teachers would bring along five learner portfolios for moderation. During the moderation, subject advisors would check whether marking had been done correctly and whether teachers had administered all term tasks.

Participant C said: *teachers themselves do the moderation and actually, no quality moderation is done. Most of the time, another teacher using a green pen makes a tick next to a red pen –so no quality work is done and teachers are not developed in this regard.*

5.2 Teacher workshops as ITT

Apart from the PSFs, ITT was provided in the form of workshops, though teachers declared that this did not happen frequently. Unlike the PSFs, which took place bi-monthly according to participants, only one or two workshops, were held annually. Only workshops that were used for empowerment in respect of a new reform took place over 3 days, while most other workshops were planned for 1 day, in this respect, just like the PSF's. Participants indicated that these workshops seldom met teachers' needs, because even though they were called content-gap workshops, subject advisors decided which content to empower teachers on.

Participant D said: *my subject advisor repeats one topic year in year out. There are new topics like evolution that we wish to be empowered on, but to no avail. It will be more beneficial to teachers when subject advisors inquire from them, which topics are problematic. Life sciences have new topics, which are new to me, I received no training in such topics during my college years. How I wish that our workshops can empower us on such topics, for example, evolution.*

Participants also indicated that the content-gap workshops became a one-man show because only the subject advisor was actively involved in imparting the information while teachers were a passive recipient of knowledge.

Participant E commented: *attending these content-gap workshops is as good as reading the textbook itself because there is nothing new, that the facilitator adds to the information in the book. Even after the workshop, I still do not understand the topic discussed, so even when the facilitator asks for questions, I am unable to ask questions because I did not understand anything.*

Participants indicated that the Advanced Certificate in Education (ACE) course that the Department of Education had introduced to help Life Sciences teachers in dealing with policy changes did not scratch the surface because the facilitators were concerned only with teaching methodology. The policy changes discussed above came with the introduction of new content, some of which teachers had not been trained on during their teacher training courses – for example, evolution. Most of the educators registered for the ACE course with the hope that it would empower them on such topics, but this hope proved to be in vain.

Participant F said: *the ACE course was predominantly about teaching methodology, not content. In schools without resources, it was impossible to apply such methods. What was worse is that the facilitators were Afrikaans speaking people who sometimes struggled to get proper English words to explain Life Sciences concepts.*

5.3 The contribution of professional development programmes to learner performance

Participants declared that most of the activities taking place during the ITT were not benefitting them or the learners. Some of the participants indicated that they liked the workshops because they used them as opportunities to interact with other teachers during lunchtime.

One participant (F) said: *during lunchtime, we share some good practices and after practicing them, my learners' performance improved. I have realised that teachers have the know-how and they can advise one another.*

According to the participants, the content-gap workshops left teachers unassisted in as far as the new content was concerned because it appeared that the subject advisors themselves lacked sufficient knowledge about what the new policies entailed. Teachers thus took the same fragmented information to the learners, leading to learner passivity during lessons.

Participant G said: *when subject advisors call us for a workshop to empower us on a new policy, they give us many handouts from their own workshops. When we ask questions about the new policy, they usually say they are also trying to get to grips with the new policy and that we must read the handouts.*

Participants also indicated that they experienced challenges with providing a conducive teaching and learning environment because the ITT did not prepare them adequately.

Participant H said: *I struggle to prepare and impart knowledge to learners because I have content-gaps and lack a good approach to teach new topics. My students are always passive and they do not seem to understand.*

6. Discussion

The findings of this research provided evidence that the South African Department of Basic Education (DBE) used PSF's and content-gap workshops to enhance professional competence [17] in teachers during the four policy changes

indicated earlier on. However, these ITT programmes had some shortcomings because they did not address the teachers' needs as envisaged. One reason for the failure of such programmes to address teachers' needs in the South African context was teachers' exclusion from a discussion on some of the innovations introduced in the curriculum [5]. Apart from giving teachers ownership of the innovations, allowing teachers to add their voices during curriculum innovations will inform well-planned ITT because, as posited by [24], teachers know their learners' needs. The exclusion of teachers from discussions about policy innovations left them incapacitated and thus affected their daily teaching and learning processes because they lacked the knowledge and skills [18] to deal with a changing cohort of learners. Since top-down approach was used to bring about changes in curricula [9], with politicians taking unilateral decisions on what to include and how to do it, such innovations left teachers with fragmented knowledge which professional development programmes also failed to address. When teachers have such fragmented knowledge, they lack the confidence [24] that is needed to make learners active and involved [3]. Lack of understanding of the new knowledge and prescripts of introduced policies led to teachers doing things the way they understood them and not the way they were designed to be done [9]. Thus, teacher confusion was transferred to the learners who responded by being passive during the teaching and learning process.

The duration of ITT contributed to creating teacher knowledge gaps in teachers. Participants alleged that, in respect of each of the policy changes, they had received once-off, three-day content-gap workshops. Unlike in most western countries where teacher training period is prolonged, and hence involves more content focus [21], participants declared that, after the ITT, they remained "empty" in as far as the new content and skills were concerned. This attests to what [24] said about teacher professional development, namely that teachers forget 90% of what is taught in a once-off ITT programme. For South African Life Sciences teachers to master the skills and knowledge of the new policies, they needed more than one content-gap workshop. According to [14], in constructivist learning theory it takes time to master a particular activity or knowledge. Participants indicated that, because of lack of sufficient time, they were denied the opportunity for collaborative elaboration [15] where they would have been able to share good practices – something that these teachers said was most beneficial to them. If teachers had been afforded the opportunity to share information in instances where they lacked certain resources (as was said by one participant), they could have been advised on how to improvise. Justice was not done to the new policies because participants indicated that the trainers (subject advisors) followed the traditional methods of delivering professional development, focussing more on theory and generic information [17]. In such ITT programmes, teachers became passive recipients of knowledge because the programmes did not allow them to have social interaction among themselves – something which [17] posited would make them active and able to master the new policy. Participants also indicated that the theory imparted to teachers did not include a discussion of new topics, such as evolution, which did not form part of their teacher training. This made teachers struggle to teach topics that were new to them. One participant also indicated that his subject advisor covered the same particular topic every time when there was a workshop. This sheds light on the fact that the subject advisors themselves have knowledge gaps. According to [14], teachers will, therefore, face a challenge as regards the planning of learning activities and methods able to engage learners' minds because such teachers are not fully empowered.

Participants reported observing knowledge gaps in the facilitators of the ACE certificate course which was meant to empower educators on the Life Sciences

content. To the teachers' dismay, the facilitators taught methodology only and were also not fluent in speaking the English language. This returns our attention to the earlier notion that teachers need to be part of all innovations so that they can determine the ITT activities that will be beneficial to them and to the learners. The ACE certificate course which served as a professional development intervention did not solve the content-gap problem because it did not so much as scratch the surface in as far as equipping teachers with the "know-how" and "know what" [12] was concerned. Teaching methodology without aligning it with a particular topic where, for example, teachers are allowed to develop lesson plans and do demonstration lessons or observe lessons, became a futile exercise. However, when teachers work as a collective to develop lesson plans and activities, they are more able to create a conducive teaching and learning environment.

The Life Sciences classrooms referred to in this study were thus not lively because teachers lacked the skills and knowledge to deal with learners of different cognitive levels and backgrounds. Learning was not contextual [14] in the sense that there was no individual attention, and this led to poor learner performance.

7. Recommendations

Based on the experience gained during this study, the following recommendations to education stakeholders are suggested:

- Teachers should play a pivotal role in determining policy innovations because they know the needs of learners.

- ITT programmes should not be a once-off activity, but a continuous process, which would allow teachers to gain additional insight into the new policies.

- Teachers should be the ones who decide on their own training needs and how they must be trained. Subject advisors must collaborate with teachers to select workshop activities and material.

- The professional development of teachers must focus on addressing content gaps and relevant teaching methods.

- During such training, teachers must be actively involved in designing lesson plans and must engage in demonstration lessons to empower one another.

8. Conclusion

The study has sheds light on the shortcomings of the professional development programmes provided by the South African Department of Basic Education. From the findings, it appeared that the in-service training of teachers, which focused on, equipping them with the necessary knowledge and skills to deal with a plethora of educational reforms, did not address teachers' needs. Even after interventions by the Department of Basic Education, teachers had gaps in their content knowledge which prevented them from creating a conducive teaching and learning environment. Lack of content knowledge prevented teachers from designing activities or tasks that would be learner-centred and thus would allow learners to be actively involved in their classes. Learners were thus passive, and this led to poor performance.

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