Instructional leadership sensemaking for science and maths in South African multi-deprived middle schools

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Sensemaking is pivotal in shaping organisational activities, such as instructional leadership actions in schools. This study used sensemaking to explore the outcome when two middle schools with similar multi-deprivation settings followed different instructional leadership enactment trajectories for science and mathematics. Two schools with effective and ineffective instructional leadership enactment strategies respectively were purposively selected from the same locality to participate in the study. Data were obtained through semi-structured interviews with 10 participants, as well as unstructured observations. Emerging data were analysed for content by means of the technique of constant comparison. The findings of the study indicate that, although multi-deprivation conditions have the potential to shape instructional leadership, schools can use sensemaking to forge unique practices that culminate in effective instructional leadership. Since ineffective sensemaking of instructional leadership generally characterises schools in multi-deprived settings, the findings of this study make it essential for districts to provide tools that support schools' effective sensemaking of instructional leadership.

Introduction

The concept of sensemaking, developed by Karl Weick, is useful for studying how people give meaning to their experiences (McNamara, 2015). Sensemaking acknowledges that people's experiences are evolving, ongoing and acquired through socialisation (Maitlis, 2005; McNamara, 2015). Experiences can be retrospectively organised into noticeable patterns and defined identities (Weick, 1995). Despite the ongoing and shifting nature of identity shaping in leadership, patterns of experiences can provide insights into implementation and enactment processes. Hallinger and Heck (2010) highlighted the uniqueness of trajectories followed by schools during the enactment of instructional leadership practices, which is an identifying tenet of sensemaking (McNamara, 2015), and recognised the role school background plays. Researchers have used the concept of sensemaking to examine school leadership processes qualitatively (Abrahamsen, Aas & Hellekjaer, 2015; Lee, 1991). This paper set out to understand what happens when two schools with similar multi-deprived conditions follow different trajectories of sensemaking in terms of instructional leadership for science and mathematics. Multi-deprivation is a social condition resulting from an accumulation of several domains of unmet needs, such as poverty, which is often characterised by the lack of resources (Noble, Zembe, Wright & Avenell, 2013). Some conditions of multi-deprivation in science classrooms manifest in the form of instructional strategies that do not support curriculum reform initiatives, thereby disadvantaging learners (Tsakeni, 2018). Multi-deprived schools face challenges that have the potential to affect teaching and learning processes negatively.

Sibanda (2017) suggested that some of the challenges in multi-deprived schools in South Africa have their roots in the period of apartheid, which was in place until 1994.

Therefore, the socio-economic status and historical backgrounds of schools are likely to influence instructional leadership practices (Govender, Grobler & Mestry, 2015; Visser, Juan & Feza, 2015). Multi-deprivation conditions, such as low socio-economic status and a lack of parental involvement, are generally associated with ineffective instructional leadership practices and lower learner achievement in science and mathematics in South Africa (Makgato, 2007; Ndlovu, 2011; Visser et al*.,* 2015). Similarly, Sibanda (2017) posited that some of the ineffective school leadership practices in South Africa are characterised by authoritarian tenets that limit participation by other stakeholders.

Although the general assumption is that schools with low socio-economic status and which accommodate learners from poor backgrounds are likely to experience negative instructional leadership practices, there are some exceptional cases in the South African context (Maringe, Masinire & Nkambule, 2015). Such exceptions confirm that, when schools follow unique instructional leadership pathways, it is possible to overcome the challenges they face, and effectively enact positive instructional leadership practices (Hallinger & Heck, 2010).

However, our understanding of the leadership theory based on such assumptions remains incomplete. Neumerski (2012) acknowledged that, at times, our understanding of leadership theory is compartmentalised, and we often focus on leadership roles. Neumerski (2012, p. 314) argued for more integrated approaches to examine instructional leadership practices in natural settings, because "the goal is not to move research to a more generic, abstract understanding of instructional leadership; rather, it is to develop a nuanced understanding that moves beyond compartmentalised sets of studies focusing substantially on roles".

This paper took an integrated approach to exploring how individual schools make sense of instructional leadership enactments, and the implications for teaching and learning. Instructional leadership practices are claimed to be more effective in schools where leadership is distributed among different people, than where particular individuals control power and take decisions on behalf of others (Fletcher, Grimley, Greenwood & Parkhill, 2012). Holistic approaches to the study of instructional leadership processes in schools take into account contextual factors and acknowledge all sources of leadership. Neumerski (2012) highlighted that a theoretical gap exists in that regard, and needs to be filled by integrated approaches to the study of instructional leadership.

This study has at least two theoretical implications; firstly, the findings contribute to the expansion of literature on holistic lenses to examine instructional leadership enactment. Secondly, we seek to understand the ability of schools to make sense of instructional leadership enactments beyond the influence of contextual settings. Hence, the choice of two schools within the same community, which experience similar levels of multi-deprivation and have learners from the same background. The implications of the study are situated in debates on promoting school improvement in science and mathematics at middle school level internationally, as highlighted by results of some international benchmark assessments, such as *Trends in International Mathematics and Science Study*

(TIMSS). In South Africa, middle school (Grades 7–9) is referred to as senior phase. We ask the following question:

> How do multi-deprived schools make sense of the instructional leadership enactment for Grades 7–9 science and mathematics?

Literature review

This study is underpinned by two overarching assumptions. Firstly, Diamond and Spillane (2016) contended that school subjects matter in the study of leadership. Instructional leaders, as coaches, have better chances of assisting teachers to improve if the leaders are knowledgeable about aspects of practice, such as teaching and learning challenges, pedagogies and content. The instructional leadership trajectories for science and mathematics are likely to be influenced by subject-context factors. Secondly, the holistic approach to studying instructional leadership acknowledges that several individuals contribute to the aggregate influence on teaching and learning at a school. This approach to school leadership is sympathetic to distributed leadership perspectives, as explained by Diamond and Spillane (2016). The advantage of distributed leadership is that leadership roles are "stretched over" a number of individuals (Diamond & Spillane, 2016, p. 148).

Robinson, Lloyd and Rowe (2008) identified five key leadership dimensions required for improved learner outcomes: (1) establishing goals and expectations, (2) strategic resourcing of materials and staff, (3) planning, coordinating and evaluating teaching and the curriculum, (4) promoting and participating in teacher development, and (5) ensuring an orderly and supportive environment for teaching and learning. One perspective is that these leadership dimensions can be implemented effectively when there is distributed leadership (Diamond & Spillane, 2016; Harris, 2004; Heck & Hallinger, 2009; Higgins & Bonne, 2011). As such, leadership practices that focus on positively managing teaching and learning for improved learner outcomes are known as instructional leadership (Bush & Glover, 2014). The leadership dimensions of Robinson et al. (2008) influenced our conceptualisation of instructional leadership for this paper.

The belief that effective instructional leadership practices translate into improved schooling drove our quest to understand the contribution made by existing practices to improve learning (Heck & Hallinger, 2009). Consequently, research efforts may use school improvement contexts, such as reading, science and mathematics, among others, to build on the instructional leadership theory (Fleisch, Schoer, Roberts & Thornton, 2016; Heck & Hallinger, 2009; Higgins & Bonne, 2011). In addition to building the leadership theory, placing instructional leadership studies in particular school improvement contexts promises practical implications, including the enrichment of our understanding of the kind of leadership required to improve selected learning areas. Similarly, Fletcher *et al.* (2012) examined school-wide strategies that supported effective instructional reading programs in five schools nominated for being successful in teaching reading in the upper primary school. School-wide strategies identified by this study hinged on the existence of effective literacy leadership, professional development for reading, school-wide

assessment for reading, strong knowledge of literacy pedagogy, knowledge of vocabulary, and comprehension.

Fleisch et al. (2016) explored a multidimensional instructional leadership approach and reported an improvement in numeracy skills of early-grade mathematics. They observed that the school improvement program used collaborative lesson planning, learner resources and teacher development to drive numeracy skills development. In addition, Heck and Hallinger (2009) assessed the impact of distributed leadership on school improvement and growth in learner achievement in mathematics, concluding that distributed leadership has a direct effect on a school's academic capacity, which, in turn, translates into an indirect effect on learners' mathematics achievement. Witziers, Sleegers and Imants (1999) also demonstrated how decentralisation of power from central management, and giving departments responsible for various subjects more power and responsibilities has the potential to improve educational outcomes. From the discussions above, it may seem that distributed leadership practices positively influence instructional leadership.

Distributed leadership spreads leadership roles among various persons and situations in the school (Diamond & Spillane, 2016; Higgins & Bonne, 2011; Seashore Louis, Dretzke & Wahlstrom, 2010) and allows for individuals abilities to be harnessed. The concept, however, negates the assumption that individual leadership positions, such as that of the principal, may sufficiently explain the instructional leadership processes in a school on their own (Witziers et al. 1999). Irrespective of this shortfall on principal leadership, existing literature highlights the important function principal leadership plays in the effective functioning of a school (Borden, 2011; Neumerski, 2012; Hughes, Matt & O'Reilly, 2015). In a case study on how deputy principals interpret distributed leadership in South Africa, Sibanda (2018) found that deputy principals perceived that it was important to involve teachers in leadership roles, such as instructional leadership. However, the deputy principals did not trust the teachers to be able to function effectively as instructional leaders. Sibanda (2017) recommended further studies to explore school leadership practices in the different educational contexts of South Africa. This study did just that, by exploring instructional leadership practices for science and mathematics in multi-deprived middle schools.

Sensemaking

We used the strain of sensemaking theory by Karl Weick, who introduced the theory to organisational studies for meaning making (McNamara, 2015). According to this theory, schools can be recognised as a form of organisation that embodies instructional leadership as one of the organisational activities. Langenberg and Wesseling (2016) argued that studying organisations through sensemaking bridges the gap between theory and practice, since it allows organisations to be studied as an activity. Sensemaking becomes a lens to study organisational activities, by exploring how people give meaning to their experiences (Maitlis, 2005; McNamara, 2015; Weick, 1995). Weick (1995) identified seven major tenets of sensemaking: (1) an understanding of ourselves as embodied in identity, (2) a retrospective of patterns of previous experiences, (3) an evolving and ongoing, (4) a social

process, (5) manifested through enactment, (6) based on plausibility and sufficiency as opposed to accuracy and completeness, and (7) made possible by internal meaning-making processes of cognition. Maitlis (2005) argued, furthermore, that sensemaking unfolds in four forms – guided, fragmented, restricted and minimal – during enactment processes, thus, supporting the assumption that schools follow unique pathways in implementing instructional leadership practices (Hallinger & Heck, 2010).

Method

This qualitative case study (Yin, 2018) used two middle schools (Grades 7–9, learners aged between 12 and 15 years) in the Tshwane West District in Soshanguve township, South Africa, as study sites; the schools were selected through purposive sampling. The two schools represented a bounded case from which thick and in-depth data were generated through semi-structured interviews and unstructured observations (Creswell, 2014). The interviews were conducted in the months of August and September 2015 and audio-recorded. The unstructured observations, which were conducted during the five visits at each of the schools, were used mainly to ensure that the criteria for the purposive sampling of the schools were always met. The schools are situated in close proximity in communities with low socio-economic status, they enrolled learners with similar cultural backgrounds and were categorised as no-fee schools, because they had previously been disadvantaged (Selod & Zenou, 2003). Although the schools received monetary and other resource allocations from the government, these were insufficient to redress their multi-deprivation conditions in the short term (Ocampo, 2004). We relied on word of mouth from the district officials to identify schools with effective and/or ineffective instructional leadership enactment practices. District officials, in turn, relied on their monitoring tools to inform their opinions (Borden, 2011; Fletcher *et al.*, 2012).

School A was identified as having ineffective instructional leadership enactment practices, while School B had effective instructional leadership enactment practices. Participation in the study was voluntary upon signing consent forms. Participants in School A were the deputy principal (School A DP), the head of department (HOD) for science and mathematics (School A HOD), a natural sciences teacher (School A NS teacher) and a mathematics teacher (School A mathematics teacher). Participants from School B were the principal (School B Principal), the deputy principal (School B DP), the HOD for mathematics (School B mathematics HOD), the HOD for science (School B science HOD), a natural sciences teacher (School B, NS teacher) and a mathematics teacher (School B mathematics teacher), making 10 participants.

The semi-structured interviews with each participant lasted an hour, and were conducted at the schools. The semi-structured interviews were loosely guided by themes on instructional leadership enactments by the principals/deputy principals, science and/or mathematics HODs, teachers and districts (see Appendix 1). The interviews also elicited data on how teachers used science and mathematics classroom practices to promote school improvement. The participants' responses in the form of narratives generated the textual data.

The data were analysed for content using constant comparison techniques, which allowed for inductive theme and concept building through abstraction (Gawlik, 2015). However, the initial template of the themes was based on sensemaking (relying on participants' meaning making of their experiences) and the instructional leadership conceptual framework, in order to ensure content validity (McCauley-Smith, Williams, Gillon & Braganza, 2015). Content validity was enhanced through direct engagement with participants and the context during the data collection process. The use of two schools with similarities enhanced the dependability of the comparisons, since this provided space to question the instructional leadership practices in place. Furthermore, sensemaking ensured the trustworthiness of the findings, which was based on the plausibility and sufficiency of the data, as opposed to accuracy and completeness (Weick, 1995). The themes that emerged are described in the following sections and are supported by the researchers, available literature and participants' narratives. The narratives are quoted verbatim, to give readers a good sense of the interview content.

Ethical clearance was obtained from the University of the Free State, the Gauteng Department of Education and the Tshwane West District education offices. Permission to conduct the study was also obtained from the school principals. Participants signed consent forms that emphasised their confidentiality and rights.

Findings

The constant comparison techniques allowed for inductive theme and concept building through abstraction and led to three main themes: (1) similar contextual settings for instructional leadership, (2) school-level sensemaking of instructional leadership enactment, and (3) the influence of distributed leadership on instructional leadership enactment.

Theme 1: Similar contextual settings for instructional leadership

The schools operated in the same district (Tshwane West in the Gauteng province of South Africa), had similar aspects of hierarchical instructional leadership configurations, and displayed similar multi-deprived conditions. The multi-deprived conditions included negative learner attitudes, negative teacher attitudes, unqualified teachers for science, insufficient resources for teaching and learning, and a lack of parental involvement.

Theme 1.1 District instructional leadership

At the time of data collection, the curriculum and assessment policy statement (CAPS) was in its fourth year of implementation; consequently, district-run teacher workshops to assist teachers to implement the syllabus were still a noticeable feature of instructional leadership practices. The deputy principal of school A appreciated the relatively new syllabus in the context of the CAPS document and efforts made to empower teachers:

> We are still on CAPS and we are actually implementing CAPS. We have moved from the NCS [previous National Curriculum Statement] now we are on CAPS. We are implementing the change … we have to attend some workshops on the process and on

> the curriculum as a whole; we also attend workshops that empower educators. I am actually attending the lead educators' workshop where we are trained on CAPS policies and curriculum and come and train other educators for the science subject.

The deputy principal of school A also acknowledged district-organised workshops as part of instructional leadership practices at the school. A mathematics teacher in School B corroborated this, by reporting on the impact of these workshops on classroom practice:

> It's two workshops per month for the whole day, where we discuss the topics for the coming term, so the workshops are mostly content related. We definitely do everything in those workshops and we also come up with new ideas on how we can make teaching easier.

When probed on the nature of assistance received from her subject advisor to supplement such workshops, the mathematics teacher for school B said, "She told us that we need to give the learners more classwork and homework. She told us that the learners need to be given homework every day". This demonstrates how the district used professional development workshops organised by subject advisors to assist teachers to make sense of and implement the CAPS curriculum in the classroom. Firestone and Martinez (2007) corroborated the positive impact of districts performing their duties in the domain of instructional leadership by procuring materials, monitoring improvement and developing the teachers, subject advisors and HODs.

Theme 1.2 School-based instructional leadership

Robinson et al. (2008) emphasised the role of positional leaders, such as principals and HODs, in maintaining order and support in schools. HODs emerged as important instructional leaders in both schools for being able to provide the expected support to teachers. School A's DP commented about the functions of HODs: "They are running their departments; they monitor class attendance … if the work is done … if the learners are coming to school and also the attendance of teachers". Such decentralisation has potentials for improved educational outcomes (Witziers et al*.,* 1999). The deputy principal monitored the HODs, as revealed by School A's DP:

> As the deputy principal you have to play a major role to make sure that curriculum is implemented in schools. You have to monitor the work of HODs whether they are doing their work of monitoring the teachers…whether they are following the curriculum and … implementing the assessment policy.

The HODs in School B had similar responsibilities that were summarised by the school's principal when she said:

> They should support and develop math and science teachers and instil the love of [for] mathematics and science subjects. They… make sure that the teachers and learners have resources that are needed in order to enable [facilitate] learning.

A teacher in school B believed that the instructional leadership roles of the principal and the deputy principal were similar to those of the HOD. This was revealed when the

teacher explained how the principal and deputy principal support teaching formally and informally:

> They [principals] also check our work and control our work just as the HOD does and some of the meetings that we hold are called by the principal especially for math because she also takes math very seriously.

It can be deduced from the explanation that the HOD, principal and the deputy principal worked hand in hand to monitor and support instruction in the two schools.

Theme 1.3 Multi-deprivation conditions

Multi-deprivation conditions were defined by a lack of parental involvement, inadequate resources – a challenge more pronounced in School A – unsupportive learners, and teachers' attitudes towards learning, as well as unqualified science and mathematics teachers.

The mathematics teacher at School B emphasised the lack of involvement by the school's parent community, who fail to give teachers much-needed support. In an attempt to enumerate challenges faced by the mathematics department, this teacher said,

> Learners do not want to work and they take math lightly and… end up hating math… also the big challenge is getting the parents involved in their children's education.

The HOD for science and mathematics in School A elaborated the resource-related challenge:

> [Regarding] resources, we have a big problem with resources and it has been going on for a long time. The other one is learner discipline and… transport but that one has been sorted.

The transport problem contributed to learners arriving at school late. The natural sciences teacher of School B elaborated on the impact of limited resources in her school as it affected science teaching:

> If the lab was 100% available for science teachers, it would be better because we as teachers have to go to the learners in classes, they do not come to us, so we do not have time to prepare the lessons in the labs. Other materials have to be the lab and you cannot take them to the classes, so that's the biggest challenge for science teachers.

The HOD for mathematics at School B highlighted that the impact of inadequate resources on teaching and learning was exacerbated by learner laxity – a contextual challenge that contributes to poor learner performance in mathematics:

> Our learners are not practising maths. Their performance level is very low and you always have to repeat the same thing many times before they can… understand it. They do not want to work. In the afternoon classes they do work but once they get home they just relax… their books prove it.

The natural sciences teacher's narrative for School A corroborated that learners did not demonstrate diligence in their schoolwork – a challenge that was compounded by teachers' negative attitudes. Unfortunately, there were no signs of instructional leadership by the HODs to change teacher attitudes positively, which would, in turn, enhance positive educational outcomes. She said,

> The attitude of the teachers is a big problem because it is affecting our working relationship, even the attitude of the learners; these learners do not like to write so you must always force them to write.

Teachers need capacitation to act professionally, and skills to motivate learners, however, there were no practical steps in place in School A.

Theme 1.4 Teacher qualifications

The principal of school B commented on the attitudes of teachers and the role played by qualifications:

> We also look at the qualifications of the teachers and their performance. A person might have all the qualifications only to find that they are not performing. People with the best qualifications at school level in most cases are a problem. They challenge some of the things with bad intentions and negative attitude.

The irony was that teachers with the best qualifications teach better than those with low qualification do, but the attitude problem was vice versa. The science HOD at School B noted that some science and mathematics teachers were not sufficiently qualified to teach the subjects. The HOD reiterated the challenge in a contradictory manner, as follows:

> I think the department does not have enough qualified science teachers, we have teachers who only did science in high school like me, but it's not a big challenge, but it is a setback some times.

Theme 2: Sensemaking at school level for instructional leadership enactment

Despite similarities in multi-deprivation, the schools followed different pathways regarding sensemaking of their instructional leadership enactment. Teachers at the two schools differed in the way they engaged and made sense of instructional leadership processes that were meant to support their professional growth and classroom practice. These differences were illustrated by three distinct themes – teachers' attitudes towards professional development, their focus on instruction, and collaboration.

Theme 2.1 Attitudes towards professional development

The teachers of school A had concerns about the impact of workshops facilitated by district officials, with contradictory opinions regarding its importance to their professional development and classroom practice. The mathematics teacher at school A believed that the district-organised workshops were not particularly valuable:

> To me I wouldn't say they are helpful, in most cases you find that the people who are facilitating… I feel at some point that I can do a better presentation than them. Some of them are not fit enough to teach us though they are trained but you find that some of them did not master the content.

In addition, the natural sciences teacher at School A believed that the workshops would be more useful if they were aligned with classroom contexts lacking teaching and learning resources: "It will be easy if these workshops could go hand in hand with resources, when we attend workshops they should also provide us with resources in order to make learning easier".

This shows that instructional leadership practices on the part of the districts did not align with the needs of schools. To the contrary, the natural sciences teacher at School B expressed that the workshops run by the district were useful. The teacher said,

> The ones from the district are more intense, they go deeper because they invite some of the teachers from the schools to share information so you end up learning some things you did not know about, but the ones in the schools we just share [ideas] among ourselves as colleagues.

The teachers of the two schools differed in the manner in which they made sense of professional development activities.

Theme 2.2 Focus on instruction

It also emerged that teachers needed to focus on instruction as a way of ameliorating the negative effects of multi-deprivations at their schools. The deputy principal of School A elaborated on how teacher absenteeism derailed classroom instruction and exacerbated existing challenges:

> Sometimes teachers can behave like children, you find that [the] teacher is in the staffroom when he/she is supposed to be in the classroom… you have to go to that teacher and check the timetable then talk to them informally and if it [the misconduct] persists you do it formally.

The science and mathematics HOD of School A concurred that teachers needed to change their classroom practices in order to assist the school to work collaboratively to achieve improvement. The HOD was dissatisfied with teachers' classroom practices, which were exacerbated by ineffective teaching methods. The HOD explained what he does in his department in terms of teaching mathematics and science:

> From the level of educators, my wish and my vision is [are] to see them doing things differently, for example in science we usually rely on textbooks only. I want to change that because as much as we don't have the materials and labs we don't have to be discouraged.

In contrast, the DP of School B explained the school's efforts regarding instructional leadership practices intend to intensify the focus on instruction, despite negative learner

attitudes. The school solicited help from two universities in the province to run mathematics and science improvement programmes to complement teacher efforts. She said:

> We are trying as a school to do our level best to make sure that our learners are getting the best education available. We put them into extra classes and we also seek outside help from math and science programs [at universities] to assist us with the teaching of those subjects… it has proven to be working so far because we are actually getting better results though it is not to the level that I would like but gradually we are changing for the better.

The DP of School B explained further, how the school used reassessment approaches to improve learners' grades after the remedial classes:

> Assessment is the core… if the learner fails I always tell the teachers to do something about that situation. Give the learner an expanded opportunity... a chance to do better... another test, assignment or even extra activities if needed to get that learner to perform better and not just give up on that learner, we should not be an underperforming school.

This comment explains the DP's efforts to make sense of instructional leadership practices further. Her explanation clarifies why, in contrast to teachers of School A, who were discouraged and despondent due to their multi-deprivation conditions, School B administrators were making sense of their experiences and intensifying their focus on instruction, which led to improved learner outcomes.

Theme 2.3 Collaboration

Sensemaking also occurs through social interactions among teachers and administrators (Weick, 1995). It was gleaned from teachers' narratives that science and mathematics department meetings at School A were not conducted as required. A mathematics teacher confirmed the irregular meetings and blamed the HOD for disregarding teachers' authority to call meetings. A mathematics teacher at School A explained, "[With regard to] departmental meetings we do it once a month but this year it was very poor, we did not have that much meetings". The teacher elaborated about subject meetings: "we were having them weekly but it has also been very poor on that point". This comment is evidence of limited instructional leadership practices at School A. The teacher elaborated on the reasons for the few meetings: "If you are a teacher you can't force other teachers to have a meeting unless you are given permission by the HOD". This reaction shows the lack of distributed leadership (Diamond & Spillane, 2016), which stifles individual initiatives that could contribute to improving learner achievement in mathematics.

Although the science and mathematics HOD of School A saw some improvement, the existing drawbacks that made things difficult were acknowledged:

> Comparing two years back and now I think the collaboration is improving. When I started as an HOD we had different groups, cliques and, it's not easy so sometimes, those cliques would make life difficult [because] there are frictions… I think this year was just smooth.

However, the story was different for School B, where the science HOD praised teacher collaboration and its impact on teachers who taught difficult topics. The HOD (a mathematics teacher) described how she took the lead to ensure this happens:

> Yes it is because I just consult my colleagues because some of them have specialised in it [mathematics] up to tertiary level. For example, during my presentation in the class you find that some of the things I cannot elaborate on them because I just use the textbook provided so I go to my co-worker and they will accompany me to class to explain those particular aspects to the learners.

Additionally, the natural sciences teacher of School B revealed how they prepared lesson plans collaboratively in the department. The science HOD of school B also elaborated on the nature of collaborations: "The lesson plans as well as some of the notes we do them together and the class works we try to do the same work". Narratives regarding collaboration indicate that teachers of School B were effectively making better sense of their experiences regarding instructional leadership than those of School A.

Theme 3: The influence of distributed leadership configurations on instructional leadership

As we compared and contrasted the instructional leadership practices, we noticed that, in addition to sharing the same socio-economic status, having learners with similar backgrounds, and the same access to the same district instructional support and similar hierarchical leadership structures, there were subtle differences in the enactment of school-based instructional leadership. The first observation was that, while School A had one HOD for science and mathematics, School B had two HODs, one for science and the other for mathematics. This difference is significant, given that learner enrolment and needs in these schools were similar. Secondly, the principal of School A had only been at the school for a month, because the previous principal had retired approximately a year ago. The situation compromised the principal's leadership level regarding effectiveness in enacting instructional leadership practices. This conclusion is evidenced by the principal's failure to interact with teachers, as elaborated by the natural sciences teacher, who said, "We haven't had any interactions with the principal because she has only been here for four weeks so there hasn't been that much interaction".

The situation at School A was different from that of School B; at School A, the principal's instructional leadership practices were visible through engagement with teachers and other management structures at the school. Whole-school evaluation meetings were scheduled and conducted by the school management team, which comprised the principal and the HODs. The principal of School B also practised instructional leadership through class visits, to ensure that the teaching was being conducted according to the expected standards. The principal said,

> I go to the classes… with the aim of seeing how learners perform but in most cases I go to math classes and after the class I will give feedback to the teachers on the areas in which they can improve on and I… do the same for science as well.

Contrarily, there were no principal class visits in School A, as confirmed by the natural sciences teacher in relation to what the DP does: "No she doesn't come to the classroom, what she does she comes to our office and our HOD's office when we have meetings to get feedback". This indicated limited engagement in distributing instructional leadership functions and a lack of collaboration in the school.

The mathematics and science teachers blamed the situation on the HOD for not convening department and subject meetings regularly and not doing enough to motivate teachers and learners. Regarding the kind of support expected from the HOD, the natural sciences teacher said,

> If he can arrange motivational sessions for science teachers and maybe teach us and the learners more about the importance of science because people do not realise how important science is in our lives.

Instructional leadership by school management was more effective and pronounced in School B, where there was greater interaction between the principal and the teachers, than in School A. This can be attributed to the fact that School B had two HODs, one for science and the other for mathematics, thereby spreading leadership over more individuals. School A's HOD struggled to convene meetings in the department and to facilitate collaboration among the teachers. In addition, the vacuum that had existed in the position of the principal in School A further constrained the spread of leadership.

In summary, the constant comparison analysis revealed that the two schools, though existing in close proximity and experiencing similar conditions of deprivation, engaged differently in sensemaking regarding instructional leadership. The differences in the way the schools made sense of instructional leadership were noted in the areas of professional development, focus on instruction, teacher collaboration, and the roles of positional leaders.

Discussion

This paper explored how two schools in similar multi-deprived school contexts made sense of instructional leadership enactment practices for Grades 7–9 science and mathematics. The theoretical implications are twofold. Firstly, the findings contribute to the understanding of school leadership theory through an integrated approach to instructional leadership sensemaking. Thus, we explored how the schools, and not individual positions in isolation, engaged in sensemaking of instructional leadership enactment (Neurmerski, 2012). The purposive sampling of two schools (one with effective instructional leadership and the other with ineffective instructional leadership enactment) that experienced similar socio-economic statuses reiterate our decision to view the process of sensemaking beyond the influence of contextual factors. The schools shared contextual factors, represented by multi-deprivation conditions in the form of unmet needs (Noble et al., 2013), with possible negative implications for effective instructional leadership enactments (Govender et al*.,* 2015; Rhodes & Brundrett, 2009;

Visser et al*.,* 2015). These implications included unsupportive teacher attitudes, lack of parental involvement, insufficient teaching and learning resources, and unqualified teachers.

Findings show that the assumption that conditions of deprivation negatively influence instructional leadership enactment was not a sufficient basis to predict the varied enactment trajectories followed by the two schools. Hallinger and Heck (2010) concurred with the notion that schools enact instructional leadership processes in unique fashions, irrespective of context. The findings of Hallinger and Heck (2010) suggested that, while contextual factors can fundamentally influence instructional leadership enactment trajectories, sensemaking may ultimately explain the unique pathways followed by each school and the implications thereof. The findings show how School B attempted, through instructional leadership enactments for science and mathematics, to achieve positive results. However, one may argue that the number of HODs and stable principal leadership gave School B an edge over School A. Maitlis (2005) revealed that there are different forms of sensemaking trajectories that organisational activity may uniquely guide and define. In the context of this paper, the instructional leadership enactment processes represent the organisational activity.

The second theoretical contribution is the ability of individual schools to make sense of instructional leadership enactment beyond the influence of contextual factors, in ways that differ from others with shared characteristics. In the context of South Africa, sensemaking could be used as a tool to circumvent contextual factors that inhibit teaching and learning, in order to refresh existing narratives that constantly bemoan the injustices of the past. The two schools had similar contextual challenges, but School B's effective instructional leadership enactment is evidence that the influence of multi-deprivation can be managed and minimised. The management of conditions of multi-deprivation was conducted through instructional leadership aspects of teacher collaboration (with both internal and external players), with a focus on instruction, improving teacher attitudes towards professional development, and involving more leaders, including the principal and deputy principal, to provide instructional leadership for science and mathematics. The fact that the principal and her deputy participated in science and mathematics lesson observations (not leaving this task to HODs only) enhanced interactions of instructional leadership and promoted distributed leadership. Teacher collaboration is closely linked to professional development and manifests through instructional leadership facets, such as leadership of teams, maintaining professional communities, collaboration, and peer coaching (Firestone & Martinez, 2007) – aspects more visible in School B than A.

School-based professional development that is meant to support teachers was compromised in School A, because the HOD for science and mathematics did not facilitate teacher collaboration. Meanwhile, in School B, the principal was more active in instructional leadership enactment, by engaging in lesson observations and facilitating whole-school evaluation meetings. Distributed leadership in School B, where portfolios were distributed among more individuals, supported effective instructional leadership enactment (Diamond & Spillane, 2016; Higgins & Bonne, 2011; Seashore Louis et al., 2010). Neumerski (2012) concurred by emphasising the role of positional leaders, such as

principal and teacher leadership, in facilitating positive instructional leadership practices. The limited distributed leadership at School A exacerbated its multi-deprivation conditions and increased its negative influence on the enactment of instructional leadership components. The circumstances in School A resulted in unmet instructional leadership needs, leading to reduced focus on instruction, as teachers failed to always attend classes. In contrast, teachers at School B engaged in actions that contributed to effective engagement in the classroom. Focus on instruction is indispensable for improving learner outcomes in multi-deprived schools (Maringe et al*.,* 2015). Relentless efforts to intensify instruction are also an indication of effective instructional leadership (Bush & Glover, 2014).

This study has practical implications, because the way teachers and school leadership interact between and among themselves has direct implications on how science and mathematics are taught and understood and, consequently, learner outcomes. The case of School B in this regard cannot be overemphasised. Through sensemaking, schools can establish leadership practices to circumvent challenges posed by conditions of multi-deprivation and improve learner engagement in science and mathematics. The findings, therefore, contribute to ongoing discourses on ways of improving Grades 7–9 science and mathematics in schools affected by multi-deprivation conditions, especially in the context of South Africa. The impact of development workshops on School B indicates that districts need to be more practical in terms of their instructional leadership practices. This can be achieved by including interventions that aim to improve the sensemaking of instructional leadership components at individual schools, such as teacher collaboration, professional development, a focus on instruction and the roles of positional leaders. Recently, South Africa has initiated programs to digitalise classrooms as one way to mitigate multi-deprivation in classrooms. Such approaches may help to activate sensemaking among teachers and administrators, and lead to more effective enactments of instructional leadership at schools, such as School A in this study.

Conclusion

This paper explored instructional leadership practices in science and mathematics at two multi-deprived schools in the same locality. The intention was to understand how schools, even when located in the same locality and sharing experiences and characteristics, could take different sensemaking trajectories and in one case ameliorate existing challenges to ensure improved learner outcomes. Findings show that schools, irrespective of their challenges, were capable of changing their circumstances by engaging in effective sensemaking of their experiences and circumstances. This sensemaking is in line with the South African CAPS curriculum transformation agenda for previously disadvantaged groups through education. The curriculum supports the integration of indigenous knowledge systems in science and mathematics in order to make these subjects relevant to learners. However the CAPS does not specify how this can be achieved, thereby leaving it to the schools and teachers to decide. Engaged distributed leadership practices, teacher collaboration, and active learner engagement, frequent class visits, inclusion of external players and putting into practice knowledge gained from workshops are some of the

measures schools can use to change their challenges into opportunities. These measures enabled School B to have an edge over School A.

Acknowledgements

We acknowledge the support provided by the South African National Roads Agency Limited (SANRAL) Research Chair at the University of the Free State for the completion of this project.

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Appendix 1: Semi-structured interview schedule for teachers, HODs, principals and deputy principals

1. Establishing goals and expectations for science and mathematics teaching and learning

1.1 What is the school's vision for the teaching and learning of (i) science and (ii) mathematics?
1.2 Who participates in developing the vision for science and mathematics?
1.3 What is your role in meeting the goals and expectations of science and mathematics teaching and learning?

2. Availability of material and human resources for science and mathematics teaching and learning

2.1 What support structures are in place for the effective teaching and learning of science and mathematics?
2.2 What kind of support is provided by (i) teachers, (ii) HODs, (iii) deputy principals, (iv) principals, (v) the District, (vi) the parents and (vii) other stakeholders?
2.3 What are the facilities and materials available for the teaching and learning of science and mathematics? Are these facilities and materials sufficient? What other facilities and materials do you wish could have been available for science and mathematics teaching and learning?

3. Planning, coordinating and evaluating the teaching and learning of science and mathematics teaching and learning

3.1 Have you recently attended any meetings to plan for science and mathematics teaching and learning? Who chairs these meetings? What was discussed in the planning meetings? Who usually participates in the planning meetings for science and mathematics teaching? What are the role of the different participants?
3.2 Who coordinates the teaching and learning of science and mathematics in the (i) school and (ii) district? Who are the individuals who coordinate the teaching and learning of science and mathematics?
3.3 What is the role of the (i) teachers, (ii) HODs, (iii) deputy principals, (vi) principals, (v) the district and (vi) other stakeholders in monitoring of science and mathematics teaching and learning? How is teaching and learning monitored?

4. Participation of in teacher development for science and mathematics teaching and learning

4.1 What professional development activities are available for teachers to support science and mathematics teaching and learning?
4.2 Who facilitates the professional development activities for the teachers?
4.3 How frequent are these professional development activities?

4.4 How do these professional development activities promote the teaching and learning of science and mathematics?
4.5 What nature of development do teachers receive during the professional development activities?

5. Ensuring an orderly and supportive environment for the teaching and learning of science and mathematics

5.1 How is an orderly and supportive environment for the teaching and learning of science and mathematics achieved in the school?
5.2 Who is responsible for ensuring an orderly and supportive environment for the teaching and learning of science and mathematics?
5.3 What are the threats to an orderly and supportive environment for the teaching and learning of science and mathematics in the school?

6. Concluding remarks

6.1 Provide a summary of the successes and challenges that influence effective science and mathematics teaching and learning in the school
6.2 Is there anything else you would like to add before we close the interview?

Thank you very much for consenting to participate in this study.

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Please cite as: Tsakeni, M., Munje, P. N. & Jita, L. C. (2020). Instructional leadership sensemaking for science and maths in South African multi-deprived middle schools. *Issues in Educational Research,* 30(1), 345-364. http://www.iier.org.au/iier30/tsakeni.pdf