BCES Conference Books, 2018, Volume 16. Sofia: Bulgarian Comparative Education Society
ISSN 1314-4693 (print), ISSN 2534-8426 (online), ISBN 978-619-7326-02-4 (print), ISBN 978-619-7326-03-1 (online)

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School Heads of Department's Role in Ensuring Teacher Professional Development in Mathematics: The South African Context

Abstract

The 1994 democratic government of South Africa brought greater responsibility and growth of school-based management in schools which impacted on the role and workload of school leaders (Rosenfeld, Ehrich & Cranston, 2009). Principals of public secondary schools delegated greater responsibility to Heads of Departments who had to ensure that Mathematics teachers are professionally developed. Although Mathematics serves as a foundation subject for many other disciplines (Roesken, 2011; Lerman, 2000), the new Mathematics curriculum and teaching standards do not match the qualified and competent Mathematics teachers, nor do they address problems in township schools, where high-quality Mathematics teaching is needed (Darling-Hammond, 2000). The term township refers to the underdeveloped urban living areas previously reserved, and still is, the residential areas for Blacks, Coloureds and Indians. Township and rural schools in South Africa have considerably fewer opportunities to excel in Mathematics, because teachers in these schools lack knowledge and skills in Mathematics and the schools are also under-resourced. The assumptions is that good teachers should be supported and developed professionally to do their best work with learners, and, to be retained. Teachers need relevant subject knowledge and professional development to handle and support the teaching-learning tasks expected of them in Mathematics teaching. Currently what is available as teacher professional development is inadequate, especially in the South African (SA) context (Borko, 2004). Despite the belief that school-based Teacher Professional Development may have a positive impact on the teaching of Mathematics, little is known about how HoDs support the professional development of Mathematics teachers.

Keywords: Teacher Professional Development, Heads of Department, teacher support, teacher competence, improved learner performance

Introduction

Heads of Departments' (HoDs') roles, have undergone significant changes – especially in terms of the professional development of teachers (Rosenfeld et al., 2009). The term HoD is used for Heads of Departments for the different learning areas, phases and departments in South Africa. In other countries the terms used are middle managers, department chair and administrator (United States of America), middle leader, subject leader and curriculum coordinator (United Kingdom). HoDs are former class teachers promoted to the role of supervising teachers to equip them with updated abilities, interests and knowledge in mathematics teaching. According to Harris and Jensz (2006), HoDs influence the quality of teaching and learning to educational scholars and policy-makers, worldwide for professional teacher development (PTD) and support opportunities to enhance knowledge and instructional practice (Timperley, 2008). HoDs' leadership role in teacher

development is central for organisational success and improvement (Earley & Weindling, 2004).

Teacher Professional Development

TPD process embraces all formal and informal activities that enhance professional career growth (Rogan & Grayson, 2004). TPD assumes that Mathematics teachers have sufficient subject matter knowledge and have successfully completed a minimum teaching qualification (Rogan & Grayson, 2004). The concept TPD is interpreted in different ways depending on various educational traditions and contexts. OECD (2009) defines TPD as "individual teacher activities for developing skills, knowledge, expertise and other characteristics". Further descriptions of TPD indicate that TPD can be achieved by means of formal structures, like courses, workshops, and informal and internal teacher collaboration that includes coaching and mentoring and external networking between different schools. Despite recognition of the importance of professional development, what is currently available as TPD for teachers, is inadequate, especially in the South African (SA) context (Borko, 2004). The competencies and abilities of Mathematics teachers do not meet learner expectations, though TPD is still seen as the best means to improve teaching practice (Supovitz & Turner, 2000).

Mogari, Kriek, Stols and Iheanachor (2009) maintain that mathematics requires a deeper understanding of content, and interpretation of mathematics concepts. This view is in line with that of the DoE (2000) which states that the standards set for teacher classroom performance and learner achievement, as well as on-going and targeted TPD, should ensure teachers meet the expected standards and adapt to curriculum changes. Teaching competency requires continuous support and guidance in particular mathematical learning areas (DoE, 2000) and should be aligned with the teacher's actual job. Instead of working with the assumption that teachers have a basic knowledge of teaching Mathematics, the TPD process should improve teachers' academic standing as well as competence and efficiency in discharging professional obligations inside and outside the classroom (Komba & Nkumbi, 2008). Mathematics TPD is linked to possession of professional knowledge.

Supporting teachers through professional development

TPD and support are essential in improving teacher competencies and lies at the heart of nearly every effort to improve teaching and learning. In-service education or staff development is conducted for different purposes and in various forms. Induction is part of TPD and aims at providing a support system for HoDs ensure the success of Mathematics teachers and improved learner performance (Joseph & Reigeluth, 2010). TPD programmes are delivered in the form of workshops, seminars, conferences and courses to improve teacher competency (DoE, 2005; Schwille & Dembélé, 2007; Villegas-Reimers, 2003). Villegas-Reimers (2003) identifies four categories of purpose for TPD: upgrading teachers; preparing teachers for new roles; curriculum-related improvements or refresher courses; and certification for on-the-job training. The competency of teachers depends on academic and pedagogic efficiency; ability, workload and commitment; teaching

and learning resources and methods; support from education managers; and supervisor effectiveness (Rogan, Novak, Mank & Martin, 2002). All these factors contribute to effective TPD.

Theoretical framework on teacher professional development

According to Katz (1975), the term "teacher professional development" has two general meanings: activities, such as workshops and graduate coursework for developing teachers' professional abilities, and, the natural process of growth which teachers undergo during their personal careers. Although Katz's study of educator development was on pre-school teachers, it applies to "other teachers" and "other teaching levels" (Katz, 1975, p. 53). Katz's study outlines the "training needs" of teachers at four different developmental levels in their careers (1975, p. 51). Individual teachers spend different amounts of time in each one. The first stage, *survival:* the teacher is new to the teaching field and needs hands on assistance to address classroom challenges and school realities. The second stage, *consolidation:* the teacher can survive daily crises, but is concerned about how to impart knowledge to learners according to changing learning styles. The third stage, *renewal:* the teacher's concerns are about what new materials, techniques and approaches are adequate and appropriate to yield best results. The fourth stage, *maturity:* the teacher shows confidence and competence and asks more philosophical questions. The theory is built on the belief that competence improved with experience, knowledge, and practice, therefore support and training through TPD should be matched with the developmental stage of the teacher. HoDs, therefore, have to provide TPD to Mathematics according to their developmental needs to ensure they attain competence (Katz, 1975, pp. 50-53). The theory further acknowledges that teaching is a complex business, and that educator preparation is rarely sufficient to provide all the knowledge and skills necessary for successful teaching.

Research methodology

This paper employed a qualitative case study approach using semi structured interviews and documents (O'Connor, 2002; Merriam, 2009; Anderson & Arsenault, 2000). Interviews and official documents, such as the Personnel Administrative Measurement (PAM) which outline the role of HoDs, were analysed to establish the role HoDs fulfil in TPD. Staff development programmes and evaluation reports were also analysed to identify the training needs and strategies for developing mathematics teachers. The data from a small sample of four Mathematics HoDs and four Mathematics teachers (from four township secondary schools in the Tshwane South district of the Gauteng Province) and from document reviews were triangulated. The eight participants, four Mathematics HoDs and four Mathematics teachers selected had undergone TPD in Mathematics in the last two years, and their teaching experience varied from one year, two to three years, three to five years, and over ten years. The selection criteria aimed at identifying the unique developmental needs for support in the different professional developmental stages. Teachers who had not been professionally developed were excluded from the sample because they lacked experience in TPD.

Knowledge constructed from multiple and differing experiences with participants from the four schools (Creswell, 2007) were compared to strengthen credibility and trustworthiness and to reveal findings (Merriam, 2009). Inductive data analysis and interpretation results were used to make recommendations for TPD and future research (Cohen, Manion & Morrison, 2000). The data was coded, and condensed into codes and themes aligned to the research topic (Creswell, 2007; McMillan & Schumacher, 2001). The research questions, research problem and the theoretical framework guided the content analysis process (McMillan & Schumacher, 2001; Neuman & Cunningham, 2009).

Discussions

Intensive TPD programmes help teachers increase their knowledge and instructional practices by focusing on three characteristics, namely: subject matter knowledge for teaching, understanding student thinking and instructional practice (Garet et al., 2001). The assumption is that appropriate qualifications can provide teachers with mathematical content knowledge and classroom practice, knowledge and skills (Mogari et al., 2009), however, planning for TPD, should identify initial Mathematics teachers' needs (Rodrigues, 2004, p. 31). Mathematics teachers orientated about the school environment and provided with a comprehensive and sustained TPD process experience reduced anxiety, and reduced feelings of isolation. TPD programmes focusing on subject matter help teachers develop subject expertise and enhances learner engagement in problem solving activities that reflect strengths and weaknesses (Higher Education Quality Committee, 2007). An established TPD process helps Mathematics teachers adjust to the school culture and professional learning community. TPD programmes should reveal the establishment and maintenance of communication, norms, trust, and a collaborative interaction, for improved teaching practice. The TPD group work and teacher interaction among teachers from different backgrounds and different professional needs, revealed participant's appreciation of the mathematical community as well as participants work in different areas (Park City Mathematics Institute (PCMI), 2013).

Implications

According to Ingerson, Beavis, Bishop, Peck and Elsworth (2004), inadequate professional development by school administration is one of the most often reported causes of poor Mathematics performance in schools. Mathematics is a complex subject that needs competent and confident teachers so Mathematics teachers requires induction in their early days of teaching, to improve teaching skills and practices not learnt during their original educator training (Dowding, 1998). HoDs who are knowledgeable in terms of Mathematics and research focus on TPD of teachers under their care by planning, doing a needs analysis with the teachers, and identifying areas to be addressed during TPD (Rodrigues, 2004). Teachers need diverse TPD arising from the specific demands of their particular activities with learners (Darling-Hammond, Austin, Orcutt & Martin, 2006). The main reason for supporting staff is to ensure that TPD and training improves schools. If TPD is lacking, some teachers may not achieve their full professional potential or become committed to attending workshops. Commitment of teachers to their own

professional growth will make a significant difference in the kind of support they give their learners (Mestry & Bisschoff, 2009). Once the staff development process has taken place, Mathematics teachers should be able to adjust to the school culture and will become part of the professional learning community. Strong professional development communities are important contributors to instructional improvement and school reform.

Conclusion and recommendations

There is a need to affirm the leadership role of the HoDs in TPD to allow HoDs to acquire knowledge and skills that will enable them to perform their role effectively. The TPD workshops designed and implemented by the department of education seem to be the main source of training provided. It seems that teachers regard these workshops as inadequate and not fully addressing their needs. This is reflected in the poor results of Mathematics caused by incompetence and insufficient understanding of mathematical concepts. Teachers who attend workshops that do not address developmental needs, do so to comply with departmental circulars. Instructional designers, therefore, need to develop flexible TPD programmes for addressing factors such as teacher competence levels, awareness of learners' experience and background, subject matter, instructional communications and technology. HoDs and teachers, however, appreciate the positive experiences of teamwork and peer support which should be further explored as a strategy for improving teacher competency. Assessment of the different levels of TPD may help in monitoring the professional growth of the teachers and to motivate them as they become aware of their own professional progress. Recommendations are that a policy on TPD should be instituted in line with the roles of HoDs and teachers. The DoE and the principals should support HODs in planning, organising, supervising and implementing professional development to better equip Mathematics teachers with the required knowledge and skills. HoDs should be able to identify the different developmental stages of the teachers and recommend appropriate training needs.

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