

Followership and sustainability of school leadership for Science and Mathematics: A distributive perspective

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(Received 21 February 2017; 26 June 2017)

Abstract

In leadership-followership relationships, roles are exchangeable, portraying followers as co-constructors of school leadership processes. Leadership literature largely focuses on the effectiveness of leaders and neglects the role of followership. The purpose of this study was to explore the role of followership in the construction of leadership processes for secondary school Science and Mathematics. We used a narrative inquiry in the form of a single school case study purposefully selected for being a top performing school in Physical Sciences and Mathematics. Narratives were elicited from seven participants who included positional leaders and teachers. Follower role identities and the leader-follower trade (LFT) were used as conceptual frameworks. An active follower role identity enabled teachers to co-construct and sustain leadership processes for Science and Mathematics. Significant teaching experience, subject expertise and proven records of good results in learner attainments activated the identity. The teachers co-constructed and sustained leadership processes for Science and Mathematics through participative leadership, continuous teacher learning and classroom practice.

Introduction

Secondary school Science and Mathematics face unique challenges when it comes to meeting the goals of total number of learners enrolled for the subjects and learner achievement. Learner outcomes in Science and Mathematics have perennially dented many South African secondary efforts at school improvement. Learner enrolment and achievement in these subjects are uniquely and adversely influenced by a myriad of contextual factors stemming from the schools' socio-cultural and historical backgrounds (Maree, Aldous, Hattingh, Swanepoel, & Van der Linde, 2006; Cho, Scherman, & Gaigher, 2014; Maringe, Masinire, & Nkambule, 2015; Visser, Juan, & Feza,

2015). The contextual factors include a lack of parental involvement, impoverished conditions, staff instability and poor time management, reduced focus on instruction and narrow school improvement interventions that are sorely confined to the classrooms. Enhanced learning is at the heart of school improvement efforts (Hallinger & Peck, 2010).

Poor school leadership practices are specifically singled out as one of the major obstacles to school improvement in South Africa (Van der Voort & Wood, 2014; Govender, Grobler, & Mestry, 2015). In international literature, it has become a mantra that school leadership practices are second only to classroom practice in directly influencing learning (Leithwood, Harris, & Hopkins, 2008). This scenario places a huge accountability responsibility for school improvement on the school leadership. However, leadership is not just about the leader, but a relationship between the leader and the follower (Hollander, 1992; Kellerman, 2007; Malakyan, 2014). A growing body of literature has begun recognising the critical role played by followers in constructing and sustaining leadership processes (Malakyan, 2014; Uhl-Bien, Riggio, Lowe, & Carsten, 2014; Alvesson & Blom, 2015; Mannion, McKimm & O'Sullivan, 2015; Starbuck, 2015).

This study was conducted against a background in which the role of the follower in the leader-follower relationship has largely been understated in leadership theory and research. Leadership processes have notably been understood from leader-centric perspectives (Starbuck, 2015). There has also been a stigma attached to the follower role and a misconception that leadership is more important than followership (Bjugstad, Thach, Thompson, & Morris, 2006; Starbuck, 2015). In the leader-follower dichotomy that resulted, the role of the leader has been regarded as more active than the role of the follower (Alvesson & Blom, 2015). The undermining of the role of the follower may have arisen from some conceptualisations of followership. Kellerman (2008) defines followership as a rank characterised by less influence, power and authority than a leader.

The portrayal of the leader role as more influential to organisational development is closely associated with designating leadership positions to individuals who would be in charge of steering change. Since leadership is regarded as an act of exerting influence, the implication is that organisational development is largely attributed to the actions of the leader. However, follower-centric approaches assert that leadership results from mutual influence between a leader and a follower (Mannion *et al.*, 2015). In a clear

illustration of leadership as a relationship between a leader and a follower, Kellerman (2007, p. 1) asserts that, “there is no leader without at least a follower...” Martin (2015) agrees that the leader-follower relationship is at the heart of effective leadership. Although the leader may be in command of more authority, the follower has the ability to impede or promote the leader’s actions (Hollander, 1992). Leadership thrives on enabling follower identities, characteristics, styles and role orientations (Kellerman, 2007; Martin, 2015). These follower identities will be discussed in the literature review section.

The discourses in school leadership research recognise the crucial role played by individuals occupying lower ranks (followers) in schools. However, the follower role in the construction of leadership has been understood through leader-centric perspectives such as distributed leadership, instructional leadership and teacher leadership. On the influence exerted by leadership practices on learner performance, the literature on distributed leadership perspectives highlight that it is exercised by various role players in schools (Louis, Dretzke, & Wahlstrom, 2010; Higgins & Bonne, 2011; Diamond & Spillane, 2016). This assertion departs from the view that principal leadership may solely influence learning. Distributed leadership perspectives have been able to demonstrate that positional leadership practices do not explain all the observed school improvement through enhanced learner achievements (Sulleyman, 2015).

As one of the foci for school improvement, science and mathematics learning has been put in the spotlight. Local reports and international benchmarks such as TIMSS portray learner performance in Science and Mathematics as very poor (Department of Basic Education, 2014, 2016; Ndlovu, 2011; Noyes, Wake, & Drake, 2013; Cho *et al.*, 2014). The poor learner performance in Science and Mathematics reflects at a time when internationally governments are working to improve citizens’ participation in Science, Technology, Engineering and Mathematics (STEM) to support the growth of economies (Clothey, Mills, & Baumgarten, 2010). Secondary school Science and Mathematics form part of the gateway subjects. However, these subjects are characterised by relatively low enrolments and reduced learner attainment (Maree *et al.*, 2006; Ndlovu, 2011). Accordingly, there is a noted scarcity of skills in the fields of STEM in most countries including South Africa (Watt, Richardson, & Pietsch, 2007).

The use of follower-centric approaches to study leadership processes has theoretical and practical implications. Sy (2010) propounds that a follower-

centric approach makes the understanding of leadership theory more holistic. The practical implications are based on the understanding of traits that characterise the best follower (Sy, 2010; Martin, 2015). We use a follower-centric approach to explore the leadership processes for the teaching and learning of Science and Mathematics in one top performing secondary school in Bloemanda Township in the South African city of Bloemfontein. We ask the question: *how does the role of the follower co-construct and sustain leadership for secondary school Science and Mathematics?* The study findings will contribute to the growing literature on follower-centric approaches to explain leadership processes. Furthermore, the study has practical implications in the debates that develop ideas on leadership practices for school Science and Mathematics. We consider the science and mathematics teachers as followers and the two terms may be used interchangeably.

Literature review

The democratisation of the workplaces has resulted in the empowerment of followers who according to leader-centric lenses had fewer prerogatives to discharge leadership functions. Through the leader-centric lenses, the individuals occupying lower ranks in an organisation have the duty and obligation to follow their leaders. Bjugstad *et al.* (2006, p. 304) define followership “as the ability to effectively follow the directives and support the efforts of a leader to maximise structured organisation”. Despite the notable leader-centric approaches to explain organisational behaviour, literature recognises that leaders cannot act independently without the support of followers (Starbuck, 2015; Monzani, Ripoll & Peiro, 2015; Mannion *et al.*, 2015). Alversson and Blom (2015) posit that effective leaders enjoy the support of a willing followership. Monzani *et al.* (2015) further say that leaders, who are willing to involve followers in goal setting, give them a voice and an opportunity to provide input about the tasks they have to perform. The implication is that effective following can be as a result of participating in leadership processes.

Some of the leader-centric perspectives of leadership such as distributed leadership and teacher leadership are a clear testimony of the recognition of the follower role in the construction of leadership. In distributed leadership set-ups, leadership is decentred and spread among various individuals in the

school including teachers (Firestone & Martinez, 2007). Similarly, the concept of teacher leadership recognises teachers (followers) who are in charge of leadership responsibilities. The leadership tasks performed by teachers include using classroom practice to promote school improvement goals, owning change processes by being part of participative leadership processes, acting as experts and sources of information and participating in teacher learning processes (Harris, 2003).

After synthesising the growing literature that calls for a shift from explaining organisational processes through leader-centred perspectives to include follower-centred perspectives, Uhl-Bien *et al.* (2014) identify two strands of research focused on followership. One of the strands is based on the role theory approach, which is a reversal of the lens of studying leadership processes by focusing on aspects such as follower role identities, follower role characteristics and style and follower role orientations. The other strand is the constructionist approach or “the leadership process” (Uhl-Ben *et al.*, 2014, p. 99) in which leaders and followers co-construct leadership when all of them may have occasions to assume leadership or followership roles. Malakyan (2014) refers to the constructionist approach as the leader-follower trade (LFT). We used both follower role identities and the LFT as conceptual frameworks in this study.

Follower role identities

Sy (2010) highlights a theoretical implication for the integration of followers as a focal point in leadership research. Our understanding of leadership becomes more holistic. Sy (2010) further illustrates through the example of how the research focus on follower identities complements research on leader cognitions of followers. Leaders may perceive followers in terms of metrics such as industry, competence, conformity, enthusiasm, insubordination and good citizenry (Sy, 2010; Martin, 2015). Similarly, Kellerman (2007) highlights the importance of the follower role in sustaining leadership by characterising follower role orientations. The author advances four followership typologies. Firstly, the Kellerman model uses one metric to define followers as either active or passive. Kellerman (2007) further identifies a second model by Abraham Zelenik. The model also uses one metric to describe followers as either possessing self-initiative or lacking self-initiative. Thirdly, the Robert Kelley model typifies followership as alienated, passive, conformist, exemplary and pragmatic. Lastly, the Ira Chaleff model

characterises followers as implementers, partners, individualists and resources. The typology serves to support the idea that followership identities sustain leaders by shaping their attitudes, behaviours and effectiveness (Uhl-Bien *et al.*, 2014).

Leader-follower trade (LFT) approach

Based on the concern that the use of leader-centred literature is concerned with the effectiveness of the leaders while neglecting the role of followership in the process, we used the LFT approach (Malakyan, 2014) as another lens to explore leadership processes for science and mathematics teaching and learning. The LFT approach proposes that leaders and followers co-construct the leadership processes (Uhl-Bien *et al.*, 2015). The co-construction is made possible because leadership and followership are regarded as roles that are exchangeable (Malakyan, 2014). Leaders and followers experience mutual influence in such a way that leadership is shared (*ibid*). The task determines the leader. Malakyan (2014) further points out that leaders and followers can co-construct the various leadership typologies. Applied to a school set up, school leaders and followers (teachers) co-construct the leadership functions. These functions include the managerial, instructional, transformational, distributed, moral and authentic, contingent, systems and teacher leadership for school improvement as mentioned in Bush and Glover (2014).

The challenges of poor learner achievement in secondary school Science and Mathematics accompanied by reduced learner enrolments in these subjects are a situation that calls for all stakeholders to act. Zhang, Wang and Shi (2012) assert that the ever changing and competitive environments that characterise organisations call for employee initiatives. Similarly, the constantly changing curriculums and calls for accountability due to high-stakes testing environments in schools call for teacher initiatives. To reiterate the point above, Mannion *et al.* (2015) posit that in times of crisis, instability and constant change, followers need leaders as much as leaders need followers. Similarly, we view the current challenges in science and mathematics education as a crisis in which leaders and followers need each other.

Methodology

The primary aim of this study was to use a follower-centred approach to explore how the role of the follower co-constructs and sustains leadership for secondary school Science and Mathematics through a qualitative case study. We were able to “study things in their natural setting attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them” (Denzin & Lincoln, 2003, p. 5). Again, within the context of a qualitative study, narrative inquiry was applied to explore how people make sense of their lives by selecting and arranging information about noteworthy episodes (Cousin, 2009). Therefore, we gathered data from positional leaders and the followers (teachers) about their lived experiences and working relations in order to “crystallize or define an issue, view, stance or perspective” (Cohen, Manion & Morrison, 2011, p. 553)

This study was part of a wider research project on instructional leadership for Science and Mathematics in the Free State province. The use of purposive sampling techniques to select one secondary school was based on the need to identify a data rich case study for the purpose of the research. The single school selected also represented a case to allow for an in-depth study. The school was located in an impoverished and predominantly black township of Bloemanda in Bloemfontein, South Africa. Despite the impoverished conditions, the school was one of the top performing schools in Physical Sciences and Mathematics in the Free State province. Some study findings associate the impoverished socio-economic status of schools with poor learner performance and reduced enrolments in Science and Mathematics (Maree *et al.*, 2006; Ndlovu, 2011, Cho *et al.*, 2014). We were keen to explore how the leadership processes for science and mathematics learning were co-constructed and sustained in the school.

After obtaining informed consent from the prospective research participants in the school, we went ahead to elicit narratives from the principal, the vice-principal, the head of the science department (who taught Physical Sciences), one physical sciences teacher and three mathematics teachers. The mathematics head of department (HOD) was not available for the interviews. The vice-principal did not wish to be audio-recorded as we interviewed her. We respected her wishes and documented the interview as field notes. The teachers were assigned pseudonyms. Joe was the physical sciences teacher. The mathematics teachers were assigned the names Tim, Rose and Mandy. We did not assign pseudonyms to the positional leaders but refer to them

using their positions. The interviews explored the experiences of the teachers and the positional leaders in the construction of leadership practices for science and mathematics teaching and learning in the school. No parameter was placed on the length of the narrative or the structure and type of experience described. The content analysis of the narratives was conducted by using a recursive approach that was used to identify the recurring themes in the narratives. The trustworthiness of the study was ensured by systematically building the arguments in the findings from the data. Furthermore, the findings of the study were developed through the triangulation of data from several participants. We used the themes to identify the emergent episodes that we used to construct the school's story.

Findings of the study

After subjecting the data to content analysis four themes emerged. The findings of the study are therefore presented under the four themes below.

Theme 1: Teachers lead by engaging in participative leadership

The tone of the leadership in the school was set for us by what the vice-principal said. We could not quote her verbatim since she declined to be audio-recorded. She indicated that the top management of the school upheld the principles of democratic leadership. Important decisions for teaching and learning were arrived at by reaching a consensus. Firestone and Martinez (2007) point out that democratic leadership is a quasi-synonym of distributed leadership. The approach works to decentre the leadership tasks in the school by granting teachers increased authority and autonomy (*ibid*). Accordingly, under distributed leadership practices the power gap between the leaders and followers is minimised (Malakyan, 2014). The vice-principal pointed out that the teachers were informed of what is expected of them in staff meetings, which we interpreted as a goal-setting exercise. Monzani *et al.* (2015) assert that if goals are set in a participative way, the followers provide their input on how the tasks should be carried out. The vice-principal described HODs as the 'anchors' of the school. They were tasked with monitoring syllabus coverage by using the pacesetter instruments and adhering to the policy. This is further evidence of how leadership was decentred in the school.

The democratic leadership principles were practised alongside managerial leadership functions. The vice-principal mentioned that some meetings with teachers were used as accountability sessions whereby individual teacher performances were discussed by analysing results and mapping a way forward. This was evidence of how the managerial leadership was used to influence classroom improvement by the positional leaders. Managerial leadership focuses on people's functions and behaviours (Bush & Glover, 2014). In these accountability sessions, we noticed that teachers played the leadership roles for science and mathematics education whilst the other members of staff, including positional leaders, played the role of followership. The HOD for Mathematics and Accounting (who specialised in Accounting) relied on the mathematics subject leader, Tim, to influence classroom practice. We figured out from the interview excerpt below that even the top management relied on Tim for leadership in mathematics education in the school.

Interviewer: What interactions do you have, as a subject head, with the principal and vice principal?

Tim: I report to them every term on the progress of the teachers.

This was clear evidence of the LFT at play (Malakyan, 2014), whereby followers and leaders co-construct the leadership processes. The leadership roles become exchangeable. The task to lead mathematics teaching and learning was performed by Tim and the rest of the individuals in the school played the role of followers.

As a subject leader, Tim was very clear about the vision of the school concerning the teaching of mathematics in the school. He was in charge of making sure that the vision is achieved and the other mathematics teachers assisted him by being active followers (Kellerman, 2007). Developing and maintaining a vision is a leadership task (Firestone & Martinez, 2007; Robinson, Lloyd & Rowe, 2008). We surmised the following from the interview excerpt.

Interviewer: As a leader with a vision, how do you prompt changes and make sure people buy the ideas that you have been mandated to pass to them? How do the teachers respond?

Tim: Mathematics is a very challenging subject it doesn't matter where in the world you go. Our long-term goal as a school is to get every learner to do Mathematics. We also have yearly goals of achieving at least more than 80%. The teachers do their part and we work very

well together. I sometimes don't even feel like I am their leader as they always push themselves and do their part. They make my work very easy.

In the above excerpt, Tim began to describe the follower role identities of the other mathematics teachers which we follow up in the next theme.

Theme 2: Follower role identities sustaining leadership for science and mathematics learning

The teachers displayed particular follower role identities that enabled them to take part in the leadership processes for Science and Mathematics. Alvesson and Blom (2015) posit that effective leaders are complemented by a willing and supportive followership. The principal of the school praised the teachers for their commitment. The principal said:

I would also like to say we are very fortunate that we have very dedicated teachers, very young mathematicians, they go all out. Sometimes they have classes from Monday up until Sunday to try and bring out the best from learners, sometimes to try and close the gap from primary to secondary school. We have been doing very well in Mathematics and Physical Sciences, we have a very great teacher of Physical Sciences with a lot of experience and he is doing very well.

Another excerpt from Tim's narrative revealed that teaching experience was vital for teachers to be placed in strategic leading roles to support school improvement through classroom practice.

Interviewer: What do you consider when allocating teachers to grades?

Tim: We meet to discuss allocation with the five teachers in my department. I prepare a draft plan myself before then engage with teachers on it. I usually put the more experienced teachers in grade 12 and the newer ones in the lower grades and give them an opportunity to progress as the years go by.

Harris (2003) confirms that teachers practise leadership through classroom practice. We were able to identify another criterion that allowed teachers to exercise leadership roles. The HOD for Science mentioned that 'performing teachers' were asked to mentor other teachers who looked up to them for

guidance. ‘Performing teachers’ were teachers who consistently achieved good results. He said:

We also have sessions here at school where we ask the performing teachers to share their ideas with other teachers. We do try to create the environment where teachers are able to come together and share ideas.

The interview excerpt below confirms that mathematics teachers engaged in similar exercises. We could also surmise why, in the configuration of school leadership, there was sometimes a need to appoint a subject leader. The existence of the mathematics subject leader is evidence of follower participation in leadership necessitated by the HOD’s lack of expertise. Below is the interview excerpt.

Interviewer: How easy or difficult is it to get any other assistance that you need with the teaching of Maths? For example from the people in the school

Rose: We have a good team here in the school, we work together and assist each other with solving problems. We all use this room.

Interviewer: Is your HOD also using this room?

Rose: The subject head, a senior teacher, also uses the room. We do have an HOD who oversees everything in Maths and Accounting but he specialises in Accounting. So we report to the Maths subject head and he will liaise with the HOD.

Interviewer: What is the role of the subject head in the school?

Rose: His duties are the same as the HOD’s, if we need anything for example resources we just tell him.

Rose seemed to imply that the mathematics subject leader was considered for the position based on seniority and experience in addition to expertise. Higgins and Bonne (2011) highlight the importance of school-based expertise in supporting instructional leadership efforts. Harris (2003) mentions that teachers exert influence on other individuals by displaying expertise and as sources of information. Tim’s follower identity in terms of expertise in Mathematics put him in a better position to lead the subject than the HOD. Teachers may perform leadership roles when the situation demands. Mannion *et al.* (2015) agree when they say that in times of crisis and instability leaders need the support of followers. To support Rose’s claims that Tim’s roles were similar to that of a positional leader such as an HOD, Mandy, another mathematics teacher, described her interactions with Tim as follows:

Interviewer: Who supervises your work as a teacher?

Mandy: The subject head. He takes learners' books and he also moderates tests.

Interviewer: Do they come to classes to observe?

Mandy: Only when we have IQMS [Integrated Quality management Systems].

Additional to being willing and supportive, the teachers displayed follower role identities that could be described according to teaching experience, expertise and proven record of good results in learner attainments.

Theme 3: Teachers lead by engaging in professional learning communities (PLCs)

From the teachers' narratives, we managed to glean more insights on some leadership processes that influenced classroom practice in Science and Mathematics. We established that the teachers organised themselves in teams. The members of the team collaborated and worked together to ensure that teaching and learning became effective. Responding to the prompt that sought to establish the source of influence in science teaching and learning, Joe – a physical sciences teacher – said:

We work as a team and assist each other at all times. Learners do not feel the gap even if one of us is not present.

The science HOD corroborated what the physical sciences teacher said. He said:

Science HOD: We also bring expertise from outside, if there is a teacher in another school then we bring them in to assist and also assist them where we can.

Interviewer: Are these other schools in your cluster or people you know personally?

Science HOD: Its people we know personally, we form relationships with other teachers at workshops and learn from them. The learning facilitators are also very helpful. They make sure they present new topics to us.

Firestone and Martinez (2007) describe teamwork and team building among teachers as a strategy of teacher leadership. The authors further describe teacher leaders as peers who have no authority over other teachers. We

contend that if teacher leaders are peers who have no authority over other teachers then they can still be referred to as followers in relation to positional leaders in the school. Joe further revealed that the nature of collaboration that took place within the teams enabled continuous teacher learning. One of the prerequisites for successful instructional leadership is teacher participation in continuous professional development and continual inquiry into practice (Robison *et al.*, 2008; Sun, Penuel, Frank, Gallager, & Youngs, 2013). Joe shared the successes of the team activities in the following excerpt from his narrative:

In the Free State we have reached a stage where we own Science now. It's not just a career anymore but a way of life. I am part of a forum that consists of eight science teachers. We get together and discuss all matters relating to the subject every day. We are constantly challenging one another and growing each other. We do winter classes, we assist the department with important projects etc. In this forum we have our LFs [learning area facilitators] as part of us. Sometimes when we have camps we call them in and assist with certain topics because of late we have a problem of learners not wanting to listen to one person the whole year, so bringing other experts tends to help.

The team comprised of teachers from a cluster of schools and it included one district official whose designation was that of a learning area facilitator. The use of systems leadership enables teachers from clusters to learn from each other (Bush & Glover, 2014). We noted that the teacher teams operated at two levels, namely cluster and same subjects within the school. The continuous teacher learning activities included inquiry into practice to ensure improved learner outcomes. Joe revealed this in the following interview excerpt:

We always have common tests per term or sometimes monthly, for example we have six topics per paper, learners write, we mark the papers and do error analysis. We then establish focus areas for example if learners are struggling with projectile motion and it is a common problem, it is then established that the problem is not with the learners but maybe with the teachers. We sit down as a cluster and find the best way to present it to the learners. We learn from one another because even if you know the content the way you deliver it is very important.

The inquiry into practice process is one way of ensuring an improved classroom.

Theme 4: Teachers lead by using classroom practice to support school improvement goals

The identification of teachers as subject experts, experienced and consistently ensuring enhanced learner achievement was based on classroom practice. Teaching higher grades and possibly exam classes was an act of leadership in the school. As we interviewed the science HOD, he mentioned what he termed “weaker teachers”. These teachers possibly had little teaching experience, limited mastery of subject knowledge and no established record of achieving high learner performance. These teachers received guidance and were led by teacher leaders. They were assigned to teach lower grades. We based our interpretations on the following narrative excerpt from the science HOD.

Science HOD: We look at the strength of the teacher in the subject and allocate the strongest teachers to grades 10–12 for Mathematics and Physical Sciences. These teachers mentor the weaker teachers who are feeding them from GET [general education and training]. They do class visits and if a teacher is not strong in a particular topic they bring another teacher in who is strong in that topic to assist and the teacher also learns from them.

Discussion and conclusion

We set out to explore how the role of the follower co-constructs and sustains leadership for secondary school Science and Mathematics. The theoretical significance of the study lies in the contribution that it makes to follower role identity as a research area (Kellerman, 2008; Sy, 2010; Uhl-Bien et al, 2014). The teachers in this study were willing and supportive of the school vision for every learner to do well in Science and Mathematics. The teachers were prepared to focus on instruction beyond the call of duty. According to Kellerman (2008), followers may display an active role in contrast to cases where followers may be described as passive and fail to adequately support change in an organisation. In this study, the above-mentioned change refers to leadership processes for school improvement through secondary school

Science and Mathematics. Additional follower role identities were established. Firstly, the findings revealed that the teachers who took part in co-constructing leadership processes for Science and Mathematics were ‘senior teachers’ because they had significant teaching experience. Secondly, the teachers had an impressive record for producing good results in classroom practice. They were referred to as ‘performing teachers’ in the school. Thirdly, the teachers were recognised as ‘experts’. It became their responsibility to lead subjects and mentor other teachers with less experience and expertise. Similarly, according to the Ira Challeff model (Kellerman, 2008), these teachers can be described as implementers (success in classroom practice), partners (co-constructed leadership processes) and as resources (subject experts and mentors).

Teacher participation in co-constructing leadership processes was set on a number of premises. Firstly, the democratic leadership, which was in place in the school, had characteristics of a distributed leadership configuration. Teachers were provided with space to discharge leadership roles. According to LFT leadership, responsibilities are distributed among the followers and the positional leaders (Uhl-Bien *et al.*, 2014). Malakyan (2014) says that leadership is a role or function and not a position that is occupied by an individual and therefore it is exchangeable. Secondly, the teachers were organised in PLCs through which teamwork and continuous learning took place. The activities of the teachers in the PLCs empowered the teachers to lead processes to improve the teaching and learning of Science and Mathematics. Thirdly, the teachers participated in the leadership processes for school improvement through classroom practice (Harris, 2003). They exercised influence on school improvement by achieving good results obtained in Science and Mathematics.

While the findings of this case study may not be generalizable, they succeed in underlining the crucial role played by followers in collaborating with positional leaders to co-construct leadership processes. The use of secondary school Science and Mathematics as a context of study advances efforts in the development of ideas leading to school improvement in that area. The development of ideas is achieved by putting issues of Science and Mathematics follower role identities on the agenda. Additional to the follower role identities are insights on developing ways in which teachers may co-construct and sustain leadership processes for school improvement through Science and Mathematics.

References

- Alvesson, M. & Blom, M. (2015). Less followership, less leadership? An inquiry into the basic but seemingly forgotten downsides of leadership. *Management, 18*(3), 266–282.
- Bjugstad, K., Thach, E.C., Thompson, K.J. & Morris, A. (2006). A fresh look at followership: A model for matching followership and leadership styles. *Journal of Behavioural and Applied Management, 7*(3), 304–319.
- Bush, T. & Glover, D. (2014). School leadership models: What do we know? *School Leadership & Management, 34*(5), 553–571.
- Cho, M.O., Scherman, V. & Gaigher, E. (2014). Exploring differential science performance in Korea and South Africa: A multilevel analysis. *Perspectives in Education, 32*(4), 21–39.
- Clothey, R., Mills, M. & Baumgarten, J. (2010). A closer look at the impact of globalisation on science education. *Cultural Studies of Science Education, 5*, 305–313.
- Cohen, L, Manion, L, & Morrison, K. (2011). *Research methods in education* (7th ed.). London: Routledge.
- Cousin, G. (2009). *Researching learning in higher education: An introduction to contemporary methods and approaches*. New York: Routledge.
- Department of Basic Education, (2014). *Report on annual national assessments of 2014*. Pretoria: Department of Basic Education.
- Department of Basic Education, (2016). *National senior certificate examination report 2016*. Pretoria: Department of Basic Education.
- Denzin, N. & Lincoln, Y.S. (2003). *The landscape of qualitative research: Theories and issues* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Diamond, J.B. & Spillane, J.P. (2016). School leadership and management from a distributed perspective. A 2016 retrospective and prospective. *Management in Education, 30*(4), 147–154.

- Firestone, W.A. & Martinez, M.C. (2007). Districts, teacher leaders and distributed leadership: Changing instructional practice. *Leadership and Policy in Schools*, 6, 3–35.
- Govender, N., Grobler, B. & Mestry, R. (2015). Internal whole-school evaluation in South Africa: The influence of holistic staff capacity. *Educational Management, Administration & Leadership*, 44(6), 996–1020.
- Hallinger, P. & Heck, R.H. (2010). Collaborative leadership and school improvement: understanding the impact on school capacity and student learning. *School Leadership & Management*, 30(2), 95–110.
- Harris, A. (2003). Teacher leadership as distributed leadership: Heresy, fantasy or possibility? *School Leadership & Management*, 23(3), 313–324.
- Higgins, J. & Bonne, L. (2011). Configurations of instructional leadership enactments that promote the teaching and learning of mathematics in a New Zealand elementary school. *Educational Administration Quarterly*, 47(5), 794–825.
- Hollander, E. (1992). The essential interdependence of leadership and followership. *Current Directions in Psychological Science*, 1(2), 71–75.
- Kellerman, B. (2007). What every leader needs to know about followers. *Harvard Business Review*, 85(12), 84–91.
- Kellerman, B. (2008). *Followership: How followers are creating change and changing leaders*. Boston: Harvard Business School Press.
- Leithwood, K., Harris, A. & Hopkins, D. (2008). Seven strong claims about successful leadership. *School Leadership and Management*, 28(1), 27–42.
- Louis, K.S., Dretzke, B. & Wahlstrom, K. (2010). How does leadership affect student achievement? *School Effectiveness and School Improvement*, 21(3), 315–336.

- Malakyan, P.G. (2014). Followership in leadership studies. A case of leader–follower trade approach. *Journal of Leadership Studies*, 7(4), 6–22.
- Mannion, H., McKimm, J. & O’Sullivan, H. (2015). Followership, clinical leadership and social identity. *British Journal of Hospital Medicine*, 76(5), 270–274.
- Maree, K., Aldous, C., Hattingh, A., Swanepoel, A. & Van der Linde M. (2006). Predictors of learner performance in mathematics and science according to a large-scale study in Mpumalanga. *South African Journal of Education*, 26(2), 229–252.
- Maringe, F., Masinire, A. & Nkambule T. (2015). Distinctive features of schools in multiple deprived communities in South Africa: Implications for policy and leadership. *Educational Management Administration and Leadership*, 43(3), 363–385.
- Martin, R. (2015). A review of the literature of the followership since 2008: The importance of relationships and emotional intelligence. *Sage Open*, 1–9. doi: 10.1177/2158244015608421
- Monzani, L., Ripoll, P. & Peiro, J.M. (2015). Winning the hearts and minds of followers: The interactive effects of followers’ emotional competencies and goal setting types on trust in leadership. *Revista Latinoamericana de Psicología*, 47(1), 1–15.
- Ndlovu, M.C. (2011). Re-envisioning the scholarship of engagement: Lessons from a university-school partnership project for mathematics and science teaching. *South African Journal of Higher Education*, 25(7), 1397–1415.
- Noyes, A., Wake, G. & Drake, P. (2013). Time for curriculum reform: The case of mathematics. *The Curriculum Journal*, 24(4), 511–528.
- Robinson, V.M.J., Lloyd, C.A. & Rowe, K.J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, 44(5), 635–674.

- Starbuck, C.R. (2015). An investigation of the relationship between follower perceptions of leader openness to experience and follower job satisfaction. *Journal of Organizational Culture, Communications and Conflict*, 19(1), 118–130.
- Sulleyman, G. (2015). Distributed leadership in educational institutions. *Journal of Education and Training Studies*, 3(4), 110–118.
- Sun, M., Penuel, W.R., Frank, K. A., Gallager, H.A. & Youngs, P. (2013). Shaping professional development to promote the diffusion of instructional expertise among teachers. *Educational Evaluation and Policy Analysis*, 35(3), 344–369.
- Sy, T. (2010). What do you think of followers? Examining the content, structure, and consequences of implicit followership theories. *Organizational Behavior and Human Decision Processes*, 113, 73–84
- Uhl-Bien, M., Riggio, R.E., Lowe, K.B. & Carsten, M.K. (2014). Followership theory: A review and research agenda. *The Leadership Quarterly*, 25, 83–104.
- Van der Voort, G. & Wood, L. (2014). Assisting school management teams to construct their improvement plan: an action learning approach. *South African Journal of Education*, 34(3), 1-7.
- Visser, M., Juan, A. & Feza, N. (2015). Home and school resources as predictors of mathematics performance in South Africa. *South African Journal of Education*, 35(1), 1–10.
- Watt, H.M., Richardson, P.W., & Pietsch, J. (2007). Choosing to teach in the “STEM” disciplines: Characteristics and motivations of science, ICT, and mathematics teachers. *Mathematics: Essential Research, Essential Practice*, 2, 795–804.
- Zhang, Z., Wang, M. & Shi, J. (2012). Leader-follower congruence in proactive personality and work outcomes: The mediating role of leader-member exchange. *Academy of Management Journal*, 55(1), 111–130.

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